

Design X Social
Global Innovation Challenge 2022

PROJECT

ALERTERA

Team



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Lt. Col. Narayan and his wife Seetha were living in Nandambakkam in Chennai when the nearby river flooded and engulfed their ground-floor house.

A neighbor's efforts to alert the Army to their plight failed and they couldn't be saved.



A photograph of a group of people, including men and women, sitting in a small wooden boat on a flooded river. The water is murky and reflects the sky. In the background, there are lush green trees and palm trees under a cloudy sky. The scene depicts a flooded area, likely due to heavy rainfall or a natural disaster.

In India, on
average
every year,

Rs.3,613 Crores
lost in property and
crop damage

3,000,000
lives are affected

1500
lives are lost

A major reason for a slow response time for
rescue efforts was

DISRUPTED COMMUNICATION

Why was there a lack of Communication?

Disruption of Power and Network

Power outages caused due to the floods limited the use of electronic devices. Mobile networks went down too, causing a massive stress on the ones that were still running, limiting the number of calls that could get through.

Lack of Coordination amongst agencies

Several agencies were involved in the rescue efforts but there was no coordination or communication between them. Commanding officers were not even able to communicate with their own teams.

Lack of Credible Information

First Responders were bombarded with requests for rescue and with the limited resources at their disposal they were not able to discern genuine requests from misleading ones.

A photograph of a flooded area with people and a wooden structure, overlaid with a semi-transparent blue filter. The scene shows a man sitting at a table under a wooden structure, another man standing nearby, and a person in a red shirt in the foreground. The water is murky and reflects the light.

THE PROBLEM

How might we **effectively connect** first responders with victims during a flood?



Why is it an **URGENT** problem?

In the past few years,
there has been an
unprecedented level
of flooding due to
Global Warming

40 Million Hectares of land in India is flood prone

In Assam, since April 2022,

**> 1.9
Million
people
impacted**

**100,000
people
taking shelter
in relief
camps**

**700
Families
lack access
to essentials**



SUBEDAR SHASHI

35 Y/O MALE

Earns 1-2L/annum

Shashi is a local boatman who doubles in as a first responder volunteer during floods in Bengaluru, India. He was a part of several rescue operations & thinks that many lives can be saved if communication is improved.

"When the flood happened, contact between many parties was lost and the situation became chaotic. We could not work systematically because of communication disruptions. Without communication, any type rescue operation will not be as effective."

MOTIVATION

To save as many lives as possible

Earn Recognition in his community

PAIN POINTS

No communication with the base or victims.

Difficulty navigating in some areas.

Very little information on the situation they're going into.

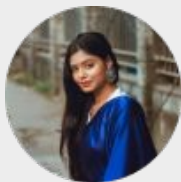
GOALS

Reach people in need on time

Not to leave anybody behind

Transport essential supplies to people who can't be rescued

Reassure victims that he or she is no longer in immediate danger



MALTI DAS

33 Y/O FEMALE

Earns 5-6L/annum

Malti Das is a local small business owner. She lives in 2 storey independent house in Bengaluru, India, with her husband, in-laws and her 2 year old child. Despite flood alerts, she was confused about the steps she needs to take for her family and herself.

"It was the middle of the night and we were wide awake. We could hear the rain lashing outside, and we knew that our family was in danger. The ground floor was flooded and the power was down. We were not able to reach any rescue helplines."

