Rain Prediction Using Fog Computing

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Abstract

Cloud data management includes cloud platforms either on location or off location. Cloud being one of the useful techniques for backing up data during the hard times of data loss. Temperature being main key to predict the climate conditions like rainfall. Raw data on cloud can be publicly to all or privately be located and exchanged between two individuals or two edge devices. There are various norms for Cloud that follows own rules and regulation for Security as well as for response purpose. Raw data can be accessed through connection or connectionless platforms over wide rages of Inter-Networking. Cloud has many varied beneficial factors from Small business to Big Corporations. Multiple Services are provided by cloud, typically Individual can opt for more or less services from cloud based on one's requirement. Setting up own services is quite a difficult work to be done to meet the quality as well as quantity so is such a case cloud plays a major role. Providing correct path to at-least meet the critical point satisfies the proof to correct results.

Keywords: *Fog Computing, Personal Computing, Supervised Vector Classifier.*

1. Introduction

Cloud delivers services to customers through Inter networking with hardware as well software resources. With Internet access the remote devices can hunt for raw files. There are various types of Cloud such as Public, Private, Hybrid, Community. PCS is a cloud service that is hosted within range of personal area of network having NAS device (i.e. attached storage). It helps the consumer to have their store for raw data or files, that they can consume. PCS's are high capacity storage category type of cloud that are home device that exhibits the experience for smooth without loss of data. Contents of PCS can be accessed by the consumer from any other devices through search engines, white remote devices such as Mobile provide content through windows, IOS, Android etc. Public cloud services can be used to exchange files. Having handy storage such as Cloud helps one to prevent Causalities. Individual who's bored of empty the space on hard-drive again and again or but new drive, cloud helps to resolve the issue.

2. Existing work

[1] Study computing on cloud comprehensively April 2018, the purpose was elimination of setups and installation steps. That actually brings in optimization of Energy, reduces extra heat and consumption of power. Enhancing of usage will help cloud usage for communication.

[2] Survey on Scalability In Cloud Environment July 2016, that talks about the Scalability that can help increase Bandwidth.

[3] Network having effect for latency in Cloud Computing 2013, decrease in Latency can help increase Capacity.

[4] Fog Computing: An Efficient Platform for the Cloud-resource management February 2019, eliminates the setups and installation steps, in optimization of Energy, reduces extra heat and consumption of power Cloud availability is predominant while as fog might lack the same.

3. Proposed Work

The use of Temperature as the main key element to predict the climate condition. The algorithm uses Support Vector Machine Classifiers to classify the dataset. The reason being multiple data for the same temperature. The snippet actually uses the current timestamp record with the same timestamp previous year records, to predict the future. Fog Computing has scope for many classified uses. Main concept is the use of cloud to provide space to use and enhance the inter-personal skills by buffering on the network. Helping the individual to easily classify the data to be specified as public or private on internet. Its more efficient in terms of latency, limited bandwidth, data protection, Internet Connectivity. Individual signs for hardware IT resources. Individual Signs for software IT resources. Regular services can be accessed based on needs. Certain amount of work is loaded. Helps IT resource to measure capability. Computer Resources are well distributed with less complexity. Work Load are managed and services base billing. The environment provided to consumer is well maintained.
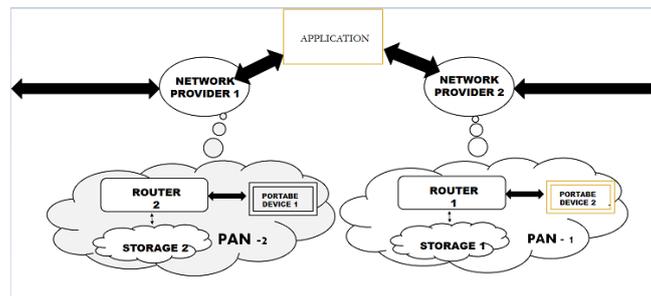
A. Abbreviations and Acronyms

wom – width of the margin

B. Equations

Objective – Hyperplane that needs to be optimal
Solution – maximize wom

$$\max \frac{2}{\|wom\|}$$

Statements:
(i) $(wom \cdot x + b) \geq 1 \; \forall \; x$ of class 1
(ii) $(wom \cdot x + b) \leq -1 \; \forall \; x$ of class 0

