Hackathon for Environmental Migrants in Bangladesh

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QUEST FOR EXCELLENCE

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Introduction

This report presents the process and results of the first-ever Hackathon for Environmental Migrants organized in December 2017 in Bangladesh. This Hackathon for Environmental Migrants hopefully does not end here but provides a basis for future work and design on this subject. Its focus is on building innovative technologies that can help communities in Bangladesh affected by erosion, cyclones and floods. These communities can become displaced when a disaster strikes or when rivers or sea gradually take their land. As a result, they may temporarily or even permanently have to move elsewhere.

Forty computer science students participated in this hackathon. They came in competitive teams from four universities in Dhaka, Bangladesh: Bangladesh University of Engineering and Technology (BUET), Dhaka University, North-South University, and United International University (UIU). In this report we outline the solutions they created, and the input on which these are based.

Evidence-based input

The input for the hackathon was evidence-based, informed by field research on environmental migration led by Dr. Ingrid Boas from Wageningen University (The Netherlands). It took place in the coastal areas of Bangladesh between August-December 2017. A focus has been on islands heavily impacted by storms and erosion, in particular Kutubdia and Bhola, and cities where people move to, such as Dhaka, Chittagong and Cox's Bazar.

We investigated how community members interacted, how they exchange information, what influenced their decisions to leave or stay, and in particular, how they used their (smart)phones in making such decisions. Our focus has been on both men and women, young and old, illiterate and low, medium or highly educated, poorer and richer segments of the community, and those with and without access to (smart)phones. The findings were directly used as evidence-based input for this Hackathon for Environmental Migrants.

In addition, we organized two workshops in Kutubdia with the local youth from local communities affected by cyclones and erosion. These participants had access to smart phones and Facebook (Facebook is the key social medium people use in the places under study). We focused on their usage of Facebook in times of disasters, and in maintaining or helping their community, even when their community is physically separated as people have been moving to other places due to the erosion. This included a focus on how those with smart phones try to help those not having access to these or those illiterate not able to use the information spread via these.

Towards designing products

Our next step has been a translation of the findings of academic research to personas and user needs. Personas represent some typical groups in and around the communities under study. By means of a user story analysis[1], we outline for each persona some possible improvements in the way they connect to their community that could help fulfilling their needs. This translation has been used as a basis for the participants to design their products.

The basis assumption informing these personas and user needs, and thereby the design of the products, is that environmental migrants are no passive victims. Affected communities help each other, support each other, in the need to adapt and to survive. They offer each other shelter, share information, or act together to raise awareness of their problems. With this in mind, the Hackathon for Environmental Migrants focuses on how technology could further empower rural communities in helping each other, to ensure they can better mitigate risks and help ensure that those who have to leave their homes or are staying in cyclone shelters can still rely on their community for support.

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[1] A user story analysis is an important part of the Scrum-framework. Scrum is the leading agile approach to software development in the world. https://www.scrumalliance.org.

Personas and their needs

We identified four different personas in and around the communities: the rural mature adults, the rural youth and young adults, the urban students, and the NGO representatives. The characteristics and needs of each group is described below. This list of four is not meant to be a complete description of the entire community. They are ideal-type groups that we encountered in the research, limited to those having access to a feature mobile phone (no internet) or a smart phone (with internet). Important to note is that the rural communities most vulnerable to environmental change – thus the areas closest to the coast and often weakly protected – were often we relatively poor communities. The rural personas reflect those characteristics.

1. The rural mature adults

Middle-aged people (above 35-60) living in rural communities impacted by environmental events and environmental change. They only have access to feature phones (no internet). Many of them are illiterate, so just use this phone to call. Also, in calling they face challenges sometimes, as for instance storing a number requires being able to read the menu, so numbers are quickly lost. They get their information mostly from face to face contact and television in the tea stall. They are not so well informed about issues that are not in their daily routine, such as disaster relief. They have little contact outside of their immediate circle, for example with the next Union.

Potential needs:

- Being informed better and quicker (e.g., about relief, aid, protest activities)
- Being able to reach out to wider social networks in times of need (e.g., for contacts who can help if they need move to in case their land/house is lost)

2. The rural youth and young adults

Young people (between 15-35 years old) living in the same rural communities as the group above that do have access to a smart phone. These are often young men[2] and college students, speaking little to no English – whilst digitally savvy, still unsure what the potential is of social media and ICT.

