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WSN Based Flood Estimations and Early Cautioning System using IoT

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Abstract: ***Wireless Sensor Networks (WSN) provides virtual layer where knowledge regarding actual world can be retrieved by any computational arrangement as these operate as digital skin. These are irreplaceable possessions used for comprehending ideas of IoT as they are used to gather information about physical phenomenon. IoT offers virtual interpretation through Internet Protocol towards a huge variation of real-life objects from buses to saucer, from building to trees in woods. Its appeal is the universal widespread access to the status and location of anything we may be interested in. The Internet of Things (IoT) is the network of physical objects, devices, vehicles, buildings and other items which are embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. WSNs are combined into the "IoT", where sensor nodes join the Internet vigorously and use it to collaborate and carry out their tasks. Wireless sensor networks (WSN) are well suited for long-term environmental data acquisition for IoT representation. Weather conditions monitoring is made by gathering quantifiable information regarding prevailing condition of atmospheric procedure to venture how will it progress in that location.***

Index Terms: WSN, Thing Speak, KNN, GSM.

I. INTRODUCTION

Internet of Things is based on the standard communication protocols and they are the broad network of interconnected objects. To complete different tasks including Sensors, RFID Tags, etc. an object will be dynamically able to join the network, team up and conspire efficiently. WSNs are spatially spread independent sensors to track the Physical and environmental states like Temperature, Sound, Pressure, etc. and to supportively permit their information over the network towards the core position as they play a major part by gathering nearby conditions and atmospheric data too. The more modern networks are bidirectional and will also permit regulations of sensor movement. Military applications triggered the development of WSN and they remain to be used in various manufacturing and various other applications.

II. PROBLEM STATEMENT

Floods are common catastrophes which occur without cautioning. Because of floods there will be compensations as they destroy crops, edifices and all in their path. Without rescue operations, animals and people can't get out of the floods.

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Consequences of floods include reduction of agriculture lands, death of people, houses getting washed away, bridges getting collapsed, etc., To decrease overhead because of the surges recovering ideas aimed at the affected places and also for the sufferers more individuals and organizations are required to spend time. These plans draw more money, masses of human power for example Clinicians, nurses, engineers etc. Additionally, government needs to spend huge money on renewing Physical edifices in surge affected spaces. Torrent is one of the utmost dramatic way of communication among man and his surroundings. Loss of life, Loss of lands, diseases are interlinked with these. We have manmade and natural reasons for flooding. Examples of natural causes are heavy rainfall, river overflow which will result in constant overflowing. Likewise, heavy showers followed by overflowing not only causes huge harm to edifices, homes will too be destroyed along with woods and plants. Alarms are planned to deliver a rapid awareness to the terrified people. Presently they are the safest means to alert the people. We can predict if the flood occurs or not with this data. The end results of a surge alter significantly depending on location, these end results can be both positive as well as negative. These Overflows can likewise disturb fatalities, one's relatives for a longer duration. The harm to dear ones has profound effects, particularly on kids. Dislocation of one's home, damage of belongings and trouble to occupations can root unending worries.

III. LITERATURE SURVEY

In emerging nations, surge because of natural calamities like tornados outcomes to a immense damage to lives. The effective solution to this is to alert people about the forthcoming flood and give people some period to vacate and guard one's belongings. Primary notifying resolutions which are available need huge cost and consistency, they also create several prominent problems starting from the technology to Politics. Difficulty of these and willingness for self-sufficiency inside a lexicon of a evolving nation whereas enduring conceivable also reachable by group of non technical offers a threat which are not solved even by much evolved territories. [Paper 6]. Amount of destruction which is instigated through overflowing is unswervingly associated with notice period fixed previously a surge started. So, it is significant for advance coverage precision and consistency of surge estimations. [Paper 9] suggests a new Network grounded method to provision surge guesses by using embedded sensor nodes furnished by wireless networking expertise. Nodes apply network of lesser mass which can spread information collected via surge sensors used for off-spot inspection. The nodes are equally accomplished of executing on-site investigation which is casted off to update system performance.

Suggested system will use Lancaster's next-gen module-built podium 'Grid Kit', offering built in provision for reconfiguration, mixed web technologies, molding it as a perfect match for the application.