MOTIVATION

To make sure her family and child are safe

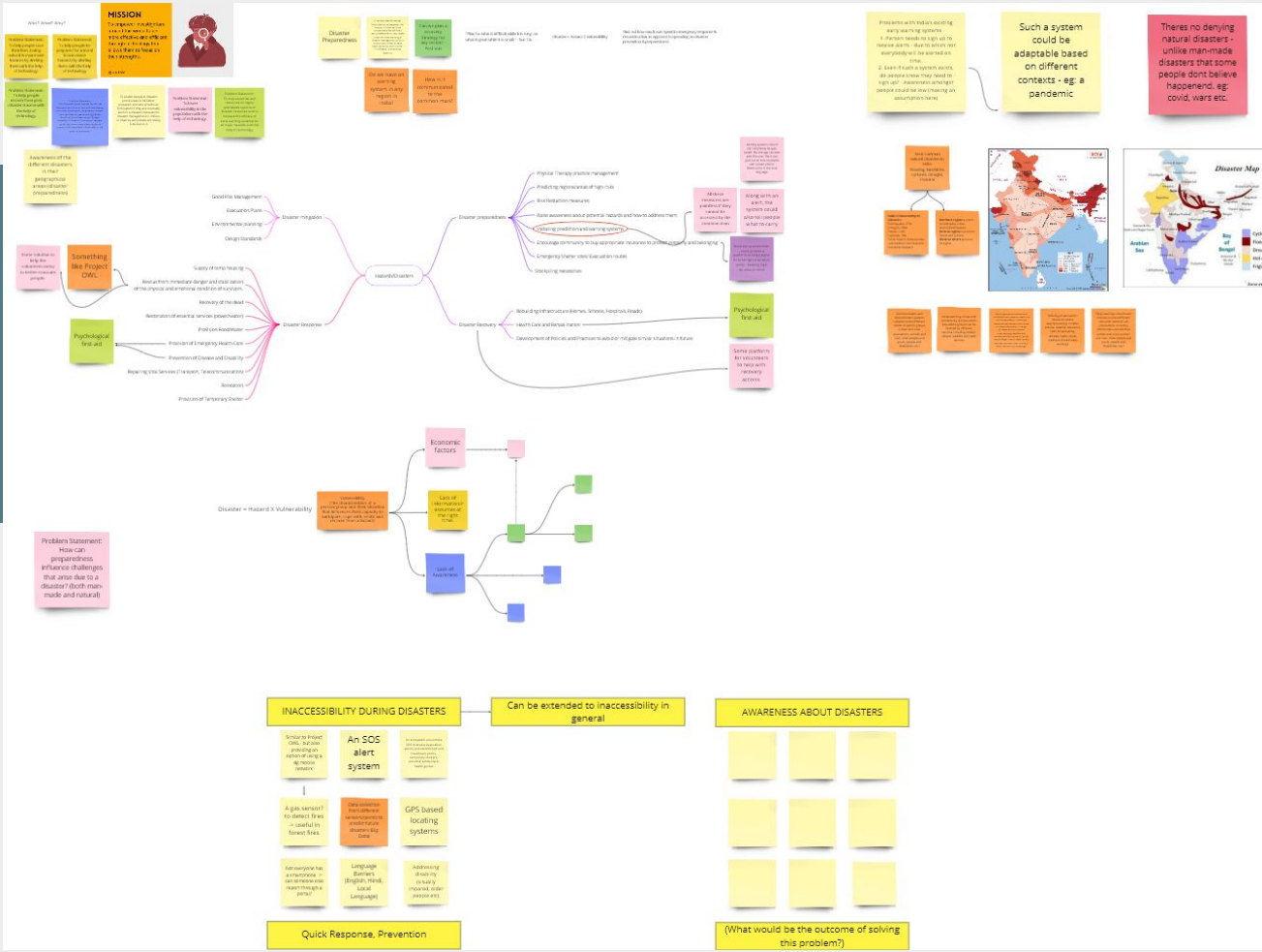
PAIN POINTS

Network & power outages causing communication disruptions.
Inability to contact loved ones & first responders.
Inability to get essential supplies & medical supplies.
Trouble knowing if rescue teams were on their way

GOALS

Ensure the safety of her family
Save important medical documentation

Our Explorations



Our Design Process

1

IDENTIFY



User Surveys
User Interviews
Secondary Research
Competitive Analysis

2

DEFINE



Affinity Mapping
Problem Statement
User Personas

3

IDEATE



Prioritization Matrix
User Journey
Information Architecture

4

DESIGN



Sketches
Wireframes
Low fidelity Prototype
High Fidelity Mockup

Think and feel?

Hear?

- Heard about people falling into tsunami in many places including the airport and airport
- Could hear car horns going off and the floodwaters entering it
- Heard about some people who had low ability in hearing because they did not want to hear responsibility for community safety
- Heard rumors about buildings collapsing, causing panic
- The govt had given warnings, but had not anticipated such a huge flood
- Could hear helicopters above but there was no place for them to land to rescue people
- Heard that people in low-lying areas

Say and do?