They believe in a better future and sometimes try to attract attention from NGOs and relevant people in their community to raise awareness to the problems their community faces. They are not very successful in attracting attention from NGOs due to English language barriers and digital technicalities. They are compassionate with and respect *the rural mature adults* and sometimes seek for support from *urban students* for their endeavours.

Potential needs:

- Attracting more attention from NGO's to their community.
- Assist the rural mature adults
- A network that is more useful in case they need to move away (for a new house, for work or education).

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[2] Young women in rural areas less often have access to a (smart)phone, even when attending college.

3. Urban students

Higher educated young (male and female) people with access to a smart phone that are originally from the same communities as the rural mature adults and the rural youth and young adults. They have left the rural areas for the city to study at the university but still maintain ties with their place of origin. They actively use Facebook to raise awareness of the dire situation at home, e.g. to set up protest actions. However, their online network largely consists of the well-educated digitally savvy people of their community, thus excluding the most vulnerable groups.

Potential needs:

- Better involve *the rural youth and young adults* and *the rural mature adults* in their actions as well, to ensure action and to keep the community emotionally together.

4. NGO representatives

Foreign NGO workers who want to help or do research about these communities and their needs. Whilst having smart phones, they have trouble finding and accessing local information due to language barriers.

Potential needs:

- Easier ways to access local information in English
- Easier ways to find interesting local people and organisations to cooperate with.

User stories

We constructed nine initial user stories from the four personas and their needs (see the diagram on the next page for details). These user stories are examples of services that could potentially fulfil the needs of the personas.
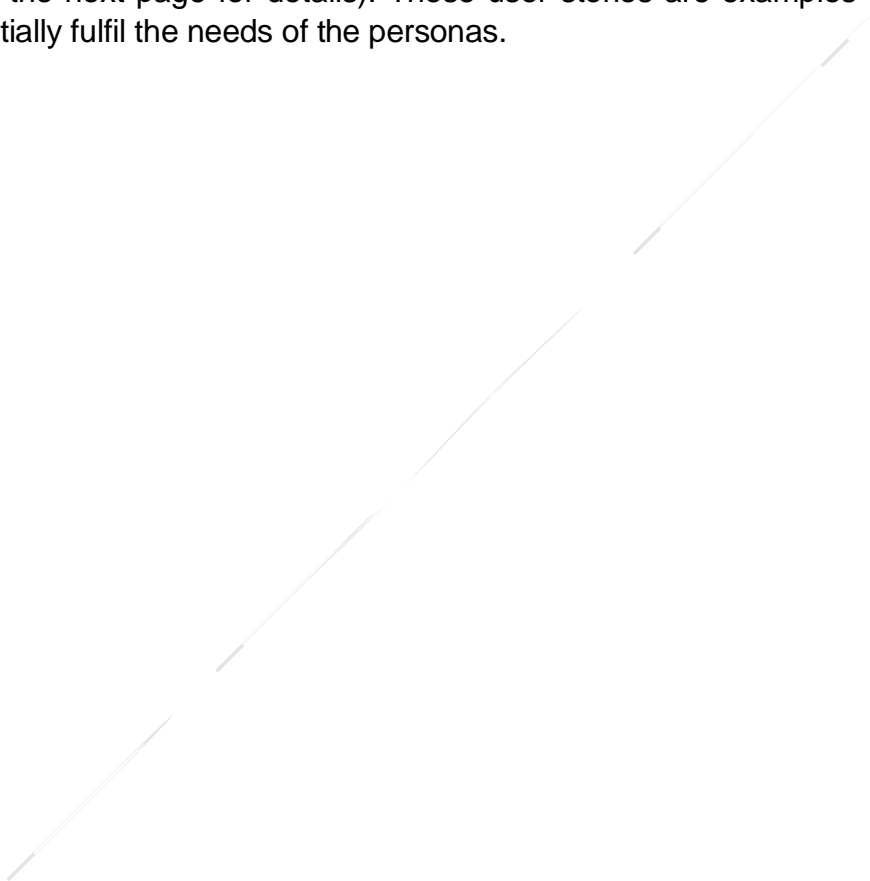
User Stories/Epics Environmental migration

as a person living in an endangered rural community with a smartphone

I would like to know where all the people from my village are living now — in order to know where my network will be strongest when I move there — 💡 number of Facebook-users listed by location (most people don't read maps)