IV. BLOCK DIAGRAM

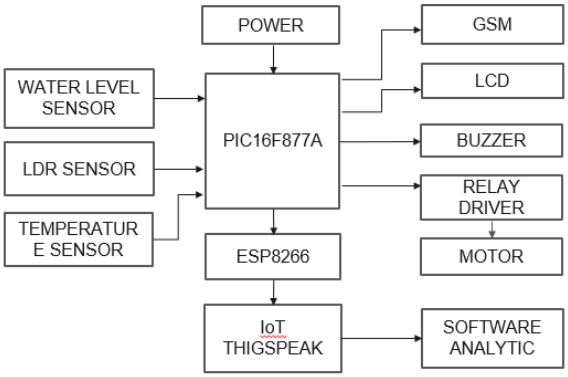

Fig.1: Block Diagram

The microcontroller is a heart of this project, situated in middle of all blocks and accomplishes all the activities of the system. The LCD is used to show every process taking place in the controller. For monitoring weather wireless sensors are used to measure the parameters of Temperature, Water level and luminosity of light. The sensors which senses all these parameters are connected to the controller and data from them are sent to control segment each three minutes. Through wireless communication GSM data is transmitted. The values of parameters are restructured on internet and even will be public. We can club the information with sensor nodes which reads facts such as level of water, speed of water etc. or any water source to be more accurate about the result of the prediction.

V. EXISTING SYSTEM

WSN's have become a vital portion of applications which comprise forecast monitoring in an extensive range of areas for instance health-care, modern war schemes. These fields will offer facilities in hourly basis and they are more precise. By the study and improvement in IoT field, the crucial idea has lifted near to the interoperability of WSNs and a cloud-based central data source which cooperates, understands a exclusively distinguishable structure which is similar to internet. This structure has flagged the mode for a Sensor Combined architecture PARASENSE based on cloud. This affords a thorough rundown on PARASENSE design which assimilates WSN with IoT.

VI. PROPOSED SYSTEM

Saving the lives when a calamity occur is the key characteristic of early cautioning system. For instance, in case of a surge if a caution is made earlier to an event, that can help workers to reduce water echelons. Surge is a circumstance in which the alive and lifeless things which fit to the environment grieves many sufferers. Humans cannot wholly evade surges, the only thing people will be able to ensure is, they will be able to advance right classifications to guess & succeeding procedures to awaken publics regarding its manifestation. We have several available technologies to guess and halt them. Lots of calamities will casually lead to surge, naming few massive rains and cyclones. These surges result in wealth loss and also human harm. The key motive behind growth of surge awareness scheme is the implicating surge in advance so human sufferers can be guarded by evacuating the public to secure locations and guards' precious properties. Here we have taken WSN and IoT technology with these concepts. The PIC16F877A Microcontroller will help to control the type of sensors like water level, Temperature, and LDR sensor. Every sensor is linked to controller and also the status of those is guided to control segment each three minutes sporadically. All sensors are connected on the Microcontroller and the status of the sensors is sent to the control section periodically every 3 minutes. ESP8266 has the control web server to update the information in data base. Over wireless communication GSM the data transmission is performed. In case of abnormal weather like high temperature increase instantly warning alarming and the display to situation.

VII. PREDICTION USING MACHINE LEARNING ALGORITHM

Sensors sense the data in the vicinity. Thing Speak permits sensors, devices to lead information to a cloud and is kept in private, public channels too. Things Speak will accumulate information in private channels, but we can use public channels too. Once it is in channel, we can investigate it. Once the data is populated the data will be segregated into relevant data structures. These segregations are with respect to relevant fields only. The fields will be in the form of sensors feeded sequence.

A. Cleaning the data

Data are normally unfinished which means misses quality standards, deficient in a point of notice, or comprising just combined information and also noisy which means comprising faults also comprising inconsistencies in ciphers.

B. KNN

New tuple entry / Estimates**:** This tuple has to be predicted. For this we need to enter the previous driven sensors data for predictions. Based on KNN the arrangement will happen and new tuple will be predicted based on the Euclidian and K value with respect to edge and calculations can occur.

K-Nearest Neighbor Classification: This is created on an knowledge that the entity would be predicted so it will fit to a similar period as per the entity in the instruction set sideways through largest comparison. We want a right resembled search classification where instructed data is saved. By analysis of the results of a KNN query we can perform classification. Simpler method is to control a sorting outcome of KNN classifier which is a common regulation.

