Prediction Of Flash Flood And Landslide Monitoring System Using Bayesian Classification In Iot

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***Abstract*:** *In this paper, we present Real-Time Flash-Flood Monitoring, Alerting and Forecasting System using Data mining and wireless sensor Network. Our System not only Measures River Water level and different weather conditions such as temperature, humidity and vibration through wireless sensor nodes but also we can forecast possibility of future disasters by using Data mining algorithm on our database. Hazardous condition information and forecasted information is employed for early-warning with the use of server to E-Mail .We use micro-controller (PIC) for connecting the server to the different sensors like Water Level sensor, Humidity sensor (SY-HS230) with the help of MAX 232 Level Shifter and ADC. We apply Naive Bayes Data mining on our database for forecasting, Naive Bayes algorithm is simple probabilistic classifier which finds output for YES & NO Probability and we also use WSN for collecting input values from different environmental conditions.*

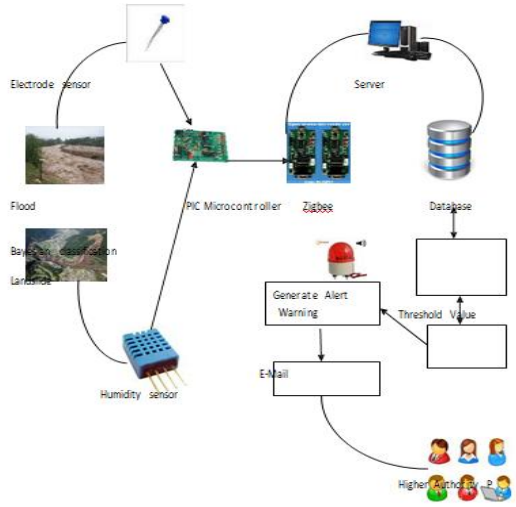
I. INTRODUCTION

In Natural Disaster Flash-Flooding is extremely dangerous, Flash-Flooding has potential to wipe out an entire city or coastline; that causes damage to many lives and property. It also has great power that can be extremely destructive, even if it is a foot high. Flash-Flooding is an event in which Or can be defined by piece of area that is usually dry area and suddenly gets under water. These Flash-floods can occur suddenly and recede quickly. When floods happen in an area that people live, the water carries along objects like houses, bridges, cars, furniture and even people.

II. DESCRIPTION

In Natural Disaster Flash-flood and landslide has more bad reputation, that kill more people world-wide than any other natural disaster in an average year, flash floods kill more than 5,000 unsuspecting people and cause millions of dollars of property damage. During floods especially in flash floods the people's asset like roads, bridges, farms, houses and automobiles are destroyed. So many People become homeless.

III. ARCHITECTURAL DESIGN

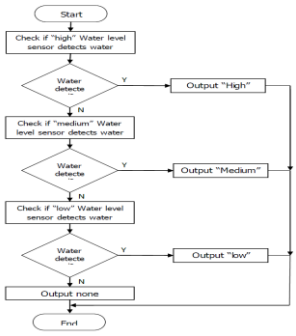


IV. ALGORITHM:

Naive Bayes algorithm is simple probabilistic classifier which gives YES or NO in result and it based on three probabilities l)Initial probability= to compute probability of yes or no results 2)Individual probability= to compute conditional probabilities and 3)Final probability= that is the multiplication of Initial probability & Individual probability. with Final probability it decides the results For example. a fruit may be considered to be an apple if it is red, round, and about 4" in diameter. Even if these features depend on each other or upon the existence of the other features, a naive Bayes classifier considers all of these properties to independently contribute to the

probability that this fruit is an apple. We are going touse or apply Naive Bayes algorithm on our database that contains data-logs of history's natural disasters for future forecasting that whether or not in future there is possibility of flash flood. The Naive Bayes Classifier technique is particularly suited when the dimensionality of the inputs is high. Despite its simplicity, Naive Bayes can often outperform more sophisticated classification methods. Why we preferred Naive Bayes implementation:

We are using the history database that contains data-logs of history's natural disasters time, date, month, year and readings for prediction so this algorithm predicts better with large databases.
When the attributes are independent of each other then we mostly preferred Naive Bayes algorithm.
We want more efficient output, as compared to other methods output.
In our system Naive Bayes model identifies the characteristics of Future forecasting or predictions that whether or not there is possibility of flash flood with the help of history databases from earlier
years. It shows the probability of each input attribute for the predictable state.
Probability is denoted by P (C/E)
P (ClEl. . . . En) =P (El. . . Enlc) P (C) /P (E1.. En)
Here P (C) is Prior probability P (El. . . . Enlc) is likelihood probability. And
P (El. . . En) is evidence. There is dependence relationship exists between C and E; like we can't get any Conclusion 'C' without any Evidence/observation 'E'. We are using the history database that contains data-logs of history's natural disasters time, date, month, year and readings
for prediction so this algorithm predicts better with large databases. When the attributes are independent of each other then we mostly preferred Naive bayes algorithm.



Suppose that there are m classes, Cl, C2, . . . ,Cm. Given a tuple, X, the classifier will predict that X belongs to the class having the highest posterior probability, conditioned on X. That is, the naive Bayesian classifier predicts that tuple x belongs to the class Ci if and only if

P {CiIX»P (CjIX)}

In other words, the predicted class label is the class Ci for which P (CiIX) is the maximum. Class labels in the proposed system dataset are flash-flood or natural disaster that is Yes or No. Attributes are temperature and humidity. And some predefined temperature and humidity data is available. That predefined values are searched in the dataset and based on that we can calculate prior probability.

V. MATHEMATICAL MODEL:

We are using Set theory to explain our system
Let S (be a main set of) == {U, Sen, Ser, L, ScanO, SetThvalueO, GrabO, SenValuesO}
U = {U l, U2, U3, U4, US, ... , Un}
Where, U will be infinite set of Users, Used to store user information for alarming & mobile phone notifications.
Sen = {Senl, Sen2, Sen3, Sen4, ... ,Sen8} Where, Sen will be finite set of Sensors.
Ser = {Serl}
Where, Ser will be set of Servers. We only need one main server in our system.
L = {U, L2, L3, L4, L5, ... , Ln}
Where, L will be set of previous logs of servers.
Grab 0: Grab function help us to collect the information from specific sensor.
Eg: Grab{c); where c is one of the channel from ° to 7.
Set Th value 0 :
Set Th value function used to set the threshold values for different sensors; it has two parameters threshold value to set and sensor number from ° to 7.
Eg: SetThvalue{Thval,Seni);
SetThvalue (128,3); that is 128 threshold value set for 3rd sensor.
Scan 0: Scan function used to scan the current sensors values with set threshold values
Eg: Scan{Currval, Thval};
Eg l: Scan{120, 128); if the current value is less than threshold values then algorithm set to false & doesn't perform any Actions.
Eg2: Scan{I30, 128); if the current value is Greater than threshold values then algorithm set to true & performs the different Actions.
A = {AI, A2, A3};

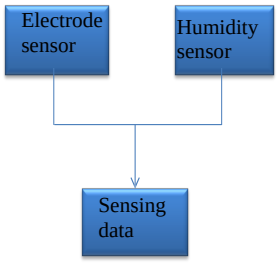
Where, A will be set of Actions.
A l is for raising alarm (on location warning),
A2 for send SMS and A3 for sending alert Notifications to android mobile phones .

VI. MODULE DESCRIPTION:

In Flash flood and landslide monitoring system use data collection ,data aggregation,data store,use Bayesian classification algorithm and finally alert generation is used.

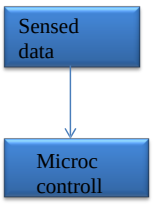
VII. DATA COLLECTION:

Data can be collected from the various sensors in hazardous area.



