Final Report

SOCIAL INNOVATION CHALLENGE

Four Key Themes

Water Management

Healthcare

Gender Equity & Inclusion

Urbanisation

A competition for aspiring innovators to devise creative and sustainable solutions to solve the current social problems.

Organized by:

Keio University

India Japan Laboratory

India Japan Laboratory (IJL),
Keio University, Japan

Centre For Society And Policy

Centre for Society and Policy,
Indian Institute of Science (IISc), Bengaluru, India

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Appendix 1: Poster of Social Innovation Challenge

Core Professors

- Rajib Shaw, Keio University, Japan (Director, India Japan Laboratory)
- Anjula Gurtoo, Indian Institute of Science (IISc), Bengaluru, India (Chairperson, Centre for Society and Policy)

Core Team Members

- Veena Gururaja, Managerial Staff, Centre for Society and Policy, IISc
- Rahul Patil, Project Associate, Centre for Society and Policy, IISc
- Namitha Kumari K P, Independent consultant
- Vibhas Sukhwani, PhD Scholar, Keio University, Japan

About the Social Innovation Challenge

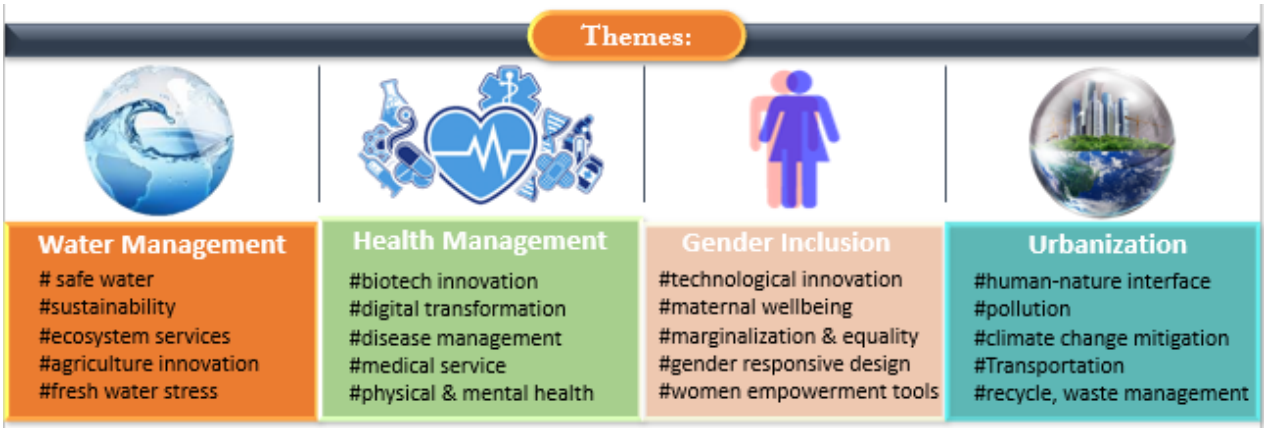
The 'Social Innovation Challenge' (SIC) was jointly initiated by the India Japan Laboratory, Keio University in collaboration with the Indian Institute of Science (Center for Society and Policy). The India Japan Laboratory 'IJL' (https://indiajapanlab.org/) was recently established by the Keio University, Japan to undertake cutting edge bilateral / multilateral research on different topics, and to enhance higher education collaboration and partnership, and facilitate exchange of intellectual capital. On the other hand, the Centre for Society and Policy (CSP) is a policy research centre based at the Indian Institute of Science, Bangalore, India (https://csp.iisc.ac.in/). Established as an interdisciplinary centre for science and technology policy, the centre explores interactions between science, technology, society, and development.

The SIC was organized mainly as a competition for aspiring innovators to devise creative and sustainable solutions to solve the current social problems. A call for social innovation solutions was launched in November 2020, across four major themes namely, Water Management; Healthcare; Gender Equality and Inclusion; and Urbanization. In addition to the wide circulation of this call through Institute websites, the information was circulated to more than 900 institutions across India.

Themes of the Social Innovation Challenge

The four key themes of the SIC and their diverse sections are as explained below:

1. **Water management** – safe water, ecosystem services, sustainability, innovative water technologies, agricultural innovations, freshwater stress, and similar issues/topics.
2. **Healthcare** - biotech innovations, digital transformations, medicine delivery, diagnostics and detection, disease management, medical services, physical wellness, mental wellness, and similar issues/topics.
3. **Gender Equity and Inclusion** – technological innovations, maternal wellbeing, AI for transforming lives, marginalization and inequality, gender responsive design, tools for women empowerment and similar issues/topics.
4. **Urbanisation** – inclusive designs, human-nature interface, sustainable living, pollution, climate change mitigation, transportation, building, waste management, recycling, and similar issues/topics.



Event Timeline

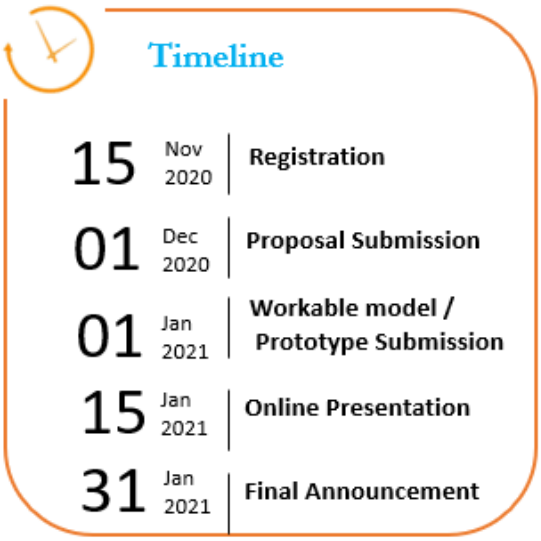
Over a duration of two & half months, the SIC event was divided into three phases:

1. Phase 1: Registrations

A total of 550 Registrations were received under four themes: Water Management- 146; Healthcare- 166; Gender Equity & Inclusion- 87; Urbanisation- 151.

2. Stage 2: Proposal Submissions (on a specified template)

By the stipulated deadline (1st December 2020), 175 proposals were submitted by the registered teams: Water Management- 33; Healthcare- 52; Gender Equity & Inclusion- 19; Urbanisation- 48; Anomalous submissions: 23.



3. Stage 3: Prototype (workable) model / Proof of Concept submission

A total of 152 teams (Water Management- 33; Healthcare- 52; Gender Equity & Inclusion- 19; Urbanisation-48) submitted their Prototype or Proof of Concept Submissions for further consideration in the Social Innovation Challenge.

Criteria for evaluation

The evaluation of the ideas received through the Social Innovation challenge (by experts from India and Japan) was based on the following five parameters of equal weightage.

1. Novelty (20%)
2. Relevance (20%)
3. Efficiency (20%)
4. Ecologically Sustainable (20%)
5. Scale of impact (20%)

Award category and Prize Money

After a thorough evaluation of the submitted proposals, the prize winners for each of the four themes of SIC 2020 were announced in the '3rd Webinar on India Japan Innovation Potentials on Technology, Culture, and Development' (on 29 Jan 2021), and the Top ranked prize Winner from each category was invited to make an online presentation.

For each category three prizes were provided along with a certificate. Also, Certificate of Excellence were awarded to five other teams in each of the four themes.

Theme 1

Water Management

1st Prize	Sai Bhargav Reddy Vootkuru *Biomass Logic 'S' – Paddy yield forecasting model using satellite imagery*
2nd Prize	Jeslin Merin Sajeev *Solar Powered IOT Controlled Pipeline*
3rd Prize	Arpan Kumar Sharma *Solar Water Purifier*

Keio University (India Japan Laboratory) in collaboration with
Indian Institute of Science (Center for Society and Policy) calls for

SOCIAL INNOVATION CHALLENGE

(Phase 2: Proposal submission)

LAST DATE FOR SUBMISSION: 1 DECEMBER 2020

1. Basic Information

Theme Area	WATER MANAGEMENT
Title	*Biomass Logic'S' – Paddy yield forecasting model using satellite imagery*
Name of Group Leader: SAI BHARGAV REDDY VOOTKURU (*+91-8186027290*)	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Sai Bhargav Reddy Vootkuru	IIT (ISM) DHANBAD	UG 3rd year	Environmental Engineering	bhargavreddy.18je0942@ese,iitism.ac.in

3. Theme Background

Our project comes under the water management theme area in this competition and to be specific agriculture sector. Here we are trying to suggest more efficient alternative ways for crop surveying and yield prediction as well as estimation with satellite remote sensing with just 1/10 the operating costs and more frequent data availability and a comparable accuracy compared to traditional ground surveys or statistical models, this has the capability of changing the lives of most farmer families and further even educating them if scaled.

4. Describe your Social Innovation Idea and its key characteristics.

*Our model **Biomass Logic'S'** forecasts crop yield using satellite multispectral & hyperspectral remote sensing (here for paddy). We first ran various crop simulations in the DSSAT model using paddy's package of practices provided by IARI, India and used LAI and Yield obtained from the simulation model, the resulting Leaf Area Index **(LAI)** is converted into remote sensing measurable quantities called Vegetative Indices, and here we chose **Normalised Difference Vegetative Index(NDVI)** as paddy crop is more sensitive to it so a slight variation in crop biomass due to diseases/pests/droughts can be captured and yield can be calculated accordingly, using pre-existing conversion relation **(√(LAI) = -1.09 + 3.70*√(NDVI))** and next a machine learning regression model was trained using NDVI as input and Yield as output, and linear equation had best fit resulting in this equation **CY = - 30.3 + (3560.5 * NDVI).** Finally, we used Google Earth Engine for the required image processing, and satellite data here we used is from **Sentinel-2** land-use satellite which belongs to the **European Space Agency** and has a spatial resolution of 10metres and temporal resolution of 10days. Now we have classified our extracted Region of interest using Random force decision tree algorithm into agriculture, urban, water, forest and further using ground points of known paddy fields classes were refined that pixels with the same value as that of ground points come under one class thus we have obtained only paddy fields pixels. Now for an entire image collection of 120days, we have calculated NDVI for each and every image. Further, from this image collection, we made a single layer which contains pixels with the highest NDVI of that respective location through-out the timeline. We named it **greenest pixel composition** now this layer was used to calculate the crop yield by applying the previously developed regression equation and finally mapped the output yield, area, harvest per acre, average NDVI values on the satellite image in GEE and on-ground validation; our model turned out to be 85% accurate.*

4.1. What is the Novelty / Uniqueness of your Social Innovation Idea?

Existing techniques are majorly dependent on ground crop surveys which require more resources and economically not feasible due to which the data frequency is inadequate to develop a proper strategy or else we use remote sensing data like evapotranspiration, MIN-MAX. Temperature, soil moisture which is used as an input in crop simulation models like DSSAT, AQUACROP to predict the yield but here we cannot access the live condition(due to prefixed equations in simulation models) of crop like it may be weed-infested are suffering from a disease which affects the yield so we might end having less accurate results. But in our model instead of using remote sensing data for inputs here, we first ran simulations using statistical models, and the resulting LAI is converted into Vegetative Indices (satellite measurable) and a regression model was trained using VI as input and Yield as output, and this equation was used to calculate the yield on GEE. We have an edge here because in this process we map yield to live remote sensing data so that if there is any change in spectral reflectance of the crop (due to disease or other stresses) yield can be calculated accordingly, in contrast, to present model so is the accuracy.

4.2. Explain the relevance of your Social Innovation Idea to address the current social problems.

Currently, due to rare frequency of surveys, inaccurate forecasting techniques leads to huge price fluctuations and food security issues due to not knowing accurate demand and supply or neither gives buffer time for agencies to come up with alternatives if demand is not met recently we have witnessed the spike in Onion prices,Why? Not having accurate supply statistics, we gave priority to export first which hiked the in-country price, in addition to this damage control can be rapidly evaluated, i.e. recently during locusts attack our model couldn't obviously stop the attack but at least predict the loss of yield within a day, as locusts feed on leaves reducing biomass thus which reduces the final yield ultimately and share these stats with the government to estimate the depth of damage or come-up with some kind of compensation accurately.

4.3. Explain the effectiveness of your Social Innovation Idea/ Concept

We have tested this model for a known region of interest, and on-ground validation we achieved an accuracy of 85% that to one month before the actual harvest and the present ground techniques can't achieve higher than 90%, but you need to consider the fact that except for sow date and geotag of the location we don't require any other data like pH, soil nature, or either calibrate every time and using just 1\10 the resources yet achieve the same result. The satellite data we used here has a 10m spatial resolution but if we could afford a high spatial resolution data say 0.5 – 1 m from Ikonos, Skybox satellites the accuracy will shoot-up as high as 95%, we can then completely replace the ground surveys.

4.4. Is your Social Innovation Idea ecologically sustainable? Please elaborate.

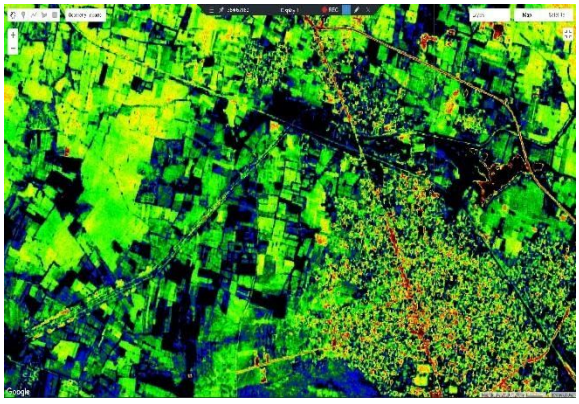
On comparing with the current estimation/forecasting techniques using our model will slash the carbon footprint by as high as 90% as we limit the manpower, travelling, resources and yet produce results with the same accuracy and this model can be easily embedded within the existing system with slight modifications(in K.V.Kendras) like skill training to already existing officials thus saving a lot of resources compared to ideas which require set up everything from scratch and further by comparing farm yields of individual farmers (can be done easily using this model)we can even achieve sustainable growth by educating those whose farms are not performing well as we have a live satellite data to show which part of the farm didn't perform well.

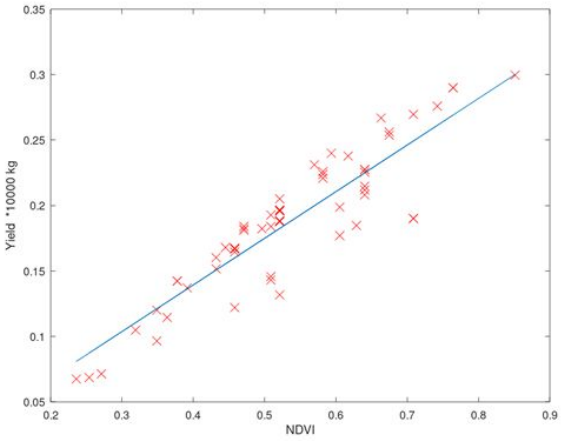
4.5. What is the scale of impact of your Social innovation idea? Is it widely applicable?

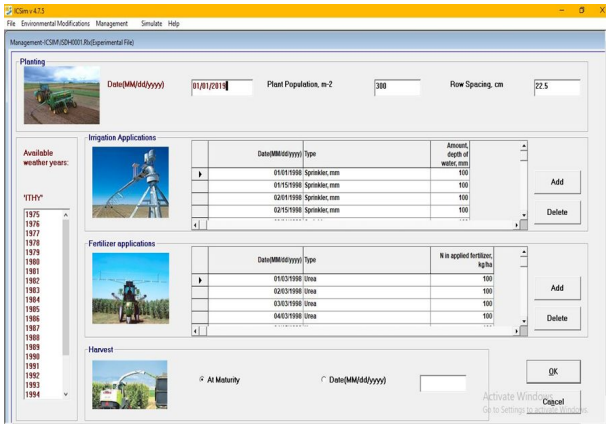
The agriculture sector continues to be the backbone of Indian economy contributing approximately 27.4% to the gross domestic product (GDP) and accounts for about 18% share, of the total value of the country's export. We target one of the largest sectors of the Indian Economy, making our project highly scalable. Our project Biomass logic-S addresses the biggest problem in the agricultural sector that hides from eyes of the industry with around 60% of the Indian population (directly or indirectly) depending on the agriculture sector, scalability is not at all a limitation. This may not be useful at farmer level but when applied at government (through Krishi Vigyan Kendra's all over India) or at co-operative scale will definitely contain the price fluctuations thus impacting many farming families.

5. Annexes

Please find the proof of concept here:https://drive.google.com/drive/folders/1ZCbT9ndpZDP_--_AGr9aUAtOmLCaqYk5?usp=sharing.







Keio University (India Japan Laboratory) in collaboration with
Indian Institute of Science (Center for Society and Policy) calls for

SOCIAL INNOVATION CHALLENGE

(Phase 3: Proof-of-Concept or Prototype Submission)

LAST DATE FOR SUBMISSION: 1 JANUARY 2020

1. Basic Information

Theme Area	WATER MANAGEMENT
Title	*Biomass Logic'S' – Paddy yield forecasting model using satellite imagery*
Name of Group Leader: SAI BHARGAV REDDY VOOTKURU (+91-8186027290)	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Sai Bhargav Reddy Vootkuru	IIT (ISM) DHANBAD	UG 3rd year	Environmental Engineering	bhargavreddy.18je0942@ese,iitism.ac.in

3. Submission of Proof-of-Concept or Prototype for your Social Innovation Idea

Under Phase-III of the Social Innovation Challenge, participants are expected to submit either a proof-of-concept or a prototype. Proof-of-concept is a form of evidence which demonstrates the feasibility of a design, concept, or business proposal of the innovation. Generally, it's derived through experiment or a pilot project. A prototype is generally a preliminary version or outcome of these activities.

a. *Even if you have submitted these details (such as photos, videos, graphics, or other form of arts), you are advised to submit them here again.*
   Examples: Images (JPG, PNG, GIF, etc.) of your innovative solutions e.g. devices, apps, flowchart for your processes, designs for your social or business models, etc.
b. *Videos can be attached separately via Google Form for the SIC-Phase-III.*

BIOMASS LOGIC'S'- Paddy Yield Forecasting Model

The agriculture sector continues to be the backbone of the Indian economy contributing approximately 27.4% to the gross domestic product (GDP). It accounts for about 18% share of the total value of the country's export. The agricultural production has kept pace with the widespread growth rate of 21 % per annum, and around 60% of the Indian population (directly or indirectly) depends on the agriculture sector.

Our model here **forecasts crop yield using satellite multispectral & hyperspectral remote sensing**. The best part is we don't require that accurate data (like soil conductivity, pH, NPK ratio)or calibration yet produce promising results.

We first ran various crop simulations in **the DSSAT** model using paddy's package of practices provided by IARI, India and used LAI and Yield obtained from the simulation model, the resulting **Leaf Area Index(LAI)** is converted into remote sensing measurable quantities called Vegetative Indices, and here we chose **Normalised Difference Vegetative Index(NDVI)** as paddy crop is more sensitive to it so a slight variation in crop biomass due to diseases/pests/droughts can be captured and Yield can be calculated accordingly, using pre-existing conversion relation

($\sqrt{}$(LAI) = -1.09 + 3.70*$\sqrt{}$(NDVI))

and a regression model was trained using NDVI as input and Yield as output, and the linear equation had the best fit resulting in this equation

CY = - 30.3 + (3560.5 * NDVI)

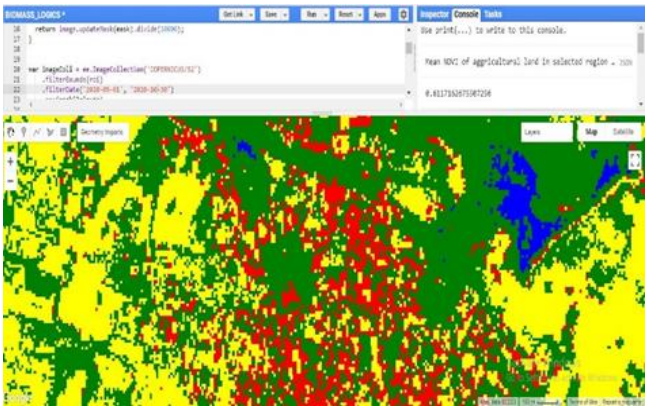
Finally, we used Google Earth Engine for the required image processing, and satellite data here we used is from **Sentinel-2** land-use satellite, which belongs to the **European Space Agency** and has a spatial resolution of 10metres and temporal resolution of 10days, but in many cases, we might end up having clouds disturbing the reflectance so to avoid such conditions we have used a cloud masking algorithm what this does is it gives a different pixel value of that location from previous cloud-free images(specifically for GEE). Now we have classified our extracted Region of interest using **Random force decision tree algorithm** into agriculture, urban, water, forest and further using ground points of known paddy fields classes were refined that pixels with the same value as that of ground points come under one class thus we have obtained the paddy fields pixels. We have now used the previously developed regression equation and mapped the output yield on the satellite image on GEE and on-ground validation; our model turned out to be **85% accurate**.