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VIII. FLOWCHART

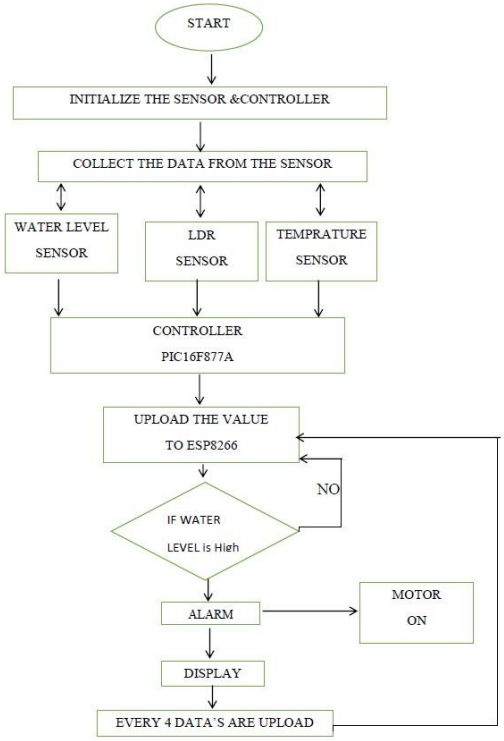

Fig. 2: Flowchart

IX. RESULTS

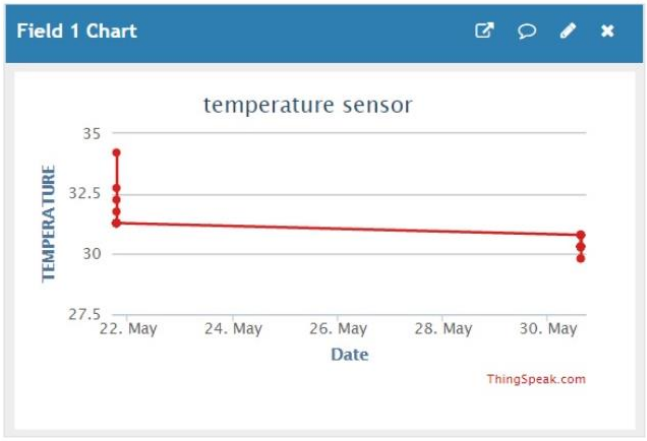

Fig.3: Temperature Sensor graph

Fig. 4: LDR Sensor graph

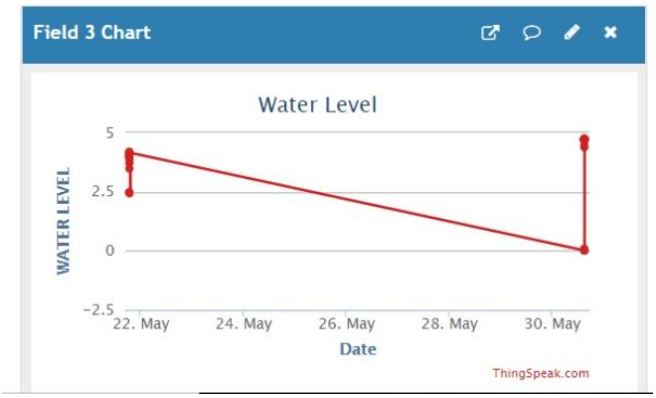

Fig. 5: Water level sensor graph

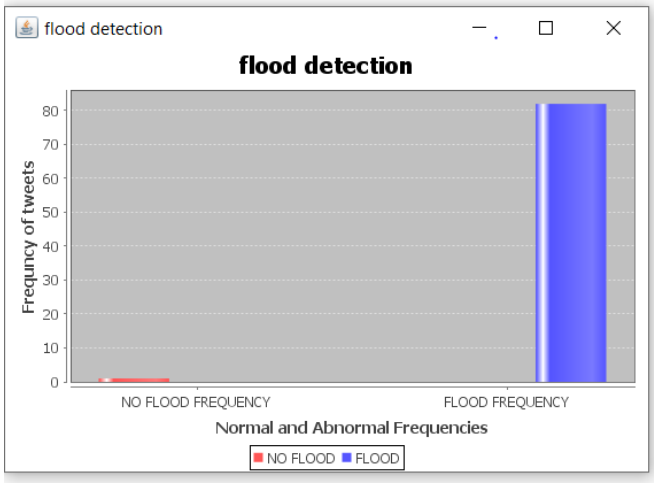

Fig.6: Flood frequency chart

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Sagar Simha K T is currently pursuing his final year M. Tech in Electronics from Dept. of Electronics and Communication, BMS College of Engineering, Bengaluru, India. He has received his Bachelor of Engineering in Electronics and Communication from Visveswaraya Technological University, Belgaum, India. His current research interests include VLSI Design, Semiconductor Devices, Control Systems.

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