

# **Predicting The Energy Output Of Wind Turbine Based On Weather Condition Using IBM Cloud**

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# Introduction:

- We are going to deploy an application that will utilize multiple Watson AI Services including Cloud function, Watson Machine Learning, Weather Data.
- During the course of this project, we'll learn about combining Watson services, and how they can build customer satisfaction interactive portals for prediction on current conditions.

## Problem Statement:

- Wind power generation differs from conventional thermal generation due to stochastic nature of wind.
- Wind power forecasting plays a key role in dealing with the challenges of balancing supply and demand in any electricity system.
- Accurate wind power forecasting reduces the need for additional balancing energy and reserve power to integrate wind power.
- In this system, the inlet condition of the wind farm is forecasted by the autoregressive model.

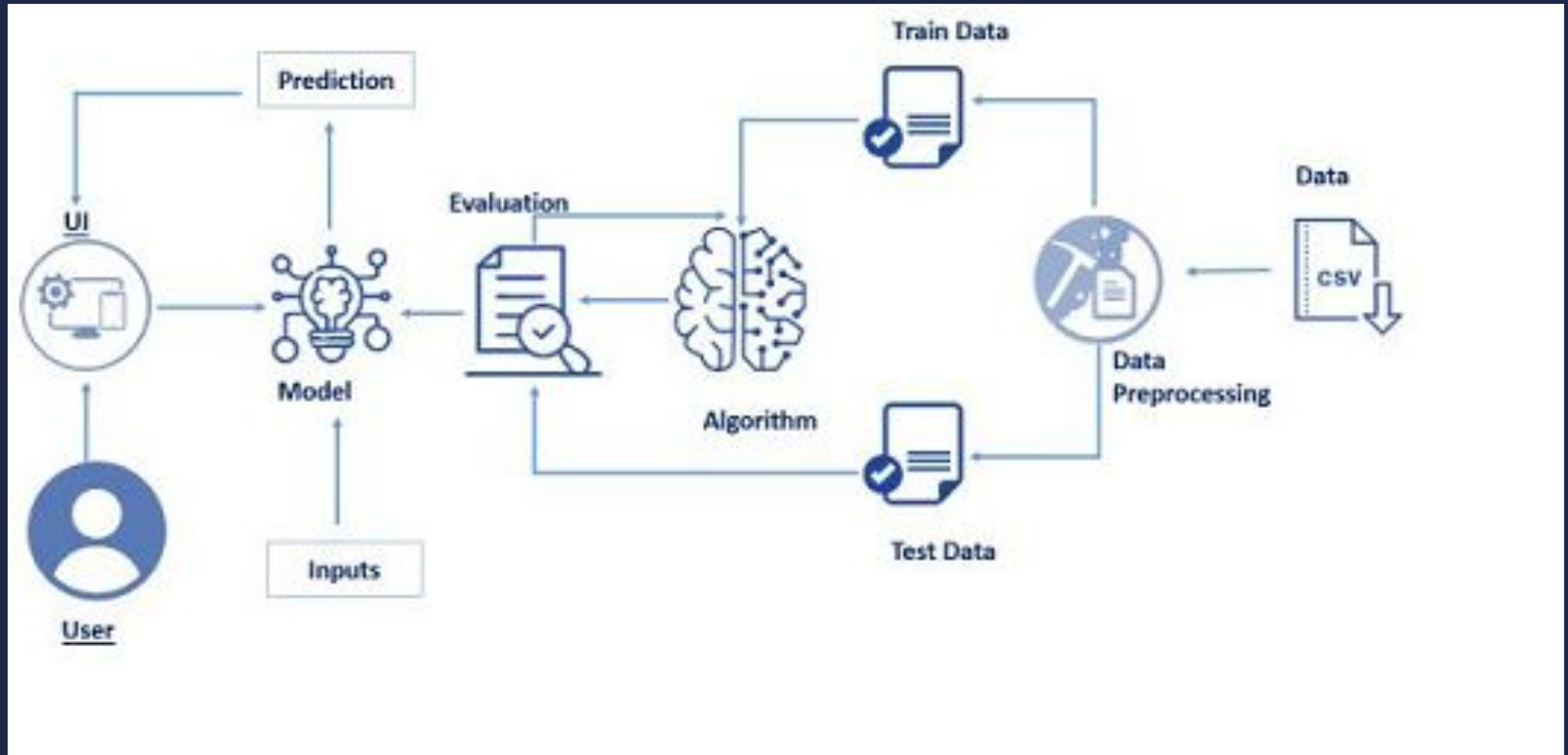
## Hardware/Software Requirements

- Cloud tool used: IBM
- IDE: Jupyter notebook, Spyder, Anaconda navigator
- Dependencies Required: Keras, Tensorflow, OpenCv
- Programming language(Back-end): Python 3.7
- Front-end: Html/css
- Framework:Flask

## Advantages:

- Reduces man power.
- Easy to use and has a user friendly interface.
- The weather conditions analysis that are not manually answered are responded to by the web dashboard.
- Results can be improved by training data to our choice of parameter.
- Weather analysis of different cities need not to be monitored.
- Can be used in areas with less connectivity as well.
- Cost efficient.
- Accurate results.

## Block Diagram



# UI screenshot:

## **WIND TURBINE ENERGY PREDICTION BASED ON WEATHER CONDITIONS**

Renewable energy, such as wind and solar energy, plays an increasing role in the supply of energy worldwide. This trend will continue because global energy demand is increasing, and the use of nuclear power and traditional sources of energy such as coal and oil is unsafe and leads to a large amount of CO2 emission. Wind energy is a key player in the field of renewable energy. In Europe, the capacity of wind energy production has doubled from 2009 to 2010.

However, levels of production of wind energy are hard to predict as they rely on potentially unstable weather conditions present at the wind farm. In particular, wind speed is crucial for energy production based on wind, and it may vary drastically over time. Energy suppliers are interested in accurate predictions, as they can avoid overproduction by coordinating the collaborative production of traditional power plants and weather-dependent energy sources. The energy can be predicted based on the power curve and the windspeed.

**WANT TO PREDICT THE ENERGY??**

# UI screenshot:

## Wind Turbine Energy Prediction Based On Weather Conditions

Enter the city name to know it's the weather conditions..

Agartala

CHECK THE WEATHER CONDITIONS

The weather conditions of the city  
are

Temperature	307.74 °C
Humidity	49 %
Pressure	1000 mmHG
Wind Speed	2.67 m/s

**Predict the Wind Energy!!**

Theoretical Power in KWh

Wind Speed in m/s

PREDICT





**THANK**  
**YOU**