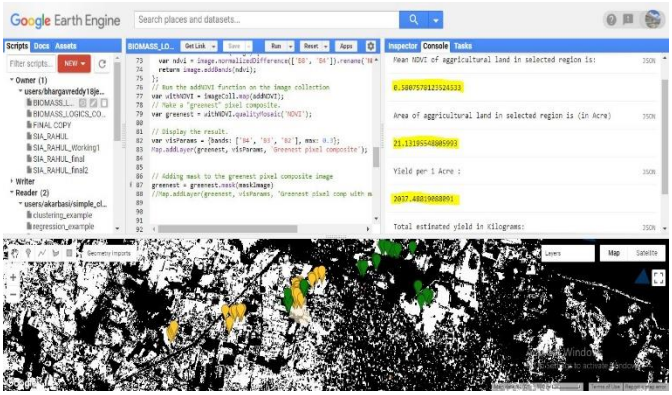
The motivation behind this project to reduce the effort put in traditional methods like ground surveying or statistical models, which requires much more time, resources and also economically not feasible and yield estimation has a significant role in price fluctuation; using this, we can estimate how much crop will be available beforehand if it is excess we can suggest farmers try

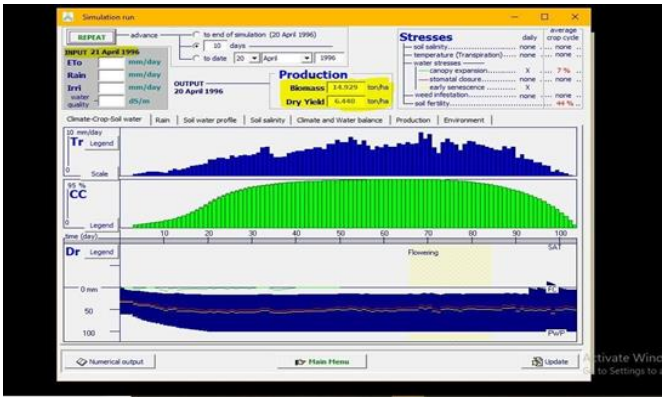
different crop and control the exports to maintain the good price for farmers as well as consumers and also ensure food security

Please find the complete proof of concept(along with codes) and prototype demonstration here:

https://drive.google.com/drive/folders/1ZCbT9ndpZDP_--_AGr9aUAtOmLCaqYk5?usp=sharing







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SOCIAL INNOVATION CHALLENGE

(Phase 2: Proposal submission)

LAST DATE FOR SUBMISSION: 1 DECEMBER 2020

1. Basic Information

Theme Area	Water Management
Title	Solar Powered IOT Controlled Pipeline
Name of Group Leader : Jeslin Merin Sajeev	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Jeslin Merin Sajeev	SCMS	UG 3rd year	Engineering	jeslinmerin@gmail.com
2	Akhil Paulson	SCMS	UG 3rd year	Engineering	akhilpaulson500@gmail.com
3	Kavya Krishna	SCMS	UG 3rd year	Engineering	kavya.k10072000@gmail.com
4	Nisha Benny	SCMS	UG 3rd year	Engineering	lovelybenny1969@gmail.com

3. Theme Background

India is under the threat of facing severe water scarcity due to climate change and wastage of water. The current system consists of water being delivered from the reservoirs to their destinations using a vast network of pipelines. This network is spread across the nation and it is not feasible to monitor the entire network constantly with the current technology. A large part of water wastage can be attributed to the issue of leakage in pipes. Another issue of unmonitored water flow is water theft wherein someone may acquire an illegal water connection by modifying a section of the pipeline network to allow a source from the main line to their residences causing the legal consumer of the line to end up paying extra for water usage that they themselves haven't used or consumed. Due to the increase in global industrial output and the over-utilization of land and sea resources, the quality of water available to people has deteriorated greatly. Hence a real time water quality monitoring system is required.

4. Describe your Social Innovation Idea, and its key characteristics.

Water, once an abundant natural resource, is becoming a more valuable commodity due to droughts and overuse. A significant amount of water is lost in the water supply system. Water leakages have been a major problem for many regions around the world. Keeping this in mind, we came up with the idea of water management system which is completely based on IoT and will help the Kerala Water Authority (KWA) to manage water distribution and leak detection with minimum human intervention. The KWA will have GUI installed with all the pipelining function mapped on GUI. A real time mapping is done and whenever a leak is detected or maintenance is required, a pop-up will occur in that point or region and KWA service can be provided. The detected locations are transmitted remotely using the LoRaWAN technology. The LoRa gateways connect to the internet via the standard protocol and transmit the data received from the LoRa embedded sensors to the internet i.e, a cloud. This idea also holds a mechanism to detect water theft and ensure equal distribution of water using water pressure sensors. Adding to this, our idea also identifies the importance of maintaining water quality which can be performed using the turbidity sensor.

4.1. What is the Novelty / Uniqueness of your Social Innovation Idea?

This mechanism provides an efficient way of water management with minimum human intervention. This is based on LoRa technology which is an open, license-free wireless data communication IoT system that promises ubiquitous connectivity while keeping network structures and management simple. This includes LoRaWAN shield (a unit where the sensor nodes are connected) and LoRaWAN gateway that has the application server and the network server incorporated in it. LoRa enables very long transmission with low power consumption. Hence, even in the remotest area where there are no proper connections: leakages, water theft, water quality, its distribution or any other data can be detected and sent to the controller from where further actions can be taken. The controller can thereby receive and send information from any hook and corner of the world. The Kerala Water Authority will have the Graphical User Interface installed that helps to provide a pictorial representation of the data received. This system also holds a water wall controlling unit in which the direction of water pipelines can be guided. All these features makes this project unique.

4.2. Explain the relevance of your Social Innovation Idea to address the current social problems.

Through our IoT based social innovation idea, we intend to solve one of the most common issues faced by our country (i.e.) the improper management of water mainly in remote locations. A proper water management system is the need of the hour as the water resources are getting deteriorated day by day due to population explosion and pollution. The idea put forward by us uses LoRaWAN network which consists of LoRa embedded sensors for detecting leaks in pipelines and water quality measurement. The sensors transmit data to the LoRa gateways via RF communication. This solves the problem of requirement of electricity or network facilities as remote locations mostly may not have access to these. Moreover, the gateways connect to the internet via the standard IP protocol and transmit the data received from the embedded sensors to the Internet i.e. a network or cloud. The system can be monitored by anyone who has access to it

from anywhere around the world. This can reduce the manpower needed in operating these pipelines.

4.3. Explain the effectiveness of your Social Innovation Idea/ Concept.

The project helps to drive away wastage of water due to leakage or other reasons. It works based on concept of LoRaWAN technology .The LoRaWAN will be used for the transmission. The sensors are attached to the LoRaWAN shield. The shield will be placed near the pipelines .If the device is placed in remote regions were internet service is not available, it communicates with the gateway using RF communication. The gateway will have application server and network server configured in it. The gateways are connected to the network server via standard IP connections and act as a transparent bridge, simply converting RF packets to IP packets. The LoRaWAN gateways transmits the data received from the LoRaWAN embedded sensors to the Internet i.e. a network, server or cloud. The gateway will be established in a place where there is strong internet connection and a remote login will be provided. The TTN will be used for the remote login and reading the data remotely. The data read by the device is transmitted to different parts of the world. So the main advantage is that a person can inspect these data's from any part of the world

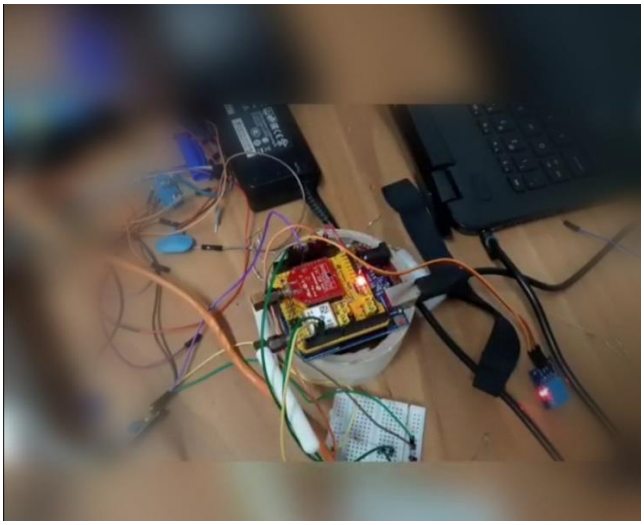
4.4. Is your Social Innovation Idea ecologically sustainable? Please elaborate.

Water is one of the basic necessities for the survival of living beings. A drop of water saved, fosters to maintain a thriving ecosystem. It is thus the responsibility of every citizen to conserve water to meet the demands of an increasing population .Our idea mainly focuses on this concept of being ecologically sustainable. Through this system, leakage of water can be detected thereby maintaining the water quantity and providing a means of effective and holistic management of water resources. A quick leakage detection via sensor nodes and its proper repair can make the water pipelines work efficiently, ensuring the uniform distribution of water. Also, a regular inspection on the quality of water by checking its turbidity is done to ensure that the water is not being contaminated thereby conserving the productivity of water and reducing its impact on the natural environment. Moreover, the whole mechanism works on solar energy powered at 150 watts. All these features are incorporated in this project in order to fulfil the needs of the present situation without compromising on the future requirements.

4.5. What is the scale of impact of your Social innovation idea? Is it widely applicable?

Water is one of the most precious natural resources for sustaining life on Earth. Therefore effective and sustainable management of water resources is vital for ensuring sustainable development. The Kerala Water Authority has a wide administrative wing and our project ensures efficient management of water with minimum number of employees. Since the entire project is based on IoT, it helps in improvised supervision and control of operation processes. The major issues related to water and its management are being tackled in our project and therefore it is widely applicable. There is uniform distribution of water ensuring that even the people in the most remotest places have a fair access to water. Water shortage due to leakages can also be avoided as such points are detected and KWA services are immediately provided upon the transmission of the data. Our idea also eliminates the fear of water theft thereby solving all common issues faced by people regarding water and is management. This idea is widely applicable as well as socially acceptable too.

5. Annexes

 LoRaWAN Shield

 LoRaWAN Gateway

 SOLAR PANEL

https://drive.google.com/file/d/1aJY-hwrY4fnhrc3DtSogr7Ssd_cH86jM/view?usp=drivesdk

Keio University (India Japan Laboratory) in collaboration with
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SOCIAL INNOVATION CHALLENGE

(Phase 3: Proof-of-Concept or Prototype Submission)

LAST DATE FOR SUBMISSION: 1 JANUARY 2020

1. Basic Information

Theme Area	Water Management
Title	Solar Powered IOT Controlled Pipeline
Name of Group Leader : Jeslin Merin Sajeev (9496886028)	

2. Details of Group Members

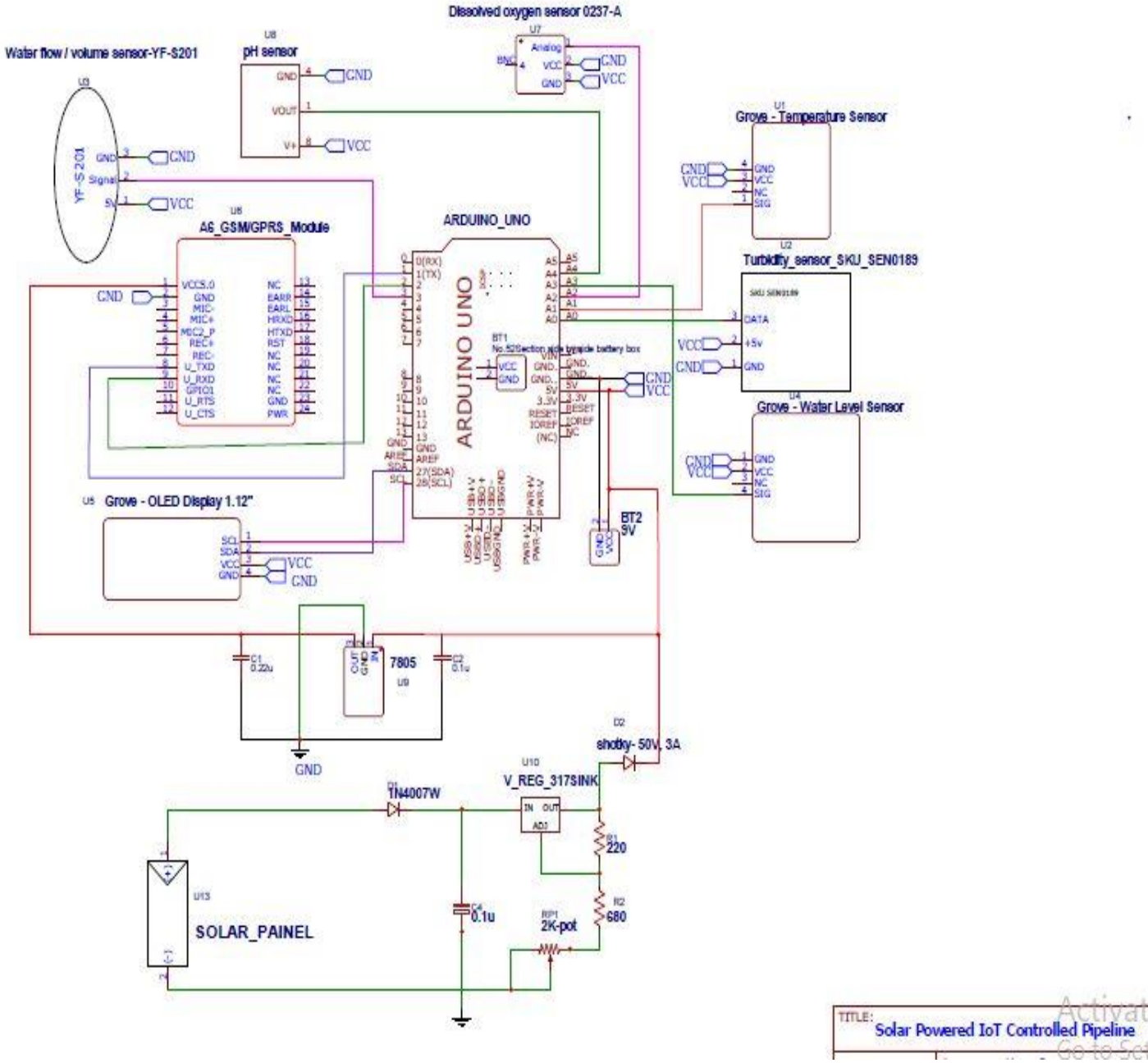
S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Jeslin Merin Sajeev	SCMS	UG 3rd year	Engineering	jeslinmerin@gmail.com
2	Akhil Paulson	SCMS	UG 3rd year	Engineering	akhilpaulson500@gmail.com
3	Kavya Krishna	SCMS	UG 3rd year	Engineering	kavya.k10072000@gmail.com
4	Nisha Benny	SCMS	UG 3rd year	Engineering	lovelybenny1969@gmail.com

3. Submission of Proof-of-Concept or Prototype for your Social Innovation Idea

Under Phase-III of the Social Innovation Challenge, participants are expected to submit either a proof-of-concept or a prototype. Proof-of-concept is a form of evidence which demonstrates the feasibility of a design, concept, or business proposal of the innovation. Generally, it's derived through experiment or a pilot project. A prototype is generally a preliminary version or outcome of these activities.

a. *Even if you have submitted these details (such as photos, videos, graphics, or other form of arts), you are advised to submit them here again.*
   Examples: Images (JPG, PNG, GIF, etc.) of your innovative solutions e.g. devices, apps, flowchart for your processes, designs for your social or business models, etc.
b. *Videos can be attached separately via Google Form for the SIC-Phase-III.*

CIRCUIT DIAGRAM

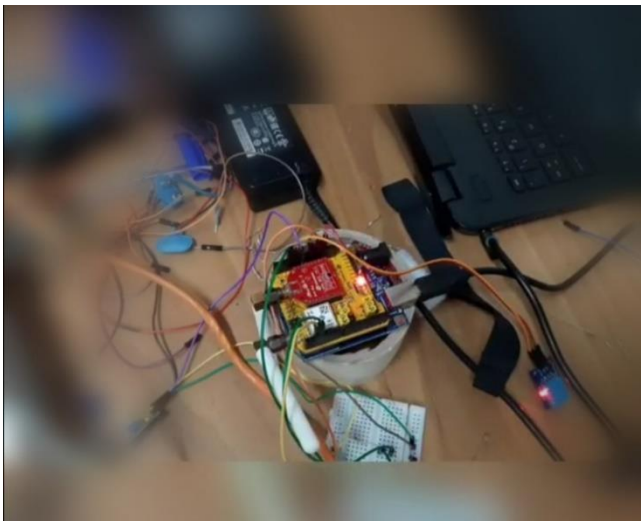


Solar Powered IOT Controlled Pipeline is designed based on the concept of LoRaWAN technology, a wireless data communication IOT system that includes LoRaWAN shield and a LoRaWAN gateway. The circuit diagram depicts a A6 GSM/GPRS module that is connected to arduino to enable communication between the microcontroller and the GSM network. The LoraWAN shield has certain embedded sensors which includes :

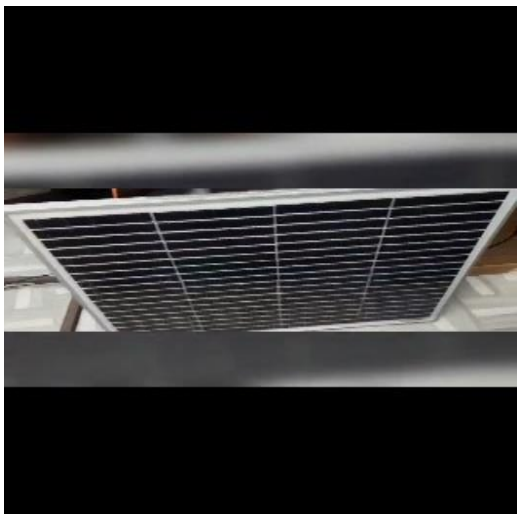
1) pH sensor : It is used to measure the acidity and basicity of water.
2) Turbidity sensor : To measure the water quality by detecing the suspended particles in it.
3) Temperature sensor : This sensor converts the surrounding temperature of water to voltage.

4) Water flow sensor : This sensor sits in line with the water line to measure how much water has flowed through it thereby measuring the pressure change.
5) Dissolved Oxygen sensor : This measures the dissloved oxygen level in water where the oxygen undergoes a reduction reaction producing an electrical signal.

This idea of water management system which is completely based on IoT will help the Kerala Water Authority (KWA) to manage water distribution and leak detection with minimum human intervention. The KWA will have GUI installed with all the pipelining function mapped on GUI. A real time mapping is done and whenever a leak is detected or maintenance is required, a pop-up will occur in that point or region and KWA service can be provided. The detected locations are transmitted remotely using the LoRaWAN technology. The LoRa gateways connect to the internet via the standard protocol and transmit the data received from the LoRa embedded sensors to the internet i.e, a cloud and then gets displayed on the OLED display.



LoRaWAN Shield



Solar Panel

LoRaWAN Gateway

https://drive.google.com/file/d/1aJY-hwrY4fnhrc3DtSogr7Ssd_cH86jM/view?usp=drivesdk

Keio University (India Japan Laboratory) in collaboration with
Indian Institute of Science (Center for Society and Policy) calls for

SOCIAL INNOVATION CHALLENGE

(Phase 2: Proposal submission)

LAST DATE FOR SUBMISSION: 1 DECEMBER 2020

1. Basic Information

Theme Area	Water Management
Title	***Solar Water Purifier***
Name of Group Leader -Arpan Sharma (9694839031)	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	**Arpan Sharma**	**BITS Pilani**	**UG 3rd year**	**Mechanical Engg.**	**f20180580@pilani.bits-pilani.ac.in**
2	Sarthak Bansal	BITS Pilani	UG 4th year	Mechanical Engg	f20170311@pilani.bits-pilani.ac.in

3. Theme Background

The freshwater resources are depleting at an alarming rate. The underground water level is going down. It is the one of the extensively used freshwater resource. However, a lot of water present in the earth is not drinkable, like ocean water, flooded water, acidified rainwater, etc. It goes waste without the proper utilization. Many state-of-art purifiers claim to purify that water. Most of the water purifiers use electricity to purify it. It also adds a burden on the conventional electricity resources. So, the depleting freshwater resources and fossil fuels to provide electricity need to be preserved with the help of renewable energy resources like solar energy. To tackle this problem, we have designed a water purifier which uses a very simple concept of water evaporation which people have been using since centuries. We modified the traditional model and tried to make it more efficient to produce fresh water.

4. Describe your Social Innovation Idea, and its key characteristics.

We used the traditional way of purifying the ocean water to drink it and made it more efficient. Our model consists of a pot which consist of dirty water and an extra space in it to collect the purified water (collector). To condense the evaporated water, we used a condenser cap which directs the evaporated water to the collector. The slow rate of evaporation is a problem in the traditional solar water purifies. So, we used some solar reflectors in our model to concentrate the heat flux and make the evaporation rate faster to convert more dirty water to pure form more

quickly. Also, there is a shield (made up of glass) which protects the heat loss from the pot in the form of forced convection and radiation. The space between the pot and the glass is evacuated to prevent the natural convection. It can be used in places near the ocean or river which contain abundance of undrinkable water, or it can be used in the areas with no electricity because it uses the solar energy to purify the water.

4.1. What is the Novelty / Uniqueness of your Social Innovation Idea?

1. It contains no moving parts, so no maintenance is required.

2. It uses no electricity.

3. It encourages the use of renewable energy resources.

4. It can be used in places near the ocean or river which contain abundance of undrinkable water

5. It can be used in the areas with no electricity because it uses the solar energy to purify the water.

6. Low cost due to low maintenance and less electricity usage.

7. It can be used to purify water in desert areas since presence of abundance of solar energy.

4.2. Explain the relevance of your Social Innovation Idea to address the current social problems.

The factors responsible for water scarcity in India are both manmade and natural. The Natural factor is mainly the erratic distribution pattern of natural rainfall. Some areas receive heavy rainfall while major area of land remains dry. Hence, the pattern of rainfall is unrecognizable. The major manmade factor are the poor management of the resources, contamination of freshwater. The groundwater is depleting fast. The results of the widespread use of ineffective techniques used for irrigation aligned with mismanagement are one of the reasons for the water deficit. Groundwater makes 40 percent of country's water supply and is replenishing at the rate faster than of consumption. Rural and remote areas of India does not have a constant source of potable water and electricity. They majorly rely on groundwater or nearby pond as the source of drinking water which contains heavy metals. Removing heavy metals from the water is an energy intensive process requires reverse osmosis techniques. Drinking untreated water is a curse in disguise. There is an urgent need to act.

4.3. Explain the effectiveness of your Social Innovation Idea/ Concept

Our solution treats one of the major problems in India and The world that is to provide safe drinking water. A research was conducted by Harvard university to find out the reasons behind the availability of safe drinking water. The research concluded that absence of electricity and the rigidity of the traditional water purification were the major reason for the lack of availability of drinking water. Our solution will revolutionizing the loves of people who does not have access to the safe drinking water. Our solution is the most effective solution that can be possible for purifying water without electricity. Our product is

portable and does not required to be fixed at a position. This makes our product to be used in variety of conditions and hence, will affect more lives possible.

