FuseMachines (Fuse.ai)

Machine Learning

Hattisar, Kathmandu

A Project Report

On

“Wind Speed Analysis”

Submitted by:

Prajwol Lamichhane

Submitted to:

Teaching Assistants

ML Engineers, FuseMachines

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Chapter 1: Introduction

Wind energy (or wind power) refers to the process of creating electricity using the wind, or air flows that occur naturally in the earth's atmosphere. Modern wind turbines are used to capture kinetic energy from the wind and generate electricity [1]. Winds are caused by uneven heating of atmosphere by the sun, variation in Earth's surface, rotation of the earth, mountains, water bodies and vegetation.

The blade of the wind turbine gets the wind's kinetic energy and rotate when the wind pasts a wind turbine. Kinetic Energy is converted into mechanical energy. The rotation turns an internal shaft connected to a gearbox, which increases the speed of rotation by a factor of about 100. That spins the generator and electricity is produced. The average wind speed data of about 29 districts is currently available from 2005 to 2016. Based on this data, data pre processing, analysis and visualization is performed.

Objectives:

The major objectives of doing this project are:

1. Promote renewable wind energy
2. Detect appropriate place where the wind turbines should be installed
3. Generate maximum output from wind energy, etc

Motivation and Significance:

On May 8, 2016, Germany had so much renewable energy that turbines and solar power were super charged and customers were actually paid to consume the energy. There are few places on our country which are very windy and due to this fact a large amount of energy could be easily produced on our country too and that with small investments. With enough renewable energy already being produced in the country, the leftovers could be sold to neighboring countries. Compared to the nuclear decay, the renewable sources of energy are far better for both living beings and the environment.

Chapter 2: Procedures

The basic procedures that were followed while doing this project are:

1. **Data Analysis:** At first the data provided by the OpenData Nepal was analyzed.
2. **Data Reduction:** The attributes with no values were completely removed from the dataset.
3. **Data Cleaning:** The data provided consisted of many noise values, missing values and inconsistencies.
4. **Data Transformation:** Transposing, changing data types, totaling was done.
5. **Data Visualization:** At last, the data was visualized and the result was obtained.

Conclusion:

In conclusion, it was found that the places like Bardia (Chispani), Arghakhanchi (Khanchikot), Jumla, Sunsari, Tarahara had the maximum wind speed. The deployment of the wind turbines on these places could result on higher amount of energy.

References

[1] https://www.awea.org/wind-101/basics-of-wind-energy, American Wind Energy Association, (Retrieved 26 Oct, 2019)