I would like to be able to make a page that links to relevant organisations, twitter accounts and persons, without me having to specify them. — in order to easily attract attention of the right people to my community without knowing the field. — 💡 a template for local communities to make a page. Could be defined by NGOs?

as a person living in an endangered rural community without a smartphone

I would like to use Facebook without a smart phone — as I don't have the money to buy one and want to stay informed — 💡 post on a specific Facebook page leads to an sms — 💡 an sms to a specified number leads to a post on a FB-page.

I would like to use an online phonebook — as I regularly loose my phone or delete my number because of memory shortage. — 💡 Facebook as phonebook for feature phone?

as an illiterate living in an endangered rural community

I would like to use Facebook by voice — as I like to stay informed about urgent matters — 💡 post on a FB-page leads to a voicemail — 💡 post on a FB-page leads to a call with a recorded text — 💡 creating and managing a FB id via voice

As an English speaking representative of an NGO

I would like to have access to pages in Bangla — As I want to know what help is needed in Bangladesh — 💡 "Make the title also in English " — 💡 Make a synchronised page that is automatically translated — 💡 Make bangla pages found with a search on english keywords

I would like to know which people from a community are active on the subject of environmental migration — so I can contact them for cooperation in projects

as a higher educated person from an endangered rural community now living in the city

I would like to add persons without smartphones to my Facebook-events — as the worst affected people from my community do not have smartphones and the impact of my events will increase when they are involved.

I would like to add persons without a smartphone to my Facebook page — as I want to keep my whole community emotionally together, poor and rich.

Solution building

On 2 December 2017, and in the two weeks leading up to the event-day, 8 teams have been working on solutions for the problems the four personas are facing, using the provided user stories as a starting point. Important to note is that the solutions created are not finished products, nor set in stone, but ideas and prototypes with potential.

During the event and the preparation for that, the teams were continuously encouraged to not just blindly focus on the provided personas and user stories, but to actively engage in a dialogue with the researchers who have been in active contact with the target group.

Results

The solutions built by the teams during the Hackathon show a great diversity of concepts, functionality and technology. It gives an impression of the effort the students put in to come up with an original idea. At the same it is interesting to see that the solutions are not always as different as they appear.

A closer look reveals that roughly three different strategies were proposed by the hackathon participants to serve the needs of the target groups:

1. A crowdsourced emergency-helpline

Problem: The *rural mature adults* lack of access to information on what they could do in case of an emergency. They know the options that are available in their village community, but that can be fairly limited.

Solution: Provide a way via which the *rural mature adults* can connect to an informant they can trust. These informants can be from their own community – for instance *urban students* originally from the same village now living in a city having access to a wider set of information sources – or experts from trusted organisations like local NGOs. Solutions in this domain work with the assumption that many of the rural adults don't have a smartphone nor have advanced reading and writing skills.

The student teams proposed and technically demonstrated a couple of ways to do this. The person in need would be able to:

- Get a fellow village member (e.g. who is now living in the city) on the phone who signed up as a village delegate or volunteer by calling a general phone number for their village. They don't need to know or have stored the number of this person, neither does he/she need to be physically in the village. The receiver is automatically selected from a pool.
- Get a question answered by texting the question to a phone number. That text-message will be automatically posted on a NGO-based help-forum on Facebook. A response to the question on this forum will be automatically sent back as a text-message.
- Get a question answered by calling to a general phone number. The question gets recorded and is put on a database. A larger community of experts manage this database and select the best answers to the question. This is converted to text and forwarded to the person who called. The person is automatically called and will hear the message.

2. Access to local information after a disaster

Problem: Directly after a disaster local information is crucial to aid-workers and worried relatives. People may be lost, and in needs to be clear where help is needed. After a disaster some may be displaced whilst not always well-reachable as they do not own a phone or phones may be lost due to the storm.

Solution: Provide easy access for NGO-workers and urban students to the rural youth and young adults. The rural youth and young adults are often actively helping their fellow villagers and they can more easily provide detailed information to inform the NGOs and worried relatives, as they have smartphones via which they can register and update information about the disaster impact in online databases.

