MIS 730 Team 2

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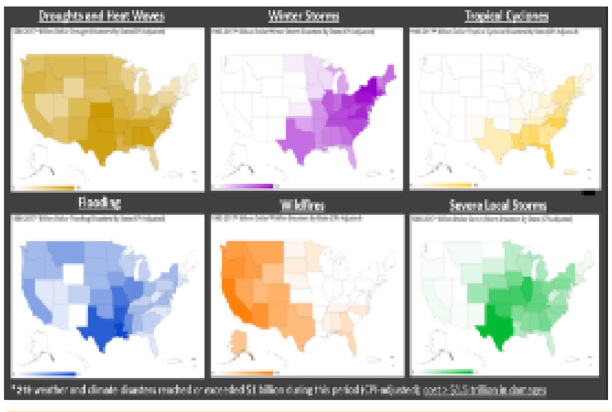
Deployment of Volunteers on Disaster Site (Flood Site)

What is Disaster?
A sudden event, such as an accident or a natural catastrophe, that causes great damage or loss of life



Problem Statement

Flood

Flooding is a temporary overflow of water onto land that is normally dry. Floods are the most common natural disaster in the United States.

Develop slowly or quickly – Flash floods can come with no warning.

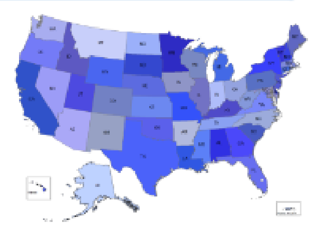
Cause of Flood

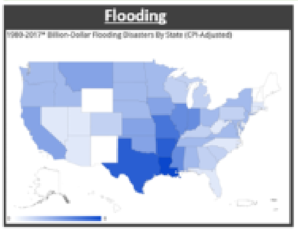
Result from rain, snow, coastal storms, storm surges, and overflows of dams and other water systems.

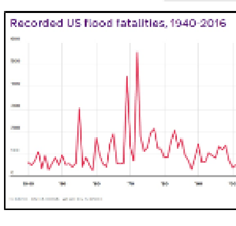
Cause outages, disrupt transportation, damage buildings, and create landslides.

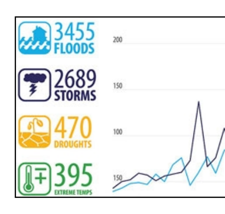
Scope

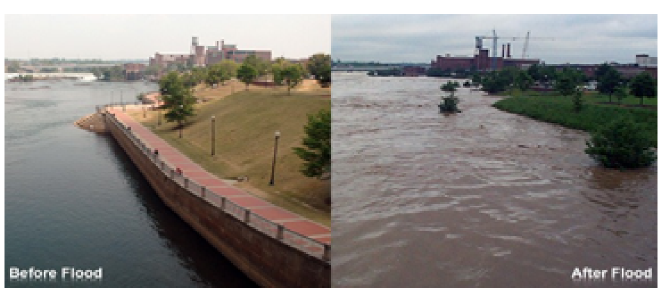
- Identification of Disaster area
- Deployment of Volunteers
- Ease Communication between volunteers
- Safety of Volunteers











Problem Statement

- The unpredictable nature of natural calamities make it difficult to respond quickly
- No organized way to deploy volunteers on the disaster site, and no way to measure the skills of volunteers
- There is no one to provide any direction to volunteers at the disaster site
- There is an inefficient system to handle the natural disaster and rescue people stuck in such areas

Goals

- Safety of people stuck in disas
- Ease communication between volunteers
- Increase the coordination among volunteers
- Help the people stuck in flood as much possible

Objectives

- Provide Direction to Volunteers
- Safe deployment of Volunteers
- Ease the communication among volunteers