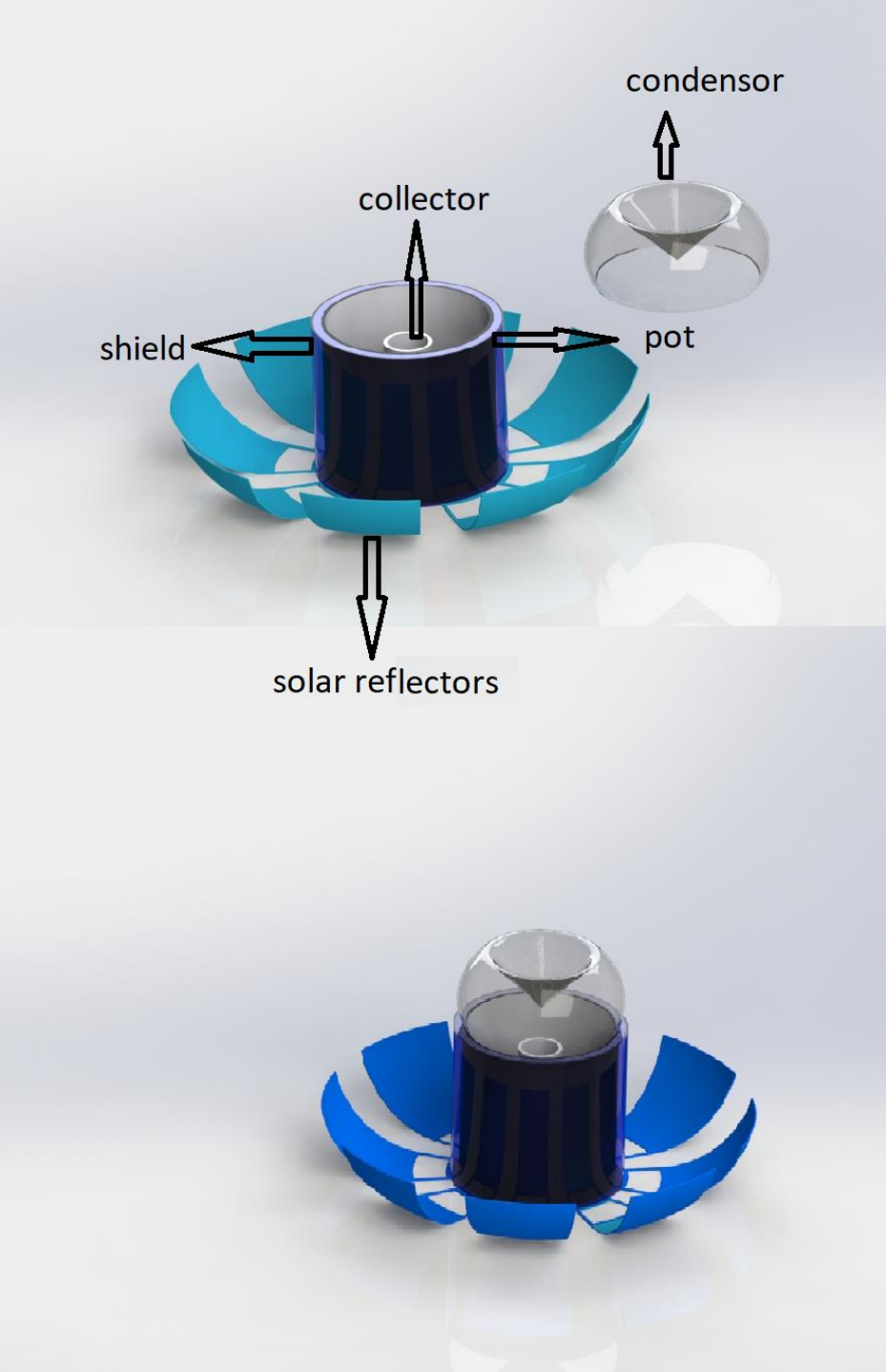
4.4. Is your Social Innovation Idea ecologically sustainable? Please elaborate.

As our product does not consume any electricity and relies on cleanest energy in the universe that is Sun. Our product is the ecological sustainable that can be possible. Our product does not emit any carbon dioxide or any other gases which are harmful for the environment. Our product does not require any frequent maintenance and does not use any consumables like filter. This makes our solution one of its kind and most ecological sustainable water purifier.

4.5. What is the scale of impact of your Social innovation idea? Is it widely applicable?

We will be able of change the lives of 1.3 billion who are living in poverty and does not have reliable source of water. With the help of our product people will not wander around in search of water and rather will contribute that time for the advancement of humanity. Our product will help prevent water born disease such as cholera, schistosomiasis, etc. It will save government approximately 1.2 Billion Dollars in Healthcare budget by preventing these diseases. A healthy nation is a prosperous nation. Our solution solves all these problems in a most efficient way possible. There is an urgent need to tackle the problem of water purification.

5. Annexes



Keio University (India Japan Laboratory) in collaboration with
Indian Institute of Science (Center for Society and Policy) calls for

SOCIAL INNOVATION CHALLENGE

(Phase 3: Proof-of-Concept or Prototype Submission)

LAST DATE FOR SUBMISSION: 1 JANUARY 2020

1. Basic Information

Theme Area	*Water Management*
Title	*Solar Water Purifier*
Arpan Sharma (9694839031)	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Arpan Sharma	BITS PIlani	UG 3rd year	Mechanical Engineering	f20180580@pilani.bits-pilani.ac.in
2	Sarthak Bansal	BITS PIlani	**UG 4th year**	Mechanical Engineering	f20170311@pilani.bits-pilani.ac.in

3. Submission of Proof-of-Concept or Prototype for your Social Innovation Idea

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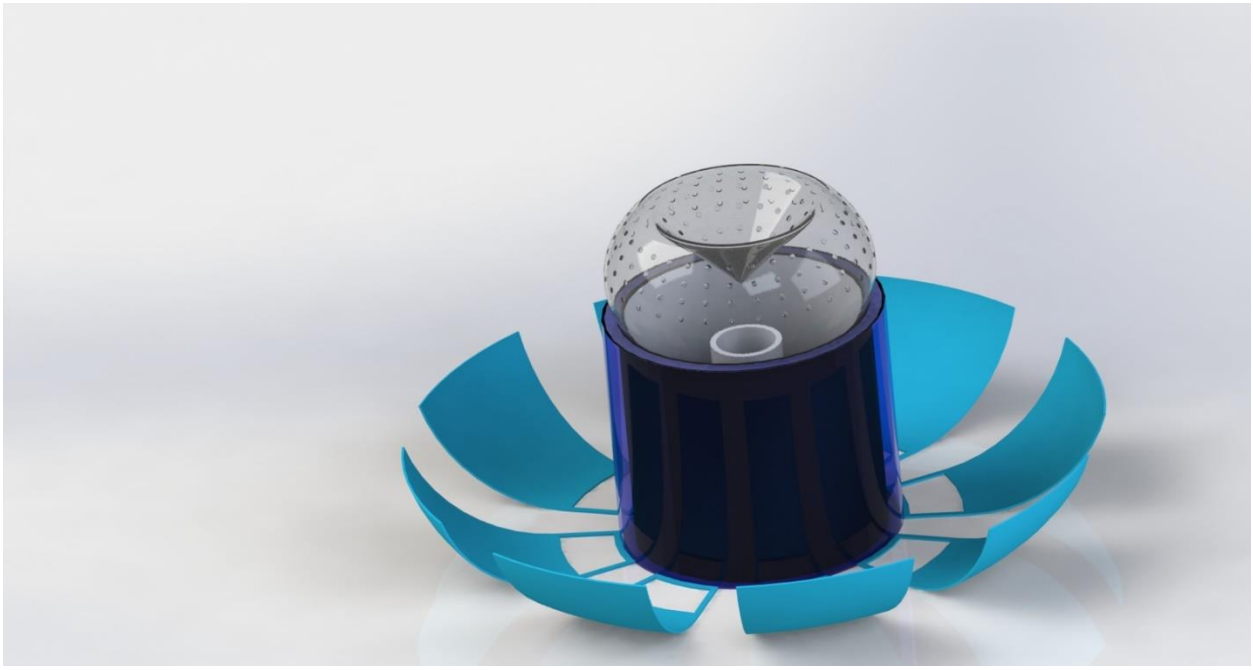
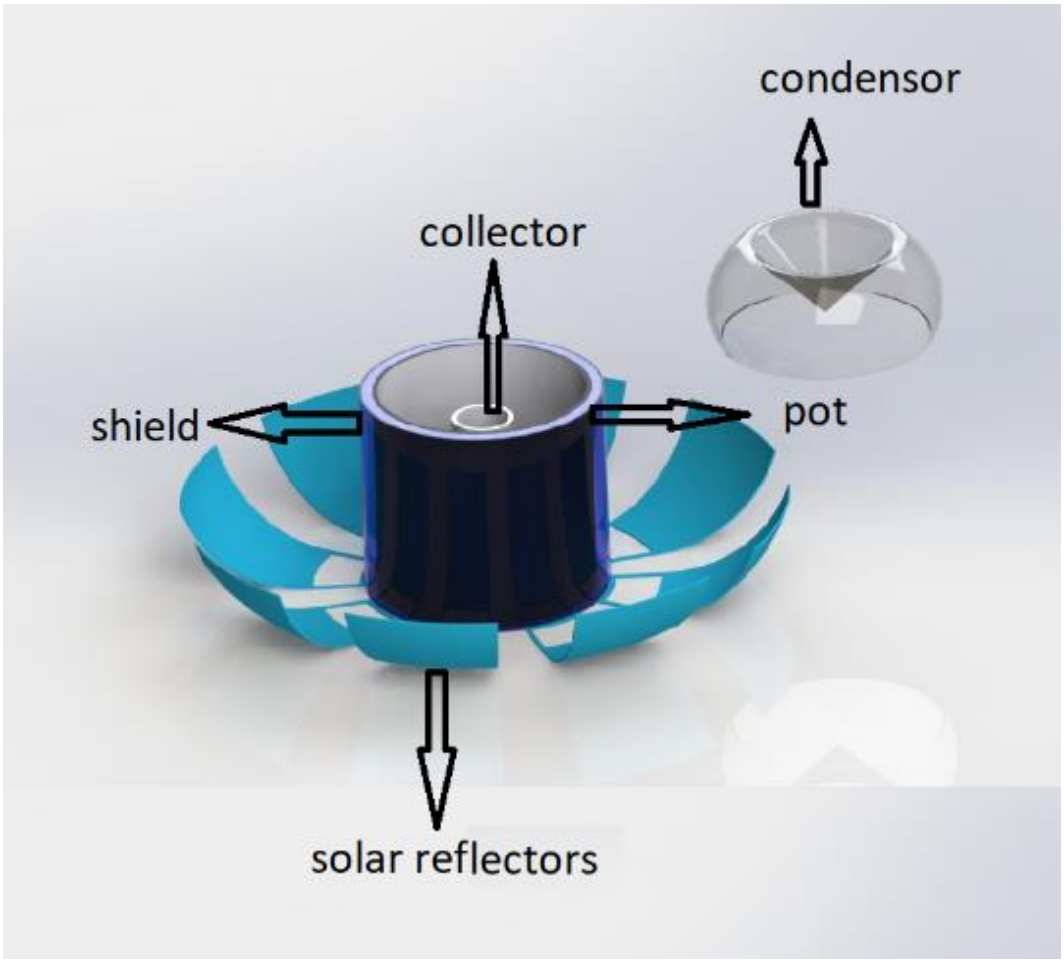
a. *Even if you have submitted these details (such as photos, videos, graphics, or other form of arts), you are advised to submit them here again.*
   Examples: Images (JPG, PNG, GIF, etc.) of your innovative solutions e.g. devices, apps, flowchart for your processes, designs for your social or business models, etc.
b. *Videos can be attached separately via Google Form for the SIC-Phase-III.*




condensor
collector
shield
pot
solar reflectors

The Business Model Canvas

Designed for: SOCIAL INNOVATION CHALLENGE

Designed by: Arpan Sharma, Sarthak Bansal

Key Partners
- Manufacturing Firms

Key Activities
- Marketing
- Research and Development
- Manufacturing

Key Resources
- Research and Development
- Intellectual Property

Value Propositions
- Provide Clean drinking water
- Provides clean water without electricity
- Produce no CO2
- Ecological sustainable
- No maintenance required
- Most ecological friendly way to produce clean water
- Net Carbon Negative

Customer Relationships
- Provide Clean drinking water
- Provides clean water without electricity
- Produce no CO2
- Ecological sustainable
- No maintenance required

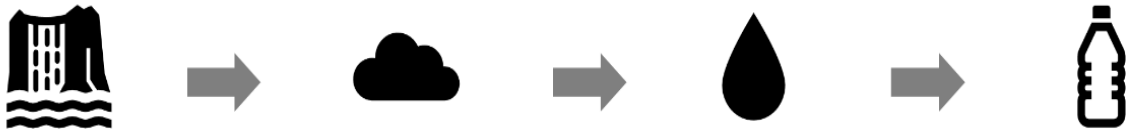
Channels
- Online-order placement using website and mobile app
- Offline- order booked through telephone or walk in

Customer Segments
- People who do not have means to purify water
- People living in brackish water
- People living without electricity
- People who does not constant source of portable water

Cost Structure
- Research and Development
- People
- Maintenance
- Customer Support
- Marketing

Revenue Streams
- Selling of the product

FLOW CHART



Impure water
(Impure water is filled in the evaporator)

Evaporation
(Water is evaporated in evaporator)

Condensation
(Water vapor is collected in evaporator)

Pure water
(The collected water is safe for drinking)

Theme 2

Healthcare

1st Prize	**Aviral Kumar Goel** *Smart Stick*
2nd Prize	**Niranjan Santhosh** *The Solar Powered Mask and Gloves Disposable Unit*
3rd Prize	**Smruti Prangya Behera** *BioBottle: Elixir of Life*

Keio University (India Japan Laboratory) in collaboration with
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SOCIAL INNOVATION CHALLENGE

(Phase 2: Proposal submission)

LAST DATE FOR SUBMISSION: 1 DECEMBER 2020

1. Basic Information

Theme Area	Health Care
Title	Smart Stick
Name of Group Leader - Aviral Kumar Goel (8076116221)	

2. Details of Group Members

S. No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Aviral Kumar Goel	BITS Pilani	UG 2nd Year	Computer Science	f20190166@goa.bits-pilani.ac.in
2	Vaibhav Ganatra	BITS Pilani	UG 2nd Year	Computer Science	f20190010@goa.bits-pilani.ac.in

3. Theme Background

According to WHO, about 285 million people are visually impaired worldwide. Out of those, 39 million are blind. In India itself, 62 Million are Visually Impaired, and 15 million are blind, the highest in any country.

Various assistive technologies have been developed for the Visually impaired, including text-to-speech, braille, screen readers, screen enlargers etc. However, often for mobility, they rely on traditional walking canes which are sticks which they tap on the ground and swing from one side to another to make sure there are obstacles in their path.

Visually Impaired and blind people often find it challenging to navigate without the help of others. Walking canes and guide dogs are helpful is such a scenario but don't solve the more significant problems of navigation and situational awareness. This problem amplifies even further in unknown environments as they cannot read signboards to guide them.

4. Describe your Social Innovation Idea, and its key characteristics.

Our device has a camera module attached to it which collects the data in the form of real-time video. The data is then be sent to a processing module to the machine learning model to perform real-time object detection and depth estimation and make a comprehensive judgement to guide the user accordingly. The user will then receive auditory feedback for their next actions. Simultaneous object identification and labelling will be running at all times, along with navigational guidance. The user will also be able to interact with the device and give basic commands. It will be an all-encompassing guidance system for the visually impaired so that they can navigate independently.

4.1. What is the Novelty / Uniqueness of your Social Innovation Idea?

Developments thus far in the domain of intelligent mobility guiding systems are as follows-

1. Text-to-speech enabled mobile devices, including GPS support for navigation.
2. Smart canes with basic object detection using ultrasonic sensors. Such devices they do not make the user situationally aware (what kind of object is there, is a vehicle approaching? etc.) Also, their detection range is low.

Our solution is based on Computer Vision capable of real-time object detection and audio feedback. The unique feature of our innovation is that it not only detects the objects in the path of Visually Impaired but also, recognises them. It will tell the user what object is in front or side of them and how far is it from them so that they can be better connected to the real world and realise true independence. We have registered a **Provisional Patent** for the same.

4.2. Explain the relevance of your Social Innovation Idea to address the current social problems.

Visually Impaired people face a lot of challenges in their day to day life. One such challenge is navigation and travel from one place to another. They are heavily dependent on others for such activities. This problem amplifies even further in unknown environments as they cannot read signboards to guide them. Our device solves the problem of navigation for the Visually Impaired.

4.3. Explain the effectiveness of your Social Innovation Idea/ Concept.

The proposed outcome of the innovation is that the visually impaired people will be able to navigate independently indoors as well as outdoors without the help of others. They will be able to travel for one destination to another without much assistance from others. The stick will identify the objects in their path and describe them to the user using audio feedback.

Our device in the hands of Visually Impaired will help them live a more free and unrestricted life.

4.4. Is your Social Innovation Idea ecologically sustainable? Please elaborate.

Yes, our Social Innovation Idea is ecologically sustainable as the hardware components involved can easily be recycled. Furthermore, our device is designed to ensure longevity with minimum hardware addition to their sticks so that the user can use it for long periods of time and thus, in turn, ensures waste production, in case any, is minimal and therefore enforces sustainable development principles.

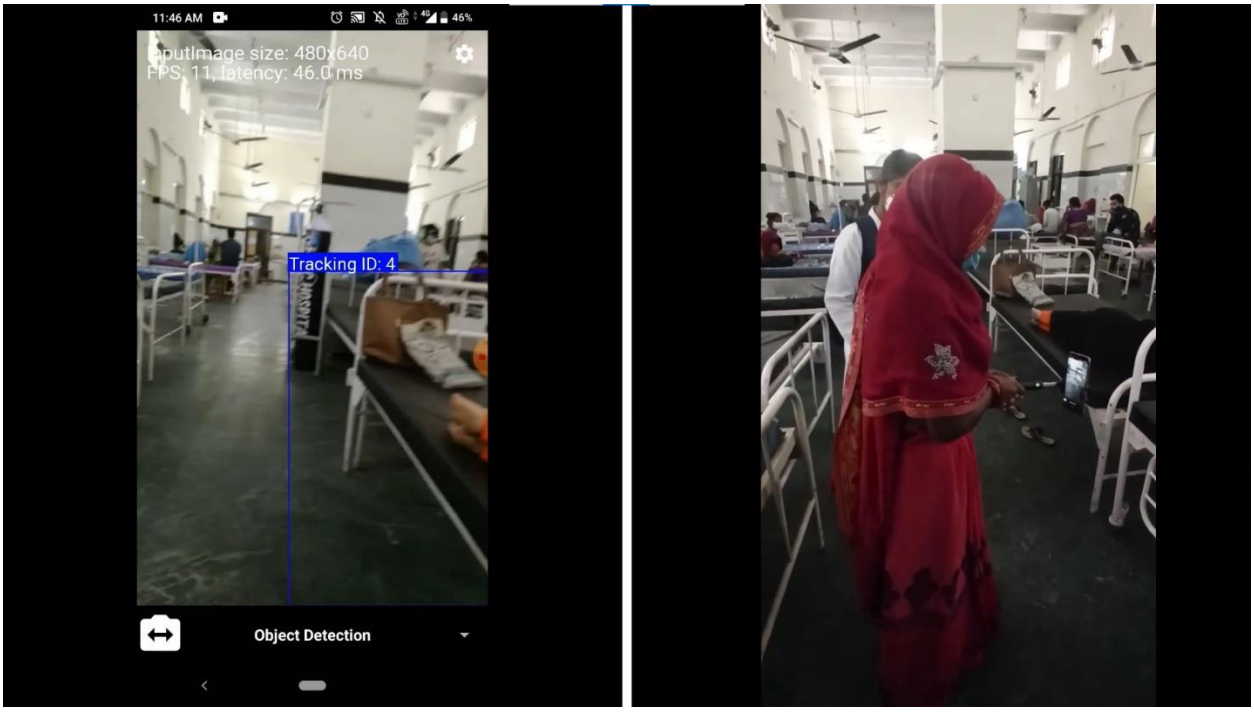
4.5. What is the scale of impact of your Social innovation idea? Is it widely applicable?

Yes, our Social Innovation Idea is widely applicable as it can be used by each and every Visually Impaired person. It will be a standalone hardware device which can be used as a replacement of the cane that they use.

5. Annexes

Please put any additional information and reference documents that you would like to share related to your social innovation idea like technical details, weblinks, proof of concept, photo of the model etc.

MVP testing for which we visited a Government Hospital (A Proof of Concept in the form of an Mobile Application being used by a Low vision Patient to navigate can be seen.)



Proof of Concept Demo video link –

https://drive.google.com/file/d/1R6JnwEeNB39crbA2oM4r470-k4LeArV0/view?usp=sharing

We have registered a Provisional Patent for our Idea already.

Keio University (India Japan Laboratory) in collaboration with
Indian Institute of Science (Center for Society and Policy) calls for

SOCIAL INNOVATION CHALLENGE

(Phase 3: Proof-of-Concept or Prototype Submission)

LAST DATE FOR SUBMISSION: 1 JANUARY 2020

1. Basic Information

Theme Area	Health Care
Title	Smart Stick
Name of Group Leader - Aviral Kumar Goel (8076116221)	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Aviral Kumar Goel	BITS Pilani	UG 2nd Year	Computer Science	f20190166@goa.bits-pilani.ac.in
2	Vaibhav Ganatra	BITS Pilani	UG 2nd Year	Computer Science	f20190010@goa.bits-pilani.ac.in

3. Submission of Proof-of-Concept or Prototype for your Social Innovation Idea

Under Phase-III of the Social Innovation Challenge, participants are expected to submit either a proof-of-concept or a prototype. Proof-of-concept is a form of evidence which demonstrates the feasibility of a design, concept, or business proposal of the innovation. Generally, it's derived through experiment or a pilot project. A prototype is generally a preliminary version or outcome of these activities.