- Ask for information about getting urgent aid for the 2 days after the tsunami who was suffering from malaria
- Heard someone about having contaminated water that was floating out of boats
- Heard about people spending a lot of money to buy medicine
- Heard that people were not doing anything. They were saying that it was not the govt's responsibility
- Thought this flood was due to mismanagement by the govt, not a natural disaster
- Got a question for having a flood, community should have been there was already some floodwaters in the community, medical help
- Get help due to inability to get outside the house to get any supplies
- Get afraid to go out on the streets, fearing the tsunami, open manholes
- Get relieved when they were taken to the hospital after 4 days
- Could see dead animals & people floating in the floodwaters
- Could see floodwaters at the 2nd floor of the apartment building
- Could see trucks being used for relief
- Could see damaged property all around
- Could see water table but couldn't hear when the sea going far out on to the boat
- Found it extremely hard to understand what the govt could not do. It was the truth or it was a rumor
- They were asked to evacuate after 4 days
- They were taken from their home by boat, and then to flood to the hospital
- Tried to contact helicopters but there was no response from them

Gain

- Get grateful for having a flood community should have been there was already some floodwaters in the community, medical help
- Get relieved when they were taken to the hospital after 4 days
- Get grateful for having a flood community should have been there was already some floodwaters in the community, medical help
- Get grateful for having a flood community should have been there was already some floodwaters in the community, medical help

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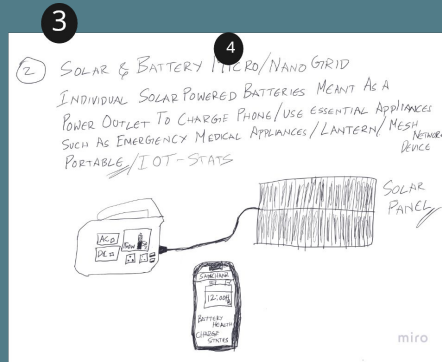
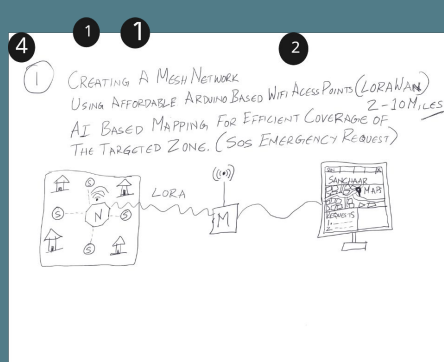
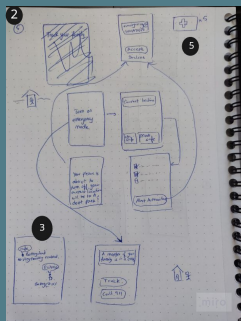
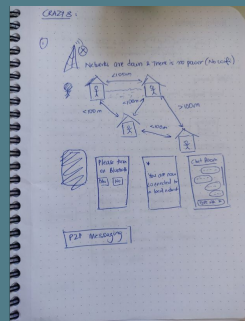
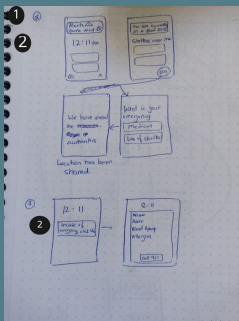
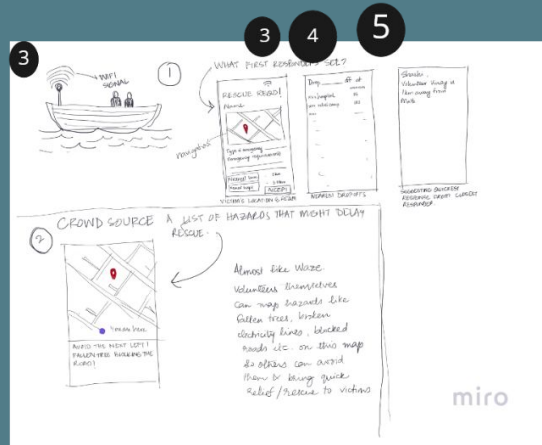
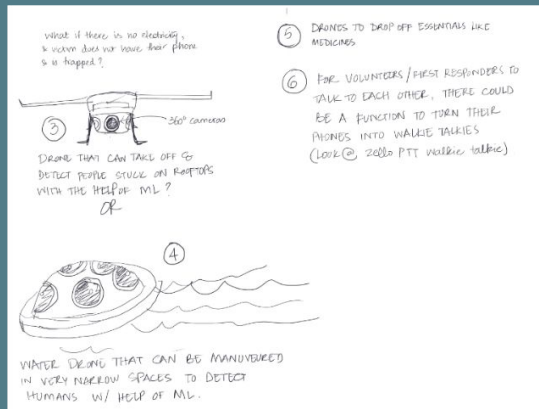
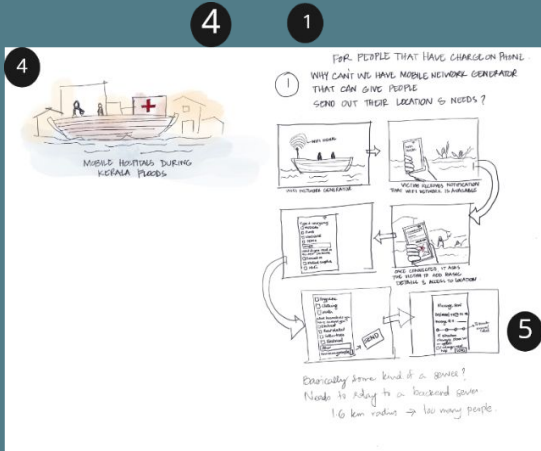
Victim - User Journey Map



