ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 2, February 2018

Intelligent Accessing of Remote System using H2O Flow for Future Prediction

Jennifer D [1], Swathi.P.I [2], Swetha.K [3], Sushmetha.G.L [4]

Assistant Professor, Department of Computer Engineering, Panimalar Engineering College, Chennai, India [1]

B.E Student, Department of Computer Engineering, Panimalar Engineering College, Chennai , India [2,3,4]

ABSTRACT: The IRMS combines the ability to capture sensor data at remote locations wirelessly and apply deep learning/machine learning to assimilate the data stream and create a data model to make intelligent decisions. Energy meter will monitor the power consumption of a dynamic load - for example, Air conditioner. Air Bridge RMS will gather the energy meter data and wirelessly push the data to LyfeSense Cloud. IRMS which will be part of the LyfeSense cloud will apply DL/ML over this stream along with other external data sources and generate a model. For example weather data. The model will be used to determine some of the critical aspects such as Efficiency of the device under test. Efficiency degradation of the device under test, and also predict the need for maintenance and Prediction of parameters like the consumption.

KEYWORDS: Deep learning, Machine learning, IRMS, LyfeSense cloud, intelligent decision, Air Bridge, Internet of things (IoT)

I. INTRODUCTION

This IRMS concept specifies the means of predicting the values based on the data retrieved from the cloud platform [1]. The prediction is purely based on past data collected and stored in the cloud. In this, we implemented this concept using the air conditioner and temperature of the Chennai city. The temperature data is collected from the cloud and the air conditioner working condition are analyzed by using a Node-Bridge which is installed in AC and the condition is monitored. Based on the collected data, the prediction is made for the upcoming months or years. This increases the efficiency of the device and able to deduct the future consumption very easily.

Working Procedure:

A. Importing files

Import files from the cloud by using h20.ai platform which supports various language[8].

B. Parsing Files

Parsing the data which is in the form of CSV or TSV format. In which it reads the data and further perform cross-validation over the files provided by the system.

C. *Split, Train and Test data*

The data is split into various data sets such as split, train, and test. The prediction is purely based on the train data set. The data is split in the ratio of either 80/20 or 70/30.

D. *Build model*

Based on the split data the model is built and ready for further prediction to be performed. The algorithm used for prediction is Gradient Boosting Model where the accuracy can be maintained.

E. *Predict*

Prediction is done based on the build model generated. It's purely based on any one of the parameters necessary for prediction to be done.

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 2, February 2018

II. ARCHITECTURE OVERVIEW

It describes the entire architecture of how the data is collected from the cloud and how it gets further processed. It predicts the data based on the previously collected data.

a. Flow Structure

- At first, the data is collected from AC by using Node-Bridge, this uses the concept of IoT[2].
- Then from the LyfeSense cloud, the consumption data is collected for further analyzing the data.
- Based on this collected data the machine learning concept is applied for predicting the data[4].
- Once the prediction is performed, it is represented in an form of a graph.
- Hence the future prediction is done based on users requirement.

