

Automatic Monitoring and Controlling of Weather Condition using Big Data Analytics

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Abstract: Objective: To monitor and control the weather condition of the state, by scrutinizing each home's weather condition. Analysis: Data which is collected from the sensor is send to the spark analytical streaming for processing; home which is not under the control of normal temperature is update in graph, which is shown by using Thing span, control abnormal temperature by using HVAC system. Findings: In existing system weather condition is only monitored automatically and controlled manually, more energy consumption, whereas in proposed system, sensor receives data and stream data process using spark a, historical data process using Apache hadoop. Improvement: Advance big data analytics tool is used for processing data and automatically controls the weather condition by using HVAC system.

Keywords: Apache spark, Apache hadoop, HVAC, Thing Span, Sensor.

I. INTRODUCTION

Many countries moving towards the concept of smart city. Making our city as smarter one can be achieved by using IOT and advanced big data analytics. All government and private sectors of the city are to be digitized. Digitization reduces make human works. Internet of things playing a major role in smart cities, because it is a main of source of information, whereas big data analytics process the data which are received from sensors. Because it creates huge information's with high speed. In this paper weather condition of home is monitored by sensors, it generates huge volume and high speed data, which is normally cannot be stored and processed by traditional machine, so advanced big data analytics is used to process the data. Historical data and streaming data stored and processed using Apache hadoop and spark. HVAC system automates controlling process of weather condition of the environment.

II. EXISTING SYSTEM

In existing weather condition of the environment is monitored by Embedded system, It uses microprocessor and micro -controller for collecting data from sensor and it send to the Labview using serial communication. Only weather condition is monitored and updated. Further weather controlling process done manually, there is automation process for controlling the weather condition of the environment.

III. PROPOSED SYSTEM

Predicting the temperature of a home for making high performance energy management. Home thermostats is used for supplying information to predictive control system. Spark is capable of processing high velocity

information [3]. Energy usage is minimized using combining the user habits and weather forecasts. Temperature changes occur in home is monitored by Thing span; it is distributed graph platform for analytics. When there is change in occupants increases or decreases the thermostat. But it is more energy consuming. The HVAC system, takes only short time to make situation under control. It change to cool or heat accordingly to the external temperature. Apache yarn used for monitoring the services and workflow [5]. Spark Machine learning -Mlib analysis the pattern of weather and response, it increases the efficiency of the system.

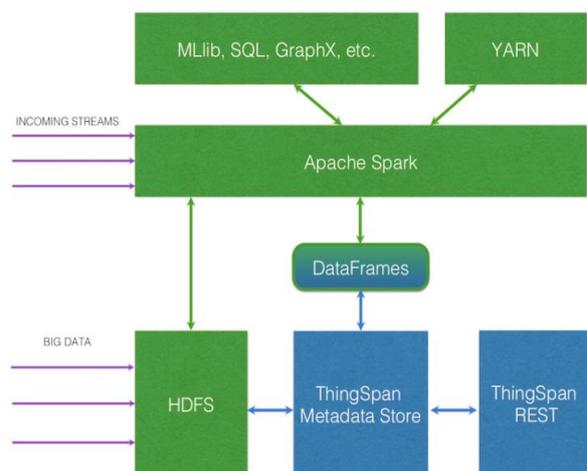


Figure1. Proposed Architecture

IV. DATA LOADING

Initial data such as state, city, weather forecast, home number and device to be monitored, are stored in Apache

hadoop. Apache hadoop is capable of storing all kinds and huge volume of data [3]. By using Thing Span RESTAPI these data send to Thing span. The result is shown as an graph below.

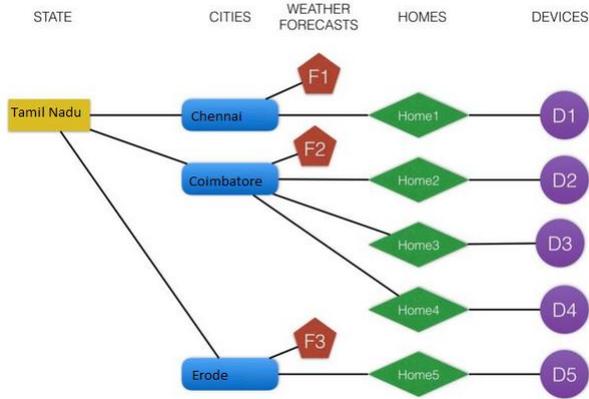


Figure2. Data loading phase

V. DATA PROCESSING

Temperature all devices are monitored by sensor. Spark is used for processing incoming temperature from sensor [6]. Spark streaming Engine process the data using RDD transformation. On this transformation, we can identify cities which deviates from the normal temperature. On our scenario city Coimbatore is deviated from temperature. In that home2 and home 3 needs an immediate activation of thermostat for heating to avoid the cold will arrive shortly. In home2 HVAC want to run for 15 minutes to attain normal temperature. Whereas in home4 needs to runs for 20 minutes from now.

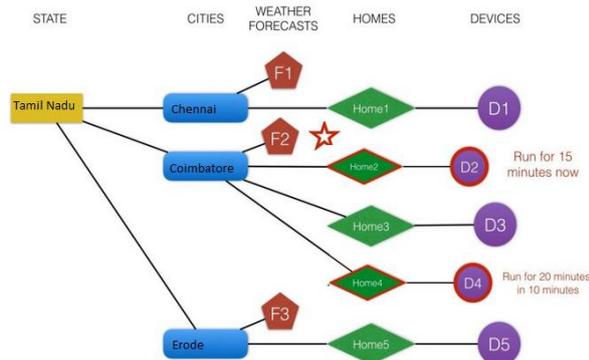


Figure3. Data processing Phase

VI. DATA PREDICTION AND ACTION

This information will be provided to HVAC thermostat controller for activation. It reduces the sudden change in temperature. It takes only minimum time to heat or cool the environment. So it keep hot in winter and cool in summer. Its main advantage is saving energy, Electricity usage is reduced. Thing span is powerful graph analytics tool. Real-time weather of the whole state monitored in the form of graph regularly [6].

VII. CONCLUSION

Smart home embed with the sensors and advance analytical software. In our system, weather condition of whole state is monitored and controlled by using hvac system. Weather condition monitored as graph using thing span. Sensors send its weather report to spark for real-time data analytics. Processing data exceeds normal temperature of weather, HVAC system is activated it reduces the weather condition to normal temperature.

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