The student teams proposed two ways to do this, which they technically demonstrated. A person would be able to:

- Trace relatives who lost their house and phone by connecting with a local representative. This representative is responsible to keep track of around 30 people. If he/she does not know where a person of that group is, he/she can use a shared online database to report a missing person. A local representative can also report when a person belonging to another group is found.
- Find out on a map where aid is needed. Local representatives such as the rural youth and young adults with smart phones can indicate on an app that (a certain type of) aid is needed. This will be automatically shared on the map.

3. **Access from abroad to local initiatives and organisations**

Problem: NGO-representatives are looking for projects to invest in, but often do not speak the local language. This means they miss a wealth of information about initiatives and organisations written in the local language.

Solution: Make it possible for English-speaking NGO-representatives to find out which projects or initiatives are relevant to them, so they can contact the administrators or can do further research into these. One of the teams proposed a solution enabling a person to search with English keywords through pages in Bengali. This was done by automatically translating the keywords to Bengali and automatically translating the results to English.

Please see the Annex for more details on these proposed solutions by the student teams.

Conclusion and future steps

This hackathon was first and foremost an event in experimenting with how technology could help to further empower communities in danger of environmental impacts in Bangladesh. It has resulted in an overview of user groups and user needs that future solution-builders can work with, and a list of potential technological solutions that could help people to push their own community forward.

We make a case for the use of evidence-based input in hackathon events like these. The research-based input and the presence and continuous feedback of the researchers made the solutions exceed the level of a nice technological exercise as it helps to ensure that these resonate with the actual needs of the affected communities involved.

The researchers remain in contact with the affected communities on the basis of whose insights the solutions have been made. We do so via phone, messenger and Facebook. In addition to the solution builders, some community members – in particular from the rural youth and the urban student groups – are member of the closed Facebook Group where ideas, updates, discussions, and information about this hackathon is shared. This is to feed an interaction between the affected groups for which the solutions are built and the actual solution-builders.

In case of interest to further develop or implement the solutions proposed (see Annex for details), please contact us (see Acknowledgements for contact details). We are able to

create links with both the solution builders and the communities themselves who can participate through user-testing and in helping to further improve the proposed solutions.

Acknowledgements

This report was written by Ingrid Boas[3] and Freek Duynstee[4], with input from the student teams. Contact at: ingrid.boas@wur.nl; freek@duynstee.com

The Hackathon was informed by the field research in Bangladesh conducted for the Veni project by Dr. Ingrid Boas, on environmental migration in the digital age, funded by the Netherlands Organisation for Scientific Research (NWO).

The Hackathon has been organized through a partnership between the Environmental Policy Group of Wageningen University (The Netherlands), Freek Duynstee Consultancy (The Netherlands), Spreeha (Bangladesh), and UIU IDSS (Bangladesh), supported by BBC Media Action and Spider Digital Innovations.

Jury members were Dr. Ingrid Boas (ENP, Wageningen University); Richard Lace (Country Director BBC Media Action): Tazin Shadid (CEO of Spreeha); and Abdus Sabur (YPSA – Young Power in Social Action).

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[3] Environmental Policy Group, Wageningen University, The Netherlands
[4] Freek Duynstee Consultancy, The Netherlands

Annex: proposed solutions by the student teams

In the following pages we highlight the most promising solutions from the four involved universities: Bangladesh University of Engineering and Technology (BUET), Dhaka University, North-South University, and United International University (UIU).

Bangladesh University of Engineering & Technology (BUET)

Mostofa Rafid Uddin, Rukshar Alam, Saqib Hasan, Mirza Masfiqur Mim, Fahim Ahmed.
Contact: Rukshar Alam, ruksharalam7@gmail.com

Persona
1, 2 and 3

Problem
There is a general lack of supportive network between the more tech savvy younger generation (rural youth and urban students) and the less digitally savvy older generation (rural mature adults).

Short description
By using this app someone can become a delegate of their home area. People from their community can contact them for information via voice messages.