Stakeholders

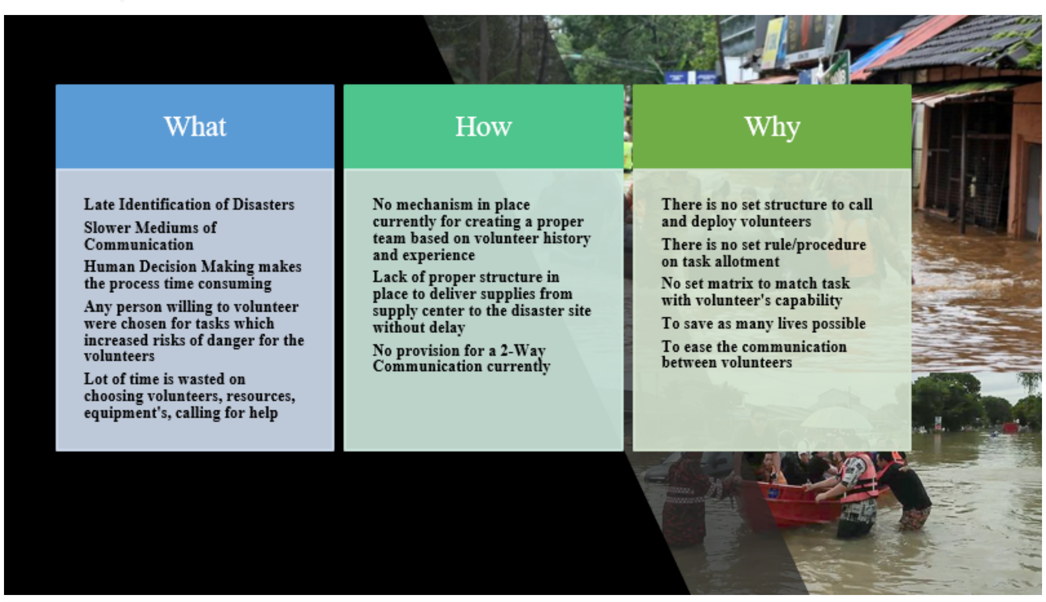
- Volunteers
- People stuck in Flood stuck area
- Government
- NGOs

Assumptions

- Getting the disaster information (area, intensity and people stuck) within 30 mins of disaster
- Every volunteer to be registered with the organization
- To get some experienced volunteers
- Message received to volunteers on time
- Availability of local volunteers
- Volunteers should have knowledge of basic knowledge of communication

Constraints

- Natural disasters come unannounced mostly & give less time to prepare for them
- Last minute cancellation by volunteers
- Change in the intensity of disaster



What	How	Why
Late Identification of Disasters Slower Mediums of Communication Human Decision Making makes the process time consuming Any person willing to volunteer were chosen for tasks which increased risks of danger for the volunteers Lot of time is wasted on choosing volunteers, resources, equipment's, calling for help	No mechanism in place currently for creating a proper team based on volunteer history and experience Lack of proper structure in place to deliver supplies from supply center to the disaster site without delay No provision for a 2-Way Communication currently	There is no set structure to call and deploy volunteers There is no set rule/procedure on task allotment No set matrix to match task with volunteer's capability To save as many lives possible To ease the communication between volunteers

As - Is

There is no 2-way communication

There is no channel to broadcast to help for the volunteers

There is no team formation formula as of now

To - Be

Walkie Talkie

Mobile Application, only accepted volunteers will be deployed. Mob app will take all the information from volunteers like experience age