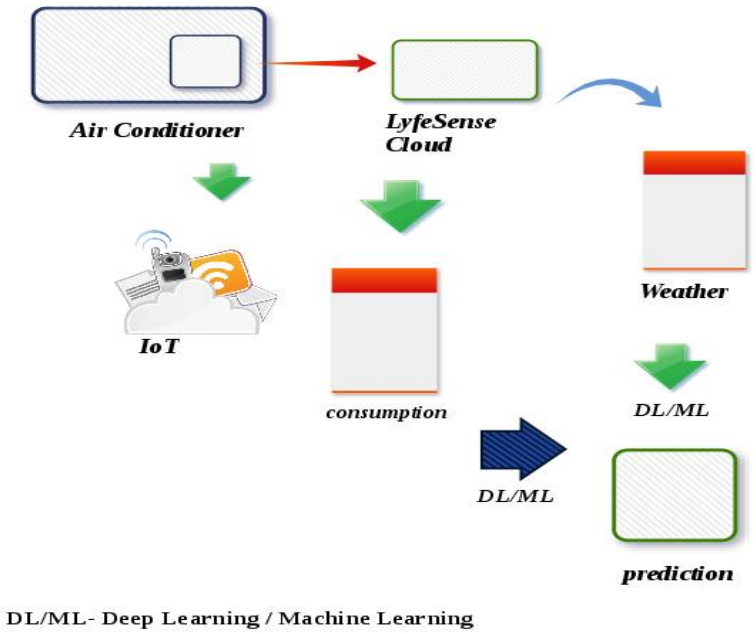

Fig – 1: Architecture diagram of Intelligent Remote Monitoring System

III. LITERATURE SURVEY

A. X-as-a-Service: Cloud Computing with Google App Engine, Amazon Web Services, Microsoft Azure and Force.com

- They emerged a concept of cloud computing, in which the users can be able to access the data anywhere in the cloud without any investment needed.
- The aim of this paper is to provide the concepts as well as the technology behind Cloud Computing in general and analyze most popular platforms, The Google App Engine, Amazon Web Services, Windows Azure Platform and Force.com
- Increases the usage and provided security over the particular infrastructure.

Merit: Rather than buying, installing and operating its own systems, an organization can rely on a cloud provider.
Demerit: Little or no control over the parameters of software.

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 2, February 2018

B. **Windows Azure Platform**

This mainly describes the Windows Azure platform for those who are interested in IT enterprise.

- It based on cloud computing concept for retrieving relevant data and manipulating over the Azure platform and also to awareness of the company.
- The Windows Azure platform provides an Internet-based cloud computing environment for running applications and storing data in Microsoft data centers around the world.

Merit: Pay-per-Use model.
Demerit: You cannot have your own OS installed and run since the OS is already there, irrespective of the choice of windows to use it.

C. **Smart Home Electricity Management System Using Cloud Computing**

The data is collected remotely and it is stored in the cloud, it is retrieved whenever needed. It stores the yearly, monthly and days consumption of data for verifying how much current have been consumed in these following days so that it can be reduced in further upcoming days.

Merit: Can collect online data power Consumption.
Can manipulate the power supply.
It can generate daily, monthly and yearly reports
on cost.
Demerit: Making a long-term financial commitment to the new metering technology and related software.

D. Weather Prediction Using Data Mining

It uses the data mining concept to predict the condition of the weather based on humidity, temperature, weather for the past days.

- This prediction is purely based on past data collected.
- Prediction is done by using Naive Bayes and K- medoids algorithm.
- But the data is predicted only for some days, not for the future upcoming year.

Merit: Weather prediction
Demerit: It is expensive to monitor. Predicted only for few days

E. IoT – An Overview

IOT concept is based on the interaction between the two objects.

- It shows how the communication is made between two things and it also reduces the amount of work done by the human.
- Internet plays a major role in interaction.
- Bluetooth concept has an effective role. An object can be accessed anywhere at any time Example: Switching of home appliances by using mobile devices from anywhere.
- Speed is increased and accuracy is maintained.

Merit: Capable to generate, exchange and consume data with minimal human intervention.
Demerit: The Internet of Things involves a complex and evolving set of technological, social, and policy considerations. Just provides only the overview concept of how an IoT works.

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 2, February 2018

IV. MODEL DIAGRAM

This project is purely based on Waterfall model. Once after each phase, testing is done to ensure the security and to avoid the customer dissatisfaction. Thus this improves the closest relation, preplanned and well-designed structure of a project which satisfies the customer requirements.

A. Requirement phase

- Proper and valid requirements are collected from the customer.
- Brief and detailed description of the project is given.
- Total time requirement and the cost of the product is estimated and it is provided to the user.
- Testing is performed whether the data collected, satisfy the customer requirements.

B. Design phase

- The data is designed based on the requirements.
- Once the data is designed is verified by the Tester.

C. Implementation phase

Based on the designed data implementation is performed and it is checked and verified by the tester.

D. Deployment phase

Once after the implementation, the data is deployed to the customer and they check for further satisfaction of their requirements. They also verify whether it met the expected value calculated in the requirement phase. The actual value is calculated and the data sets are sent to the customer, once after their needs are satisfied, the data is deployed to the customer.