First Responder's – User Journey Map

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Sketching Solutions



Interview Insights

"Due to communication disruption, we sent multiple volunteers to the same spot. Owing to the lack of coordination, our response time was over four hours."

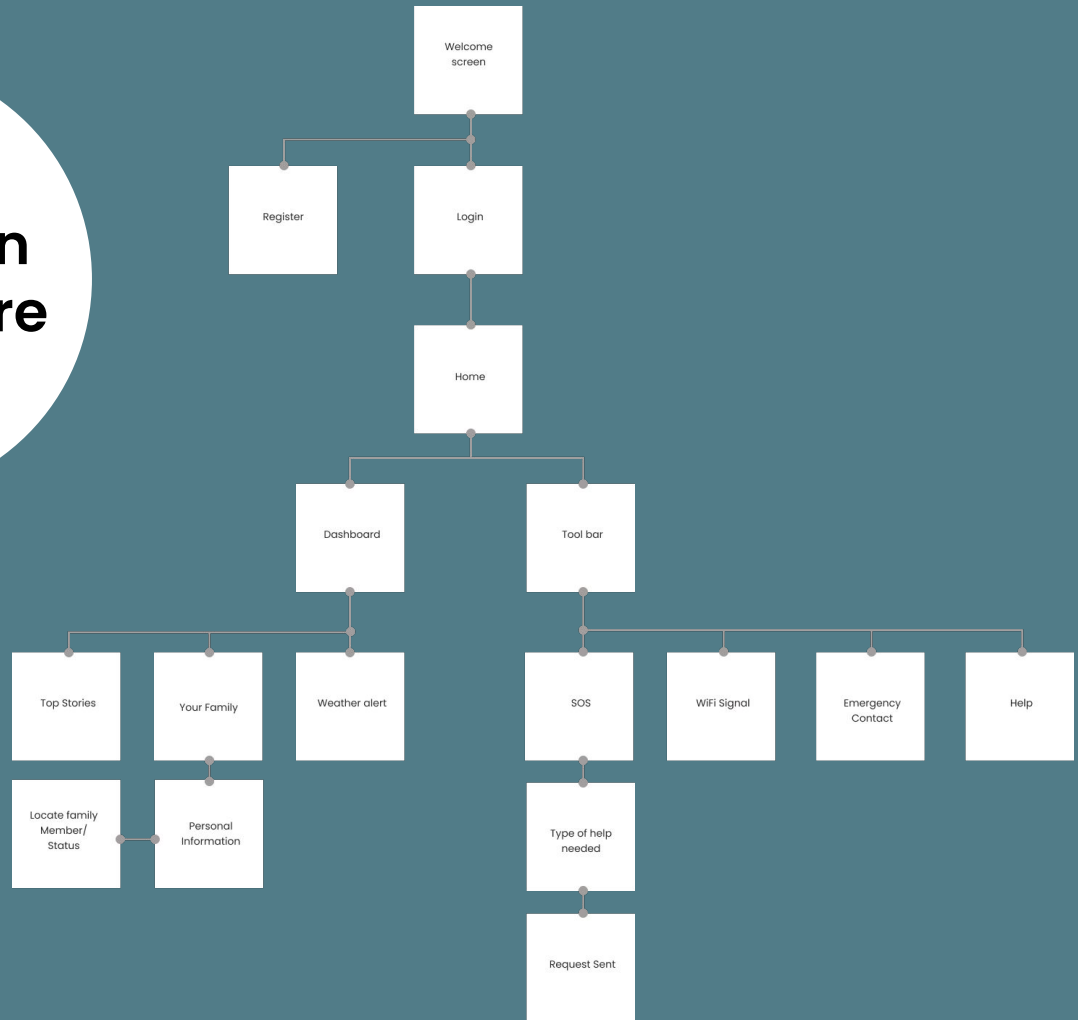
- Volunteer First Responder during the Chennai floods in 2015