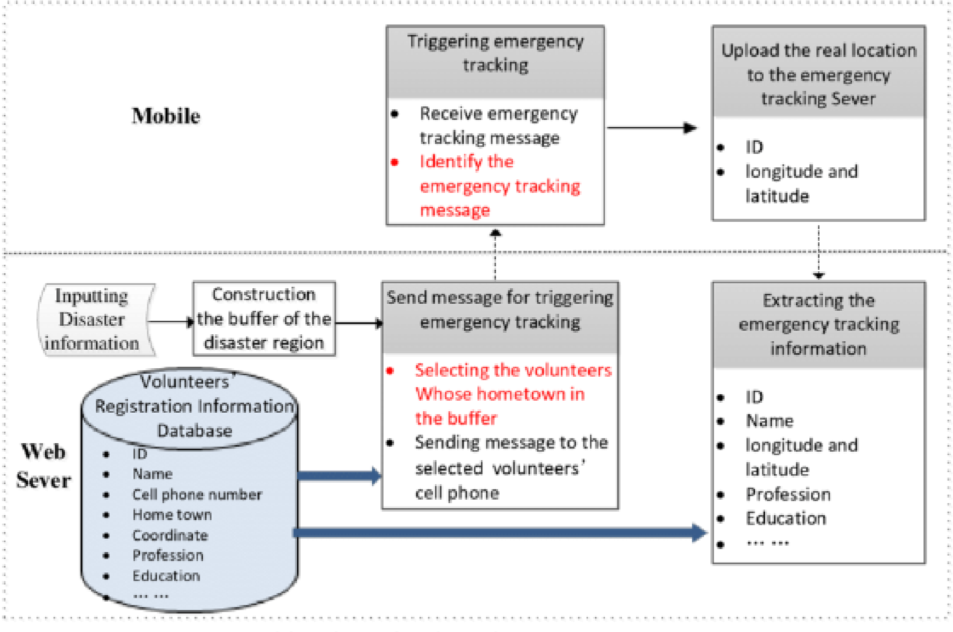
- - Local Volunteerism
- - out of state

Broadcasting the message to all the local people

Machine learning algorithm will define the team as well as roles as per experience and age and locality

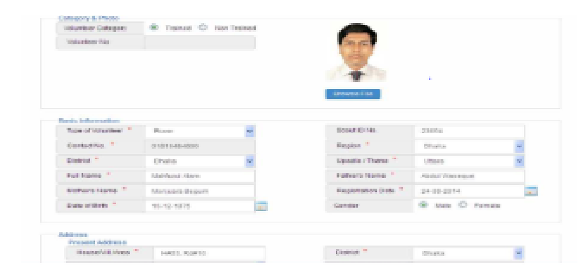
Solution Space

Alternative 1



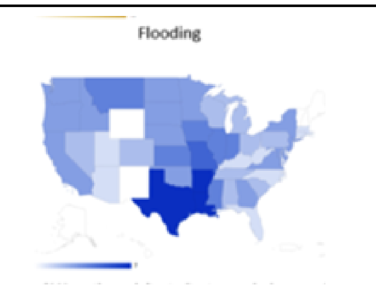
- Create a mobile application for volunteer login
- App will have certain details to be filled by volunteers
  - Age
  - Experience
  - Interest in area to help
  - Area
  - Contact Number
  - Can be contacted anytime or not
- Their data will be stored in database at data center
- During emergency, message for help will be triggered to all the volunteers who has the app

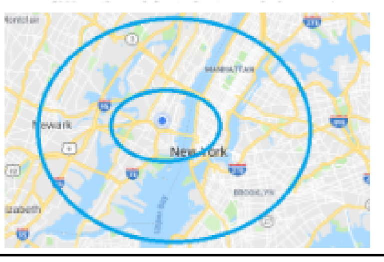
Alternative 2



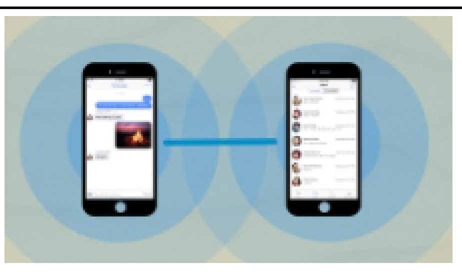
1. The organization will broadcast disaster event through social media
2. There will be provisions wherein various links and forms will be attached where interested volunteers can register themselves.
3. Upon registering an immediate acknowledgement will be sent to volunteers once disaster strikes specifying further plan of action such as what, how, where etc.
4. Notifications will be sent to the registered volunteers about requirements through social media about expected course of action
5. The registered volunteers will then reach the nearest office where they will be briefed about the tasks ahead and will be dispatched in teams.