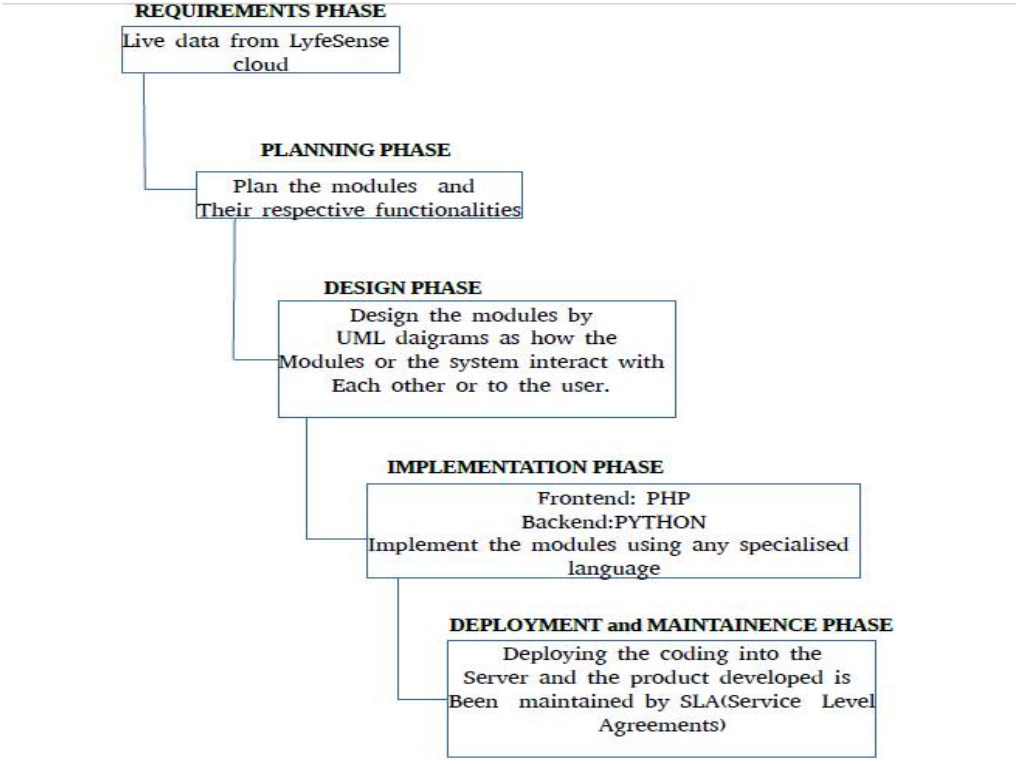

Fig – 2: Waterfall model for IRMS

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 2, February 2018

V. GRAPHICAL REPRESENTATION

Based on the predicted value the corresponding graphical representation is mentioned for giving clear understanding to the customer. The data is drawn based on using the vector concept as since we used only two parameters [6].In this, we can further include any more parameter we want, but we need to specify the Tensor flow concept in which it describes the advanced methodology of describing the predicted data.

