"ADVANCED MINOR FLOOD MONITORING DISCHARGE CHANNEL"

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ABSTRACT:

The project aims to protect the city from floods during heavy rainfall. It makes use of the data in order to identify the location and potential impacts of floods can have on people, property and natural environment. Thus, reducing the damages caused to the people, property and the environment. The society and the economy of any country suffer in many ways after a flood with the loss of lives, vegetation and infrastructure, which means there will be fewer people on the labour force, less agriculture available for locals and for exporting and less businesses to contribute to the country's economy development. About 90% of the damages caused by natural disasters (external droughts) are caused by floods. This study is focussed on the prospect that climate change

may contribute to increase flooding resulting from rising sea levels and heavy rains in certain regions of the planet. This study gives the scope because floods are among the most frequent natural disasters that cause greater economic losses and difficulties to human activities. In the current investigation an advanced minor flood monitoring discharge channel Model is developed in such a way that, the flood gates were operated automatically by the use of soil moisture sensor module & ultrasonic sensor module by detecting the total amount of water in the underground tank, when the tank crosses threshold limit, automatically the pumps start to pump out the water from the underground tank to the nearby lakes. Also, this idea can be effectively implemented to store water also.

KEYWORDS: Underground tank, sensor, automated discharge channel gate, Flood, Pump, Infrastructure, Disaster.

INTRODUCTION:

Floods are natural disasters that occur when an area of land becomes submerged in water. They can be caused by a variety of factors, including heavy rainfall, melting snow, dam failures, or tidal surges from the ocean. Floods can happen quickly or develop gradually over time, depending on the circumstances.

After a flood, a country's society and economy suffer in a variety of ways due to the loss of people, vegetation, property, and infrastructure. As a result, there are fewer people in the labour force, less agriculture available for consumption locally and export, and fewer businesses to support the growth of the economy. There will be a large-scale human emigration, and many of them could end up homeless and jobless. The government will need to increase spending to close this imbalance. The nation may need to go to the outside world for food and supplies to clean and repair its infrastructure.

This study is justified because floods are among the most frequent natural disasters that cause greater economic losses and difficulties to human activities. About 90% of the damages caused by natural disasters (excluding droughts) are caused by floods and associated water flows. In addition, this study is justified as there is the prospect that climate change may contribute to increase flooding resulting from rising sea levels and heavy rains in certain regions of the planet. Hence in

the present work an attempt is made to reduce effect of flood in a minor way by providing automated underground tank.

OBJECTIVE:

1. To design and fabricate subterrestrial flood control tank with automated discharge channel gates.
2. To validate the model for practical applicability in flood prone areas.

METHODOLGY:

The following methodology has been adopted to design the Advanced minor flood monitoring discharge channel

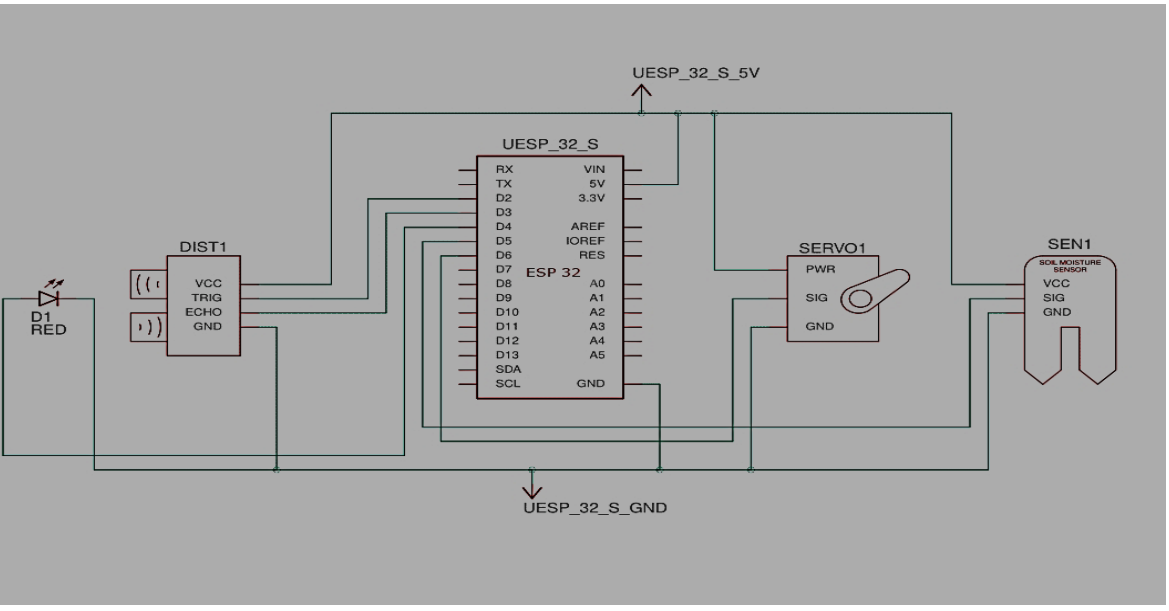
1. Identifying the flood prone area.
2. Collecting the data of rainfall intensity of that area.
3. Design of subterrestrial tank.
4. Fabrication of Automated flood gates.
5. To recharge the underground water by using the collected flood water.