Alternative 3



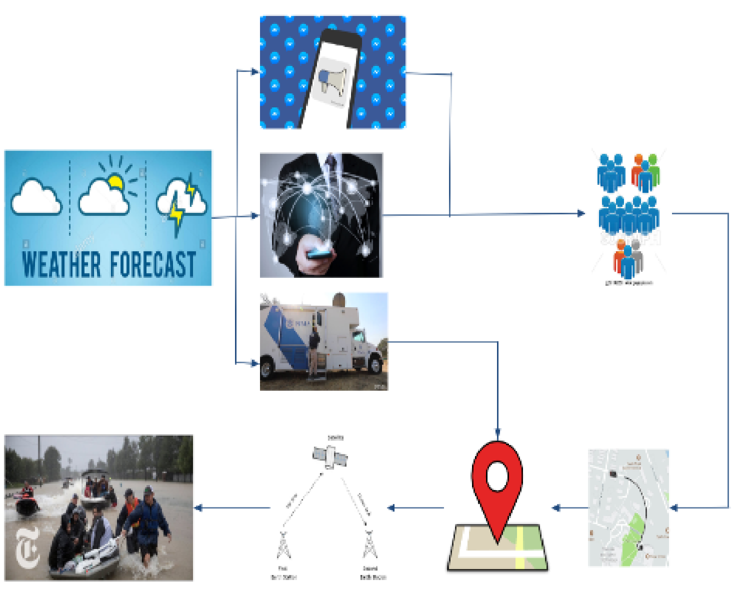


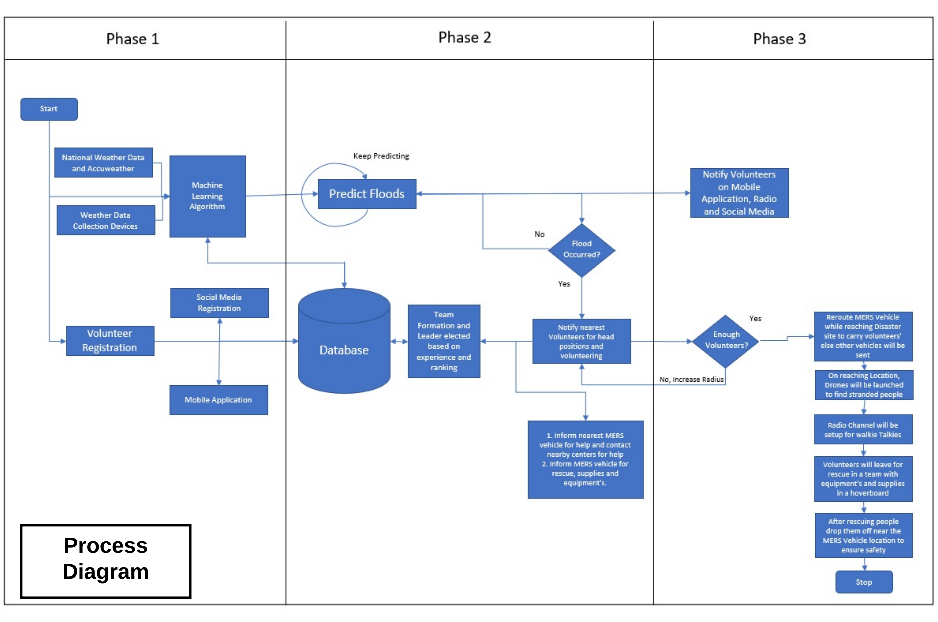
- Communication Problem
  - The organization will also have a mobile application which can help create a near field communication by creating or hotspot/Bluetooth based network and will collect location-based data of the volunteers.
  - Based on predictive analysis of possible disasters nearby. The application will initially inform volunteers in the possibly affected areas.
  - The volunteers within 50 miles range of the region will be sent out a message and need to respond if they can help the organization in the event. If the number of volunteers who can help are lesser than what they would need, then they can extend the range to a 100- or 200-mile range
  - Volunteers can use local alerts, radio stations, and other local information sources, such as American Red Cross apps, to get information and advice as soon as available.
  - Use text messaging or social media to communicate with family and friends.
  - Telephones and cellular phone systems are often overwhelmed following a disaster, so use phones only for emergency calls.
- Commute: How to reach Disaster Affected Areas
  - Use boats, hoverboats to travel around the highly flooded areas
- Make people learn what to do upon reaching disaster area
  - While onboarding a volunteer in the organization, they will be trained with several sessions. This will keep them prepared on how to strike an affected region effectively.
- Coordination among volunteers
  - The volunteers can use the application for messaging nearby people. Otherwise can try to message using their phones