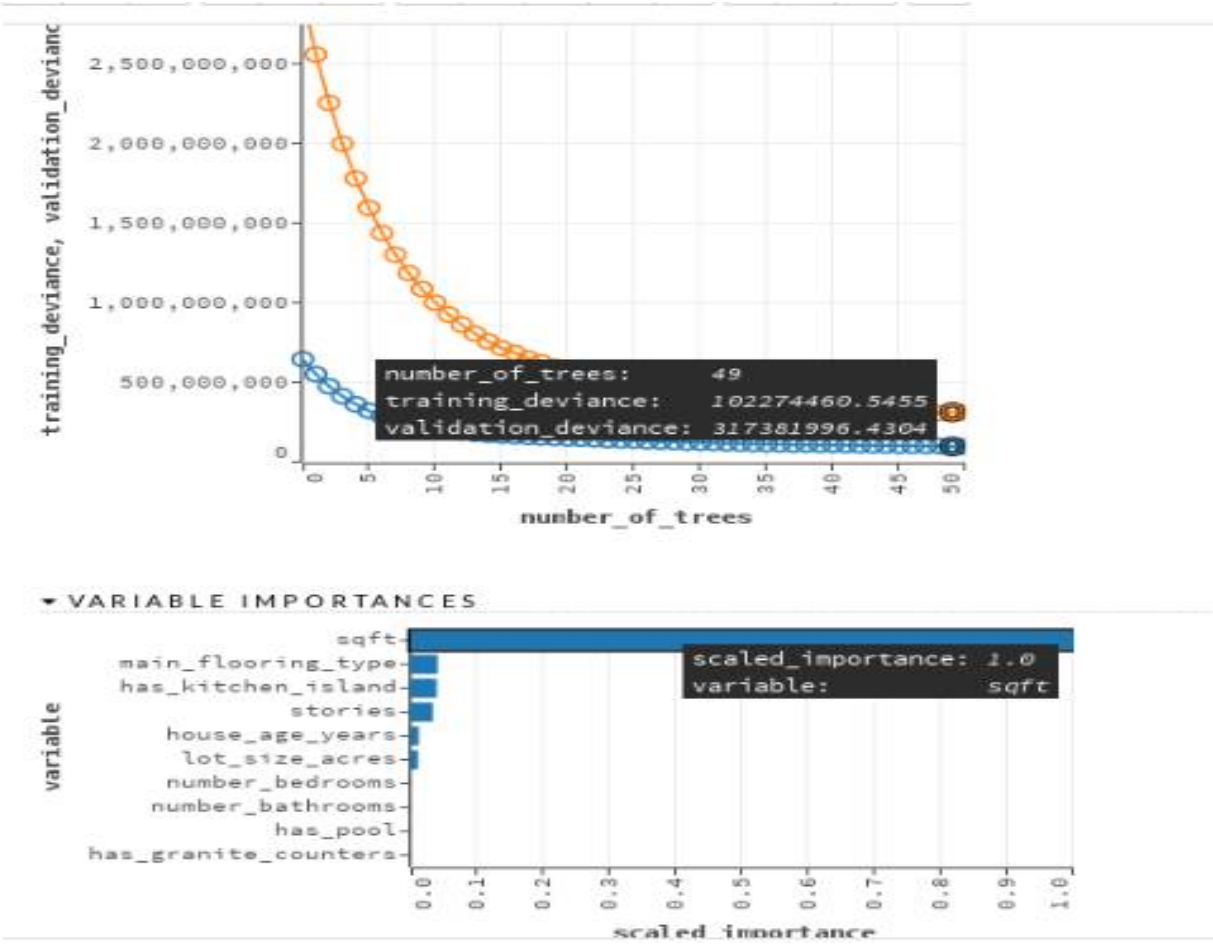

Fig – 3: Prediction model

VI. H2O.ai PLATFORM

- H2O.ai makes machine learning accessible and allows business users to extract insights from data [8].
- H2O's REST API allows access to all the capabilities of H2O from an external program or script via JSON over HTTP.
- The speed, quality, ease-of-use, and model-deployment for the various cutting-edge Supervised and Unsupervised algorithms like Deep Learning, Tree Ensembles, and GLRM make H2O a highly sought after API for big data science.