To Prove:
$$\frac{wom}{\|wom\|} \cdot (x_2 - x_1) = \frac{2}{\|wom\|}$$
$$wom \cdot x_2 + b = 1$$
$$wom \cdot x_1 + b = -1$$
$$wom \cdot x_2 + b - wom \cdot x_1 - b = 1 - (-1)$$
$$wom \cdot x_2 - wom \cdot x_1 = 2$$
$$\frac{wom}{\|wom\|} \cdot (x_2 - x_1) = \frac{2}{\|wom\|}$$

4. Implementation

Climate Conditions main criteria is the temperature. Many factors like Humidity, Heat Index and the other natural calamities like Storm, Heavy Rain indirectly dependent on Temperature. Here by, comes the implementation of fog computing. The edge servers play a vital role in managing the datasets for

that particular location. For instance, want to predict 11th Feb 2020 climate. Considering -7 dated back records along with 11th Feb 2019, 2018, 2017, 2016…. as to get trend of climate that helps in getting a particular trend or flow that we get, There By, increases the precision. The use of supervised support vector machine Algorithm to get the most closest answer as possible.

The algorithm does a classification based on 0's and 1's.
0 for no-rain and 1 for rain to occur. The data is stored in .data format as in to help in input is readable.

The fig below depicts the ideology of the implementation.
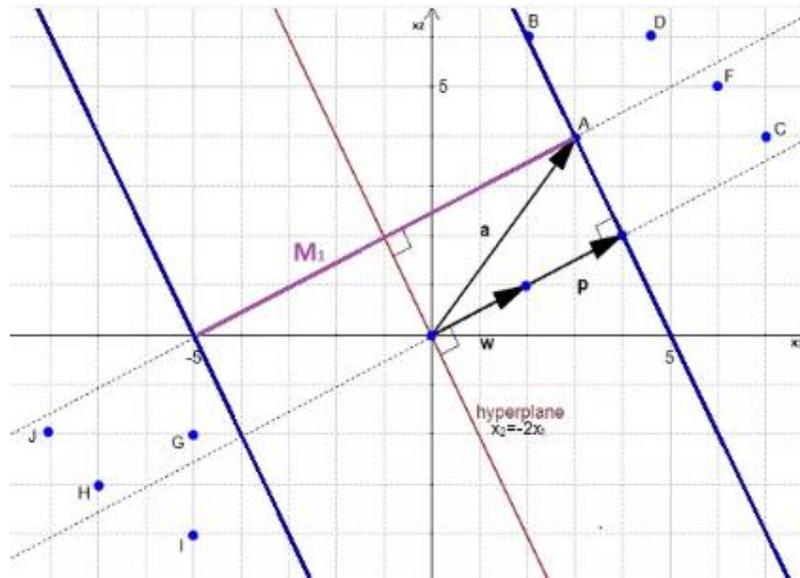
Just using Temperature, Humidity and Heat Index of the present to predict the upcoming. Events to occur. The project is capable of predicting the percentage of raining just based on knowing the information of the locality.
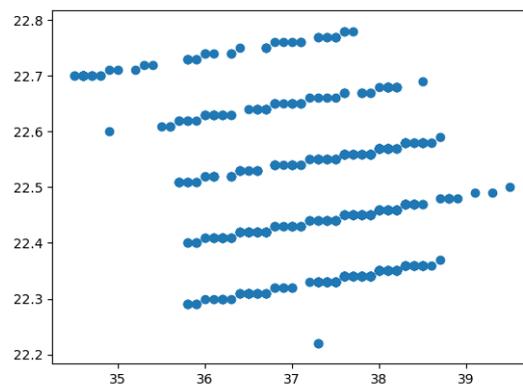
5. Result Discussion
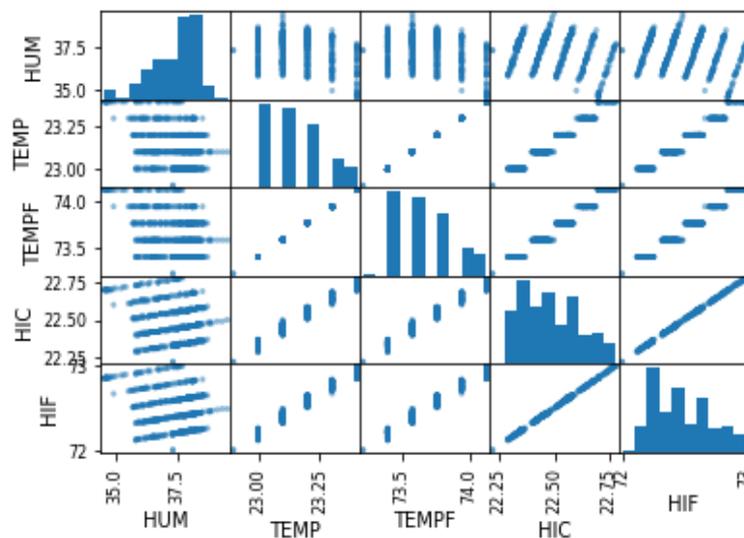
The above scatter_matrix the important factor to deal the relations between various data element in the dataset.data.
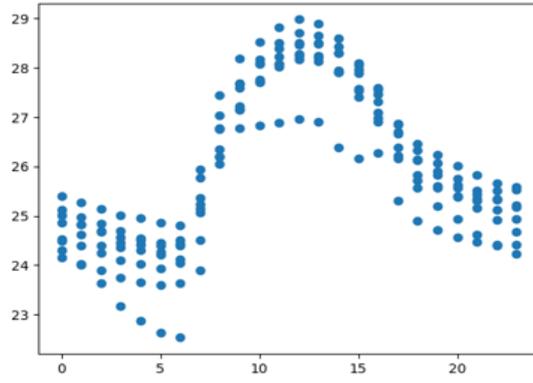
The above fig. describes the comparative relationship between x axis Hour (Hr) and y axis Temperature(*C)