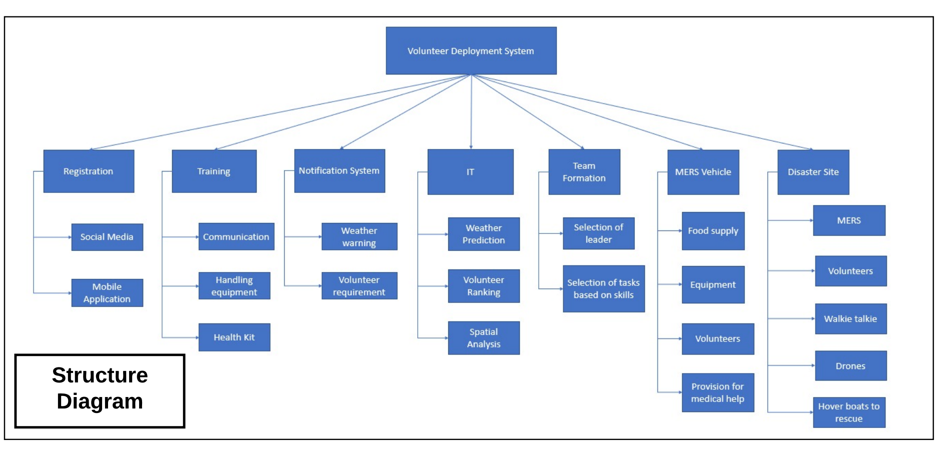
Recommended Solution

- Data from weather services and applications will be sent to data center to predict/check flooding activities
- Once a flood is confirmed using weather agencies and prediction, the volunteers near the flood struck location are notified if they can volunteer for the disaster and Facebook broadcast for volunteering event would be sent out near the specific location.
- The application will let specific people choose to be a leader/volunteer of specific department based on their experience and caliber.
- The nearby MERS vehicles will start toward the disaster location with equipment's and food supplies.
- The volunteers will be sent from the nearest office to the disaster location using army trucks.
- Once they reach the disaster location, Walkie Talkie would be given to each volunteer for communication, drones will be sent to find people and the rescue team will set off for rescue on hoverboats.