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 2, February 2018

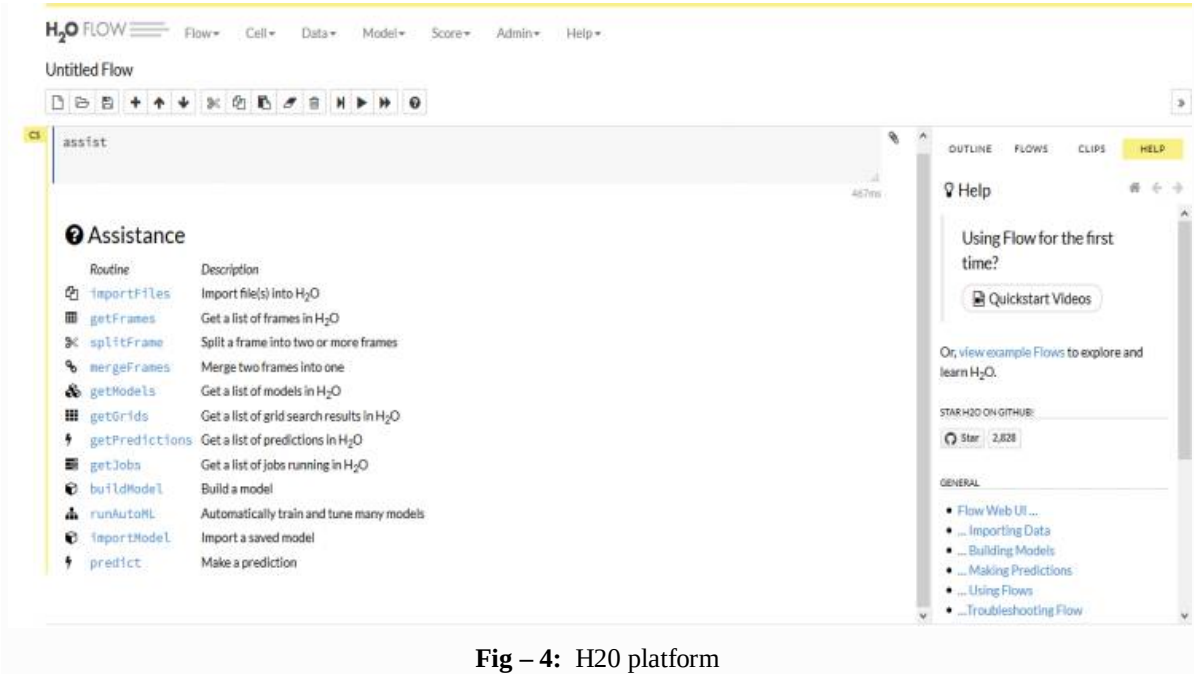

Fig – 4: H20 platform

VII. GRADIENT BOOSTING ALGORITHM

Gradient boosting is one of the most powerful techniques for building predictive models.
Michael Kearns articulated the goal as the "**Hypothesis Boosting Problem"** stating the goal from a practical standpoint as: "an efficient algorithm for converting relatively poor hypotheses into very good hypotheses"
Gradient boosting (GB) is a machine learning algorithm developed in the late 90's that are still very popular. It produces state-of-the-art results for many commercial applications.

Usage:

Gradient boosting can be used in the field of learning to rank. The commercial web search engines Yahoo and Yandex use variants of gradient boosting in their machine-learned ranking engines.

VIII. AIR BRIDGE

The newest addition to the Air Bridge™ family, Air Bridge™ 2000 is an industrial-grade IoT gateway that instantly turns your device IoT enabled. Air Bridge supports a variety of wireless protocols such as GPRS, Wi-Fi, Bluetooth and so on. AirBrige1 is based on Wi-Fi whereas AirBridge2 is based on GPRS. In addition, it supports the industrial communication standard MODBUS over RS485, it has a rich set of GPIOs, DACs, ADCs, PWMs and serial interfaces for a variety of integration options.

ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 2, February 2018

Fig – 5: Board Design

IX. CONCLUSION

The proposed system **INTELLIGENT REMOTE MONITORING SYSTEM (IRMS)** enables small to medium-sized business to implement cloud and big data technology with a reduced commitment of company resources. The processing capabilities of the data model could provide new insights into the business pertaining to performance improvement, decision making support, and innovation in business models, products, cost savings, and services. Benefits of implementing remote technology through cloud computing are cost savings in hardware and processing, as well as the ability to experiment with big data technology before making a substantial commitment of company resources.

REFERENCES

[1] https://spectrum.ieee.org/tech-talk/telecom/internet/popular-internet-of-things-forecast-of-50-billion-devices-by-2020-is-outdated
[2] Internet of Things: A Survey on Enabling Technologies, Protocols, and Applications http://ieeexplore.ieee.org/document/7123563/?arnumber=7123563
[3] Technologies for an Aging Society: A Systematic Review of "Smart Home" Applications
[4] https://pdfs.semanticscholar.org/cd2c/6718a9e3309532f9f1493208a8215cbba9b2.pdf
[5] http://www.physicalgeography.net/fundamentals/7a.html http://arxiv.org/abs/1307.2661
[6] Machine Learning tutorial https://www.toptal.com/machine-learning/machine-learning-theory-an-introductory-primer
[7] Machine Learning Platform https://www.h2o.ai
[8] Introduction to Machine Learning-Second Edition
[9] http://cs.du.edu/~mitchell/mario_books/Introduction_to_Machine_Learning_-_2e_- _Ethem_Alpaydin.pdf
[10] R. Kohavi and F. Provost, \Glossary of terms," Machine Learning, vol. 30, no. 2-3, pp. 271-274, 1998.
[11] R.E. Schapire. *The Design and Analysis of Efficient Learning Algorithms*. Ph.D. thesis, MIT Press, 1992.
[12] Raspberry Pi - Teach, Learn, and Make with Raspberry Pi, Available: http://www.raspberrypi.org/
[13] https://projects.raspberrypi.org/en/projects/weather-logger