How does it work
For the delegate:

- The user must enter his/her district, village and name along with his/her phone number.
- By tapping on 'contact list' users will be directed to the contact list which is loaded from their mobile devices. Delegates can choose to send voice messages to these contacts to let them know they have become delegates for information during times of calamity.
- By tapping on the 'group voice call', the user can send a voice call to multiple persons to broadcast important messages in times of need, thereby reducing time and effort to contact all individuals.
- One particular delegate may not have all the information. So we have the 'online forum' where the user can post queries to be responded by other delegates. A knowledge sharing hub like this can a go long way to strengthen social bonds among young people and also to discern information to all.
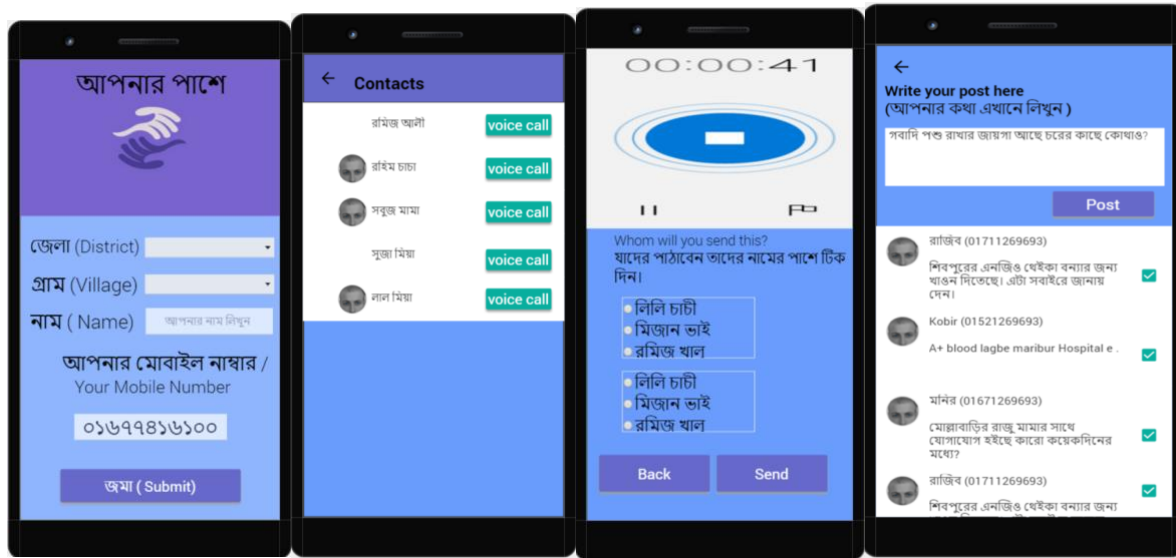
For the rural mature adults:

- Dial a special number to get a list of the delegates (the owners of the app).
- After that they can simply choose any one of the delegates to send voice messages to them with queries.
- They will later receive their answers through voice messages as well.

Dhaka University

Roksana Rahman Rumpa, Naeem Hasan Anik, Syed Monowarul Islam Zibon, Oishi Mahmud, Ahnaf Akif. Contact: Naeem Hasan, me_naeem@outlook.com
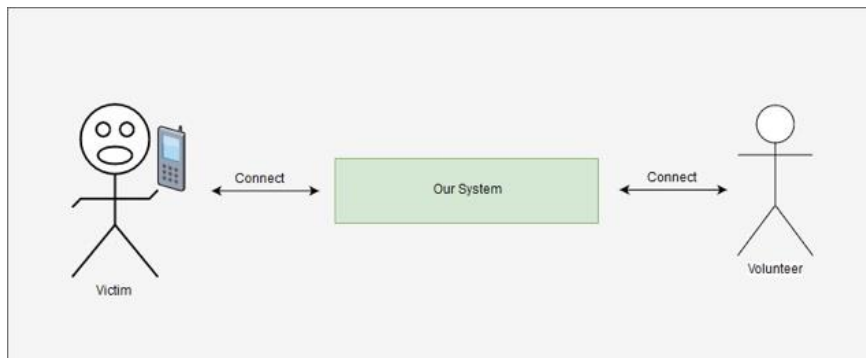
Persona
1

Problem
No people to call for help when in trouble

Short description
A victim makes a call on our system asking for help, the system forwards the call to a volunteer or towards a helpful NGO representative from that location.

