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ESTIMATION OF POWER CONSUMPTION USING MACHINE LEARNING

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Abstract: - A non-nosy checking framework assesses the conduct of individual electric apparatuses from the estimation of the absolute family unit load request bend. The all-out burden request bend is estimated at the passageway of the electrical cable into the house. The force utilization of individual apparatuses can be assessed utilizing a few AI procedures by investigating the trademark recurrence substance from the heap bend of the family unit. We have just built up the observing arrangement of ON/OFF states. This framework could build up adequate precision. In the following stage, the observing framework ought to have the option to appraise the force utilization for a climate control system with an inverter circuit.

Key Words— ***Power Estimation, Data Prediction, Machine Learning***

I. INTRODUCTION

Energy is the primary source of the world. [1,2,3,4]. If the fuel is exhausted the our future generation will suffer a lot.[4,6]The improvement of a checking framework, which can screen every family unit electric machine, is critical to obtain essential data for building the strategy of the vitality preservation, the figure of electric vitality request to design constructing new force plants, furthermore, making better new client administrations. It is normal that the observing framework for family electric apparatuses is economical and non-meddlesome, on the grounds that the ordinary checking strategy which is set up estimating types of gear for every machine is costly and powers the client's burden. The nonintrusive observing methods the estimation of intensity load is done in the outside of a house.

We have built up a non-meddlesome observing framework, which can assess the ON/OFF states of family unit electric apparatuses incorporate inverter. For the framework clients, the framework can accomplish an adequate exactness utilizing enormous edge classifiers. Consequently, the framework can gauge the force utilization of traditional electric machines, which show a consistent power utilization, in the event that we know the force utilization of every family unit electric machine. Be that as it may, an electric apparatus with an inverter circuit (inverter type machine, for example, a forced air system doesn't show a consistent force utilization. In this way, we need to build up the non-meddlesome observing framework, which can gauge the force utilization of inverter type machines.

II. LITERATURE SURVEY

2.1 Machine learning algorithms to detect DDoS attacks in SDN

Author: Santos, R., Souza, D., Santo, W., Ribeiro, A

Software-Defined Networking (SDN) is an emerging network paradigm that has gained significant traction from many researchers to address the requirement of current data centers. Although central control is the major advantage of SDN, it is also a single point of failure if it is made unreachable by a Distributed Denial of Service (DDoS) attack. Despite the large number of traditional detection solutions that exist currently, DDoS attacks continue to grow in frequency, volume, and severity. This paper brings an analysis of the problem and suggests the implementation of four machine learning algorithms (SVM, MLP, Decision Tree, and Random Forest) with the purpose of classifying DDoS attacks in an SDN simulated environment.

2.2 A Semi-Supervised K-Means DDoS Detection Method Using Hybrid Feature Selection Algorithm

Author: Gu, Y., Li, K., Guo

Distributed denial of service (DDoS) attack is an attempt to make an online service unavailable by overwhelming it with traffic from multiple sources. Therefore, it is necessary to propose an effective method to detect DDoS attack from massive data traffics. However, the existing schemes have some limitations, including that supervised learning methods, need large numbers of labeled data and unsupervised learning algorithms have relatively low

detection rate and high false positive rate. In order to tackle these issues, this paper presents a semi-supervised weighted k-means detection method. Specifically, we firstly present a Hadoop-based hybrid feature selection algorithm to find the most effective feature sets and propose an improved density-based initial cluster centers selection algorithm to solve the problem of outliers and local optimal.

2.3 Pattern Recognition and Machine Learning

Author: G.W.Hart

A nonintrusive appliance load monitor that determines the energy consumption of individual appliances turning on and off in an electric load, based on detailed analysis of the current and voltage of the total load, as measured at the interface to the power source is described. The theory and current practice of nonintrusive appliance load monitoring are discussed, including goals, applications, load models, appliance signatures, algorithms, prototypes field-test results, current research directions, and the advantages and disadvantages of this approach relative to intrusive monitoring.

2.4 Fast Learning in Networks of Locally Tuned Processing Units.

Author: J. Moody

We propose a network architecture which uses a single internal layer of locally tuned processing units to learn both classification tasks and real-valued function approximations (Moody and Darken 1988). We consider training such networks in a completely supervised manner but abandon this approach in favor of a more computationally efficient hybrid learning method which combines self-organized and supervised learning. Our networks learn faster than backpropagation for two reasons: the local representations ensure that only a few units respond to any given input, thus reducing computational overhead, and the hybrid learning rules are linear rather than nonlinear, thus leading to faster convergence. Unlike many existing methods for data analysis, our network architecture and learning rules are truly adaptive and are thus appropriate for real-time use.