"My son suffered from malaria during the floods and needed emergency care. With all means of communication disrupted, we waited 4 days to take him to the hospital. Our rescue was possible, thanks to the efforts of the community volunteers."

- The victim from Surat floods in 2006.

Information Architecture



User
Experience

Introducing

ALERTERA

An end-to-end emergency response service...



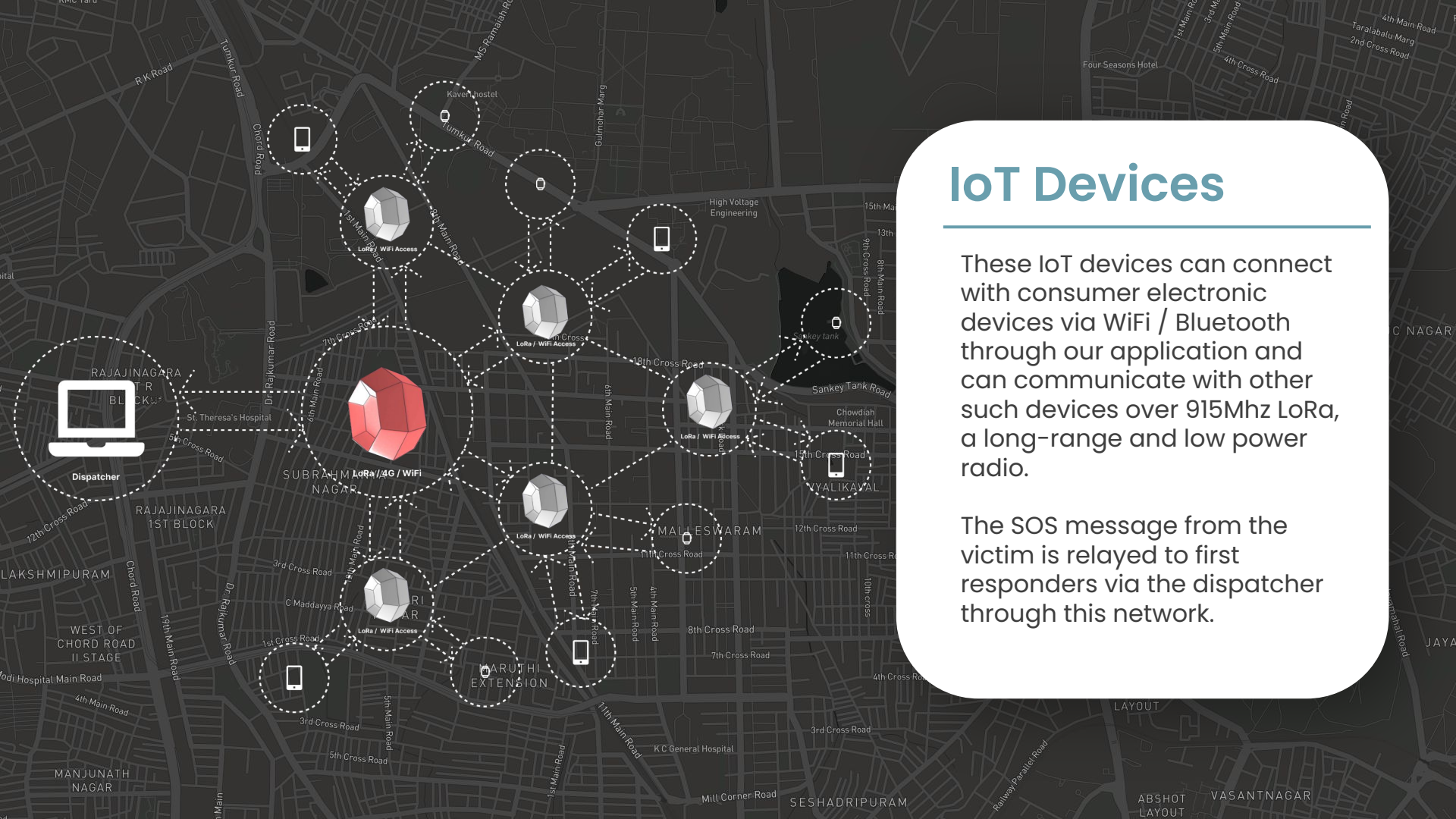


...that creates a resilient communication network

Mesh Network

Our technology creates an ad-hoc mesh network that connects first responders and civilians in real-time, so emergency services can be deployed where needed most.