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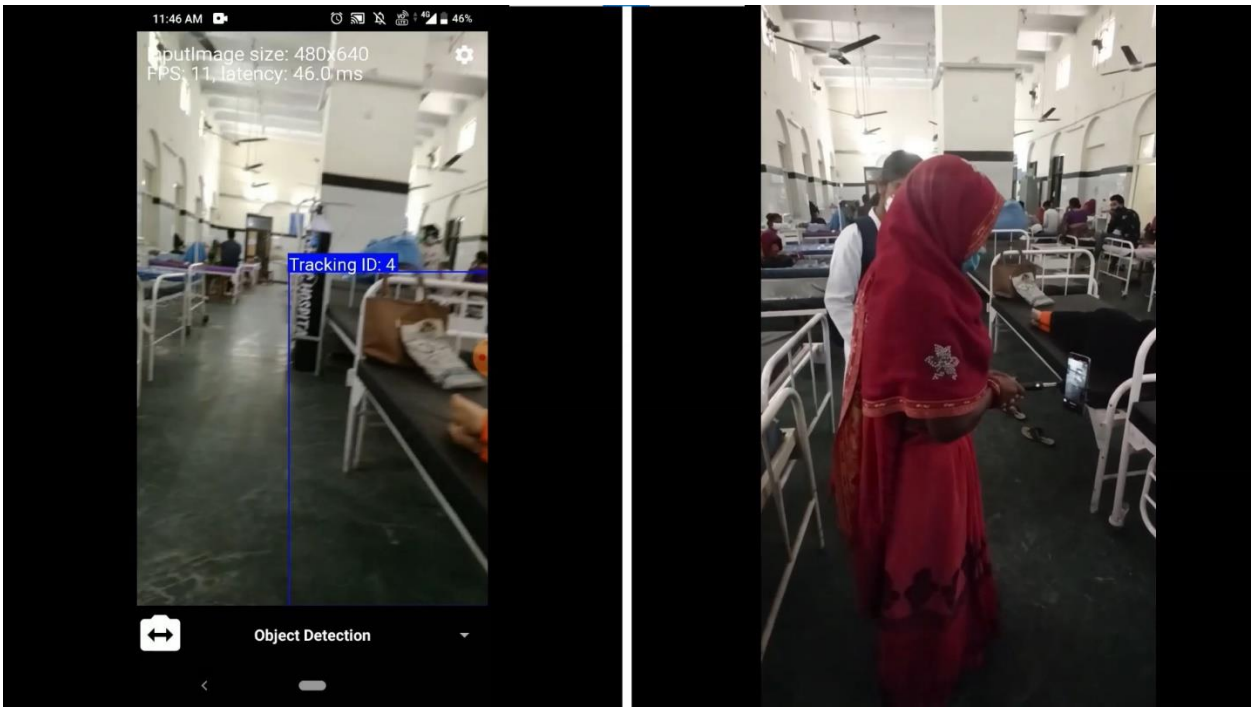

Proof of Concept Demo video link –

https://drive.google.com/file/d/1R6JnwEeNB39crbA2oM4r470-k4LeArV0/view?usp=sharing

Here is a link to a 5 minute video of patients using our proof of concept and also a medical professional opinion about our idea. -
https://drive.google.com/file/d/1PJyNHmqh9OqEUdE692GQIo35cBBLKB3u/view?usp=sharing

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Keio University (India Japan Laboratory) in collaboration with
Indian Institute of Science (Center for Society and Policy)

SOCIAL INNOVATION CHALLENGE

(Phase 2: Proposal submission)

LAST DATE FOR SUBMISSION: 1 DECEMBER 2020

1. Basic Information

Theme Area	___Health care_____
Title	The Solar Powered Smart Mask and Gloves disposable unit
Name of Group Leader _Niranjan Santhosh _____	8078021764

2. Details of Group Members

Sl.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Niranjan Santhosh	SCMS School Of Engineering & Technology	UG 2nd year	Electronics & Communication engineering	niranjansanthosh016@gmail.com
2	Sidharth KS	SCMS School Of Engineering & Technology	UG 2nd year	Electronics & Communication engineering	sidharthaugust17@gmail.com
3	Salil CL	SCMS School Of Engineering & Technology	UG 2nd year	Electronics & Communication engineering	clsalil17@gamil.com
4	Sreelakshmi TU	SCMS School Of Engineering & Technology	UG 2nd year	Electronics & Communication engineering	sreelakshmiudhayan@gmail.com

3. Theme Background

The world has been facing difficult times since December 2019 after the widespread of the novel corona virus. With the number of affected increasing day by day, social distancing is the only preventive method known.. Health care and biologists are working round the clock for invention of vaccination to fight the corona virus .WHO recommends usage of mask and gloves as an effective solution against the virus spread. With people returning to their normal life, the number of masks and gloves used per day is on a toll. The next hassle we face would be

improper disposal of used masks and gloves that neither comes under medical waste or normal waste. The collection of such used masks and gloves by a garbage collector is unsafe as it can further cause cumulative spread of the virus. To tackle this, we propose a fully automatic 3 stage disposable plant which can be implemented at every hospital. All the three stages of our disposal unit are attached or installed as a single module.

4. Describe your Social Innovation Idea, and its key characteristics.

The first stage of the unit is a collection tray in which the count of gloves and masks disposed is determined by IR sensors. The bin can also measure the load of the waste using a load cell kept over the flap. When the set count of masks and gloves is reached, the sanitizer unit connected to a DC motor pumps and sprays the liquid on the disposed materials. If the number exceeds 10,000 in count or the weight on the load-cell exceeds 4kg, the flap will rotate in the clockwise direction by 180 degrees and the disposed materials reaches the second stage. Here, the flap is exposed to UVC light for 40 minutes via UVC light strip which is turned on for 30 minutes by enabling a timer. Once the timer is reset, the flap will again rotate and the waste moves onto the collecting tray kept in the third stage. This stage consists of a heating coil controlled with a relay, timed up for the temperature of 100-200 degree centigrade. The disposed wastes shrink to the size of small cotton balls and are completely disinfected. An automatic hand sanitizer dispenser attached will help in hand sanitization before disposal.

4.1. What is the Novelty / Uniqueness of your Social Innovation Idea?

Solar powered smart mask and gloves disposable unit can make a change in the normal disposal methods by avoiding a threat to human health and our ecosystem by creating a safe platform for disposal . The use of environment friendly (pollutant free) materials and the availability of automatic hand sanitizer dispenser to sanitize our hands before disposal along with the unit make our product ecologically sustainable and unique. By using IR sensors, when the count reaches the threshold limit of 10000 or 4kg the flap will automatically rotate to the next stage of disposal. considering the need to survive the pandemic we believe that our product is relevant and can help many of them in safe disposal of their used products. It provides a contactless working by which it prevents in the wide spread of the disease. This is done using an automatic sanitizer which helps in disinfecting the waste materials and by using rotating flaps the waste is transferred to next stage were disinfection take place under UVC light there also an rotating flap which is provided to take the waste materials to next stage where heating take place and at last the sanitized waste is taken outside . In all these stages there is no contact of a person which makes it very unique . Another speciality of the device is that the whole unit is biodegradable as it is built using clay.

4.2. Explain the relevance of your Social Innovation Idea to address the current social problems.

Corona Virus hit the World at it's spine and the lives of the people had been trembled ever since. As it has no intention to stop spreading by it's own, scientists have been working day and night for the invention of vaccine. Social distancing is the only known precaution, and masks and gloves will increase the chance of not getting infected. The safe disposal of masks and gloves is as important as wearing those. That is where our idea is relevant in the current social scenario. As

the covid 19 still threatens the life of the people, the number of masks and gloves used per day is on a toll. People should pack the used masks and gloves in proper manner and hand them over to the sanitary workers, corporation officials, public places or other concerned authorities. Improper disposal of masks and gloves can create virulent transmission of many diseases. In order to overcome this hassle we have implemented an automatic three stage disposable plant. This will turn out to be a priceless asset for our community.

4.3. Explain the effectiveness of your Social Innovation Idea/ Concept

Nowadays mask and gloves are an ineluctable part of our life. Many are unaware of the consequences that can happen due to unsafe disposal of these used products in normal dustbins and throwing them away in roads, which can lead to further spread of virus and can also cause pollution. Solar powered smart mask and gloves disposable unit can prevent this from happening. With the help of this unit, waste collection is much easier and the used products are fumigated which helps the person emptying the bin from getting affected. This makes waste management easier and also fumigation is efficient and time saving. As the unit is solar powered, it can be easily installed in public places, transport hubs etc. Our product is cost effective and the materials and energy sources used are pollution free, which helps in keeping the environment clean. The unit has an intake capacity of 4 kg at a time. It is fully automatic, can save labour cost, time and effort required for collection by workers.

4.4. Is your Social Innovation Idea ecologically sustainable? Please elaborate.

Amid COVID-19, there has been an uncontrolled increase in the use of Personal Protective Equipment (PPE) kits and other medical equipments by frontline health and sanitation communities. These materials potentially being infectious, pose a threat to human health, terrestrial, and marine ecosystems, if not scientifically handled and disposed. Thus we are putting forward an idea, which ensures the proper dismissal of masks, gloves, PPE kits and others in an ecologically sustainable manner where the health and productivity of the present generation is maintained for the benefits of the upcoming future. Moreover, the whole mechanism runs on Solar energy which is renewable and causes no long-term damage to the environment. This entire 3 stage unit proposed is designed and made out of clay which is a natural, eco-friendly binder thus eliminating the threats imposed by constructing a plastic unit. No such unsustainable energy sources are being used that can deteriorate the future requirements. Our present findings can thus help the regulatory authority to set forth the steps for safe disposal of masks, gloves and PPE kits in an ecologically sustainable manner.

4.5. What is the scale of impact of your Social innovation idea? Is it widely applicable ?

Considering the global need to survive the pandemic, the scale of impact of the idea would be impeccable. The prototype not only serves humanity from the infection of the Coronavirus, but also the environment from pollution. The disposal of the waste, which can neither be categorised in the normal waste nor medical waste category is another serious issue which we need to consider. The components which have been used in the prototype are of low cost. The main materials required for the project are made of clay which makes it biodegradable and more economic. The cost of manufacturing these materials requires less capital. This device can be widely accepted by the public. The innovation is therefore relevant, as well as, easy to implement.

5. Annexes

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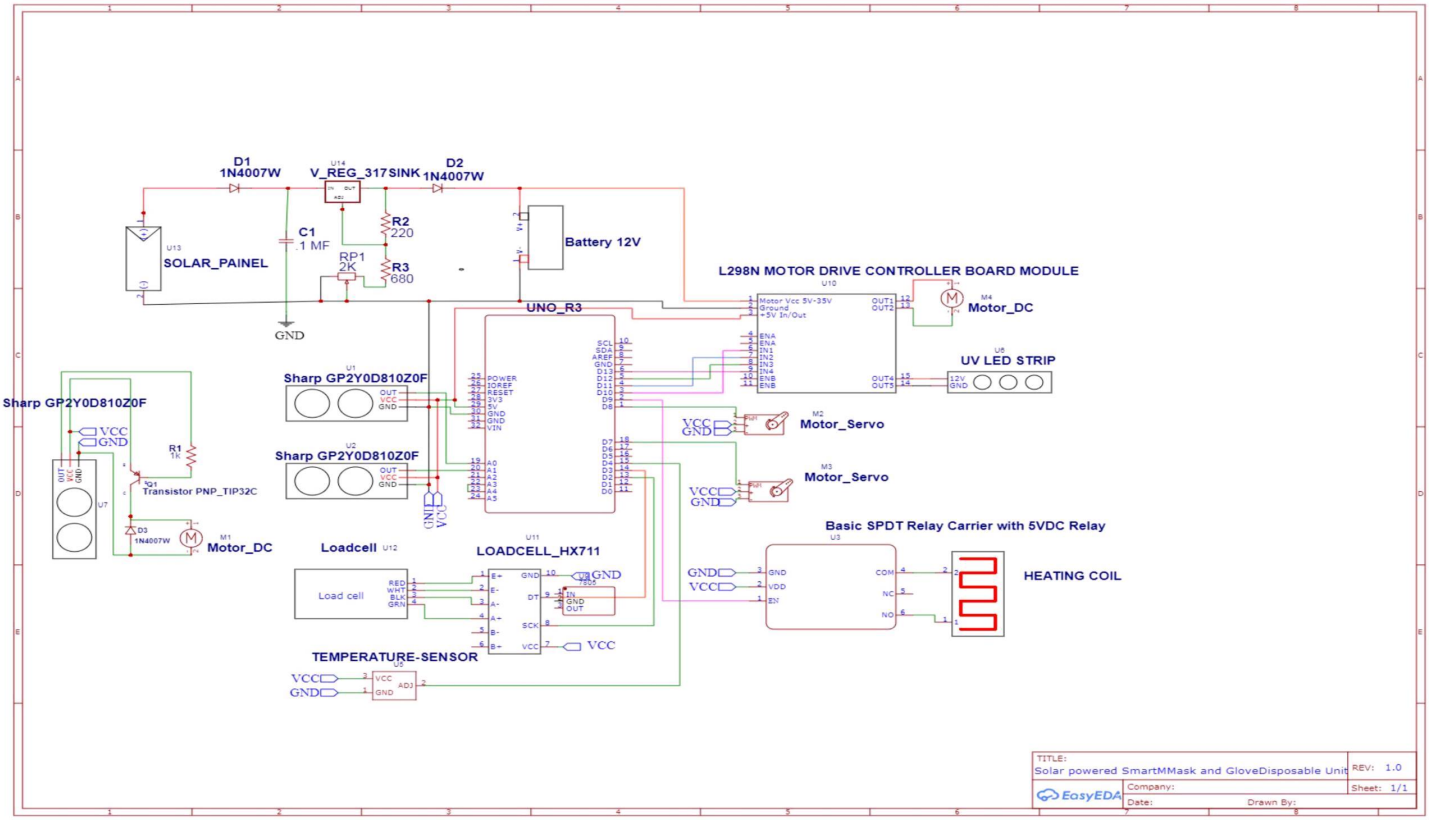

https://drive.google.com/file/d/1aB0CCGmC6u1fmWCJx8ADTDmNTl87j7UN/view?usp=drivesdk

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SOCIAL INNOVATION CHALLENGE

(Phase 3: Proof-of-Concept or Prototype Submission)

LAST DATE FOR SUBMISSION: 1 JANUARY 2020

1. Basic Information

Theme Area	Health care
Title	The Solar Powered Smart Mask And Gloves Disposable Unit
Name of Group Leader : Niranjan Santhosh(8078021764)	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Niranjan Santhosh	SCMS School Of Engineering & Technology	UG 2nd year	Engineering	niranjansanthosh016@gmail.com
2	Sreelakshmi T U	SCMS	UG 2nd year	Engineering	sreelakshmiudhayan@gmail.com
3	Sidharth K S	SCMS	UG 2nd year	Engineering	sidharthaugust17@gmail.com
4	Salil C L	SCMS	UG 2nd year	Engineering	clsalil17@gmail.com

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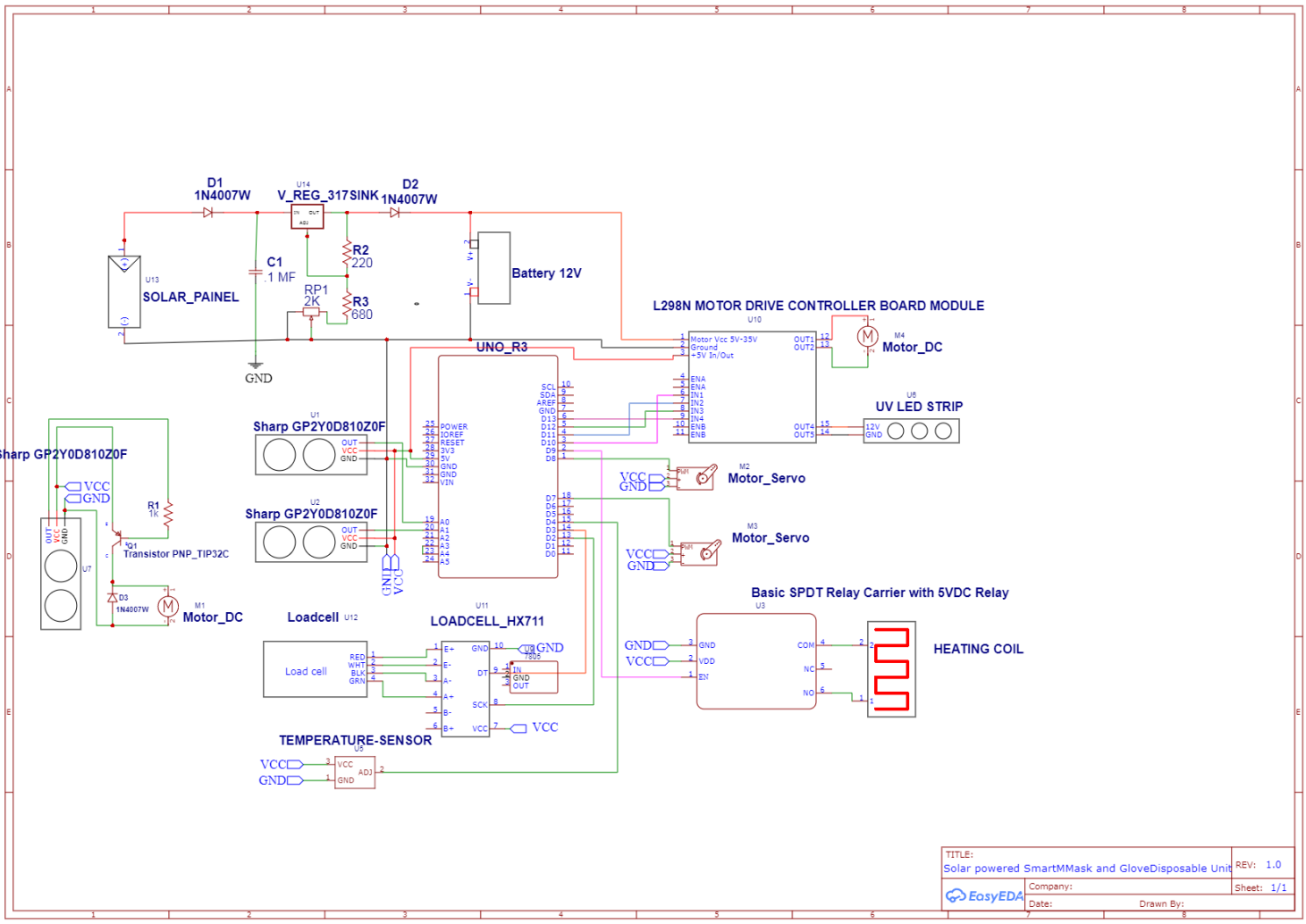
a. *Even if you have submitted these details (such as photos, videos, graphics, or other form of arts), you are advised to submit them here again.*
   Examples: Images (JPG, PNG, GIF, etc.) of your innovative solutions e.g. devices, apps, flowchart for your processes, designs for your social or business models, etc.
b. *Videos can be attached separately via Google Form for the SIC-Phase-III.*



All the three stages of our disposal unit are attached as a single module or it can be installed as single unit. The entire 3 stage unit is designed and made out of clay which can eliminate the threats imposed by designing a plastic unit. The first stage is a collection tray where the number of gloves and masks is counted or weighed. It uses GP2Y0D810Z0F IR sensors, facing each other, inserted at the top of the first stage near the opening to detect the number of gloves and masks disposed in the unit. The bin can also measure the load of the waste using a load cell over a flap. If the set mask and gloves count is reached the sanitising liquid is sprayed on the mask and gloves. The sanitizer unit is connected to a DC motor to pump the sanitizer liquid into the first stage via a small pipe with splitter. The disposed mask and gloves will be collected on the free moving flap held horizontally to separate first and second stages. The load cell measures the weight of the disposed waste. If the number of mask and gloves exceeds the threshold limit of 10000 or the weight on the load-cell exceeds 4kg, the flap will rotate in the clockwise direction for 180 degrees and the disposed gloves and mask reaches the second stage. The disposed masks

and gloves on reaching the second stage flap is exposed to UV-C light for 40 minutes. The UVC light is exposed via UVC light strip which is turned on for 30 minutes by enabling a timer. Once the timer is reset, the flap will rotate with 180 degrees and the waste will reach the collecting tray of third stage. The third stage consists of heating coil controlled with a relay. The relay is acting as a switch to control the ON/OFF for the heating coil. The tray used is fire resistant, kept at 50cm on the top of the heater. The heating coil is timed up for the temperature of 100-200 degree centigrade. Thus, it will be toggling to On/OFF position and maintain the temperature for a specified range say 100 to 150 degree centigrade. The gloves and mask shrinks to the size of small cotton balls and are completely disinfected by the third stage. Once the required threshold for the temperature is reached the heating coil will be disabled. This complete unit is powered by solar panel of 150Watt with batteries attached to it. So, it is completely nature friendly biodegradable and run with natural source of energy. The Solar panel of 15 Watt is connected to a charge converting circuit which will charge the 12 Volt battery. This 12V battery powers the microcontroller board, 12V DC motor and the heating coil.An automatic hand sanitizer dispenser attached will help in hand sanitization before disposal.

https://drive.google.com/file/d/1aB0CCGmC6u1fmWCJx8ADTDmNTl87j7UN/view?usp=drivesdk

Keio University (India Japan Laboratory) in collaboration with
Indian Institute of Science (Center for Society and Policy) calls for
SOCIAL INNOVATION CHALLENGE
(Phase 2: Proposal submission)

LAST DATE FOR SUBMISSION: 1 DECEMBER 2020

1. Basic Information

Theme Area	Health Care
Title	*BioBottle: Elixir of Life*
Name of Group Leader: Smruti Prangya Behera (*Phn No.: 8280529830/7008180491)*	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Smruti Prangya Behera	VIT, Vellore	PG, final year (2nd year)	Biotechnology	**smrutiprangya30jan97@gmail.com**
2	Sourav Kumar Das	VIT, Vellore	PG, final year (2nd year)	Biotechnology	**skdsouravkumar@gmail.com**
3	Bharanii Dharan J	VIT, Vellore	PG, final year (2nd year)	Biotechnology	**jbdbharani@gmail.com**
4	Sarthak Suvojit Das	VIT, Vellore	PG, final year (2nd year)	Microbiology	**sarthaksuvo@gmail.com**
5	Sumit Moharana	VIT, Vellore	PG, final year (2nd year)	Microbiology	**sumitmoharana5@gmail.com**

3. Theme Background

The problem we are addressing here is health care. The health is directly proportional to pure water. As we know water is the source of many infection, illness, allergy, etc. A small bacterium in water can cause the entire community sick. In this situation, the water purifiers you can't take everywhere you go also the cost of purifiers are getting higher. So, by addressing this problem we have developed an idea of instant portable water purifier in the shape of a bottle (BioBottle) which have magic 7 layers from natural sources pay a major role in water purification along and can store 500ml of water as storage. The important aspect of our idea is the BioBottle is cheap around Rs. 300 and it doesn't required electricity and people can get good benefits of natural products as a result of water purification.

4. Describe your Social Innovation Idea, and its key characteristics.

Our idea is basically to give a user-friendly bottle with purifying system en-builded in the bottle and with medicinal value added in water. This will be very useful for the rural people and for the tracking people. Which it will be very compacted and easy to handle it. Easy to clean it and very cheap in price. Mainly the bottle consists of 7 layers of filtration such as,

1. FILTER PAPER (PRIMARY FILTERATION)
2. SAND FILTER
3. ACTIVATED CARBON FILTER (COCONUT SHELL BY HEATING AT 300˚C)
4. COCONUT FIBRE FILTER
5. *Moringa olifera seed powder* layer
6. ZINC OXIDE LAYER
7. ANTI-TDS SECTION BY ORANGE PEELS AND TULSI LEAVES POWDER (THE LAST SECTION) MADE UP OF COPPER COATING INSIDE.

