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SMART GRID USING MACHINE LEARNING

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ABSTRACT- In today's world, wastage of energy has become more frequent which leads to build a system which will take another way to maintain power generation and make proper distribution of energy and that system is called as SMART GRID.In this paper we will be making a Smart Grid which will overcome these issues by using Machine Learning. We will be using solar data power generation prediction by machine learning. This paper will help production or utility company to get knowledge of how much they have generate and distribute. By his paper blackout and energy wastage can be reduced.we developed the application which shows energy generation and user log.

INDEXED TERMS: Smart Grid, Blackout, Machine Learning, analysis; visualization.

I. INTRODUCTION:

The Electric Grid which is used for Delivering an Electricity through the largest interconnected network build by Humans. The Transition from Actual Electric Grid towards Sustainable, Efficient and Flexible Electricity Network requires Complex Methods. Moreover Urbanization indicates that the total Necessity of an Energy will Increase in Future while at the same time Penetration of Renewable Energy Resource will also Increase.Smart Grid are becoming popular every coming day as they are fast, reliable and efficient. Their popularity is among users as well as in utility companies. The Smart Grid represented as an electric system which uses information, two-way communication technologies, and computational intelligence which is integrated across electricity generation, transmission, substations, distribution and consumption then achieved a system which is clean, safe, secure, reliable, resilient, efficient, and sustainable [1].The Smart Grid represent an Opportunity to transform the Energy industry into an Era of Reliability, Scalability and Efficiency that will Increase our Economic Wealth and Environmental Health.Smart Grid helps in Conserving an Energy Reducing cost , Increasing Reliability and Transparency which makes it more Efficient. As can be figured, that huge quantity of humans demands an equal quantity of energy to fulfil there usual duties for their daily life. Therefore, electricity demand is in a way to grow at the same rate as number of human beings are growing on Earth, and since the Earth has limited, resources, it becomes of major importance to rationalize the use of energy, and also trying to use renewable energies that will provide electricity which can be consumed with lower impact on the planet [7]. To make Smart grid more Efficient we are using Machine Learning.

The proposed system provides a Web Application which provides an interface to visualize the relationship between the temperature, irradiance and the energy generation prediction for Present as well as Future Using Weather Data like Temperature for utility companies and also gives the overall list of data of users.

LITERATURE REVIEW Model which will balance conflicting requirements for high prediction accuracy, low computing time between training and prediction of model, and reliability at any time of the week and for variety of customers. Statistical models and Artificial intelligence and machine learning models (AI/ML) like neural networks and support vector machines are used [2] having advantages like Prediction models for D2R depending on few data can maintain high shortterm prediction accuracy. Information that can be combined with the knowledge of industrial experts which uncovers hidden saving valuable information, which contributes effectively in better business decisions making. At the same time, MGs are proved reliable and sustainable alternatives for traditional power systems. [3]. Highlight the issues of big data and challenges which is faced by the DEM employees in SG Networks. In this paper, we've summarized the state-of-the-art in the exploitation of big data tools. In smart grid platforms the Dynamic energy management dis done. We've first highlighted that, in order to copeup with the Huge size of data, the smart grid requires advanced data analytics, big data management, and powerful monitoring techniques. Having Advantages like High performance computing, insisting on cost efficiency and security issues within the context of SG control [4]. Development of a resilient grid is done to meet public demand, and regulate the overall requirements, is a paradigm shift which should be met with the help of new strategies. This paper explores the challenges and opportunities by detailing the system of energy distribution and advantages are DA could be key ingredient for fulfilling those requirements and developing new strategies [5].a game-theoretic way which schedule the energy consumption of residential customers automatically within the presence of bidirectional energy trading by allowing the residential to buy and sell energy from/to the production company with their PEVs. They formulate a game which is energy management, where the residential users are the players and the daily schedules are their strategies of household appliance which is in use. In addition, the analysis done on the discharging of PEV's battery which shows that the utility company should provide special electricity price which encourage residential users to store and sell electricity energy back to the production company by using their PEVs at proper timings and advantage is The proposed game-theoretic way reduces the total energy cost and individuals daily electricity payment. [6]. Smart Grid is a vision, which requires cost justification at every step/point before implementation, while testing and verification before extensive deployment of it. Use of machine learning, stochastic analysis, and weather impact projections to give predictions of the next most likely events so that proper actions/decisions can be taken which will reconfigure the system before next worst events that can take place. The rapid and safe interconnection between the distributed generation and energy storage at any point and at any time on the system [1]. When smart grid's, end users change into prosumers, they become most important value creators within the smart grid and also a decisive agent which can change there electricity usage. There's a plethora of research and development areas which are related to the smart grid which can be exploited for new business opportunities, thus spawning another branch which is also called as "green economy" which is focused on turning smart energy usage into a profitable business [7].

IMPLEMENTED MODEL

System Overview Here first pre-processing of Data is done on the dataset. After this the applications are categorized according to the attributes which we have taken into consideration. And this all is visualized to the user through the interface which we have built.

SYSTEM ARCHITECTURE:

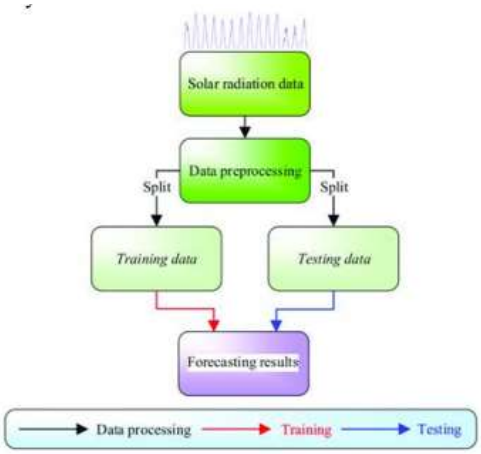

Figure 1: Architecture of the system

The above architecture shows the flow of how the procedure of the system is going to work and how the interface is built. In the above architecture we can see the different steps that are used for the working of the system and the same are explained below:

Dataset: The dataset that we have, there are column like temperature, irradiance, energy generated.

Data Pre-Processing: Since there were no null/missing values in the dataset. However, the raw data needed to be pre-processed to turn it into some valuable information.After it data is splitted into training and testing data.

Training data: This data is given to the system /model, its trains the data and predicts the result.

Testing data: After growing from testing model its predicts the result.

Forecasting results: In this part we predict the results in the form of table or graph. From the above architecture we can easily understand the work flow of how the system was built and also all the blocks are explained at a detail. So in it we can see that we have created a model by machine learning. The dataset is pre-processed to categorize the data as per the attributes which we are going to take under consideration

CONCLUSION In this paper, a machine learning regression model is detailed for predicting energy generation issue for future by giving location by the user to the system. This project displays Energy Generation prediction in the form of cards by entering details like city, state, and country in the form. The energy consumption log is also displayed in the interface like add log and existing log. While predicting energy generation we get 98% accuracy using regression model.

FUTURE SCOPE The future extent of this paper is vast and can be used in several ways and not just as a energy generation prediction. It can be furthered used for time series forecasting. It can also be furthered used for theft detection of electricity. Analyzing the amount of energy being consumed. Reducing of global warming.

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