Above fig. describes general relationship between x axis Temperature(*C) and y axis Heat Index(*C) We have seen how all the natural factors are inter dependent. Like the moisture and heat are major cause to rain. A linear relationship is into consideration between Speed and Temperature factor. Dependency is formulated by propositional concept.

A Straight line can be drawn and then finding the mean square error and considering the best line to find the perfect and fit output. Temperature is nothing but the average KE. Every particle has a motion and it has energy associated with it.

The molecules do move towards same direction and also don't have similar speed. As a result only few have the KE.
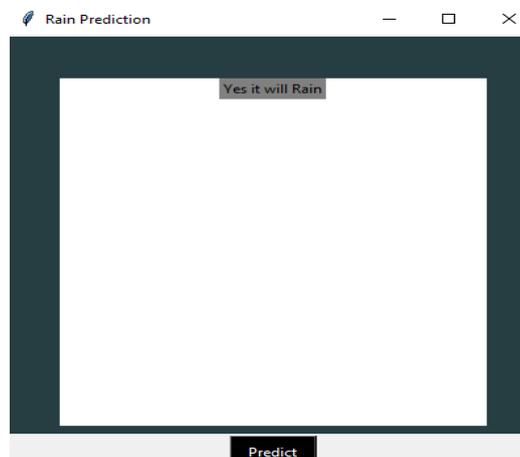
6. Conclusion

There has been accuracy making calculation for present Temperature. The Results show the precision of 1.0 choosing the random state between 10-14 when classifying between train and test data. Getting the desired result for Humidity and Heat Index based on present Temperature. The Algorithm can help in case for IOT for instance the Home application like automatic fan and other air supplying appliance Eg. A/C.

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