Idea/Approach Details

Ministry Category: Ministry of power

Problem statement: Integrated flood warning and alert system using IoT

Team leader Name: Chetan Chadha

Problem Code: #MOP9

College Code: #7209

Idea/Solution/Prototype

With the increase in the risk factor due to natural and man-made disaster there comes the call to develop the early warning system(EWS) which could alert the humans and saves precious life and valuable assets. So we have developed an alert system that can alert the people around the dams before the release of water from the dams.

- A centralized system has been developed and a common platforms have been provided to connect the dams all over the India which will contain information like current water level and amount of water to be released.
- We have used an IOT enabled RF Transceiver based mesh network which gets activated prior to the releases water from the dam.
- As soon as the water raises above critical level and water release is scheduled, RF mesh network will get activated giving the alert message and information using a display and a warning message is generated using text-to-speech converter (for audio).
- This system is flexible enough to work with or without network availability. As a single LoRa (RF module) has connectivity up to 10KM.
- Due to IOT connectivity when it comes in network range our system will send information about water release to all the service providers so that they can send EWT(early warning texts) to their active users present in the danger area.
- Modules will be placed on or near electric poles if in case there is power shortage or power cut it will use solar power through Batteries.

The Proposed solution will not only create alertness about water release but also alert the farmer about the release of water beforehand so that they can take prior actions. This same solution can be used for spreading any kind of alertness. This solution will transfer the information about the alert from an area where there is no network to that area where a network is available and then with IOT or with RF module alert message will be communicated to the public and other required authorities.

Video Link of Proposed Solution: https://youtu.be/CVlemhBHzQw

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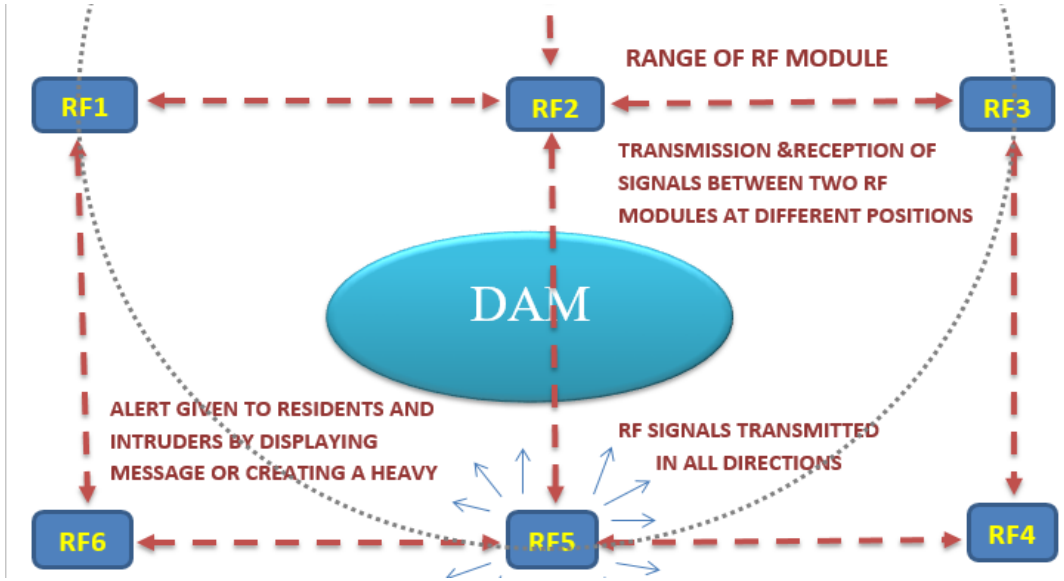