SYSTEM REQUIMENTS

1. ULTRASONIC SENSOR MODULE – HC- SR04
2. SOIL MOISTURE SENSOR MODULE
3. 5V 10A RELAY MODULE
4. TOWER PRO SG90 SERVO MOTOR
5. ESP32S DEVELOPMENT BOARD (WIFI + BLUETOOTH)

Working Principle:

- The soil moisture sensor measures the water level. It periodically or continuously monitors the water level by measuring the electrical resistance between its probes.
- The sensor is connected to a control system, which is microcontroller. The control system receives the water level data from the sensor and compares it to a predetermined water threshold limit.
- Based on the comparison between the measured water level and the threshold limit, the control system determines whether to open flood gate need to be open or not. If the water falls above the threshold, indicating to open the gate, the control system activates the servo motor. The servo motor is responsible for controlling the open and closing the mechanism of gate. The control system sends signals to the servo motor to initiate the desired movement.
- After opening the gate, the ultrasonic sensor sends an ultrasonic pulse out at 40kHz which travels through the air and if there is an obstacle or object, it will bounce back to the sensor. By calculating the travel time and the speed of sound, the distance can be calculated. when water level reaches the threshold limit in the subterrestrial tank**,** the ultrasonic sensor sends out a signal to activate the pump.



- When the pump gets activated, it pumps out the water from the subterrestrial tank to the nearby lakes or connecting subterrestrial tanks through a channel.
- All the operations are analyzed in a office room through Blynk IOT in our project

Fabricated "Advanced Minor Flood Monitoring Discharge Channel"

RESULTS AND CONCLUSIONS:

- The fabricated minor flood control discharge model has been well executed & it shown that flood control gates were open automatically within 14 milliseconds (Instant) when water level reaches to threshold depth.
- Based on the number of the Sub terrestrial tank, the water storage can be increased which can be used effectively whenever required.
- The flood gates were automatically operated by the use of soil moisture sensor modules and ultrasonic sensor modules by detecting the total amount of water in the underground tank, and when the tank crosses threshold limit, automatically the pumps start to pump out the water from the underground tank to the nearby lakes.
- The entire automated real time operation was monitored by application
- This is how the advanced minor flood monitoring discharge channel Model was developed in the current investigation. This concept may be successfully used to store water as well.

INNOVATION IN THE PROJECT:

In this project we have focused majorly on automated flood gates based on the depth of the water & Sub terrestrial tanks with real time analysis of the same through mobile or system application.

SCOPE FOR FUTURE STUDY:

1. This type of application can be used for larger floods, as of now we have designed for minor floods. The same design can be used to develop a working model for larger floods & also need deeper investigation for practical feasibility.
2. We have developed a prototype working model. Same application can be implemented in larger model by more investigation.