JAHANGIRNAGAR UNIVERSITY

Institute of Information Technology

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Topic: Real-time Disaster Response Platform.

Problem Description:

Natural disasters are unexpected events which causes extreme loss of lives & properties. They are increasingly frequent & devastating, sometimes leaving the communities overwhelmed. Disasters like floods, hurricanes, firing, temperature or sea-level rising are increasing in recent years. In Bangladesh, along with the other southern nations are facing major, categorized hurricanes each year. As a result it is mandatory to provide accurate information to the rescue volunteer about needs of the victims.

Solution:

A cloud based platform that combines with Artificial Intelligence (AI) & crowdsourcing to provide real time information & support system during these natural disaster. Because, the traditional methods rely on centralized co-ordination & manual data collecting causes inefficiencies & delays.

Proposed Methodology:

(A) Data Collection

(I) Satellite & Sensor data: Real time monitoring of affected areas through satellite images & ground levels sensors for detecting flood levels, temperature & structural damage.

(II) social media platform & crowdsourcing
Eyewitnessed reports & geo-tag based images/videos from social media platform (facebook, twitter, youtube etc) to verify & enrich data gathered from the sensor.

(B) Information Analysis with AI.

(I) Predictive Modeling: Using AI algorithms to predict the floodwater rising level, spread of heat/firing, potential secondary disasters, enabling proactive response.

(iii) Resource Allocation
Optimize resource allocation (blood, water, medical supplies, rescue items) based on real-time needs & predicted impact zones.

(c) Information Dissemination:
(i) Multilingual alerts & updates: Send real-time alerts & updates to affected areas through SMS, push notifications, local TV/radio channels.

(ii) Co-ordination Platform:
Facilitate communication & collaboration between response teams, volunteers & affected communities.

Cloud Computing as Essential Part:

Uses of Cloud Computing infrastructure can dynamically scale up & down to handle the growth in data & processing demands during disaster, ensuring platform stability & responsiveness.

Beside, cloud storage provides a secure & centralized repository for all data, while cloud computing power enables real time AI-analysis & predictive modeling.

cloud service offers "pay-as-you-go" model. It reduces the upfront infrastructure costs & enabling efficient resource allocation during & after disaster.

Data can be remotely accessed & collaborate from anywhere with internet connectivity provided by cloud-based storage which empowers a global response network.

Benifits of the System:

Faster response time: Real-time data & AI-driven model lead to quicker deployment of resources & improve rescue efforts.

Improved resource allocation: Optimized resource allocation ensures critical supplies & personal reach those who need them most.

Increased preparedness: Predictive modeling helps communities prepare for potential secondary disasters & mitigates their impact.

Enhanced communication & collaboration: This platform facilitates better communication & collaboration among all the stakeholders involved with this response.

Proposed Steps

Data Acquisition, AI Analysis. :- Centralized (cloud based system)
Satellite images, Social Media Platform, Crowdsourcing: Data resource & privacy
Predictive Modeling, Analyze report/data with NLP, optimization :- AI Models.
SMS alerts, Notification, Broadcast to TV, Radio :- Dissemination channel

Diagram

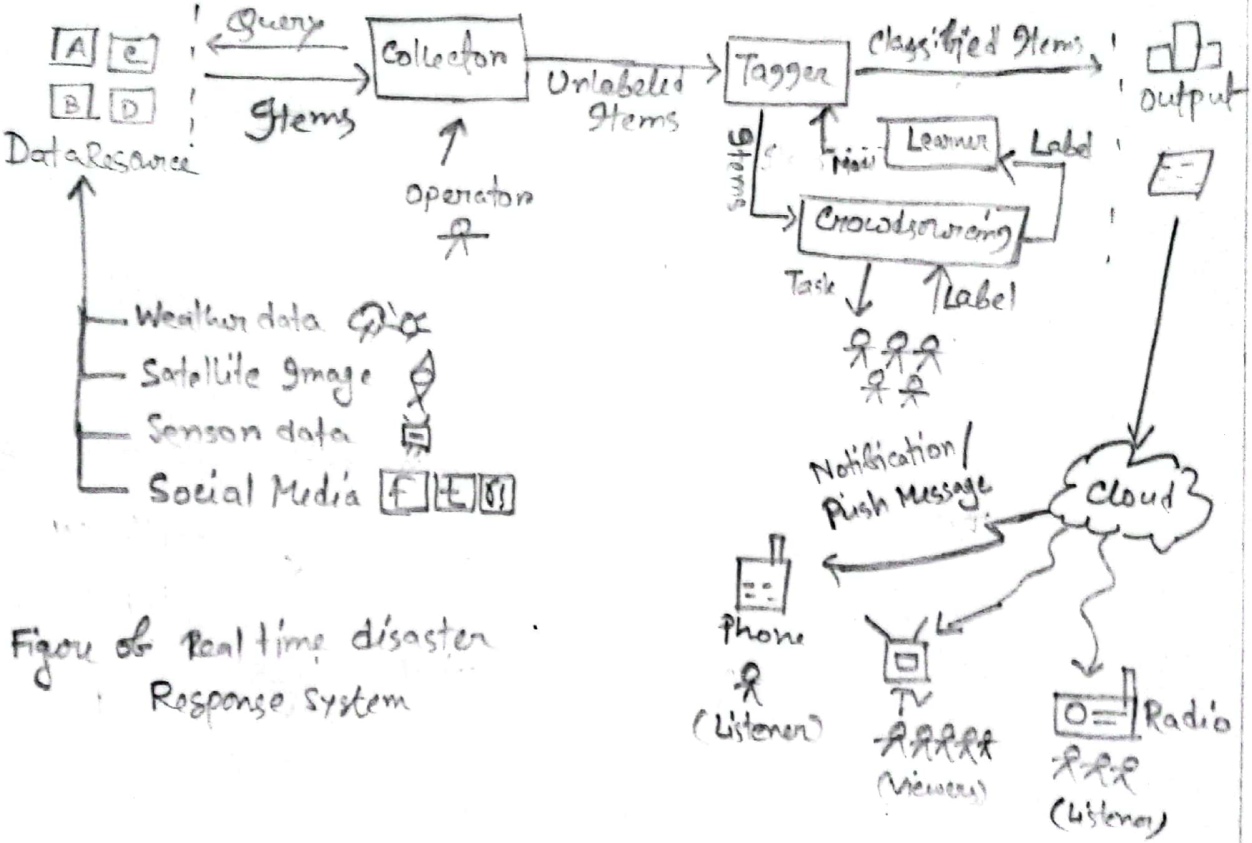

Figure of Real time disaster Response System

Future Scopes:

Integration with autonomous vehicles for real-time damage assessment & targeted delivery of aid.

Development of artificial intelligence powered chatbots to provide multilingual support & health resources to affected individuals.

Building a global network of disaster response platforms for co-ordinated international collaboration.

Conclusion

The proposed idea plays the unique capabilities of cloud computing to create a more efficient, effective & resilient disaster response system, which save lives & minimizing damage in the face of natural disaster.

References

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