The network consists of small Internet Of Things devices strategically placed in flood prone areas after creating comprehensive flood models with the help of Artificial Intelligence & Machine Learning.

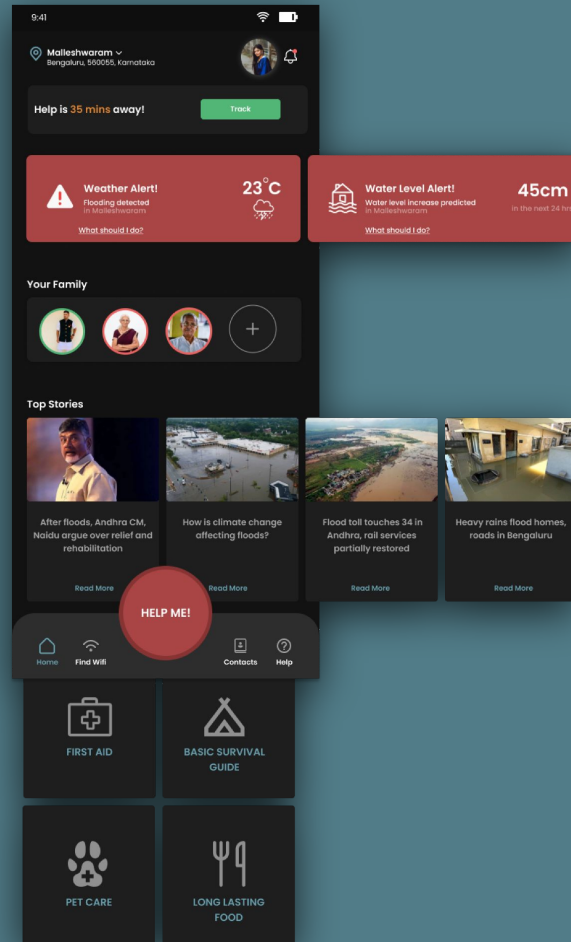


IoT Devices

These IoT devices can connect with consumer electronic devices via WiFi / Bluetooth through our application and can communicate with other such devices over 915Mhz LoRa, a long-range and low power radio.

The SOS message from the victim is relayed to first responders via the dispatcher through this network.

Simple.
Intuitive.
Resource Friendly.