VIII. DATA AGGREGATION:

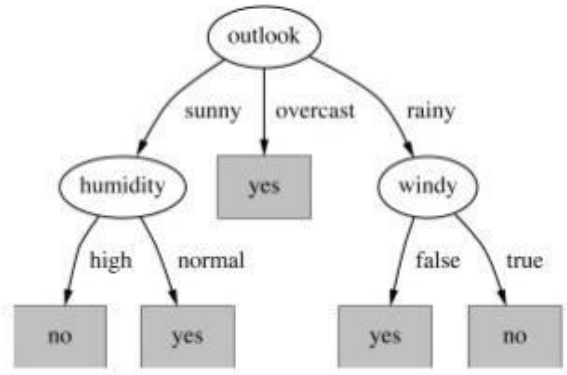
Data can be transfer from the sensor to microcontroller with reduced power consumption.



IX. DATA SHARING/BACKUP:

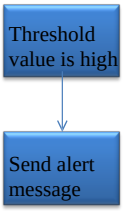
Data can be shared through internet and store the data in server.

Divide up a large collection of record into small set by using decision rule.

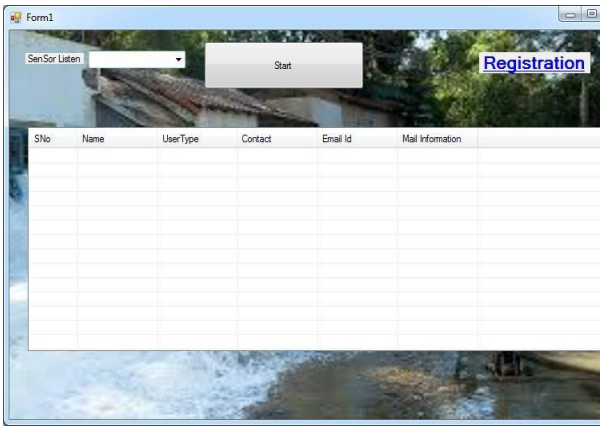


XI. ALERT WARNING:

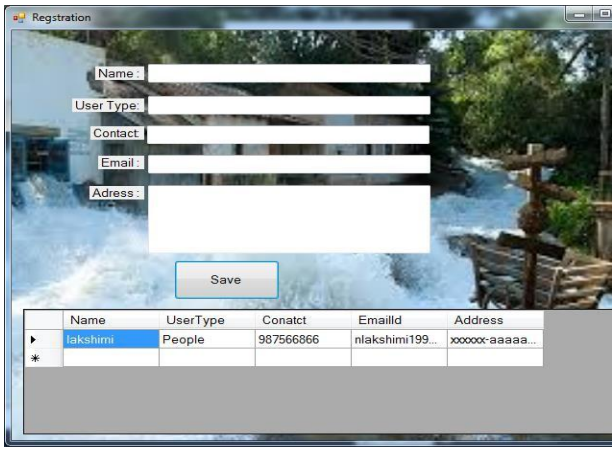
Sending alert messages to the near by people.

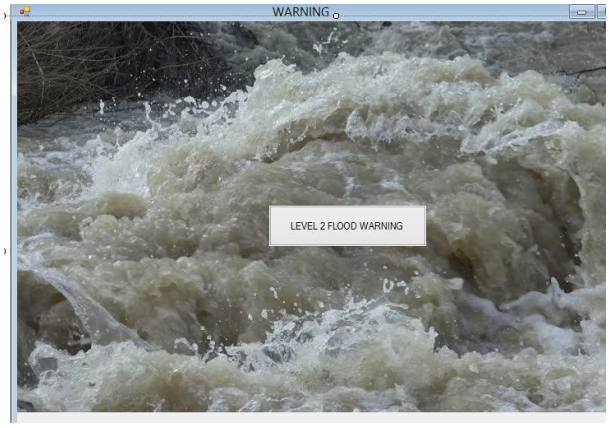


OUTPUT:



X. DECISION TREE:





XII. CONCLUSION:

We are trying to build a Novel technique that will give us best result to get better understanding of the Environmental conditions and to alert in and before hazardous conditions to the authorities and uses. That include not only monitoring and alerting to the authorities & uses but also it provides future predictions for the future disasters to the user. Our system not only just monitors hazardous conditions andAlert hazardous conditions but also it forecast hazardous conditions and allow the users to interact with the system via E- MAIL. Hence we come to conclusion that Real- Time Flash-Flood Monitoring, Alerting and Forecasting System is more advanced technique that can provide us best features.

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