



Tata Centre
for Technology
and Design
IIT Bombay

TURNING POINT



Tata Centre Newsletter, May 2020

In the wake of the current Covid-19 crisis, two projects supported by Tata Centre at IIT Bombay, have promptly stepped up to action.

WWH – connecting people with help and information

EDUCATION

This technology platform supports two modes of connecting people - with help providers and with information.

Hospitals, government agencies, NGOs and foundations have felt the need for helplines to connect with the relevant, and to avoid unnecessary travel and contact. Hospitals - to connect patients to doctors, Government agencies - to provide information on the crisis, schemes and packages, handle

citizens' complaints and connect demand of personal protective equipment, ventilators, etc. to supply chains, and NGOs - to reach out to senior citizens, special populations, and migrant workers. With the current lockdown, the call centre staff have been unable to access the existing infrastructure and cater to this surge in demand.

The World Wide Help (WWH) platform - an Education project - headed by Prof Kameswari Chebrolu, Dept of Computer Science and Engineering, has been able to meet these challenges by providing two modes to connect with help providers. Formerly called the VMOCOSH platform, this generic voice-based mobile-crowd-sourced helpline helps to provide access to information in an asynchronous manner. While it is an easy to set up and cost-effective platform, it is voice based making it very accessible, and independent of literacy level or tech suaveness. The solution is similar to call centers, except that this can be managed through smartphones and the helpers/volunteers can work from anywhere.

Challenges seen from the use cases has meant refining the WWH platform for the research team. While 90 per cent of the code is reusable, some 10 per cent has been modified or disabled. For instance, one use case has no concept of second-level helpers, while others have. Another expects direct calling i.e. when people

Hospital Helpline	
Accepted Task	
Task Id:	702
Category:	Patients above 12
Language:	Marathi
Client Number:	9822484824
Date:	May 07,2020, 11:46 AM
Name:	
Location:	MAHARASHTRA
<input type="button" value="CALL"/> <input type="button" value="MESSAGE"/>	
<input type="button" value="MARK AS COMPLETE"/> <input type="button" value="REALLOCATE"/>	

Hospital Helpline	
Pending Task	
Task Id:	337
Category:	Pregnancy or Women specific Issues
Language:	Hindi
Date:	April 05,2020, 01:11 PM
Name:	vamshi
Location:	TAMILNADU
<input type="button" value="ACCEPT"/> <input type="button" value="REJECT"/>	

Screenshots of the WWH platform

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call requiring help, it should redirect the call immediately to helpers while the other person waits on call. Other helpers who do not want this feature have specified that they would attend to the calls only when free. To support the general public better, many use cases have also needed integration of WhatsApp – the social media platform - since phone calls do not support media exchange like images, pdfs and so on.

The research team has required to do quite a few iterations with those wanting to use the technology platform. Understanding the requirements and coming up with the right fit of features to be enabled/disabled/coded is keeping the team busy. If the number of requests to setup increase, scaling up may be a challenge and more coders will have to be involved, as each setup requiring some amount of fine tuning. This has been a big change for the WWH research team and the response to such needs is definitely work in progress. For more details about the project contact chebrolu@cse.iitb.ac.in

The Research Team

World Wide Help (WWH) Mode 01

This platform supports two modes of connecting people with help and information.

A team led by Prof Kameswari Chebrolu of the Department of Computer Science & Engineering, IIT Bombay, has developed the World Wide Help (WWH) platform that can connect people with help providers like healthcare workers, doctors, NGO volunteers or BMC personnel. It helps in managing multiple requests for the help providers (eg. doctors/hospitals), by maintaining a virtual queue from help seekers.

The WWH solution supported by Tata Centre for Technology and Design, at IIT Bombay, supports the above workflow via phone calls and text messages through Whatsapp, without physically visiting people, and yet keeping up with social distancing norms and digitizing information.

A slide deck is available at:

<https://tinyurl.com/rregaez>

A demo of the app (made for KEM hospital):

<https://www.youtube.com/watch?v=ZoFUqCMnqIA&t=89s>

FOR MORE INFORMATION PLEASE CONTACT:

chebrolu@cse.iitb.ac.in

Mode 01 Connecting people with help providers

Use case scenarios:

- Hospital** helplines connecting patients with doctors to avoid unnecessary travel/contact
- Government** helplines that:
 - provide information on Covid;
 - provide information on govt schemes initiated to help during lock-down; or
 - handle citizens' complaints.

