A SURVEY ON APPROACHES FOR UNDERPASS WATER CLEARENCE CHECKING DURING NATURAL CALAMITIES

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Abstract *— Recent climate changes caused significant challenges in disposing enormous amount of water falls to the ground like rain. An underpass getting flooded during intense rain is a catastrophic problem in any growing city. Due to vulnerable infrastructure, more water accumulation can be in an underpass. This direction is a dangerous situation for pedestrians as vehicle drivers. What makes the condition worse is that Google maps do not render any information pertaining to water level flooded underpass. This survey makes us to develop a frame work that monitors the level underpass. This developed frame work shall provide a environment friendly solution to manage the traffic congestion when an underpass gets clogged due to intense rain.*

Keywords— Internet of Things (IoT), Sensors, Wi-Fi Module, LCD, Cloud Architecture.

I. INTRODUCTION

In recent times all the humans and creatures on the earth facing troubles because of growing population, aging infrastructure etc. it's too important to find solution for water monitoring & control system. Due to inadequate drainage mechanisms and also poor design, placing and maintenance is also main reason vulnerable situation of the underpass in the cities and also leads to floods may occur during heavy rainfall. In country like India where escaping from the traffic and the major issue to the people. The Motorists rack their brains every time the sky opens up to find figure out is there any underpass that end-route to their destination to escape from the traffic that takes place in the city. If they find any underpass there occurs another stress of rainwater accumulation in the underpass. And if they choose to wait then they end up being late waiting for hours together till the water drains or till the water is pumped up.

During monsoon season, many underpasses are waterlogged. Most cities are facing the problem of underpasses getting flooded. These inoperable underpasses not only cause heavy traffic but also pose grave danger to the pedestrians with dangerous diseases and infections. These situations can have a negative impact on drivers because they cause stress, waste of time and other health issues. Waterlogging in the nearby areas, blockage of stormwater, and Backflow of water can also cause spreading Typhoid, cholera and other waterborne diseases, and various infections such as amoebiasis and toxoplasmosis. Internet Of Things has become powerful technology that could replace human based strains. It consists of all web-enabled devices that collect the information using embedded sensors and send and process the data using processors and communication hardware for further visualization. Units generated from the wind-solar power system need not be took by the thermal-based plant. Because of continued rise of wind and solar generators, granting renewable energies in power networks is increasing.

II. APPROACHES FOR UNDERPASS WATER LOGGING METHODS

Within this segment, allotment methods for Underpass Water Logging have been projected.

A. Clearence Checking of Underpass for Highway Widening

In [1], Widening of main road can reduce the clearance of the low-level underpass road, restricting the passage of vehicles and leading to collisions with structures. Therefore, checking the clearance of the underpass road effectively should be considered at the design stage. It describes a digital twin approach for checking the clearance of underpass roads in highway expansion projects using online map data. The underpass road digital twin and BIM model of the newly widened road based on existing main road digital twin are created to assist the clearance check and redesign. The proposed method presented a cost-

effective clearance check for underpass roads in road widening design without field surveys and was successfully implemented in an underpass road in the UK. In future, more digital twin methods for overpasses, bridges, tunnels, and traffic safety facilities should be employed comprehensively to assist more road widening applications.

B. IoT for water level monitoring

In [2], water is a resource that not only plays an important role in various fields of agriculture and industry, but also plays an important role in the ecological life of all living organisms, including humans. It also plays an important role in balancing the cycle. People unconsciously realize the importance of consuming the minimum water requirement for their organism. Water is wasted in many ways. This waste occurs from domestic households to industrial levels, which can be caused by leaks from taps or domestic water tanks, but also by large-scale housing, filtration and management in factories. Therefore, there is requirement for real-time and accurate system-based protocol. It has importance on different levels disciplines, may be for survival, economic or other different fields. Water conservation is therefore this is one difficult aspects of human survival. Technologies have become an integral part of people's lives these days. IoT is simple and easy-to-use technology that has a wide range practical application. The group's application can be extended to water management, providing a cost-effective and robust approaches that can be used for monitor water levels.

