PRODUCTION FORECASTING USING WEATHER CONDITION

"Climate is now a data problem"

Technology Area: Machine Learning

Application Area: Agriculture

PROBLEM STATEMENT:

"Climate is now a data problem," said by Mr. Claire Monteleoni. Earlier, Improper weather predictions lead to many crops damaged resulting in loss of money and time invested. But technology has evolved over years leading businesses to higher stable growth. Regression analysis will help you with better production forecasting using weather condition.

The main problem is that the potential users of the climate forecasts and agrometeorological advice (farmers, decision-makers) do not understand the economic benefit of using meteorological information in their activities.

Report of Hindustan times on food crisis:

India is among the countries which are at the greatest risk of food insecurity due to weather extremes caused by climate change, a global study suggests.

The study, published in the journal Philosophical Transactions of the Royal Society A, looked at 122 developing and least-developed countries, mostly in Asia, Africa and South America.

The countries at the greatest vulnerability to food insecurity when moving from the present-day climate to 2 degrees Celsius global warming are Oman, India, Bangladesh, Saudi Arabia and Brazil and many more as researchers said.

challenges are faced by farmers due to climate change:

1. Non-seasonal rains
2. Monsoon delays
3. Droughts
4. Floods

PROJECT OBJECTIVE:

The main goal of this project is to predict

- The weather (temperature, percentage of rainfall, humidity, floods, droughts) can be predict more accurately with the help of machine learning techniques.
- Also going to provide clear graphical representation of daily weather conditions based on the user specified location.
- We are also going to provide alerts to the people regarding natural calamities (floods, droughts).
- And also going to provide suggestions to the farmers regarding the weather.

ABSTRACT:

Present weather predicting technology is not up to the standards. Predicting the weather is really a night mare for the metrological department people. Large amount of weather data is producing day by day, these data can be used to predict the weather more accurately.

In light of the need to make a close relationship between information producers and users, it is still seen that a lot of work is needed before meaningful progress is registered. Timely and accurate climate forecasts and agrometeorological warnings are useful tools for policy and decision-making, but can only be achieved if executed and applied in close and continuous cooperation with the "data users".
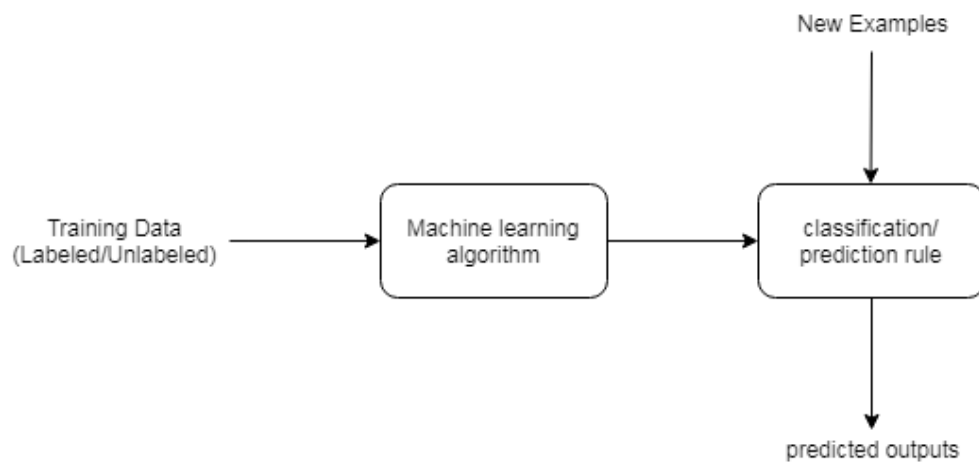
It is thus certain that in an agricultural production system, advance information on key rainy season variables, in the form of climate forecasts and agrometeorological warnings are crucial for improving production.

Technology Stack:

Machine Learning Frameworks: Scikitlearn, Matplotlib, Seaborn, NumPy, Pandas, TensorFlow.

Programming Languages: Python, R programming for Data Training/Preprocessing.

UML diagram:

New Examples

Training Data
(Labeled/Unlabeled) → Machine learning algorithm → classification/ prediction rule → predicted outputs

Algorithm:

Step 1: Initially datasets which are required for the prototype will be collect from the Kaggle website.

Step 2: The collected datasets may be labeled or unlabeled. It can be trained with the help of predefined libraries.