4.1. What is the Novelty / Uniqueness of your Social Innovation Idea?

The novelty behind our BioBottle is very compact, user friendly and easy to handle by all kind of people and very cheap in price. BioBottle, which look like a normal bottle. But which consist of top with filtration area and bottom with purified water holding. The total capacity is 1 ½ litres, which hold half litres in purifying area and bottom with 1 litre. It can be dismantled and clean easily and shelf cell of the filtration used will be 1 to 2 months. This bio bottle is not just a purified water, but it is a value added by medicine value in the purified water. The bottom area has a small clip which can be pulled and released after pouring impure water on top area to create a vacuum for faster purification.

4.2. Explain the relevance of your Social Innovation Idea to address the current social problems.

Currently in INDIA the quality of water available for the rural people is very less, when compare to urban. The water purifier which is very costly, which can't be affordable by rural people and also for the people who are travelling and tracking long distance. This bio bottle will be very easy to handle, eco-friendly and valuable added with medicine plant material valuable in the filtration system.

Think of the situation where you miss your water purifier for you are thirsty enough to think life as dead because neither you can drink the river water in fear of contaminations nor you can stay without water. So, here if you have this bottle you can get fresh water from very common source of water with our 7-layer idea and a vacuum for increasing the water pressure.

4.3. Explain the effectiveness of your Social Innovation Idea/ Concept

As we have proved with a DIY prototype with pipe and tape by creating layers and we poured totally dirty water and we get a clear water (we have pictures). So, we call it an efficient one. Then we talked with filter manufacturers to get a model for actual testing, we didn't receive it

due to lockdown but the idea was appreciated by our guide and manufacturers. For this innovative idea we received VIT TBI grant.

4.4. Is your Social Innovation Idea ecologically sustainable? Please elaborate.

BioBottle which has a greater ecological sustainability, by which the 6 layers in the filter such as:

- **Filter paper** is a semi-permeable paper and which separate fine substances from liquids or air. Filter paper is mostly used because even a small piece of filter paper will absorb a significant volume of liquid. And it is environmentally friendly paper filters, which is easily degradable in soil after the use.
- Sustainable biological filters called slow **sand filters** have been used to filter drinking water since the 1800s. They don't use any chemicals, create no waste and use very little energy. "Sand filtration helps change the composition of the bacteria for the better. The bacteria deep in the sand filters can remove harmful bacteria, viruses, parasites and other unpleasant substances. Sand filters can be a sustainable boost to drinking water treatment.
- Moringa oleifera seeds containing cationic antimicrobial proteins have been used as natural coagulants for the removal of turbidity; however, a low removal efficiency and high residual organic levels limit their applications. Which it is are an economical and eco-friendly approach. “Environmentally friendly biosorbent from Moringa Oleifera leaves for water treatment”.
- Activated Carbon technology to adsorb contaminants. This material is the most adsorbent organic material in the world and is completely natural and sustainable. Coconut-shell based activated carbons are predominantly microporous and are the least dusty, thus, they are very efficient when it comes to organic chemical adsorption. Compared to other types of activated carbon, coconut-shell based activated carbon filters have the highest hardness, which makes them ideal for water purification. Eco-friendly and a renewable resource for water purification. Coconut shell carbon filters adsorb volatile organic chemicals, pesticides and herbicides, disinfection by-products like THM, remove halogens from water and improve appearance and taste of drinking water.
- Coconut shell activated carbon is extensively used in water purification due to its high porosity and large surface area, which makes it a highly valued adsorbent material. coconut shells are also an eco-friendly and a renewable resource for water purification.
- Tulsi leaves are anti-fertility effect, anti-diabetic effect, anti-allergic and immune modulator effects, stress resilience, anti-ageing effects, anti-oxidant activity, immunity tune-up, anti-inflammatory action, antibiotic protection, lung and bronchial support, nutrition, allopathic medicine complement, antimicrobial properties. Tulsi Leaf extract have great potential as antimicrobial agent for the treatment of water.

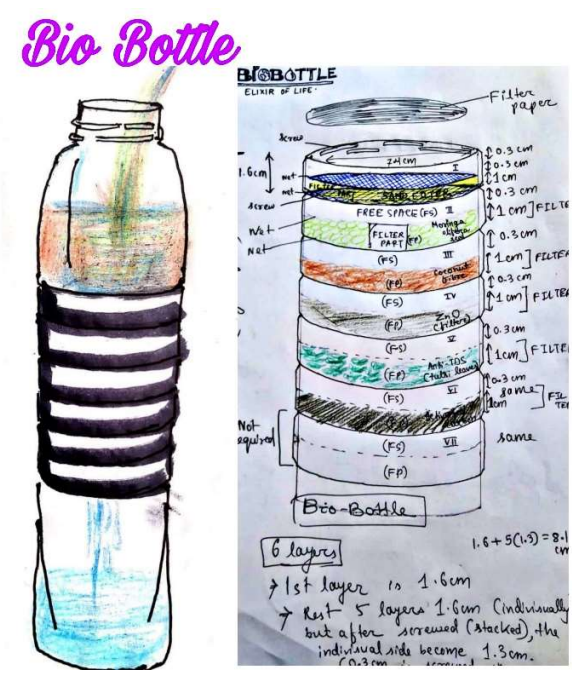
4.5. What is the scale of impact of your Social innovation idea? Is it widely applicable?

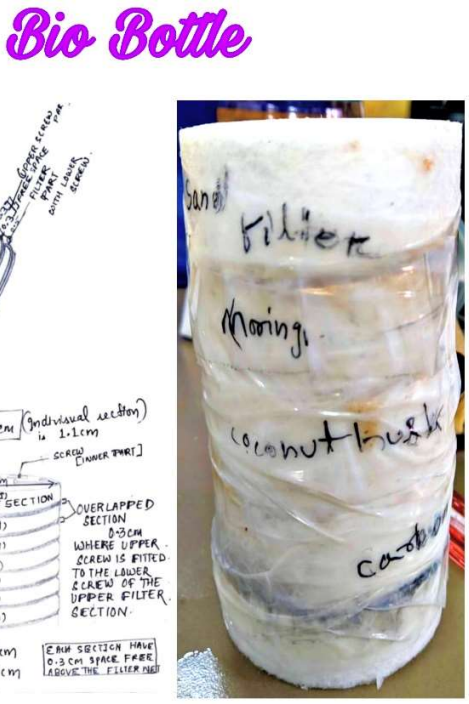
Mainly, the plastic wastage of bottle and packaged bottle will be avoiding in market. So, that the world will start its new era for biodegradable and used friendly bottle. Here BioBottle is small in

size and very cheap is price. Which will be available for all the people. The quality of the water will be reached till the death end of the rural people in India.

5. Annexes

Please put any additional information and reference documents that you would like to share related to your social innovation idea like technical details, weblinks, proof of concept, photo of the model etc.





Keio University (India Japan Laboratory) in collaboration with
Indian Institute of Science (Center for Society and Policy) calls for
SOCIAL INNOVATION CHALLENGE
(Phase 3: Proof-of-Concept or Prototype Submission)

LAST DATE FOR SUBMISSION: 1 JANUARY 2020

1. Basic Information

Theme Area	Health Care
Title	BioBottle: Elixir of Life
Name of Group Leader: Smruti Prangya Behera (Phn No.: 8280529830 / 7008180491)	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
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5	Sumit Moharana	VIT, Vellore	PG, final year (2nd year)	Microbiology	**sumitmoharana5@gmail.com**

3. Submission of Proof-of-Concept or Prototype for your Social Innovation Idea

Health care is the issue we are solving here. The health of pure water is directly proportional to it. Water, as we know, is the cause of many illnesses, diseases, allergies, etc. A tiny bacterium in water will make the whole population sick. In this scenario, the water purifiers you can't carry wherever you go are also increasing the cost of purifiers.

Thus, we have created an idea of an instant portable water purifier in the form of a bottle (BioBottle) that has magic 7 layers from natural sources that play a major role in water purification and can store 500 ml of water as storage by addressing this problem. The important

feature of our concept is that the BioBottle is cheap at about Rs. 300 and, as a result of water purification, it does not require electricity and people can get good benefits from natural products.

The innovation behind our BioBottle is very lightweight, user-friendly and simple for all kinds of people to handle and at a very low price. BioBottle, which resembles a regular bottle. But which is composed of top with filtration region and bottom with holding of filtered water. The overall volume is 1 1⁄2 litres, holding half a litre in the purifying area and 1 litre at the foot. It can be quickly dismantled and washed and the filtration shelf cell can be used for 1 to 2 months.

Our idea is basically to give a user-friendly bottle with purifying system en-builded in the bottle and with medicinal value added in water. This will be very useful for the rural people and for the tracking people. Which it will be very compacted and easy to handle it. Easy to clean it and very cheap in price. Mainly the bottle consists of 7 layers of filtration such as,

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- Coconut shell activated carbon is extensively used in water purification due to its high porosity and large surface area, which makes it a highly valued adsorbent material. coconut shells are also an eco-friendly and a renewable resource for water purification.
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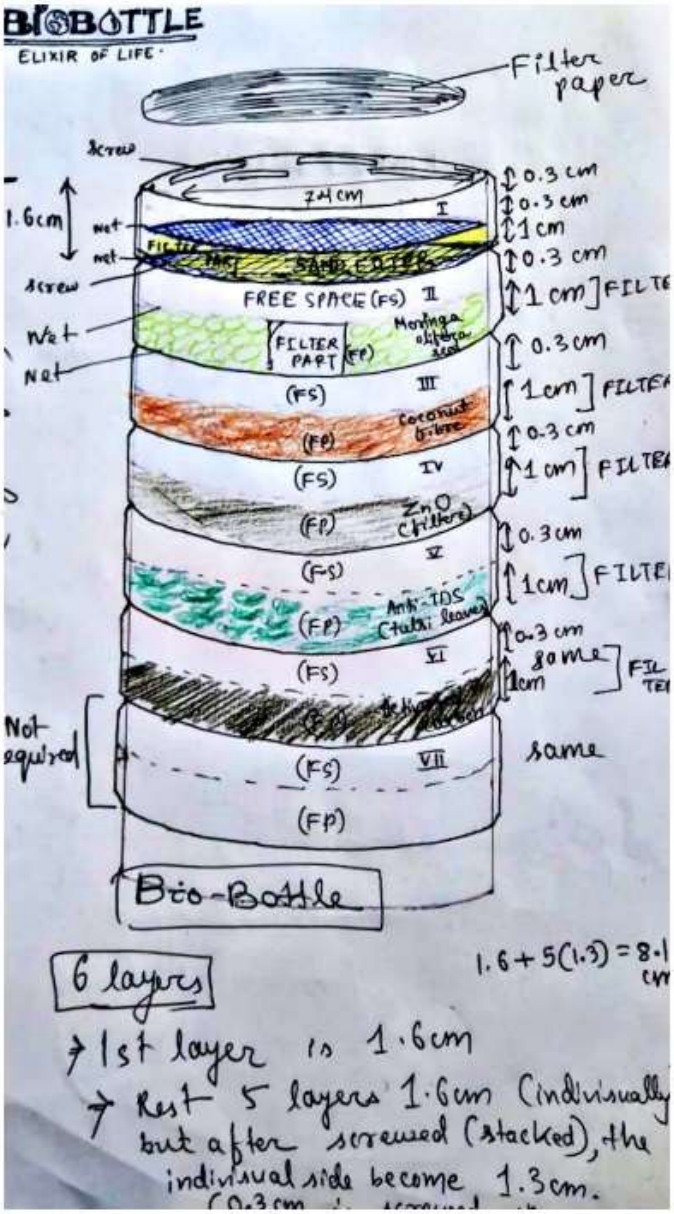
As we have proved with a DIY prototype with pipe and tape by creating layers and we poured totally dirty water and we get a clear water (we have pictures). So, we call it an efficient one. Then we talked with filter manufacturers to get a model for actual testing, we didn't receive it due to lockdown but the idea was appreciated by our guide and manufacturers. For this innovative idea we received VIT TBI grant.

a. Even if you have submitted these details (such as photos, videos, graphics, or other form of arts), you are advised to submit them here again.

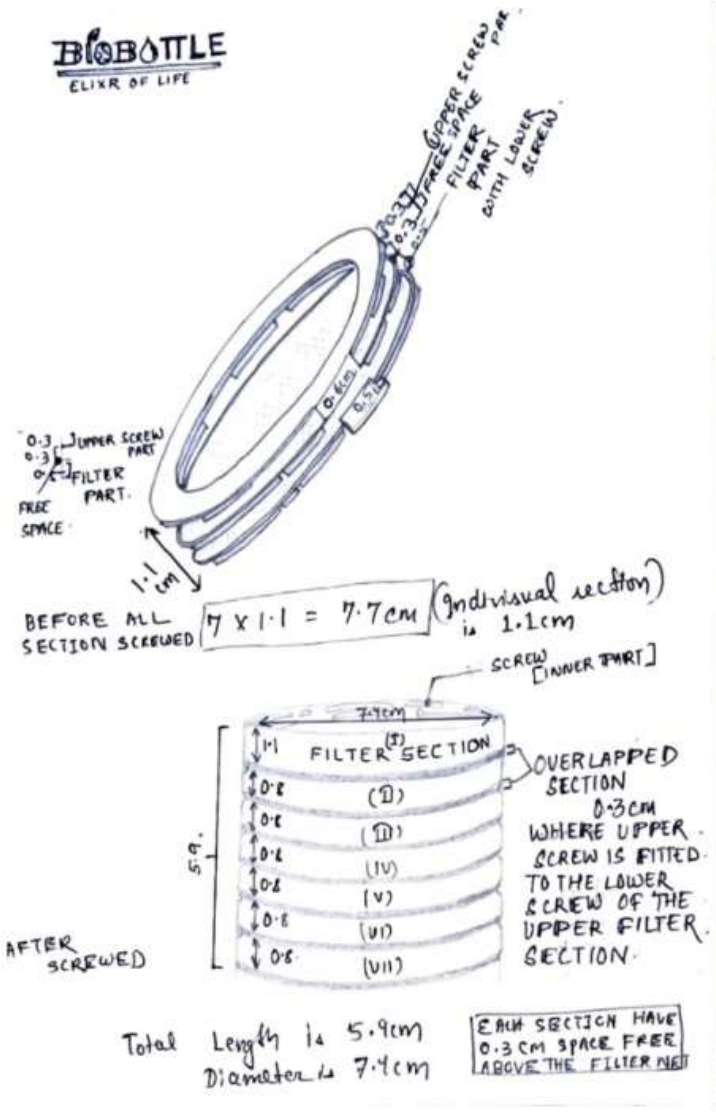
BIOBOTTLE

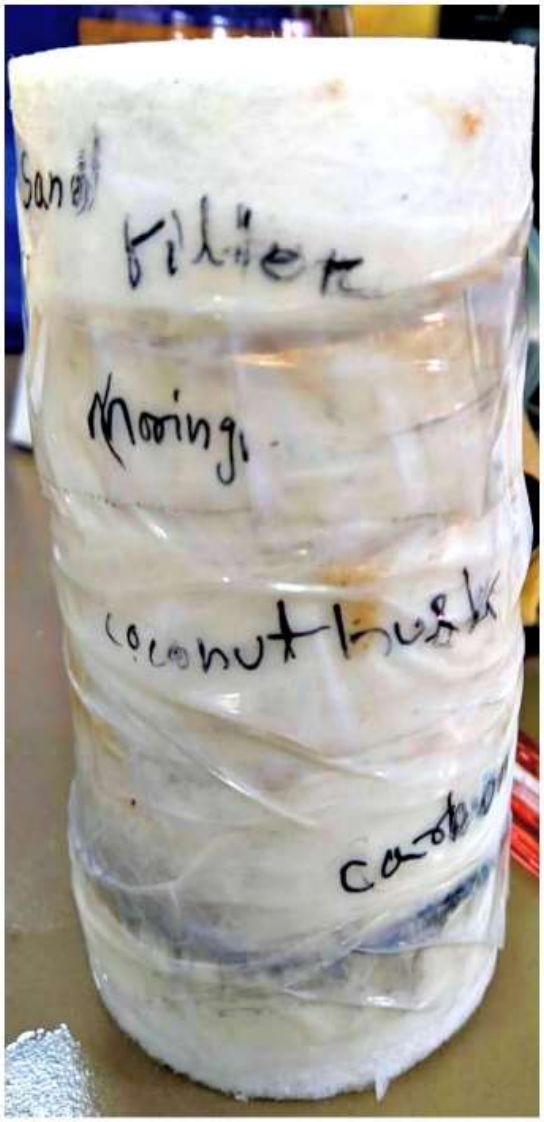
Elixr of Life

Bio Bottle


BIOBOTTLE
ELIXIR OF LIFE
Filter paper
Screw
1.6cm
Net
Net
Screw
Wet
Net
FREE SPACE (FS) II
FILTER PART (FP)
Moringa oliefera leaf
(FS) III
Coconut fibre
(FP)
(FS) IV
ZnO (Filters)
(FP)
(FS) V
Anti-TDS (Tulsi leaves)
(FP)
(FS) VI
(FS) VII
(FP)
Bio-Bottle
0.3 cm
0.3 cm
1 cm
0.3 cm
1 cm
0.3 cm
1 cm
0.3 cm
1 cm
0.3 cm
1 cm
0.3 cm
same
same
Not required
6 layers
1.6 + 5(1.3) = 8.1 cm
→ 1st layer is 1.6cm
→ Rest 5 layers 1.6cm (individually but after screwed (stacked), the individual side become 1.3cm.

Bio Bottle


BIOBOTTLE
ELIXR OF LIFE
UPPER SCREW PART
FREE SPACE
FILTER PART
BOTH LOWER SCREW
0.3
0.3
0.2
FILTER PART.
FREE SPACE
1.1 cm
BEFORE ALL SECTION SCREWED
7 x 1.1 = 7.7cm (Individual section is 1.1cm
SCREW [INNER PART]
7.7cm
1.1
FILTER (I) SECTION
0.8
(II)
0.8
(III)
0.8
(IV)
0.8
(V)
0.8
(VI)
0.8
(VII)
5.9
OVERLAPPED SECTION 0.3cm WHERE UPPER SCREW IS FITTED TO THE LOWER SCREW OF THE UPPER FILTER SECTION.
AFTER SCREWED
Total Length is 5.9cm
Diameter is 7.4cm
EACH SECTION HAVE 0.3 CM SPACE FREE ABOVE THE FILTER NET


filter
coconut husk

Theme 3

Gender Equity & Inclusion

1st Prize	Krishna Gilda *Aasha- A new hope*
2nd Prize	Anagha Vasista *Nirbhaya -Women's Safety Device*
3rd Prize	Shalini Das *Virtual Self Defense Training with AI*

Keio University (India Japan Laboratory) in collaboration with
Indian Institute of Science (Center for Society and Policy) calls for

SOCIAL INNOVATION CHALLENGE

(Phase 2: Proposal submission)

LAST DATE FOR SUBMISSION: 1 DECEMBER 2020

1. Basic Information

Theme Area	Gender Equality and Inclusion
Title	*Aasha*- A new hope
Name of Group Leader: Krishna Gilda (08275598911)	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Krishna Gilda	NID, Ahmedabad	PG 1st year	Product Design	krishna_g@nid.edu
2	Joseph Francis	NID, Ahmedabad	PG 1st year	Product Design	joseph_c@nid.edu
3	Nilesha Giri	NID, Ahmedabad	PG 1st year	Product Design	nilesha_g@nid.edu

3. Theme Background

Per the recent census, there are around 58.72 cr females in India, out of which 60% females menstruate. Numerous studies across India have found that 80% of the total women population don't have access to basic sanitary products and only 12 % of women use hygienic products. Sanitary pads are the most widely used sanitary product amongst women but come with drawbacks like rashes, allergies and even chances of cervical cancer. Pads being a single-use product, need a steady distribution chain and also generate large amounts of biological waste. In contrast, menstrual cups prove to be a more beneficial solution owing to its long life, reusability, and biologically inert material. They are also cheaper than pads (over a period of time), easier to distribute and provide a very high degree of comfort and mobility with low risk of spillage. Though they have been introduced in the market decades ago, they are still not popular amongst Indian women due to lack of awareness, access, fear of penetration, and lack of sexual education.

4. Describe your Social Innovation Idea, and its key characteristics.

Aasha - our proposed social innovation idea is a device that helps fold the menstrual cup, facilitating easy penetration. It has a hollow pipe-like structure with a provision to pull the stem of the menstrual cup within, thus shrinking the cup into a fold. The rim of the cup now has a smaller diameter. *Aasha*, with the folded cup intact, is then inserted into the vaginal orifice. Once inside, the stem of the cup is released and the folded cup regains its shape inside the vagina. With a gentle push, the rim of the menstrual cup fits across the cervical cavity, creating a vacuum, ready to collect menstrual blood. Next, *Aasha* is removed and sanitized for further use.

For the process of removing the cup, *Aasha* is inserted into the orifice, the stem of the cup is pulled, folding the cup, thus releasing the vacuum along the rim of the cup. Both are then removed, sanitized and stored for future use.

Key Features:

◦ Can be used to measure the depth of the cervix and buy the right sized cup. ◦ Direct contact with vagina and body fluids is avoided during insertion and extraction ◦ Long life, reusable ◦ Universal, fits all types and sizes of cups ◦ Self-explanatory design ◦ Saves time ◦ Low cost

4.1. What is the Novelty / Uniqueness of your Social Innovation Idea?

While menstrual cups are a novel idea to Indian women, *Aasha* encourages them to upgrade from sanitary pads and adopt cups. Currently, no such product exists.

Among the barriers to widespread adoption of cups are- a) awareness regarding the product, b) those who are aware, are afraid to use because of the fear related to penetration. Those who overcome the fear and try the product have a learning curve that extends over a few menstrual cycles before they get used to the process. This long learning curve may lead to bad experiences and thus resulting in many women giving up cups, which is otherwise a great product.

Aasha acts as a bridge between shifting from pads and clothes to a safer, more comfortable, and sustainable product by giving women the freedom to understand their cervix and its size before buying a cup. This results in reducing the learning curve to a single day with its simple design and ease of insertion without direct contact to the vagina or body fluids. This makes for a pleasant experience and thus easier adoption.

4.2. Explain the relevance of your Social Innovation Idea to address the current social problems.

Owing to the differences in bodily functions, women have been disenfranchised over the course of modern history. With the advent of feminist movements and technological innovations, we have witnessed some change. However, we are still striving for true gender equality. In fact, girls are widely known to drop out of schools after their menstrual cycles start and women face difficulties at their workplaces. It is because of this discomfort and worries about period blood management that women lose out on opportunities that will set them on par with their male counterparts.

In a country where sex education is not available to everyone, *Aasha* will help overcome myths and fear related to penetration and enable first-time users to have a good experience and even recommend it to their peers. Promoting the usage of menstrual cups will not only empower women with greater comfort and mobility but will also diminish the worry about menstrual blood management, Women can swim, play sports and carry on regular activities with ease, giving them back the opportunities that they had missed.