Process Diagram



Structure Diagram

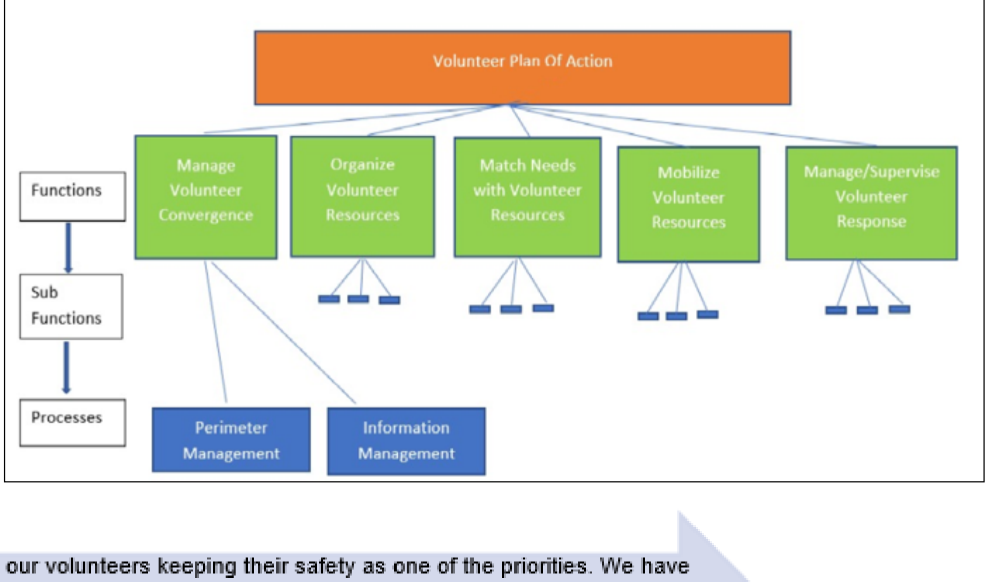
Zachman Framework

	WHAT	HOW	WHERE	WHO	WHEN	WHY
CONTEXTUAL (SCOPE)	Deploy volunteers into disaster hit areas	Individual to Individual or through innovation empowered strategies that would give viable and productive correspondences under typical and uncontrollable issues at hand	Flood struck areas all over USA	Registered and Unregistered volunteers, and people struck in disaster	Before a disaster hits a particular area or just after it has hit.	To ease the deployment of volunteers in flooded areas to rescue people and saves lives
CONCEPTUAL	To come up with a structure where there is organized volunteer deployment and a set task to individual matrix	Using Mobile application, Social Media and equipments	Organization center and location where disaster relief equipments are operated	Technology equipments and disaster relief team	During disaster when all channels fail and no idea on when to implement a solution	To bridge the gaps that are present in the current structure and formulate a more efficient system
LOGICAL(SYSTEM MODEL)	To ease the communication between volunteers. And also create a channel to communicate between volunteers and people stuck in flood	Volunteers will communicate through Walkie Talkies, and also catch any signals sent by people stuck	Volunteers will be deployed on field using hoverboat.	Walkie Talkie connected to a central station little away from flood area. People will be connected to each other and also to central station truck so as to have a to and fro connection	During disaster and after flood strikes	Communication between volunteers is very important, as when they are deployed we can track them for their safety and also they can call for extra help if needed.
PHYSICAL (TECHNOLOGY MODEL)	Use of Robotic arm on Hoverboat. Drone to find people stuck at various locations and Walkie Talkie for Communication		Hoverboat will be operable on flood water. The arm will help lift people and move heavy objects.	Volunteers will use this technology to save people stuck in flood	Once the disaster occurs	People are stuck in floods, unable to move from a place. This will help volunteers to reach them and pick them from those areas
DETAILED REPRESENTATION	Devices monitoring the disaster hit area	NData provided by weather forecasr for prediction. Notifacitons sent to vpunteersd through mobile app and social media	Disaster hit area and the location where volunteers are located	Devices and volunteers	Before a disaster hits a particular area or just after it has hit.	Protection of stranded people.
FUNCTIONAL (USER)	Volunteers available at site will use Walkie Talkie, drones and hoverboats	Volunteers will Communicate using Walkie talkie, Rescue using Hoverboats and find people through drones	Center and Disaster Struck Area	Volunteers will use these devices and equipments.	While the disaster rescue operations are ongoing	Rescuing people stranded at various points and getting them to safe zones

Cost Estimations

Infrastructure and Services	Costing
Data Center	$250,000
Mobile Application Development	$150,000
Server	$60,000
Application Licenses	$25,000
Maintenance	$150,000
Food Supplies	$250,000
Equipment's and Vehicles	$5,000,000
First AID	$50,000
Training	$150,000
Employees	$400,000
Total	$6,485,000

System view of Solution



Conclusion

The aim of this project is to deploy our volunteers keeping their safety as one of the priorities. We have focused on three main aspects of disaster struck area i.e. **commute, communication and safety.**

For **commute** we'll use hover boats which will ease their commute on disaster area as it can move on land and water.

- For **communication** we'll use multiple channel walkie talkies working on radio wave communication, which won't get affected in any weather conditions.

In terms of **safety** every volunteer will go through a training program to make them capable, efficient and help them develop abilities to tackle various real time situations.

<u>On implementing our solution we will be able to deploy volunteers in an efficient manner.</u>