2.5 Applying Support Vector Machines and Boosting to a Non-Intrusive Monitoring System for Household Electric Appliances with Inverters

Author: T. Onoda

A non-intrusive load monitoring system has been developed for estimating the behavior of individual electrical appliances from the measurement of the total household load demand curve. The system is useful for monitoring both inverter and non-inverter type appliances that change their mode of operation over time. The total load demand is measured at the entrance of the feeder line into the house and the operating status of household electric appliances can be identified with the help of Support Vector Machines (SVM), Boosting, RBF and neural network techniques by analyzing the characteristic frequency content from the load curve of the household. Load curve measurements of air-conditioners, refrigerators (inverter type and noninverted type), incandescent light, uorescence light and television systems are used as examples for training and test data. So far only a small data set was measured for this feasibility study and our experiments show a great potential for machine learn.

III MACHINE LEARNING ALGORITHM

Four algorithms have been implemented to check whether a URL is legitimate or fraudulent.

Random forest creates the forest with number of decision trees. High number of trees gives high detection accuracy. Creation of trees is based on bootstrap method. In bootstrap method features and samples of dataset are randomly selected with replacement to construct single tree. Among randomly selected features, random forest will choose the best splitter for classification[14,15,16]

Decision tree are used as a well-known classification technique. A decision tree is a flowchart-like tree structure where an internal node represents a feature or attribute, the branch represents a decision rule, and each leaf node represents the outcome. The topmost node in a decision tree is known as the root node. It learns to partition based on the attribute value. It partitions the tree in a recursive manner called recursive partitioning.

Naïve Bayer's The Naive Bayes algorithm is an intuitive method that uses the probabilities of each attribute belonging to each class to make a prediction. It is the supervised learning approach you would come up with if you wanted to model a predictive modeling problem probabilistically. Naive bayes simplifies the calculation of probabilities by assuming that the probability of each attribute belonging to a given class value is independent of all other attributes[17,18-22].

Logistic Regression is a statistical method for analyzing a data set in which there are one or more independent variable.

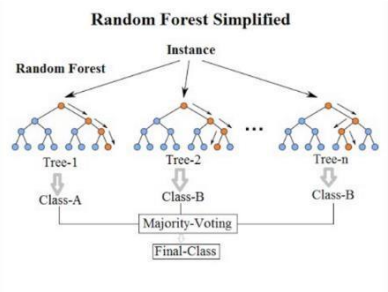

Fig 1 random forest classification

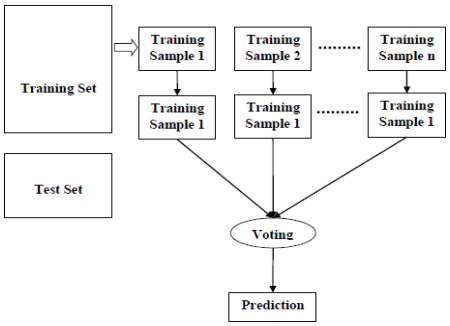

Fig 2 logistic regression

IV SYSTEM ARCHITECTURE

System Architecture is a generic discipline to handle objects (existing or to be created) called "systems" in a way that supports reasoning about the structural properties of these objects. The system architecture is a response to the conceptual and practical difficulties of the description and the design of complex systems.

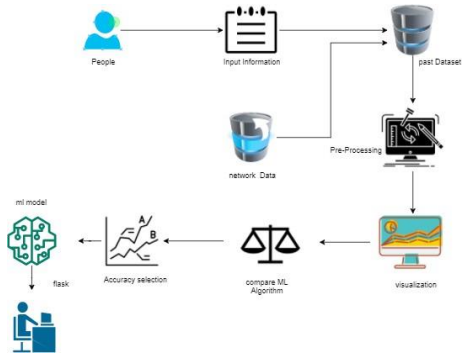

Fig 3 System architecture

V PROJECT DESCRIPTION

In this we try to improve the accuracy while compared to the previous one and here we try to find the sufficient accuracy for monitoring System which can estimate the power consumption of electric appliances, to actual fields accuracy and lower FPR compared to other models. Apart from Logistic Regression and Categorical Naive Bayes, the performance of other models is also comparable. Support Vector Machine works well for linearly separable data. The data is not linearly separable directly, but after applying kernel, the data becomes separable and SVM is able to learn well from the data[23-27]. The dataset which is for use for machine gaining knowledge of has to truly include these features. There is such a massive quantity of gadget learning algorithms and every set of rules has its own working mechanism which use are Hypertext Transport Protocol or HTTP (http), HTTP with Transport Layer Security (https), and File Transfer Protocol (ftp). The is that the identifier for the net server on the web. Sometimes it's a machine-readable Internet Protocol (IP) address, but more often especially from the user's perspective it is a human readable name

V ACCURACY CALCULATION

General Formula:

F- Measure = 2TP / (2TP + FP + FN)

F1-Score Formula:

F1 Score = 2*(Recall * Precision) / (Recall + Precision)

VI CONCLUSION AND FUTURE SCOPE

In this we compare with several regression algorithms to estimate the power consumption of an air conditioner as follows: multi-layered perceptron's (MLP), radial basis function networks

(RBFN) and support vector regression (SVR). MLP is a conventional nonlinear regression method. we find the sufficient accuracy for monitoring System which can estimate the power consumption of electric appliances, to actual fields.

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