Fig. 1 Working of our prototype

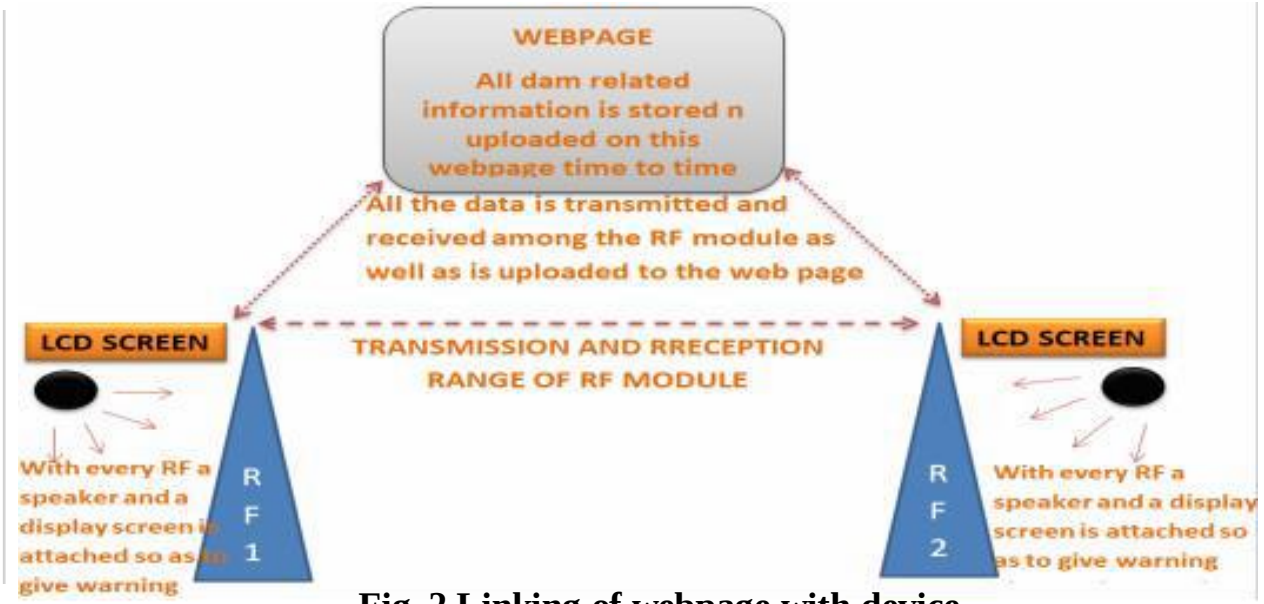

Fig. 2 Linking of webpage with device

Technology Stack

We have proposed a cost effective solution which does not require much maintenance and is highly efficient in use. Here we are using

1. LoRA Long range RF module which is a transceiver and will transmit and receive signals among other RF modules up to 10kms of range.
2. IOT:- A web application is made for internet of things where all the live information will be updated about dams and from same platform will control all the modules which are deployed in any area.
3. DATABASE Management:- A common database will be created for all the dams where live information about every dam will be updated with information like current water level, maximum capacity and amount of water to be released.
4. Solar And Lithium Ferro Phosphate Batteries which will be used to power the RF modules and charge with help of Solar.
5. Other Hardware parts:- LCD, Text to speech converter and audio bacons are required for intimating messages to mass.

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Cases Used

- A mesh wireless network of RF modules (LoRa) is used so as to reduce the problem of connectivity as has very long range of communication and if any of the RF fails to transmit the data then communication will not get interrupted because it can get the connectivity from other RF module connected in the mesh this will work as Fail Safe MODE which serve as a backup to each RF module.
- Our devices will be placed on the electric poles and getting power from them if in case there is no power supply available then will be using solar as power backup.
- The information about the status of all the dams will be transferred to the web page through IoT.

Show Stopper/Dependencies

- Access to service provider BTS(Base Transceiver Station) to get mobile numbers from VLR(visitor location register) and HLR(home Location Register) so Early Warning Text can be sent to all the users in that area.
- Installation of our LONG RANGE RF module, LCD display and text-to-speech converter so that the data and information could be transmitted at low cost. We need permission from ELECTRICITY BOARD of that area to place our RF module on the electricity pole of that area.
- If this system get implemented then this can be used to rise any kind of alert.

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