Steps:

- Authorities need to **recruit** help providers (helpers) who need to **install** the Android app.
- Help can be **requested** by the general public via phone call (from any type of phone) or Whatsapp **text** messages.
- The help request is **converted** into a task and **assigned** to the helpers.
- The helpers can open the task in their app, call or message the person and provide **help/advice** (anonymously).
- Authorities can **monitor** their workforce via a dashboard.

World Wide Help (WWH) Mode 02

This platform supports two modes of connecting people with help.

A team led by Prof Kameswari Chebrolu of the Department of Computer Science & Engineering, IIT Bombay, has developed the World Wide Help (WWH) platform that can help conduct surveys through phone calls without physically visiting people, and yet keeping up with social distancing norms, and digitizing information.

The WWH solution is supported by Tata Centre for Technology and Design, at IIT Bombay.



FOR MORE INFORMATION PLEASE CONTACT:

chebrolu@cse.iitb.ac.in

Mode 02 Conducting Surveys

Use case scenarios:

- BMC workers** collecting travel history of international travelers.
- Collecting information that can help model Covid transmissions.

Steps:

- Staff conducting the survey need to **download** the Android app.
- Authorities (e.g. BMC) needs to **upload** a file containing the phone numbers of people to call, along with a Google form URL on the dashboard.
- The WWH platform will **distribute** this work as tasks to the staff.
- When the staff opens the task in their phones, they can **call** and simultaneously **fill** the forms (all on phone).
- Authorities can **download** all responses as a spreadsheet, for analysis.

Safe burning of waste

WASTE MANAGEMENT

The proposed solution looks into the development of a simple, portable and cost-effective incineration system for only masks and gloves which can be used in small hospitals and quarantine centres.

In the current Covid-19 outbreak, members of health care agencies, municipality waste management teams and housekeeping units are at much greater risk. As per the guidelines, a single-use mask shouldn't be used for more than six hours or, on more than one occasion, and which if done, may increase chances of infection. This has led to a huge amount of highly contaminated waste spreading the risk of the disease further.

Though big hospitals in metro cities have systems in place for medical waste collection and incineration, there is a high risk in proposed quarantine centres in schools, guest houses, hotels, grounds, trains, etc. which lack such incineration systems and trained workers handling such contaminated medical waste. In the coming weeks, more and more such quarantine facilities will be required and coming up. There is thus an urgent need for the development of portable and small scale incinerators which can be used in such make-shift hospitals or quarantine centres.

In response to this challenge, Tata Centre has recently taken on the project Development of a portable incineration device for safe disposal of masks/gloves in hospitals and quarantine centres, under Prof Sandeep Kumar, Dept of Energy Science & Engg. and Prof Sanjay Mahajani, Dept of Chemical Engg. With Mumbai being the biggest hotspot in India and the relevant students and project staff away from the Institute, working on the project's hardware element hasn't been easy. Looking into the available material resources along with a remote but coordinated effort from the research team, they have also managed to take on help from Jayaraj Abraham of CTARA, IIT Bombay, for fabrication.

Typically, medical waste includes wet waste and hazardous chemicals, which push up the cost and bulk of the medical incinerators. The team hopes that the novelty lies in the prototype's design and they are hoping to make it a compact, portable, affordable and pollution-free device. The design is focused on dry waste of masks and gloves, and is free from any hazardous chemicals. The fundamental

concept of burner design has been applied for smoke-less operation. The prototype is ready and has been successfully tested with gloves and different types of masks available in the market.

Currently, there are no such portable emission-free devices available in the market. The portable ones available in this category and installed in some apartments in the containment zones, are designed for sanitary pads, and in principal furnaces which do not focus on clean combustion and produce harmful smoke. It is not suitable when the current scenario is facing the challenge of scale. This device is designed for clean combustion and smoke-less operation.



Aimed at quick mass production at an affordable cost, the prototype design makes it simple and mechanically operated.