4.3. Explain the effectiveness of your Social Innovation Idea/ Concept

Two of the problems that stand in the way of adoption of menstrual cups are- a) the fear related to penetration and b) awareness about the product.

What *Aasha* does is effectively eliminate the fear of penetration by giving women a chance at comfortably probing and understanding their physique better. It also helps them understand the depth of cervix which varies from person to person and make an informed purchase of menstrual cup by size.

Once the purchase is made, women find it difficult to penetrate the wide rim of the cup and have to try out different folds, some of which may open and hurt the sensitive organs. The position is also an issue for many as some may have to squat, fold a single leg, and experiment with uncomfortable postures to get used to it.

Aasha eliminates the confusion by simply being comfortable with any posture, be it standing or sitting, thus making the penetration process effortless. This will help spread more positive word of mouth, thus eliminating the aforementioned barriers.

4.4. Is your Social Innovation Idea ecologically sustainable? Please elaborate.

Women in India face problems of access to proper sanitary products. Part of the reason is that pads are single-use and the existing distribution system is unable to supply and resupply pads to every area of the country. The municipal solid waste management systems, even in urban areas face difficulties to safely dispose of biohazardous-waste. Adoption of *Aasha* and consecutively menstrual cups, both of which can be used for approximately 10 years, lifts the weight off the distribution chain reducing manufacturing and transportation strains on ecology. Also, it practically eliminates the biohazardous-waste generated through the use of menstrual pads and tampons and the tremendous amount of time it consumes to decompose. Over a period of ten years, menstrual cups save an approximate of 412 billion tonnes of non-biodegradable bio-hazardous waste across the country.

The material of *Aasha* and menstrual cups are medical-grade bio-plastic and silicon respectively making it fairly safe to discard and re-cycle after its decade long life.

4.5. What is the scale of impact of your Social innovation idea? Is it widely applicable?

The manufacturers of sanitary products can reduce their recurring costs and overhead costs, from multiple raw material suppliers to plant maintenance and other CTCs, by shifting to manufacturing *Aasha* and menstrual cups.

The cost and strain of recurring distribution of sanitary pads can be mitigated and distributors can easily receive and stock the products even in remote areas. This results in a substantial reduction in the carbon footprint when considered across the country.

Greater access from the distribution chain ensures that 58.7 cr women in India will have access to a long-lasting and extremely comfortable product that will eliminate their menstrual blood management issues. This will save at least 2.5 years of period stress for a woman across 10 years. Which is upwards of a quadrillion year across the population of India. This staggering statistic is testament of the immense impact it will have on women's lives and how it will benefit the larger society.

5. Annexes


आशा


आशा


1
Insert the cup in *Aasha*
2
Latch the stem of cup
3
Take your position
4
vaginal opening
Insert *Aasha* inside vagina
5
Release the latch
6
Gently push inside
7
Remove *Aasha*
आशा

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SOCIAL INNOVATION CHALLENGE

(Phase 3: Proof-of-Concept or Prototype Submission)

LAST DATE FOR SUBMISSION: 1 JANUARY 2020

1. Basic Information

Theme Area	Gender Equality and Inclusion
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3	Nilesha Giri	NID, Ahmedabad	PG 1st year	Product Design	nilesha_g@nid.edu

3. Submission of Proof-of-Concept or Prototype for your Social Innovation Idea

Aasha, more than a product - is a hope to ease women with their routine and adventures during their periods. It is a sincere attempt to reduce the learning curve of menstrual cups for the beginners and thus encouraging more women to adopt use of cups.

Link to PoC video:

Updated Design

Salient Features

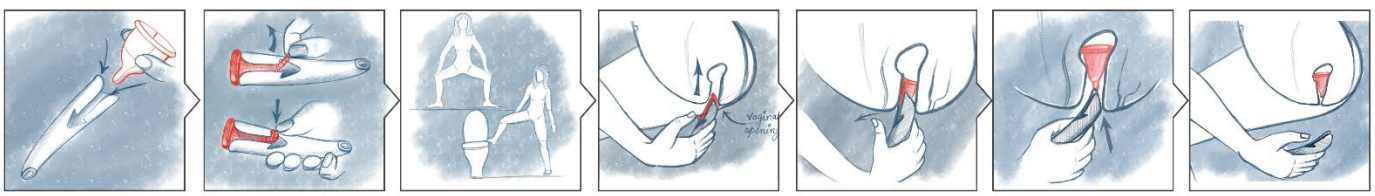
1. Narrow end of *Aasha* can be used as a dilator to flex the vaginal muscles

2. Ergonomic design

3. Latch mechanism to hold the menstrual cup

4. Universal design- *Aasha* can be used with all types of menstrual cups

Steps to use *Aasha*



1. Insert the cup in *Aasha*
2. Latch the stem of cup
3. Take your position
4. Insert *Aasha* inside vagina
5. Gently push inside
6. Release the latch
7. Remove *Aasha*

Keio University (India Japan Laboratory) in collaboration with
Indian Institute of Science (Center for Society and Policy) calls for

SOCIAL INNOVATION CHALLENGE

(Phase 2: Proposal submission)

LAST DATE FOR SUBMISSION: 1 DECEMBER 2020

1. Basic Information

Theme Area	Gender Equality and Inclusion
Title	Nirbhaya -Women's Safety Device
Name of Group Leader: Anagha Vasista (9886626332)	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Anagha Vasista	**RNSIT**	UG 3rd year	Engineering	anaghavasista@gmail.com
2	Varun Shilesh	**RNSIT**	UG 3rd year	Engineering	varunshilesh2@gmail.com
3	Abhilash M	**RNSIT**	UG 3rd year	Engineering	abhilash6112000@gmail.com
4	Akshaj SM	**RNSIT**	UG 3rd year	Engineering	smakshaj@gmail.com
5	Varshinee Velayudha	**RNSIT**	UG 3rd year	Engineering	varshinee.velayudha@gmail.com
6	Vaishnavi A.	**RNSIT**	UG 3rd year	Engineering	vaishnavi23.arun@gmail.com

3. Theme Background

"Violence against women in India takes place every 3 minutes and a rape every 15 minutes on an average in 2018" according to National Crime Records Bureau. Crime against women is a rising global concern, women are often embarrassed to speak up for their justice and hence there is no action taken. Occasionally, even if the victim's family wishes to fight, either the judicial system fails them, or it drains them emotionally, financially and physically, Nirbhaya for example. In today's world, where women are playing such an important role in the country's economic growth, bringing an end to the stereotypical notions of the men driven society, such instances impose a major roadblock in executing their maximum potential towards the growth and development of the nation.

Through this project we want to develop safety device to help alert and track crimes against women. We want women to feel safe about their surroundings, to feel confident enough to stand up for what is right and to be more independent than ever.

4. Describe your Social Innovation Idea, and its key characteristics.

Our solution is a combination of two components, firstly, the mobile application and second is the physical trigger device. The mobile application can be used if she feels unsafe or is doubtful about the unlikely event occurring, in which case she can use the application to see a location of the nearby Safe Zones or if necessary, alert her emergency contacts. Her phone's camera and microphone is activated so as to record the unfolding events.

The device can be made extremely portable and easy to use. When pressed, it will directly connect the user to the nearest located police station and also the emergency contacts. It will be continuously interacting with the user's phone for location and other vital data, but in case unavailable, can operate independently also.

The safe zones are entities like shops or petrol pumps whose employees have undergone a mandatory training from Durga India (NGO) and have agreed to help women in need. Whenever their shop is open, it will be displayed on our app, users can go there if they feel unsafe. The safe zones are very useful when the woman is not under any real threat, but wants to be safe.

4.1. What is the Novelty / Uniqueness of your Social Innovation Idea?

Currently, there are numerous application-based emergency trigger buttons in the market but they all possess an inherent disadvantage, not being as effective as expected, because they require the user to switch on their mobile, open the app and then trigger it, which gives the perpetrator enough time to either run away or react more aggressively.

The basic concept is that citizens are there for each other in times of distress. When we want our protection, we need to be ready to offer our help to someone else. This mentality is much better than having everyone depend only on the police and expecting them to always come to the rescue.

Another very important factor that is unique to is the collaboration with a NGO like Durga India, which is focussed on women's safety and has been consistently contributing to the cause for 10 years. The success of our model is mainly because Durgas who are nearby are more likely to reach the spot much faster than the police.

4.2. Explain the relevance of your Social Innovation Idea to address the current social problems.

Women's safety has always been a problem we need to solve, it is increasing over the years. Safety should be everyone's right and that gender equality is currently lacking. Our product will help ensure users feel safe and secure, always aware of nearby safe zone locations. They have the confidence that in case something goes wrong, on a click of a button, they can inform their emergency contacts, police, Durgas and the people surrounding them that they are in need of help.

The device will be a guaranteed one touch solution to safety, the users are then are required to help others in need, if an alert is received. It basically unites the citizen against violence. This will act as a complete solution to the issue of safety in public spaces, we can further expand the idea to other segments of users such as the elderly or children.

This project has a lot of scope and potential to grow into a feasible solution.

4.3. Explain the effectiveness of your Social Innovation Idea/ Concept

The project is designed to be extremely effective as it does not rely on one entity completely. The combination of police, emergency contacts, Durgas and active bystanders make the product very effective. The chances of not receiving timely help is almost zero, this means that women are always safe and this has a huge impact on our society.

One core aspect to make the product effective is the number of users. The more users in a certain area, the more chances of getting immediate help. This is why we are going to offer incentives such as coupons and cashbacks.

We have included features like live chatting with Durgas, camera activation to collect evidence, over three hours of video content on various safety tips and tricks and much more, all this without compromising the safety of our user's data.

Durga India has already identified over 500 safe zones across the city and is continuing to train people, providing an effective platform on which our solution will expand.

4.4. Is your Social Innovation Idea ecologically sustainable? Please elaborate.

Our idea has a very minimal contribution to the ecology as the product is based on a smartphone application. The physical device is a compact push button which is reusable. The physical device has very less power consumption, enabling one life cycle to last for 6 to 8 months, the batter can be replaced once drained out.

We at BluTree are very careful about how we treat the environment and will do our best in order to not harm it.

4.5. What is the scale of impact of your Social innovation idea? Is it widely applicable?

The project has been developed in such a way that it has maximum impact on society, we want it to change as many lives as possible. The problem of women's safety is very widespread, not only in India, but across the world. The reason behind keeping the cost of the device extremely low is so that we get a maximum number of people to join our movement. If government and police departments are able to support us, it will be a very impactful solution.

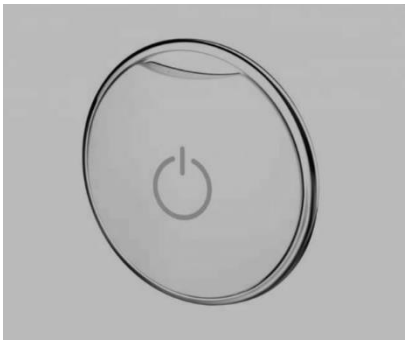
We will be able to collect data points and plot a map of the red zones in every city, based on this data police can further strengthen their security in that region. This will work as a chain reaction ensuring safer localities and further sensitizing citizens to behave responsibly. We plan to roll out the product in Bangalore first and after an initial testing, launch in other cities. We have received interest from countries like Thailand and are working hard toward making that possible very soon.

5. Annexes

We have partnered with Durga India, our official product launch is scheduled to take place on December 12th, 2020 at the NGAGE National Youth Summit.

Durga India Website- Durga India

The following is an image of the physical rigger device which is clipped on to the users outfit.



Keio University (India Japan Laboratory) in collaboration with
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SOCIAL INNOVATION CHALLENGE

(Phase 3: Proof-of-Concept or Prototype Submission)

LAST DATE FOR SUBMISSION: 1 JANUARY 2020

1. Basic Information

Theme Area	Gender Equality and Inclusion
Title	Nirbhaya -Women's Safety Device
Name of Group Leader: Anagha Vasista (9886626332)	

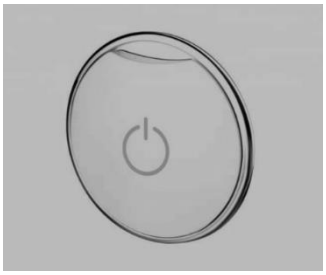
2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Anagha Vasista	**RNSIT**	UG 3rd year	Engineering	anaghavasista@gmail.com
2	Varun Shilesh	**RNSIT**	UG 3rd year	Engineering	varunshilesh2@gmail.com
3	Abhilash M	**RNSIT**	UG 3rd year	Engineering	abhilash6112000@gmail.com
4	Akshaj SM	**RNSIT**	UG 3rd year	Engineering	smakshaj@gmail.com
5	Varshinee Velayudha	**RNSIT**	UG 3rd year	Engineering	varshinee.velayudha@gmail.com
6	Vaishnavi A.	**RNSIT**	UG 3rd year	Engineering	vaishnavi23.arun@gmail.com

3. Submission of Proof-of-Concept or Prototype for your Social Innovation Idea

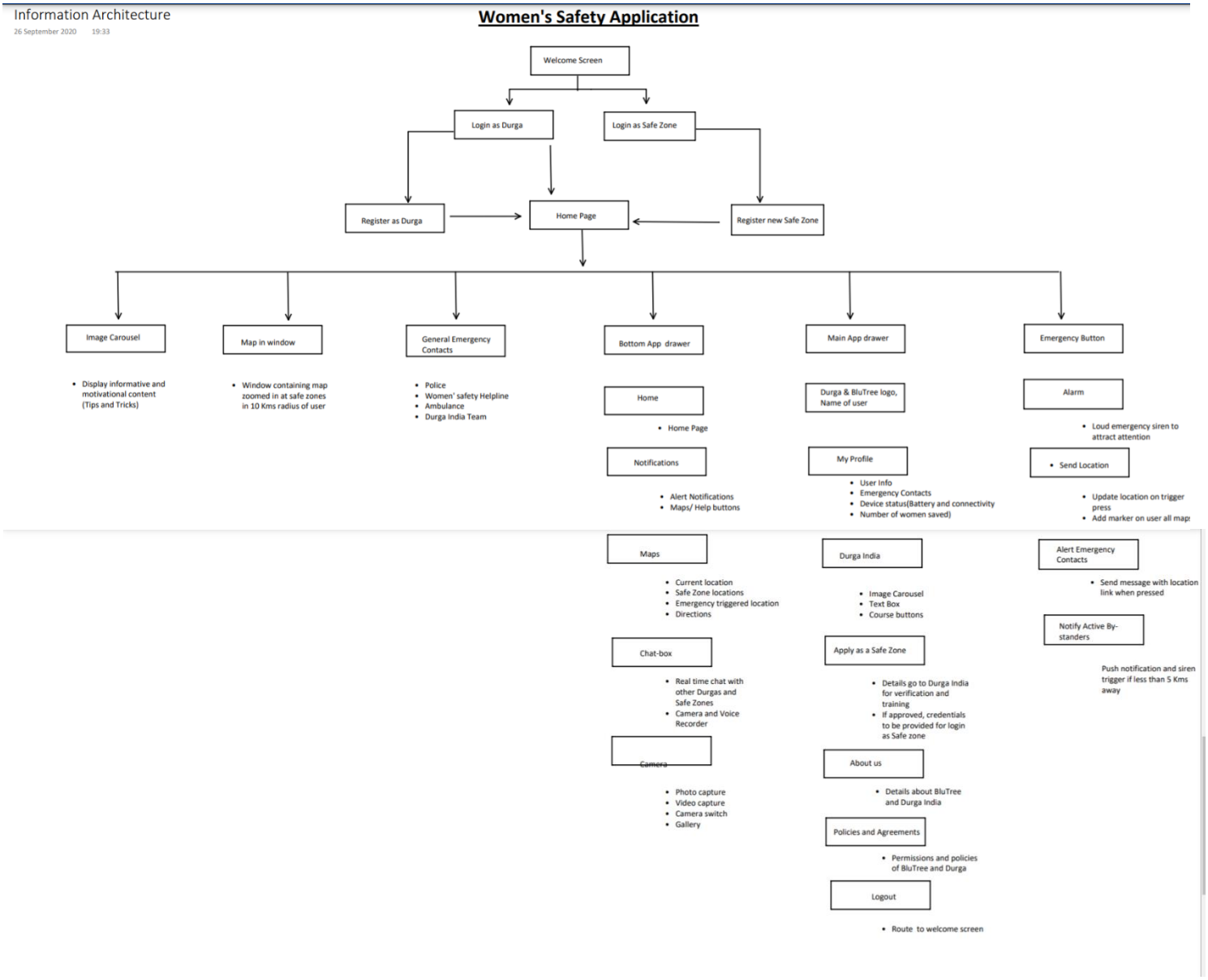
Mobile Application Demo Video:

Please click on this link to watch a demo of our application



Product Demo Video:

Application Information Architecture



Keio University (India Japan Laboratory) in collaboration with
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SOCIAL INNOVATION CHALLENGE

(Phase 2: Proposal submission)

LAST DATE FOR SUBMISSION: 1 DECEMBER 2020

1. Basic Information

Theme Area	Gender Equality and Inclusion
Title	Virtual Self Defense Training with AI
Name of Group Leader	Shalini Das (9082280914)

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Shalini Das	VIT Bhopal	UG 2nd year	Computer Science	shalini.das2019@vitbhopal.ac.in
2	Shanzeh Batool	VIT Bhopal	UG 2nd year	Computer Science	shanzeh.batool2019@vitbhopal.ac.in
3	Toshini Agrawal	VIT Bhopal	UG 2nd year	Computer Science	toshini.agrawal2019@vitbhopal.ac.in
4	Pranjal Roy	VIT Bhopal	UG 2nd year	Computer Science	pranjal.roy2019@vitbhopal.ac.in
5	Prachi Bhatt	VIT Bhopal	UG 2nd year	Computer Science	prachi.bhatt2019@vitbhopal.ac.in

3. Theme Background

In today's digital world with movements like #MeToo and #NoMeansNo raging the social media, a lot is spoken about gender equality and inclusion but few concrete actions are taken. Our idea on developing a virtual self-defense training software aims at taking a step in this direction. Millions of women, girls and children all over the world, young and old alike, feel threatened and insecure to step outside their homes, be it at day or night. With our virtual, user-interactive instructor, we wish to encourage all females to be independent and learn to fight for themselves. Women and girls of all and any age groups can train and prepare themselves for any unforeseen future situations in which they may need to protect and defend themselves or others for that matter. Our novel idea brings an expert AI self defense trainer to the comfort of your homes where you can learn, practice and improve on your defense techniques and moves, at your own pace and boost your confidence.

4. Describe your Social Innovation Idea, and its key characteristics.

With the help of AI and motion-capture (mocap), a woman can learn self defence techniques virtually. There will be two levels for learning self-defence techniques: basic and advanced. Each of these levels will be further classified into two stages: trainer and opponent. In each level, the user has to first qualify the trainer stage to reach the opponent stage. In the trainer stage, the movements of the user shall be studied with the help of mocap, if she is able to follow the instructions and match her movements with the AI trainer then she will score points according to her accuracy of movements. She has to continue to score points to achieve the qualifying score so that she is eligible for the opponent stage where an AI opponent shall test her learning. If she is able to use the techniques successfully in countering the opponent then she will qualify the second stage that will clear the basic level and she will be ready for the advanced level. If she wants to further improve her self defence then she may choose to learn the advanced level of self defence techniques that follows the same procedure as that of the basic level.

4.1. What is the Novelty / Uniqueness of your Social Innovation Idea?

There are many applications where self defense techniques are taught through pictures and videos explaining moves and providing them with training plans but through motion capture, which will capture the movements and through 3D pose estimation which will produce a 3D pose similar to spatial pose of the person, will help in recognising the exactitude of the position. The accuracy of the moves will be increased as the movement grasped will be corrected by an AI responsive model which will be trained to correct and show the right amount of strength required for a punch or kick and the angle of particular joint which should be bent for techniques in self defense (Krav Maga). This in turn will help in not only providing the user with correct moves but also fixing them to the last detail as it would be user-interactive. There will also be a testing phase where at last the user will face an opponent in order to evaluate the learnings from the training phase.

4.2. Explain the relevance of your Social Innovation Idea to address the current social problems.

Women harassment is one of the growing issues where the woman not only in the night but is susceptible to attacks in the broad daylight as well. So, self defense like Krav Maga has been introduced where the main purpose is to defend yourself from the attacker. So, learning techniques from the comfort of your home and being able to go out without the fear of getting assaulted, our app provides virtual sessions which feels like a real trainer is training you as it captures the moves of the user and the AI model corrects them just like how a real trainer would. As you are provided with precise instructions to perform moves. Also, due to low self confidence and fear most women prefer to bear the bully, for that, there is an opponent stage provided where an AI attacker is faced by the user so that he/she gets a 3D experience of the situation which helps in boosting the confidence and hence fighting the bully.

4.3. Explain the effectiveness of your Social Innovation Idea/ Concept

The statistics tell that women who know techniques for self defense are 50%-60% less likely to be bullied. So, this app will help women learn techniques precisely which will in turn build their self confidence and feel positive about their bodies as well. Also, this app not only caters to women but also welcomes anyone who wants to face their fear of bullies by making sure that they learn the correct technique in the comfort of their homes, as some people don't have much time to go to training centres to learn self defense even though they prefer face to face interaction while learning. Also, this app has an advanced stage where someone who is already familiar with techniques can brush them up and can learn to workout through really tense situations. The main service provided by this app of having to fight with an AI trained opponent makes the journey effective as the user is able to self-evaluate his/her training and feel positive to face the oppressor.

4.4. Is your Social Innovation Idea ecologically sustainable? Please elaborate.

Our application focuses on teaching self defense techniques with the help of motion capture and AI. It supports the idea of ecological sustainability by proving to be a saviour of natural resources. Since the users will use this application at their homes, it helps in reducing the physical day-to-day travel to and from a training center and hence contributes to saving fuel and gas and in reducing the air and noise pollution caused by the same. It doesn't affect the environment in any harmful way, hence does not raise any ecological sustainability issues but rather helps in playing a small but significant part towards a cleaner environment.

4.5. What is the scale of impact of your Social innovation idea? Is it widely applicable?

The idea of this application is targeted for all the women, girls, children as well as anyone else out there who feels vulnerable and would like to protect themselves against crimes involving them or their loved ones. According to statistics, every 1 in 3 women, 1 in 7 men and 1 in 15 children worldwide experience an act of violence in their lifetime. Our self-defence software can prove to be the much needed help and support they need. Our app upholds the principle of gender equality and inclusion and welcomes any and all users, irrespective of their gender, who feel a need to arm themselves against bullies and oppressors.