How does it work
Our system has a database with Volunteers or NGO representatives' contact information which can be updated by a smartphone application with "currently active" or "currently inactive" status.

When a victim makes a call on our system asking for help, the system (IVR) asks the caller to specify his/her location and then forwards the call to a volunteer or towards a helpful NGO representative from that location.

A second option is: We can assign a unique number [like 4000] to each "Union Parishad". Since there are only 4554 "Union Parishad" in Bangladesh, they can easily be represented by a four digit number. An SMS with the code of the "Union Parishad" to a fixed number gives an immediate reply with a list of contact numbers of volunteers or NGO representatives from that "Union Parishad", who are currently active at that moment.

In the future, other functionalities using "**keywords**" can be added to the text message. For example "4000 for" to get a weather forecast. Which generates an autonomous call about current weather forecast from the system to the user.

Currently active volunteers on "Union_name"

0171XXXXXXX

0192XXXXXXX

0173XXXXXXX

Please contact any number to get support

North South University - I

Tahzib Mashrik; Mohammed Ali Zubair, Taki Uddin, Mohsin Ahmad Contact: Mohammed Ali Zubair, mazg1493@gmail.com, +8801748536475

Persona
1 – though limited to those who can text and read

Problem
The rural mature adults can be disconnected from wider social networks, and thereby less quickly informed in disaster situations and more cut-off from help.

Short description
Post on Facebook using SMS based services.

How does it work
It bridges the information flow between smartphone and feature phone users by integrating SMS based services and social media (i.e. Facebook). We made a system that the users can sign up for independently or with their family members as well. This registration can be done online or via an sms based portal. After the initial steps for registration, the information is saved in a server and the registered people will be able to communicate to Facebook using sms based services.

An example of its use: You can post a plea to the nearby safety organizations (government or otherwise) online either by using SMS or the internet stating that your family members have been lost and to contact you in case they are found. The message you sent will be saved in the database and the administrator in charge of the system will be notified.

An added extension to that service is with Facebook. The text message will be relayed to a Facebook page that is connected to our system. It will appear as a Facebook page feed and the users subscribed to those pages will also receive a message notification of the user who sent the text.

Posts

Porashuna
Published by Ali [?] · 2 mins · 🌐

Ali's family is lost.
Help.
Members include:
Tahzib
Taki

Contact him here: 8801748536475

Boost Post

👍 Like   💬 Comment   ➤ Share   Ⓟ ▼

Porashuna
18 mins · 🌐

Hello

Boost Post

👍 Like   💬 Comment   ➤ Share   Ⓟ ▼

See all

Posts

Porashuna
Published by Ali [?] · 4 December at 18:47 · 🌐

See all friends

Education

People Also Like

AFC **Amicale des fêtes de Chalmaison**
Performance & event venue

Grameenphone ✓
Telecommunications company

Di Digital ✓
Broadcasting & media production company

Porashuna   ⚙ ✕

Ⓟ   Hello Ali.
     Today's post message:
     Hello

     Hello Ali.
     Today's post message: Ali's
     family is lost.
     Help.
     Members include:
     Tahzib
     Taki

Ⓟ   Contact him here:
     8801748536475

Type a message...

🖼 🏷 GIF 🙂 📎 📷   👍

19

North-South University - II

Ashraf Ishrak; Sarwar Jahan; Morsalina Eza; Majedur Rahman. Contact:
Majedur.Rahman@northsouth.edu, +8801775676776

Persona
1 and 3

Problem
High educated people living in the city, with smart phones, would like to help endangered communities in rural areas. These groups are however not necessarily part of the same social network, and the rural mature adults may not be on Facebook.

Short description
Connecting experts or high-educated persons in urban areas with rural communities in remote areas, to exchange information and advice.

How does it work
It works like this: people in rural areas using feature phones can post problems on the app using their phone with voice mail. After getting the voice mail the system automatically:

- converts voice to text
- decides the category of the problem
- sends it to the relevant experts by push notification

The expert will an answer the post, which will be send back to that the rural person via voice message.

The system has an interactive process where for every solution there will be a point for solution provider, thereby generating a top chart list of solution providers. That can motivate a people to help each other.