Step 3: Machine learning algorithm will be applied on trained dataset.

Step 4: All the trained dataset is loaded into machine learning classifier for the prediction of weather.

Step 5: In this machine learning classifier, we can add new dataset examples for the better and accurate weather prediction.

Step 6: Finally, from the final output we can estimate and analyze the future weather with good accuracy.

Step 7: From the above obtained output we can give alerts and suggestions to people.

Advantages:

1. Improved information on agroclimatic potential, i.e., a greater range of measurement, more computer–based analysis, more agroclimatic screening of environments to match agricultural activities to regional weather–types and improve weather forecasting.
2. From the predicted results, in seasonal and non-seasonal raining conditions farmers can select their crops.
3. Crop production can be increased, and waste of money and time can be reduced.
4. A focus on integrated regional development to reduce overall vulnerability to drought by increasing public awareness.
5. Low cost, High performance.

Dependencies:

1. Initial Datasets from the Kaggle website and data.gov website.

2. IMD - Meteorological Services for Agriculture in India datasets.

3. IMD old weather records.

Conclusion:

The potential benefits of climate forecast and agrometeorological warnings for decision-support in agricultural and natural resources management is beyond debate. However, climate forecast and agrometeorological warnings can only achieve their full value if conceived, executed and applied in close and continuous cooperation with the "data users".

Thus, successful policies require precise information on the weather and how it affects harvests. Owing however to limitations in current practice, there is a need to improve the accuracy and clarity of forecasts issued and to ensure communication between information producers and users on the current and future conditions of the atmosphere.
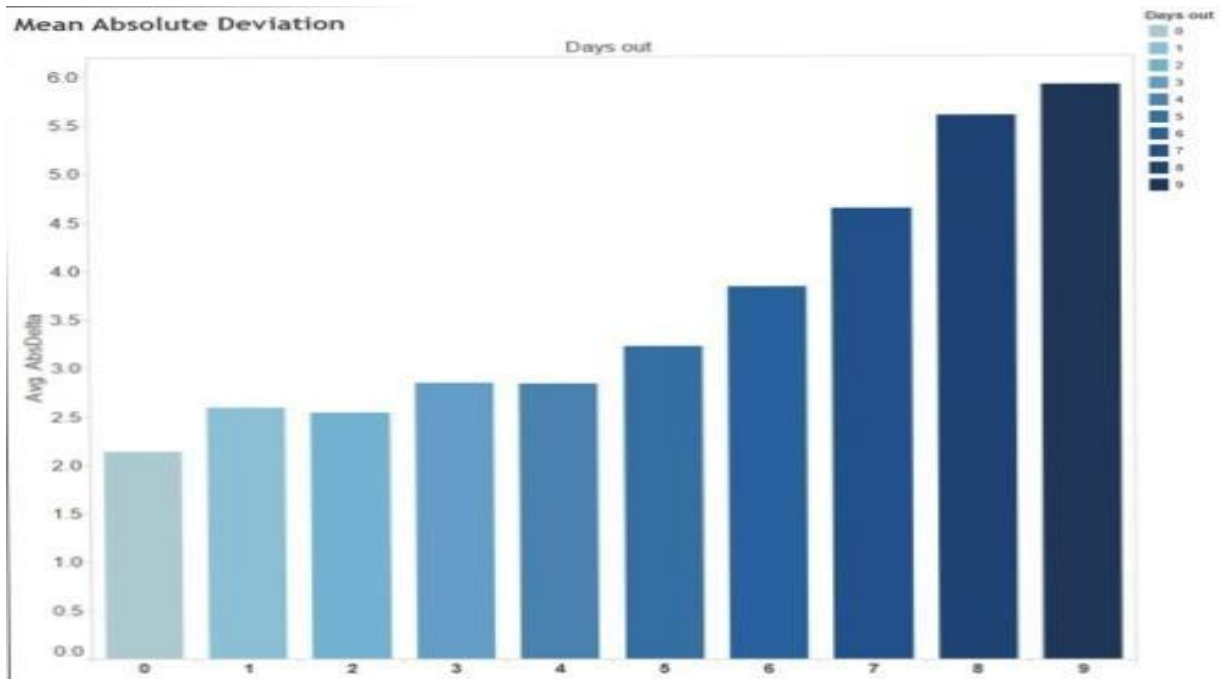
Day-by-Day Weather Forecast Report Using ML