Operational feedback from the actual users and workers could help at this stage. The frequency and ease of usage, and overall capacity during trials could also contribute to making the required modifications to the final design. With the prototype ready, the team is trying to identify interested collaborators who can facilitate field trials and for manufacturing on scale. The challenge is Mumbai has extended its medical waste collection facility to all the quarantine centers as well, and the impacted cities and towns are inaccessible. The team is trying to communicate with Dhule Municipal Corporation for testing.

While the safe disposal of waste by untrained workers is a challenge, it may not be a major pain point as observed by the municipal authorities. In many places, it is just openly burned. Pollution is not a concern at the moment, with the country in lockdown mode. But with the approaching monsoon, open burning may not be easy anymore. The contamination in handling and through rain water could become a major source of infection.

The Research Team



A timely flood warning system

HOUSING/DISASTER MANAGEMENT

This new project has collaborated with OXFAM India to design an affordable early warning solution for flood disaster.



Prof. Santosh Noronha, Dept. of Chemical Engineering, Professor-in-charge, TCTD

In an interview, Prof Santosh Noronha, Dept of Chemical Engineering and Professor-in-charge, TCTD, speaks about his project - Early Warning Solutions for low cost economies.

Q.1. What are the objectives of the project?

We aim to develop a technology prototype for detection of early signs of a flood disaster, and will then plan for the dissemination of appropriate warning signals to concerned authorities.

Q.2. What motivated you to take up this project?

This challenge was brought to us by OXFAM India, which is one of the leading non-government organizations

working in flood disaster-prone areas and providing humanitarian assistance to communities suffering from such disasters. Communities living in regions like eastern UP and Bihar are particularly vulnerable to riverine flooding almost every monsoon season. In most cases, a formal circular regarding precipitation is posted via the district administration in terms of the overall weather and the impending monsoon season. Such information is useful in planning the harvesting and sowing of crops, but it does not help communities in preparing for situations which might exceed their coping capacity.

Scenarios vary depending on the precise nature of the disaster, but usually communities living close to the river gauge their vulnerability by keeping a constant manual vigil on the water level of the river. There are however, gaps in their mechanisms, which leave much to chance.





We aim to develop a technology prototype for detection of early signs of a flood disaster, and will then plan for the dissemination of appropriate warning signals to concerned authorities.



One of the biggest limitations is the crucial time gap between the risk perceived by the first individual within the community and the subsequent spread of this information to the last member of the community.

Similarly, communities in Orissa are still dependent on manual methods for the purpose of dissemination of early warning messages of cyclones. This problem is further exacerbated for communities farther away from command centres. Without sufficient lead time for response, communities stand to lose resources in the form of cattle, crop and other necessities, if not only life. Dissemination of immediate and accurate risk knowledge to all the members within the community is at the core of designing an efficient early warning system, without which the response to a disaster would be limited.

Q.3. How is the proposed solution an improvement over the existing ones?

In the current method, communities rely solely on crude or indigenous methods for gathering information and dissemination of warnings regarding a possible disaster. The solution being proposed attempts to automate and streamline the process of gathering information of the risk and then relaying this information to communities and authorities in real time. Such a set up would markedly improve the lead time for communities to react to the event, and would also help the administration in the

evacuation of villages and settlement downstream.

Q.4. Where do you plan to carry out field tests?

As per our partners OXFAM India, the first pilot of the prototype would be tested at Saral Bhanga river basin (Assam) at the India-Bhutan border. The location has been under constant duress from floods and OXFAM India has worked to develop local level institutions across the border for river management and flood mitigation. Conducting such field tests would help ensure better quality feedback for the first prototype.

Q.5. What kind of support do you expect the collaborating organizations to bring to the project?

There are two kinds of support expected from our collaborating organization:

- Testing & implementation: OXFAM as an agency possesses a large network of volunteers on the field, where the first prototype of the technology can be tested. This is necessary for the purpose of data gathering and generating feedback, which would feed into developing an improved version of the technology.
- Funding: As a novel project, OXFAM would also support in the exploring of technologies and further development of prototypes specific to varying use cases.

6. What are the challenges envisaged in this project in the near future?

We expect challenges during the validation phase that follows once a prototype has been developed. Validation in this case is dependent on testing the prototype during an actual flood. Simulation exercises for the purpose of validation can be conducted, but their efficacy would likely be limited.

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