C. Automotive radar sensor for tracking Rainfall

In [3] uses a vehicle-mounted W-band radar to qualitatively estimate intensity of the rains without interfering the observation objective. In addition, detect the first object is used by ADAS systems, is also designed to detect amount rain and estimate the intensity of rain. Automotive ADAS radar systems are often fragmented radar signal processing section that calculates Doppler range and the speed profile from the analog signal received from radar antenna, one object detection section for ADAS applications such as forward collision detection and obstacle detection. Usually, Doppler velocity noise filtering is also done in radar signal processing process to remove noise it's not target of detection. Object detection phase uses the CFAR (constant false alarm rate) algorithm to identify objects and evaluate target coordinates using the target phase difference accepted by each patch antenna. In the proposed method, the rain intensity estimation routine between two steps is added and filtered distance profile used for it estimate rainfall intensity in the radar signal processing stage.

D. Role of Water level Monitoring in dams

The main idea of this method [4] is to automate the monitoring of water levels near all dams through a central server [4]. This can be achieved by using IoT-related cloud service applications. First, each point is considered a point. Most such points are connected to a central control center operation of each point. First, the device near the main point (dam) consists of ultrasonic sound sensors on both edge of the embankment gate. This ultrasonic sensor is useful for detecting water level on both side of gate. Each dam has a local level station from can contain water level data sent to a central server. An ultrasound sensor must be connected a microcontroller through which the data is submitted to local base station. For this, remote communication methods must be used, since the minimum distance between the transmitter (near the sensor) and receiver (near the base station) is at least 1 km. Thus, information two levels of water sensors reach the local base station. After collecting information from water sensors, main station sends the data to the central control center via the cloud. Information from each other major station is uploaded to the cloud, and the central command center can use this data to monitor the water level in real time and determine whether the dam gates should remain open or closed. All points will have a base station collects data and sends information to the cloud, and the command center will have real-time information from all points country.

E. Bayesian Network Analysis for Vehicle traffic control in flooded areas

Internet of Things (IoT) has become the center of

thought in progress infrastructures because it is manageable to power applications on interacting smart devices. IoT has enabled use these smart devices in the development of network operations, which is significantly suitable for everyday activities where its services are extended through the Internet [5]. As it grows the technology of these smart device, many problems solved, especially if it comes to traffic jams and flood monitoring. There are use cases used worldwide where smart devices have been set up to be built with decision support the system through a wireless sensor network (WSN). [2], [3]. Based on various studies on traffic congestion and flood monitoring, the mitigation of these problems needs to be improved through open source implementation and real-time optimization. The Philippines is one country that suffers from both major floods and traffic jams. This problem would eventually get worse if effective there is no solution provided which can have a bad impact on the commuters and worst on the country's economy as a whole. This is the main goal work develop a system for local drivers that reliably monitors and analyzes vehicle traffic and flood conditions and performs predictive analysis of possible alternative diversion routes to avoid congested and flooded road areas.

F. prevention of water logging in urban areas using IoT

In [6], this has a purpose to carry out Large-scale application internet of things technology in urban flood prevention management and it analyzes the security requirements and security architecture from the Internet of Things technology and discusses the need for urban flood prevention management systems. with the key technology internet of things technology to do well the overall design and functional design in designing urban flood prevention system. Finally, the application process to this technology in Chongqing drainage prevention management system is concentrated. The application result shows that the anti-flood and Chongqing's drainage function is gradually improved with drainage facilities; inspection and maintenance is gradually standardized, operation monitoring and early warning management is fully strengthened. There are visual controls for quick commands and dispatch, and at the same time evaluate the sewer pipe network can be done correctly.

III. CHALLENGES OF MONITORING UNDERPASS WATER LOGGING

The challenges in monitoring underpass water logging include:

- Ensuring the reliability and accuracy of sensors placed in underpasses is crucial.
- Managing and interpreting vast amounts of data collected by IoT sensors can be challenging.
- It requires robust algorithms and analytics to accurately detect and predict water logging incidents while minimizing false alarms.
- IoT devices collect sensitive data, and securing this data against cyber threats is essential.
- Ensuring continuous power supply to IoT devices within underpasses can be challenging.
- Adhering to local regulations, standards, and privacy laws while deploying IoT solutions is crucial.

IV. CONCLUSION

A various water measuring system with different levels of indication is discussed. It will also signifies when the water is below and above than the requirement. Future, Work can involve the analysis on water level in a particular area so that the wastage of water is prevented. An SMS-based system may include a message must be sent to original authorized customer when the water level drops from below specified water level. Success paves the way for increase in originations like WSN, IoT, 5G and numerous others. This programs a water utilization for checking framework dependent on cloud in a lake which lets in plunging the consumption of the water.

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