North-South University - III

Ashraf Ishrak; Sarwar Jahan; Morsalina Eza; Majedur Rahman. Contact: Majedur.Rahman@northsouth.edu, +8801775676776

Persona
4

Problem
The NGO representative from abroad cannot find Facebook groups and pages on their subject in other languages. Specifically, when the writing is not recognisable (Chinese, Bangla)

Short description
An open app (no login) where the user performs a search in their own language to find groups and pages in a local language with all results translated to their own language. With one click it is possible to checkout those groups and pages.

How does it work

Video Link: https://youtu.be/OcQ6I_o2xMg

United International University – I

Abdullah Al Rifat, Abdur Rahman, Al Amin Neaz Ahmed, C.M.Muktadir, Nirob Mahmud Tamim.
Contact: Al Amin Neaz Ahmed, neazahmedneaz@gmail.com

Persona
2, 3, 4

Problem

Not all environmentally affected areas receive help, or unclear to determine where most help is needed

Short description
A transparent database created by crowd-sourced information indicating where help is needed during disaster.

How does it work
A help button for a user – such as someone from an affected community or NGO workers - to send a signal of their current position to get help from nearby villagers or NGO workers.
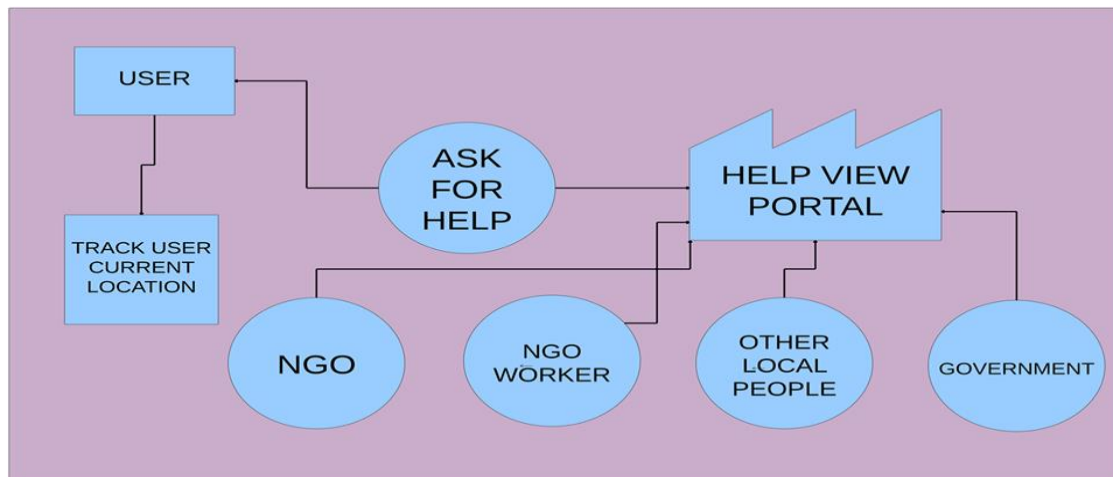
The web-portal will demonstrate where help is needed while support is lacking. For instance, after cyclones disaster relief often comes. But in cases of erosion this is often lacking. This system allows people to signal that, so that it becomes transparent where help is needed and support is lacking.

United International University - II

Yeazullah Aziz Ameek, Toha Khan Mozlish, Niger Sultana Tahniat, Md. Younus Bipul.
Contact: bipulyounus@gmail.com

Persona
2,3

Problem
People frequently lose their houses and phones in the chaos during a storm. It can be hard to trace them.

Short description
An app for red crescent volunteers. It shows the group of people and geographic zone that the volunteer in question is responsible for. It also shows nearby volunteers with their respective groups and zones.

How does it work

Each volunteer is responsible for a group that consists of on an average 30 people. By being responsible for a certain group, it is also quickly clear when someone from the group is lost. If lost, the volunteer will put this person on a missing list via the app. And as soon as the missing person is found by any other group, the volunteer will be notified.

Others may also access this app. Suppose, Rahim lives in city and his relatives and parents live in a village. Suddenly a disaster has struck. So, his parents and relatives had to move to somewhere else temporarily. Now, Rahim wants to know where his family is. But the problem is Rahim's parent do not use a phone or don't know how to use a phone. By using the app Rahim can search with his parents' name. The app will show in which zone and in which group his family is in and also the phone number of volunteer and location of the group. So, now he can contact with his family.