When observed, many people would like to learn self defence, but for reasons like money, distance and commute, they don't get the chance to do so. Our social innovation idea of virtual self-defence training using motion capture, overcomes all these barriers and provides a golden opportunity to everyone out there.

5. Annexes

1. A Review of Virtual Reality and Motion Capture in Martial Arts Training: N.A. Mohd Jelani, A.N. Zulkifli, S. Ismail, M.F. Yusoff
2. https://www.kdnuggets.com/2019/06/human-pose-estimation-deep-learning.html
3. https://medium.com/@samim/human-pose-detection-51268e95ddc2
4. https://greatist.com/move/krav-maga-self-defense-moves
5. https://80.lv/articles/deepmotion-ai-driven-motion-for-games
6. https://www.researchgate.net/publication/332301037_Creating_Pro-Level_AI_for_Real-Time_Fighting_Game_with_Deep_Reinforcement_Learning
7. http://ceur-ws.org/Vol-2498/short10.pdf

Keio University (India Japan Laboratory) in collaboration with
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SOCIAL INNOVATION CHALLENGE

(Phase 3: Proof-of-Concept or Prototype Submission)

LAST DATE FOR SUBMISSION: 1 JANUARY 2020

1. Basic Information

Theme Area	Gender Equality and Inclusion
Title	Virtual Self Defense Training with AI
Name of Group Leader	Shalini Das (9082280914)

2. Details of Group Members

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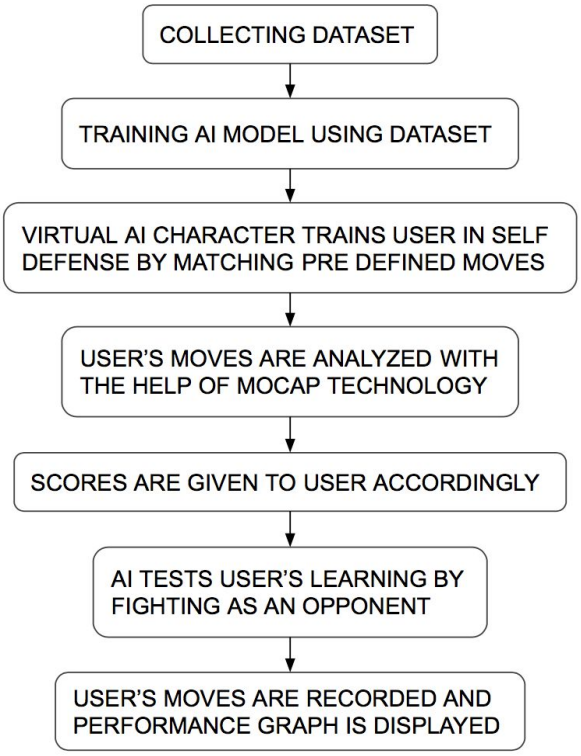
3	Toshini Agrawal	VIT Bhopal	UG 2nd year	Computer Science	toshini.agrawal2019@vitbhopal.ac.in
4	Pranjal Roy	VIT Bhopal	UG 2nd year	Computer Science	pranjal.roy2019@vitbhopal.ac.in
5	Prachi Bhatt	VIT Bhopal	UG 2nd year	Computer Science	prachi.bhatt2019@vitbhopal.ac.in

3. Submission of Proof-of-Concept or Prototype for your Social Innovation Idea

Under Phase-III of the Social Innovation Challenge, participants are expected to submit either a proof-of-concept or a prototype. Proof-of-concept is a form of evidence which demonstrates the feasibility of a design, concept, or business proposal of the innovation. Generally, it's derived through experiment or a pilot project. A prototype is generally a preliminary version or outcome of these activities.

a. *Even if you have submitted these details (such as photos, videos, graphics, or other form of arts), you are advised to submit them here again.*
   Examples: Images (JPG, PNG, GIF, etc.) of your innovative solutions e.g. devices, apps, flowchart for your processes, designs for your social or business models, etc.
b. *Videos can be attached separately via Google Form for the SIC-Phase-III.*



1) Collecting dataset - We collect details of self defense moves such as strikes – as per karate, and boxing, take-downs and throws –as per judo, aikido and wrestling, ground work –as per judo and wrestling, escapes from chokes and holds – as per judo, aikido, wrestling, empty-hand weapon defenses – per aikido. We also store the details of vital points they target and bone movement while using these techniques.

2) Training AI Model using dataset - Now we train the AI model with the dataset we collected with the help of supervised machine learning. With action recognition we teach the AI model self defense moves.

3) Virtual AI Character Trains User in Self Defense by Matching Pre Defined Moves - The primary aim of using a kalman filter in matching the movements of a trainee(user) to trainer is by tracking and detecting data points in motion capture. In a motion/object tracking algorithm, there are generally four steps: object detection, location, association, and trajectory estimation. At the learning stage the primary data set, Motion Capture(MoCap) recording of the trainer will be used. The trainer will perform different attacks and defence techniques. For example: Karate stands: kiba-dachi, zenkutsu-dachi, etc, so suppose there were 6 types of recordings. Defense techniques: gedan-barai, jodan-uke, etc. So suppose there were 8 types of recordings. After seeing the trainer, the trainee will perform these actions. Between each performed action(developed dataset) and recordings the MoCap system will maintain adequate motion tracking. Then the acquired data sets will be used to match the MoCap of both trainer and trainee(user) to

check whether the trainee is getting the right moves or not and then on the basis of matching percentage of both the datasets, scores are provided to the trainee in the training phase. The scores provided will decide if the trainee is ready for another level(basic and advanced technique levels) or not.

4) User's Moves are Analyzed with the Help of MoCap Technology - Motion capturing technology also known as MoCap is a technique for capturing motion of an object by mapping the data to a 3-dimensional object in order to produce realistic animations which help the user get immediate feedback from the trainer. The use of optical MoCap enables complex movement and realistic physical interactions to be easily recreated in a physically accurate manner without restraining the user's movements.

5) Scores Are Assigned To User Accordingly - A criteria will be set according to the percentage of correctness of moves, which will be examined from developed datasets(trainee's dataset) and then accordingly, scores will be assigned at each and every level of both the stages. They have to achieve a certain number(according to the criteria) which will determine the degree of accuracy learnt for performing the techniques.

6) AI Tests User's Learning by Fighting as an Opponent - This test will be performed at the assessment stage where the primary datasets are MoCap recordings of the assessment moves which will be used by both the trainer and the trainee. And the developed data set is the defence techniques used by trainees. Finally we will match these primary dataset and developed dataset and accordingly provide the scores to the trainee.

7) User's scores recorded and performance graph is displayed - For making the performance graph,the dataset underconsideration will be the number of scores achieved by the trainee at various levels of learning stages. Through SciChart, the performance graph will be made dynamically and flexibly as it is an android chart control library.

Theme 4

Urbanisation

1st Prize	**Ahmer Bashir Shah** *Instant conversion of human hair wastes from salons and chicken poultry wastes into NPK, amino acids and micronutrient rich novel organic liquid fertilizer for ready to use in agriculture*
2nd Prize	**Manorama Maharana** *Project Aasha*
3rd Prize	**Azeem Husain Khan** *A Portal for Farmers to Sell their Produce at a Better Rate.*

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SOCIAL INNOVATION CHALLENGE

(Phase 2: Proposal submission)

LAST DATE FOR SUBMISSION: 1 DECEMBER 2020

Proposal should not exceed 4 pages. Any proposal exceeding 4 pages will not be considered. Also, please strictly follow the word limits in each section.

(Note: Delete the instructions in Red and Green font when submitting the proposal)

1. Basic Information

Theme Area	_Urbanisation____ (Specify one core theme) *(Water management / Health care / Gender Equality and Inclusion / Urbanization)*
Title	*Instant conversion of human hair wastes from salons and chicken poultry wastes into NPK, amino acids and micronutrient rich novel organic liquid fertilizer for ready to use in agriculture.*
Name of Group Leader Ahmer Bashir Shah__ (*6005432788,9622424014*)	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Group Leader	Ahmer Bashir Shah	PG 2nd year	Agricultural Engineering	ahmar.bashir1@gmail.com
2	Group Member 1	**Tayeeba Shakeel wani**	**PhD 2nd year**	**Public administration**	**tayeeba16@gmail.com**
3	Group Member 2	**Muzamil Hamid wani**	**PG 2nd year**	**Agricultural Engineering**	**muzamilwani.029@gmail.com**

**Please add more rows to the table depending on the number of group members*

3. Theme Background (What problem is being addressed by your Social Innovation Idea?) **(170 words)**

Human hair wastes take more than 50 years to decompose naturally that too when provided perfect temp and pH. Around 125 million kgs of human hair waste from salons, temples and 350 million tonnes of chicken poultry wastes are generated in India annually. In Srinagar city alone more than 700 Kgs of human hair wastes and 1.80 lakh Kgs of poultry wastes are generated each month. But no feasible waste management plan is present for these two quantum solid wastes in India. As such these two solid pollutants remain untreated and piled in landfills. Similarly, around 200-250 metric tones of kitchen waste is generated daily in Srinagar city in which around 70% is the food wastes or the

organic wastes. Also growth rate of agriculture index has dropped from 8.73% (1971) to 2.61% (2018) due to uneven and rough use of chemical fertilizers on agricultural land. Besides, these chemical fertilizers are also proven poisonous and unfit for human consumption by many Indian standards.

[End Section 3 in Page 1]

4. Describe your Social Innovation Idea, and its key characteristics. [200 words]

Our innovative technology at SKUAST-K has been successful in converting within 30 minutes Human hair and Poultry wastes completely into 100% novel Organic liquid Fertilizer "KeraH-GroW" richest in Nitrogen (13%-16%), phosphorus (2-3%) and Potassium (42-45%) with 27 essential elements and 10 essential amino acids for instant use. Three bulk wastes (hair, poultry wastes & Kitchen wastes) processed organically in this invention by a novel process provides a cost effective method to provide at large scale harmless (NPK) rich eco-friendly liquid organic fertilizer to be either poured directly into soil or sprayed directly on crops. The liquid fertilizer can also be lyophilized to powder form and packed in bags for ready to use. The innovative technology will not only provide a novel solution in reducing a major layer of untreated quantum wastes in urban areas but will also add in providing a potent new organic fertilizer that can deliver at par with chemical fertilizers thus reducing chemical inputs in Indian agricultural systems.

4.1. What is the Novelty / Uniqueness of your Social Innovation Idea? [170 words]

The developed technology and developed end product with such high organic percentages of N-P-K are both novel. The method with its created SOP for converting all Keratinous wastes into Liquid organic fertilizer is innovative and is cost effective. The uniqueness of this technology is that we are using one mass of organic wastes to convert mass of keratinous wastes into liquid organic fertilizer instantly without any chemicals involved and harmful derivatives emitted into atmosphere. The technology is published at Indian Patent office (under Patent application ID 201911047825).

4.2. Explain the relevance of your Social Innovation Idea to address the current social problems. [170 words]

Our social Innovation idea is under its pilot scale stage initially for Srinagar city, Kashmir. Once the production line is operational, it will help in reducing a mass layer of untreated hair wastes and poultry wastes piled up at different corners in Srinagar city. The current practice for tackling these hair wastes and poultry wastes is burning it openly or filling them up in specified landfills. Obviously these two practices are at no cost eco-friendly and feasible. In this scenario if our technology of "waste to value" will be taken at a higher scale, this will undoubtedly prove a cost effective and eco-friendly method for treating these two solid pollutants not only for UT of J&K but for other states of India also. In addition to it, this will provide farmers a new, cheaper and more potential organic fertilizer than vermicompost and cowdung that will deliver at par with chemical fertilizers.

4.3. Explain the effectiveness of your Social Innovation Idea/ Concept **[170 words]**

KeraH-GroW is a 100% tested product for its vigor and performance on various agricultural trials like on chilli, kale and tomato under the supervision of State agricultural university SKUAST-K. The product will reap same yield for farmers as they obtain from use of chemical fertilizers on their agricultural crop. It was found in some trials with parallel controls, that the product showed remarkable 12-15% increase in productivity of crop as compared to use of conventional chemical fertilizers. 1 kg of hair can produce upto 20 litres (if 20× diluted) of organic liquid fertilizer containing 177.48g Nitrogen, 208.37g Potassium and 4.54g Phosphorus (w/v) with adequate traces of 27 essential micronutrients and 14 essential amino acids (like methionine, tryptophan, isoleucine and valine etc).Statistics says around 2500 farmers on an average commit suicide in India per year for many reasons. Urea non availability also being one of the crucial reasons. 51% of farmer community in India is obliged to purchase urea under black marketing. As a result of black marketing farmers are forced to pay 61% more cost over the actual mrp. of the urea fixed by the govt. The product will gradually help to resolve these unexpected causalities if technology is carried out with the stern intervention of the Govt.

4.4. Is your Social Innovation Idea ecologically sustainable? Please elaborate. **[170 words]**

While practices such as burning of human hair openly leads to emission of severe harmful gases (such as ammonia, carbonyl sulphides, hydrogen sulphides, sulphur dioxide, phenols, nitriles, pyrroles, and pyridines) into environment. Our technology will surely prove to be alternative to this practice. Our innovation as mentioned above is eco-friendly and does not involve any chemical processes or emission of harmful derivatives into atmosphere. This will not harm our ecology in any way but infact will help in sustaining ecology by waste management.

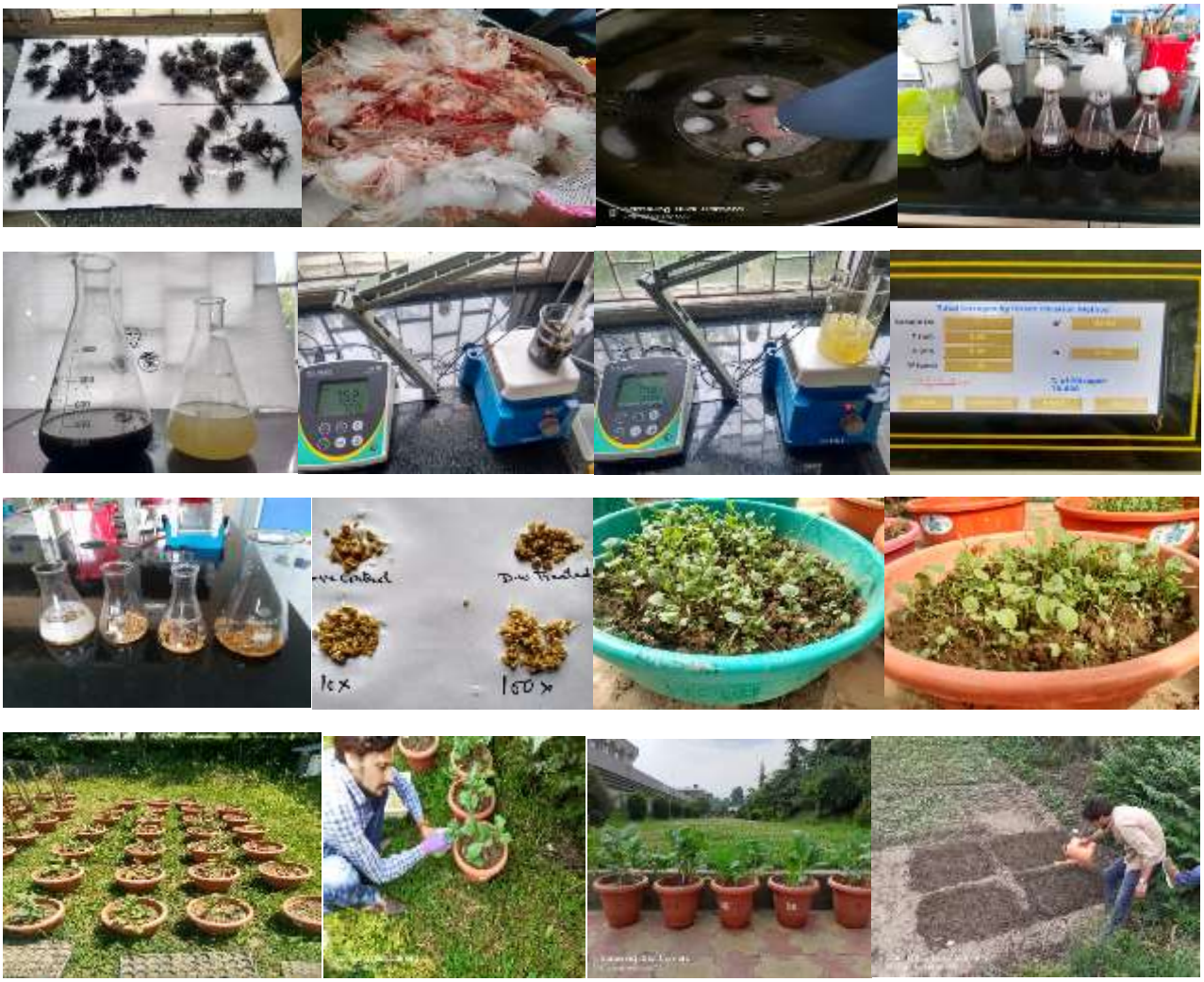
4.5. What is the scale of impact of your Social innovation idea? Is it widely applicable? **[170 words]**

The innovation not only has a potential to go on a national scale but even to global scale with abundant raw material available throughout. Our concept of this waste management is under process (pilot scale) initially for Srinagar city. This model of waste management in collaboration with the concerned Srinagar Municipal Corporation will operate initially at a capacity of 400 litres/day (continuous feed disposer unit) with an input Keratine wastage of 30 Kgs each single day. The scale will be gradually increased to 1000 Litres/day after one year of progress. The model can be extended to whole Kashmir with a raw wastage of 2000 kgs hair wastes and 10 lakh Kgs poultry wastes generated each month. Similarly on a much higher scale with the above mentioned figures of selected wastes for India, the model can be extended to the whole country.

[End Section 4 in Page 3 **5. Annexes (strictly within 1 page)**

Please put any additional information and reference documents that you would like to share related to your social innovation idea like technical details, weblinks, proof of concept, photo of the model etc

PROOF OF CONCEPT:



Before

Human hair waste and poultry wastes

Within 40 minutes

After

Final end product of liquid organic fertilizer 'KeraH-GroW' (NPK) rich

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SOCIAL INNOVATION CHALLENGE

(Phase 2: Proposal submission)

1. Basic Information

Theme Area	URBANIZATION
Title	Project Aasha
Name of Group Leader: Manorama Maharana (+91 9731222896)	

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Manorama Maharana	Vellore Institute of Technology, Vellore.	UG 3rd year	Computer Science Engineering	manoramamaharana@gmail.com
2	Kartavya Asthana	Vellore Institute of Technology, Vellore.	UG 3rd year	Computer Science Engineering	asthana.kartavya@gmail.com

3. Theme Background

While there is enough scientific and academic evidence to suggest that environmental degradation poses a threat to the existence of the planet, there has not been a proportionate political and public response to prevent it. On one side - the climate is getting warmer and glaciers are melting, while on the other – humans are still engaging in activities that are detrimental to nature.
Recently, policymakers and other influential people have made efforts to encourage the masses to adopt eco-friendly practices. However, unawareness and lack of incentivisation amongst citizens have made this attempt futile.
Interestingly, the younger generation who are least responsible for environmental degradation will be affected most by it. Thus, we have developed an application that encourages and rewards citizens living an eco-friendly lifestyle. As research shows that people look to their peers for cues about how to behave, we aspire to create a community where citizens observe fellow beings indulging in activities such as waste segregation, tree plantation, car-pooling and get motivated to do the same.

4. Describe your Social Innovation Idea, and its key characteristics.

We hope to create a community that embraces and celebrates an eco-friendly lifestyle together. People love to be competitive and this healthy competition can tactfully be used in a way that is beneficial for the environment. We have developed an application that rewards people in the form of points for adopting healthy practices.

After signing up on our android application, users can take up challenges that have been designed to help people adopt a greener lifestyle. On completion, they will have to click a picture of the same and upload it on Twitter with relevant hashtags. The image will also be retweeted by our bot – 'aasha.bot' to spread awareness. To ensure that the user is uploading authentic images, we will conduct periodic audits. For every challenge, they are awarded with points and a leader-board reflecting the same is maintained. The reward system has been built to motivate the users to perform even better.

To further create awareness, we display articles that contain facts and cogent arguments about the state of the planet. In case an area experiences environmental issues, users can 'report the region' to the local authorities. This would assist them in reducing the impact of the hazard.

4.1. What is the Novelty / Uniqueness of your Social Innovation Idea?

While there exist few applications with the same objectives as ours, they have not been successful in motivating the masses. Most applications are only educational in nature and hence are unable to get attention. Often, when apps solely let people know of their carbon footprints, excessive water consumption etc and not ways to improve their habits, people feel pestered and attacked. They are made to feel they're culpable for bringing the environment to this state.

Our application is unique as we encourage users to contribute by giving practical challenges. Further, they are rewarded after completing the challenge and a leader-board is maintained which results in a healthy competition incentivising people to do good. As we enable users to post images of challenges through Twitter, they can share them with their friends to spread awareness. We provide a diverse set of challenges opposed to a singular issue which most apps deal with. We uniquely provide challenges, rewards, sense of community and relevant news in one place.

4.2. Explain the relevance of your Social Innovation Idea to address the current social problems.

Since the industrial revolution, about 375 billion tonnes of carbon have been emitted by humans into the atmosphere. The planet is warming by unprecedented amounts and a delay in action today will affect our future.

Keeping in mind the idea of "*alone we can do so little and together we can do so much*", we have developed an application that encourages people to adopt eco-friendly lifestyles. In today's digital era, online applications are the best method to convey one's message to the masses.

Lifestyle changes are difficult to practice in isolation without any immediate incentive. When individuals see other members of their community carrying out tasks like cutting down the use of plastics, using public transport, reducing water consumption etc; and getting rewarded for the same, they are likelier to make these changes. Once they live a 'greener life' and get societal recognition for the same, they will continue with it. Environmental degradation is an acute problem and only by unifying citizens can we save the planet.

4.3. Explain the effectiveness of your Social Innovation Idea/ Concept

Off late, governments and influential people are endorsing entities that are accessible and promote eco-friendly practices. Our application is perfectly placed in such times as it checks all boxes. With appropriate branding, there is a strong possibility of it being adopted and promoted by institutions - including the government.
Once it gains public traction, more citizens would want to associate with the application as it will be seen as a symbol of responsible citizenry. The tasks in the app have been framed in a way that makes them look feasible. To impel app users to undertake a particular task and highlight its need, facts regarding the same have been provided. The users will upload a picture of the completed task on Twitter which will then be retweeted by our bot with the intention of our application getting more attention.
The potential of the application to attract users and make them perform eco-friendly tasks using their sense of community and healthy competition is a reflection of its efficiency.