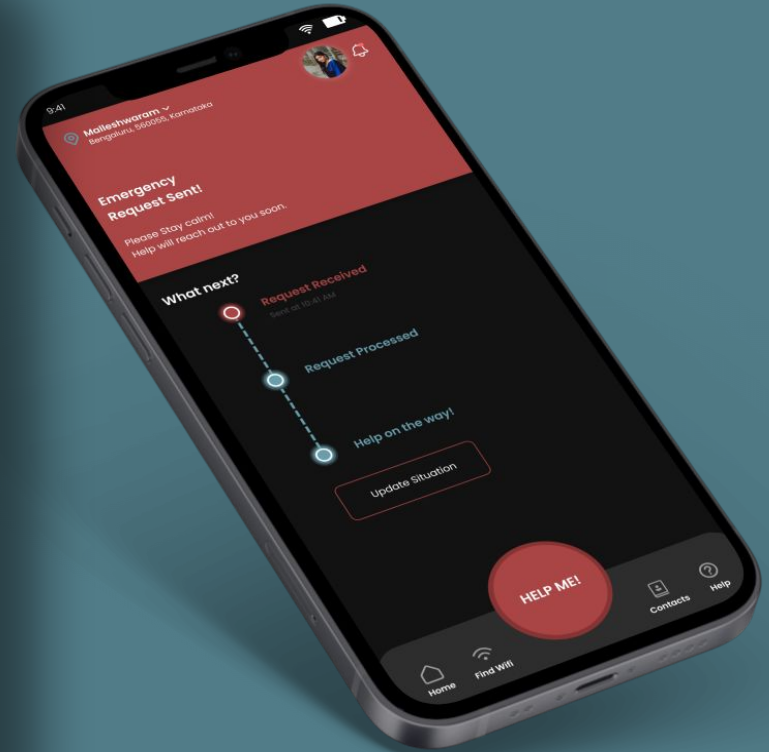
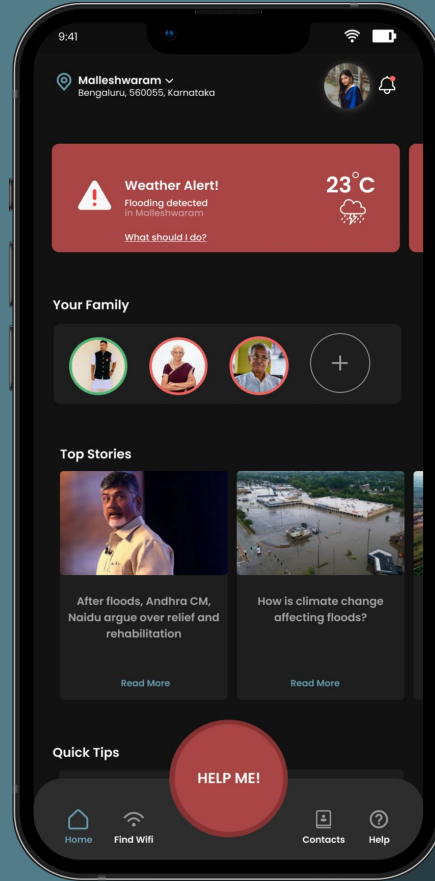
Get regular weather and flood updates

Easy access to your family's safety status

Relevant stories to your location

Find easy quick DIYs for immediate relief

Request help from first responders easily



Also accessible on Smart Watches

Get alerted on time!



Dispatcher's View

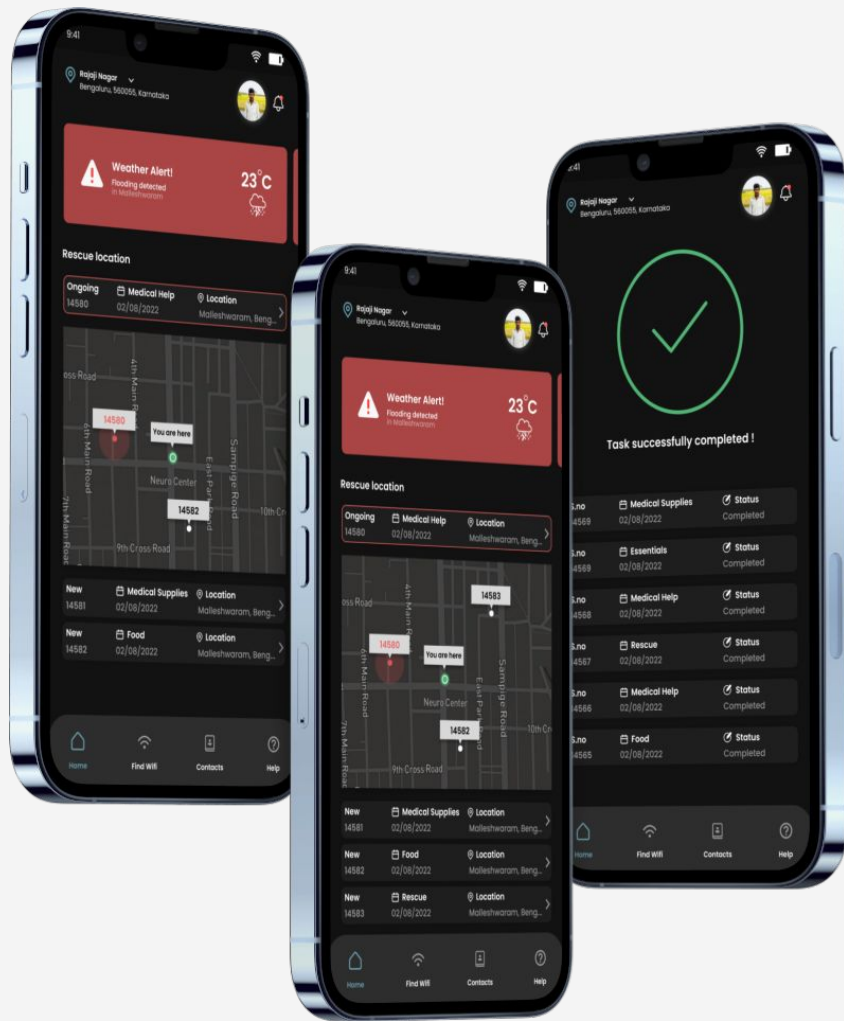
Dispatchers in the backend receive all requests for help