4.4. Is your Social Innovation Idea ecologically sustainable? Please elaborate.

According to NASA, 17 out of the 18 warmest years on record have all occurred since 2001 and carbon dioxide levels in the air are at their highest in 650,000 years. Fortunately, in today's generation, mobile apps are able to spread awareness on the environment and fight climate change. Be it an application for monitoring air quality or water consumption, technology promotes people to play their part in saving the planet.
Project Aasha is not only ecologically sustainable itself, but also promotes the idea of green lifestyle practices to its users by encouraging them to take up challenges like planting trees, practicing car-pooling, recycling, segregating waste and conserving water amongst others. We have also focused on asking users to adopt long term lifestyle changes such as implementing rain water harvesting, installing solar panels and switching to LEDs. By getting the users to undertake these daily and lifestyle challenges, we make the effort of combating the threat of environmental degradation.

4.5. What is the scale of impact of your Social innovation idea? Is it widely applicable?

The problem of environmental degradation is prevalent throughout the globe. Recently, governments are looking to establish systems that make people cautious of the impacts of climate change. As our vision aligns with a powerful entity like the government, the impact of our application is huge.
We have provided the option of using the app in multiple languages. This is to be inclusive towards people in rural regions that are comfortable with their native language and widen the reach of our vision. Challenges have been framed in a manner that's easy and comprehendible.
We primarily target the younger generation who are most aware about environmental problems. This ensures 'word of mouth' publicity because most young people are very social. Sharing of challenges on social media by users as well as retweets and likes by our bot provide Project Aasha with more traction and reach. Taking advantage of the digital era, we have made efforts to instil a sense of responsibility towards the planet without making it seem tedious.

5. Annexes

Source Code: https://github.com/Manorama09/Aasha (GitHub link)

Proof of concept (POC): https://youtu.be/hfDw3ATTiRs

Project Explanation Video: https://youtu.be/LSP6Vg8sZVE

Tech Stack Used:

1. The Android Application is built using Flutter framework with Firebase as the database. We make use of the Cloud Firestore functionality to store the necessary details.
2. Several pub dev packages have been imported to include multiple features in our application.
3. We use social authentication (using Google or Twitter) as a sign in method for ease and security.
4. The twitter bot (aasha.bot) has been programmed using the tweepy library using Python and the Twitter Developer API.

How does it work?

1. Users sign up with their Google or Twitter account. (Social authentication)
2. The home page consists of multiple modules that are listed as follows:
    a. *The E-Challenges Section:* A list of challenges has been provided for users to choose from. On choosing a challenge (daily/lifestyle), the user can view details regarding the same and upload a relevant image on Twitter using hashtags as instructed.
    b. *The Rewards Section:* This section displays the user's position on the leaderboard based on their performance in challenges. Ranks are displayed based on individual as well as region-wise performances.
    c. *The Awareness Section:* They can view happenings related to environmental concerns to keep themselves up to date. The articles are read from Twitter using our bot – aasha.bot, that filters tweets based on hashtags, keywords and the users tweeting them.
    d. *The Analysis Section:* Users can visualize the impacts of climate change on various parameters (region-wise) such as Carbon Footprint, Temperature, etc.
    e. *Settings:* One can choose their region and also switch between multiple languages to browse the application with ease. This increases the scale of impact in rural areas of our country, where usually native language is a preferred way of communication.

Future Scope of Project Aasha:

1. We plan on implementing an additional module – The 'Report an Area' Section – where users can report an area for violating rules that thus damage the environment and need immediate attention.
2. The admin panel will be developed where, the admin will be responsible for maintaining a leaderboard and conducting sporadic audits. The admin will also receive reports and convey them to the concerned local authorities in the respective region.
3. We plan on including additional bonuses and rewards in form of badges for every milestone a user achieves.

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SOCIAL INNOVATION CHALLENGE

(Phase 3: Proof-of-Concept or Prototype Submission)

1. Basic Information

Theme Area	URBANISATION
Title	Project Aasha
Name of Group Leader: Manorama Maharana (9731222896)	

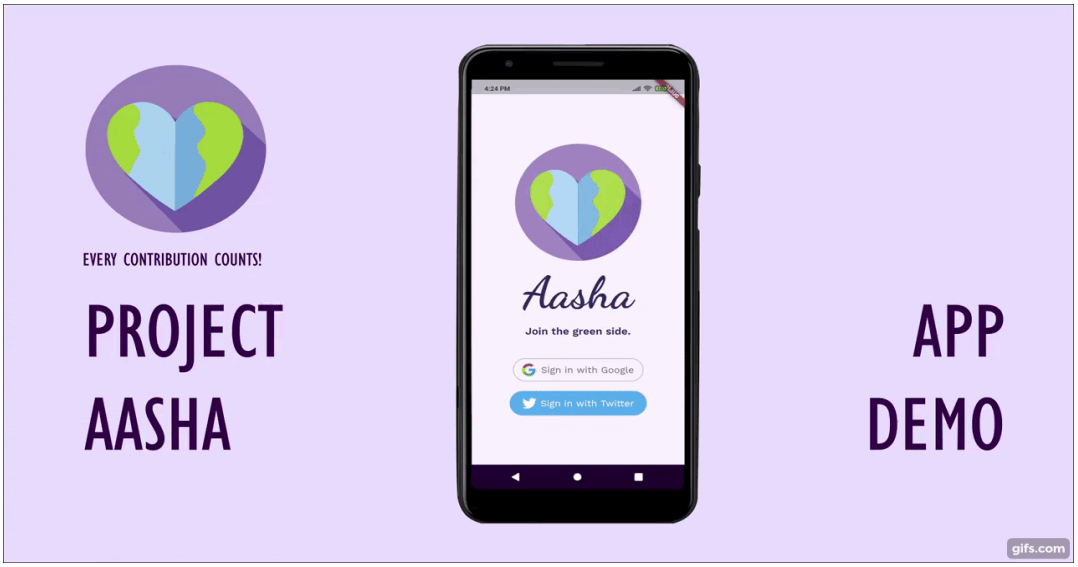
2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Manorama Maharana	Vellore Institute of Technology, Vellore.	UG 3rd year	Computer Science Engineering	manoramamaharana@gmail.com
2	Kartavya Asthana	Vellore Institute of Technology, Vellore.	UG 3rd year	Computer Science Engineering	asthana.kartavya@gmail.com

3. Submission of Proof-of-Concept or Prototype for your Social Innovation Idea

Table of Contents:

3.1. Proof of Concept – Video Demo: *youtu.be/hfDw3ATTiRs*



3.2. Web Application Prototype

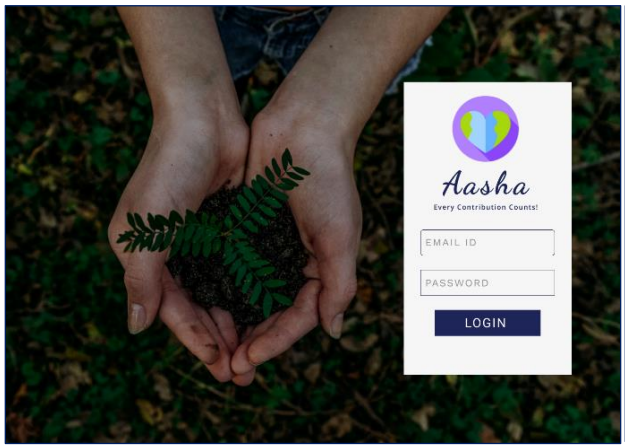


Figure 3.2.1. Admin Login Page

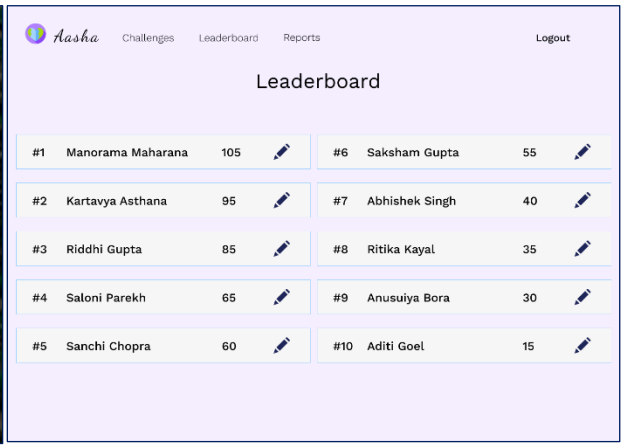


Figure 3.2.2. Leaderboard

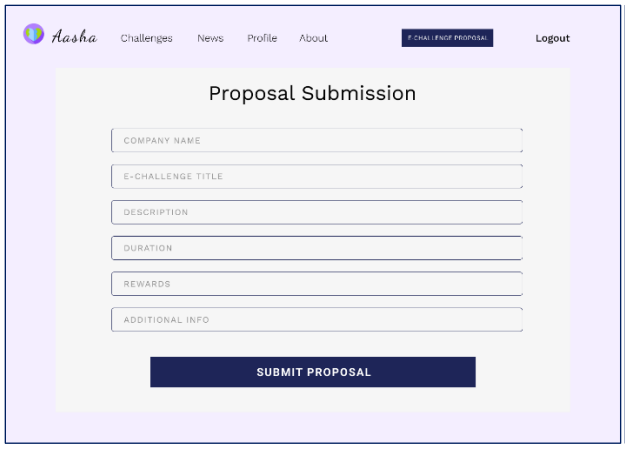


Figure 3.2.3. Proposal Submission Form

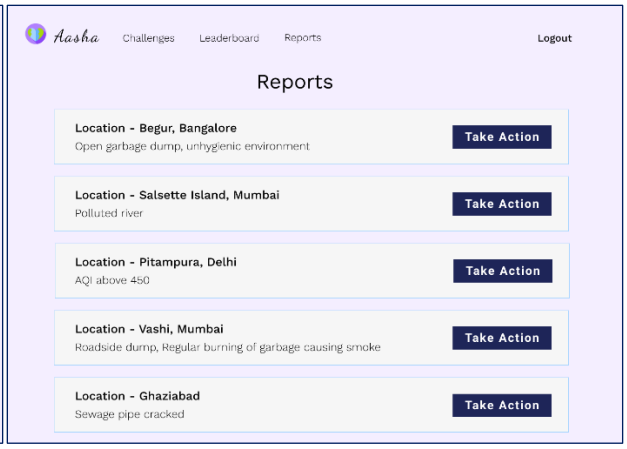
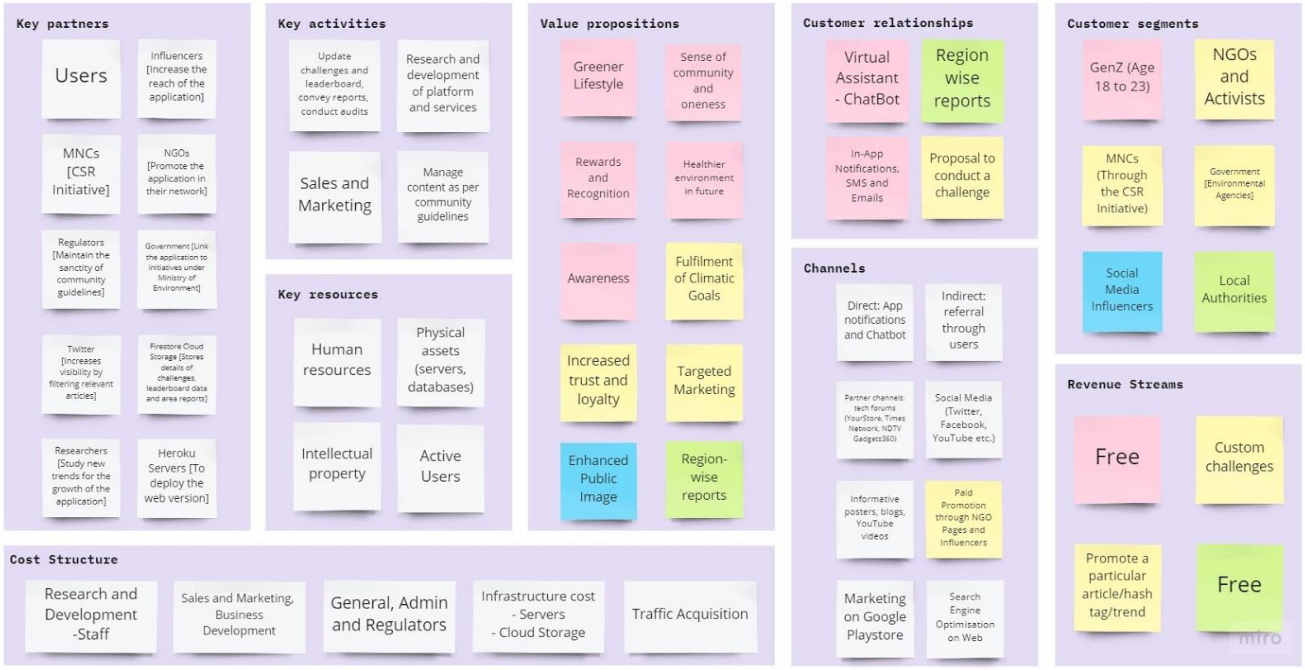


Figure 3.2.4. Received Complaints

3.3. Project Explanation – Video: *https://youtu.be/LSP6Vg8sZVE*

3.4. Business Model



3.5. Source Code

GitHub Link - https://github.com/Manorama09/Aasha

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SOCIAL INNOVATION CHALLENGE

(Phase 2: Proposal submission)

LAST DATE FOR SUBMISSION: 1 DECEMBER 2020

Proposal should not exceed 4 pages. Any proposal exceeding 4 pages will not be considered. Also, please strictly follow the word limits in each section.

(Note: Delete the instructions in Red and Green font when submitting the proposal)

1. Basic Information

Theme Area	_Urbanization
Title	A Portal for Farmers to Sell their Produce at a Better Rate.
Name of Group Leader	AZEEM HUSAIN KHAN (6394822768)

2. Details of Group Members

S.No.	Name of Group member	University / Organization	Program (UG or PG) / Year	Discipline	Email
1	Azeem Husain Khan	Dayananda Sagar Academy Of Technology & Mngmt.	UG 2nd Year	Computer Science Engineering	azeemhusain1302@gmail.com
2	Anannya Mahapatra	Dayananda Sagar Academy Of Technology & Mngmt.	UG 2nd Year	Computer Science Engineering	anannya1947@gmail.com
3	Rahul Tripathi	Dayananda Sagar Academy Of Technology & Mngmt.	UG 2nd Year	Computer Science Engineering	rahultripathidev@gmail.com
4	Vansh Sameer	Dayananda Sagar Academy Of Technology & Mngmt.	UG 2nd Year	Computer Science Engineering	vvvansh1990@gmail.com
5	Kamal Nayan	Dayananda Sagar Academy Of Technology & Mngmt.	UG 2nd Year	Computer Science Engineering	itsk1201@gmail.com

6	Ayush Kumar Sinha	Dayananda Sagar Academy Of Technology & Mngmt.	UG 2nd Year	Information and technology Engineering	inc.ayush29@gmail.com

3. Theme Background

The following problems are faced by farmers.
1. Farmers are unaware about the price of the product or market trends.
2. Farmers cannot market their products to any other parts of the world other than the closer by cities from their farm land.
3. Inadequate transport and communication facilities.
4. Farmers are in a hurry to sell their produces since most of them are indebted to money lender and they want to get rid of them.
Disclaimer: Being from rural area I, group leader, witnessed this personally.

4. Describe your Social Innovation Idea, and its key characteristics.

We are planning to design a portal which provides a medium to farmers to sell their produce directly to the customers, hotel owners or anyone across the country. Farmers can sell their produce at their own price keeping in mind about the market price which will be updated time to time by the portal and farmers will be suggested to use.
Key Characteristics:
1. To overcome the challenge of technology, a message based system will be used which connects the farmer to the portal.
2. The farmers can register to the portal and will receive regular updates about the market price and trend.
3. Farmers can use their own transport means or third party transportation service supported by the portal.
4. It will also benefit the buyers as they receive the best produce directly from the farm at a standardized market price.

4.1. What is the Novelty / Uniqueness of your Social Innovation Idea?

1. The Uniqueness of our Social Innovation idea is that we would let farmers to avoid the middleman and sell their produce directly to customers. This portal will be a mean by which the farmers can directly connect to the customers, restaurant owner, etc. and sell their produce at better rate.
2. Optional transportation service will also be provided by the portal.

4.2. Explain the relevance of your Social Innovation Idea to address the current social problems.

Our idea can be implemented on particular regions in the beginning as it deals with perishable items also since our portal is built on direct relationship with the farmers and the buyers by omitting the role of middlemen. Thus, a better income for farmers and happy buyers.

4.3. Explain the effectiveness of your Social Innovation Idea/ Concept

I have three reasons to show the effectiveness of my Social Innovation Idea:
1. We will update about regularly about market price and trend. Farmers are unaware about the price of the product or market trend.
2. Inadequate transport and communication facilities. This portal will resolve this problem too by providing optional transport service.
3. Omit the role of middleman to increase the farmer's income and remove technology barrier by introducing simple messaging platform.

4.4. Is your Social Innovation Idea ecologically sustainable? Please elaborate.

Yes, our idea is ecologically sustainable. We will try to solve maximum problems of farmers and provide them a user friendly portal to sell their produce at better rate. Our idea can be implemented on particular regions in the beginning as it deals with perishable items also since our portal is built on direct relationship with the farmers and the buyers by omitting the role of middlemen. Thus, a better income for farmers and happy buyers.
Generally, the middleman and wholesale businessmen purchase the agricultural products from the farmers at a lower price. They also get the commission from the farmers for the transactions made. In turn, fresh vegetables and fruits purchased at the lower prices from the farmers are sold out to retail businessmen at higher price and retail businessmen sell those Agricultural Products further at higher prices to the buyers. As a result, the farmers get only the lower price for their produce whereas the consumers have to pay higher price for the same produce.

4.5. What is the scale of impact of your Social innovation idea? Is it widely applicable?

Since we will be in direct relation with farmers and buyers. Our main parameters will be trust, demand supply, transport, etc.
To be honest, our idea cannot be applicable widely. We can extend the area but we are supposed to be very calculative about transaction cost and other government regulation.
Our idea can be implemented on particular regions in the beginning as it deals with perishable items also since our portal is built on direct relationship with the farmers and the buyers by omitting the role of middlemen.

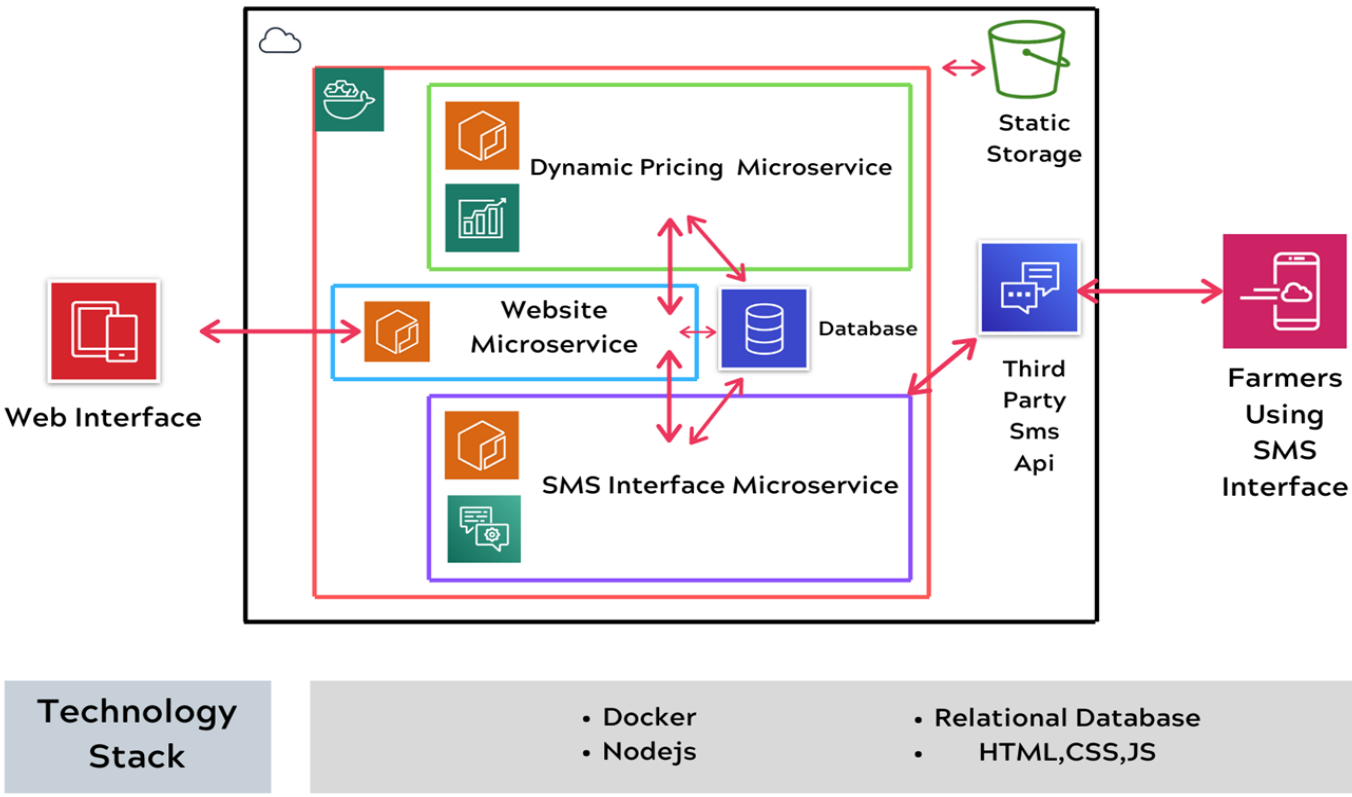
5. Annexes

Approach:

- ***A SMS Interface is created using a Third Party API (Twilio Conversations) along with a Web Interface . By using our SMS/Web service, farmers can interact with our platform to upload and manage details about their produce/vegetables and track orders and payments.***
- ***Micro services are made to handle the SMS Queries and run Web Server independently with the help of Docker along with a Relational Database and the platform will be hosted on a Cloud Service Provider (Amazon Web Services).***
- ***The prices of the produce can be compared to other platforms using our in-house API and the Open-Source changed dynamically to increase the sales.***

Technology stacks :

- ***Docker***
- ***Node.js***
- ***HTML, CSS, JS***
- ***Relational database***



Appendix 1

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SOCIAL INNOVATION CHALLENGE

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