They have a holistic view of all new, ongoing and completed cases

They can also assign requests to first responders based on the request's location

The screenshot displays the Dispatcher's View interface. At the top, a user profile for 'Welcome, Rajesh' is shown. The main section is titled 'ACCIDENTS' and features a date filter for '02/08/2022'. Below this, there are three status filters: 'New' (12), 'Ongoing' (6), and 'Completed' (50). A table lists the accidents, with columns for 'New', 'Accident On', and 'Location'. The table shows 12 new accidents, all occurring on 02/08/2022, and all located in Malleshwaram, Bengaluru. To the right of the table is a map showing the locations of the accidents, with red dots indicating the accident sites. The map includes labels for various areas like Deewanarapalya, Malleshwaram, and Malleshwaram, Bengaluru.

New	Accident On	Location
14580	02/08/2022	Malleshwaram, Beng...
14579	02/08/2022	Malleshwaram, Beng...
14578	02/08/2022	Malleshwaram, Beng...
14577	02/08/2022	Malleshwaram, Beng...
14576	02/08/2022	Malleshwaram, Beng...
14575	02/08/2022	Malleshwaram, Beng...
14574	02/08/2022	Malleshwaram, Beng...
14573	02/08/2022	Malleshwaram, Beng...
14576	02/08/2022	Malleshwaram, Beng...
14575	02/08/2022	Malleshwaram, Beng...
14574	02/08/2022	Malleshwaram, Beng...
14573	02/08/2022	Malleshwaram, Beng...




First Responder's view

Regular weather alert and flood updates

Easy access to new requests from victims and their needs

Get validation of completed tasks



Our solution has been developed to simplify and speed up the process of rescue and relief operations during floods.

The analytics-based model ensures emergencies are prioritized.

The application reassures victims that help is on the way thereby reducing panic and fear.

The simple and frictionless user flow reinvents how we ask and receive help during crisis.

Impact on the society



Sustainability

Our application is designed to consume less power and data.

We aim to utilize reused plastic to encase our network nodes and hubs, contributing to a significant reduction in CO2 emissions.

Our solution can be extended and reused to respond to other natural & man-made disasters.

Practicality & Business Viability

Can be scaled to other disasters

Low initial set up costs and easy to implement

The system can be extended to support governments, military organisations, and private organisations to set up their disaster response networks

Reduces the need of keeping track of the casualty

Can gather relevant user information to support research and development

References

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- World Economic Forum – <https://www.weforum.org/agenda/2019/08/prevent-famine-from-drought>
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- Innovative flood disaster response and mitigation through PPPs – <https://www.innovationnewsnetwork.com/innovative-flood-disaster-response-and-mitigation-through-ppps/5896/>
- Millions in India displaced by 'deadly' urban floods – BBC News – <https://www.youtube.com/watch?v=uOPwazbOc6o>
- India Floods: Rescue operation in Kerala flooding – BBC News – <https://www.youtube.com/watch?v=NZsEhJyP06M>
- Kerala Flood 2018 – Aerial View – https://www.youtube.com/watch?v=GAoFVMTe_24&t=3s
- Mumbai Under waterFlood Aerial view – Dji Mavic pro vasai – https://www.youtube.com/watch?v=Y69Gh_wh_f0&t=88s

A background image showing a group of hands of various skin tones, some with red paint designs, reaching towards the center. The image is overlaid with a semi-transparent teal filter.

Thank you !

We thank UMO Design Foundation for the opportunity and our mentor Prashant Shanmugam for his guidance and support.