FORECAST OF STUBBLE PRICE

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Abstract

When on one hand India is fighting COVID-19 war, on the other hand we cannot forget our responsibility towards environmental sustainability as well as global health. In this situation Scientists are predicting more respiratory impairment in north India due to annual stubble burning mediated rise in air and soil pollution. Despite a ban by Punjab Pollution Control Board, stubble burning is still practiced. The need of the hour is to find an efficient and environment friendly way to manage stubble burning.

Our plan is to implement a portal to dispose of stubble in a more sustainable and economic manner. The farmers will be provided with the predicted price of stubble based on market price which will generate extra income for farmers and also reduce environmental pollution. This system will also help businesses to procure stubble and purchase the same to create recycled products for the market.

Keywords: Stubble burning, Web Development, Machine learning, Price prediction

1. INTRODUCTION

The air quality in North India is decreasing day by day and it is toxic to breathe. This has an adverse effect on lungs leading to major breathing disorders. One of the significant factors for air pollution is stubble burning. Agricultural crop residue burning contributes towards the emission of greenhouse gases (CO_2, N_2O, CH_4), air pollutants (CO, NH_3, NO_x, SO_2, NMHC, volatile organic compounds), particulates matter and smoke thereby posing threat to human health. Stubble burning is now recognized as one of the most significant activities that degrades ambient air quality. Stubble burning is a practice of removing paddy crop residues from the field for sowing the next crop. These residues put a burden on farmer's backs because these residues are not so useful for the farmer and there is pressure on the farmer to sow the next crop in time. Therefore, they clear the field by burning the stubble. According to different studies, the residues of rice and wheat crops are major contributors to the total stubble loads in India.

With the increasingly computational power of the computer, machine learning will be an efficient method to solve this problem. With a successful model for stubble price prediction, we can encourage farmers to sell stubble, which in return will improve the air quality by not burning the stubble and generating income through it. The waste which was once burnt before will now generate extra income for farmers and also reduce air pollution. This system will also help businesses to procure stubble and purchase the same to create recycled products for the market. So, it is a win-win situation for both farmer and customer.

2. LITERATURE REVIEW

A state wise inventory[2] of air pollutants such as CO_2, CO, SO_x, NO_x, NH_3, PM2.5, BC, PAH, NMVOC and NMHC (organic compounds containing only C and H excluding methane) emissions from burning of crop residues was prepared for the year 2008–09 using the IPCC 2006 inventory preparation guidelines.[3]Rice stubble burning is a concerned issue as it takes place during the winter months; inversion

conditions are prominent during those months. Inversion conditions do not allow the smoke emitted from burning to disperse in the atmosphere resulting in reduced dilution that further mixes up with fog and forms smog that is dangerous to human health and surroundings.[6]The Punjab government has shown commitment to identify a workable, long-term solution for the problem of stubble burning. In this context the following is important: The Punjab State Farmers and Farm Workers Commission held workshops with various stakeholders in November 2019.

Undoubtedly,[7]the lack of proper management of abundant crop residue has had an adverse influence on the environment and human health not only in India but also in the world. Agricultural field burning has created many environmental problems, particularly causing a threat to the soil fertility and the emission of toxic gases such as CO_2, CO,$PM2.5$ and $PM10$. Consequently, a variety of alternative approaches should be considered as substitutes for open field burning,e.g.,in situ incorporation, mulching, Happy Seeder machines, and bioenergy use.

PROPOSED MODEL

3.1 Architecture Diagram
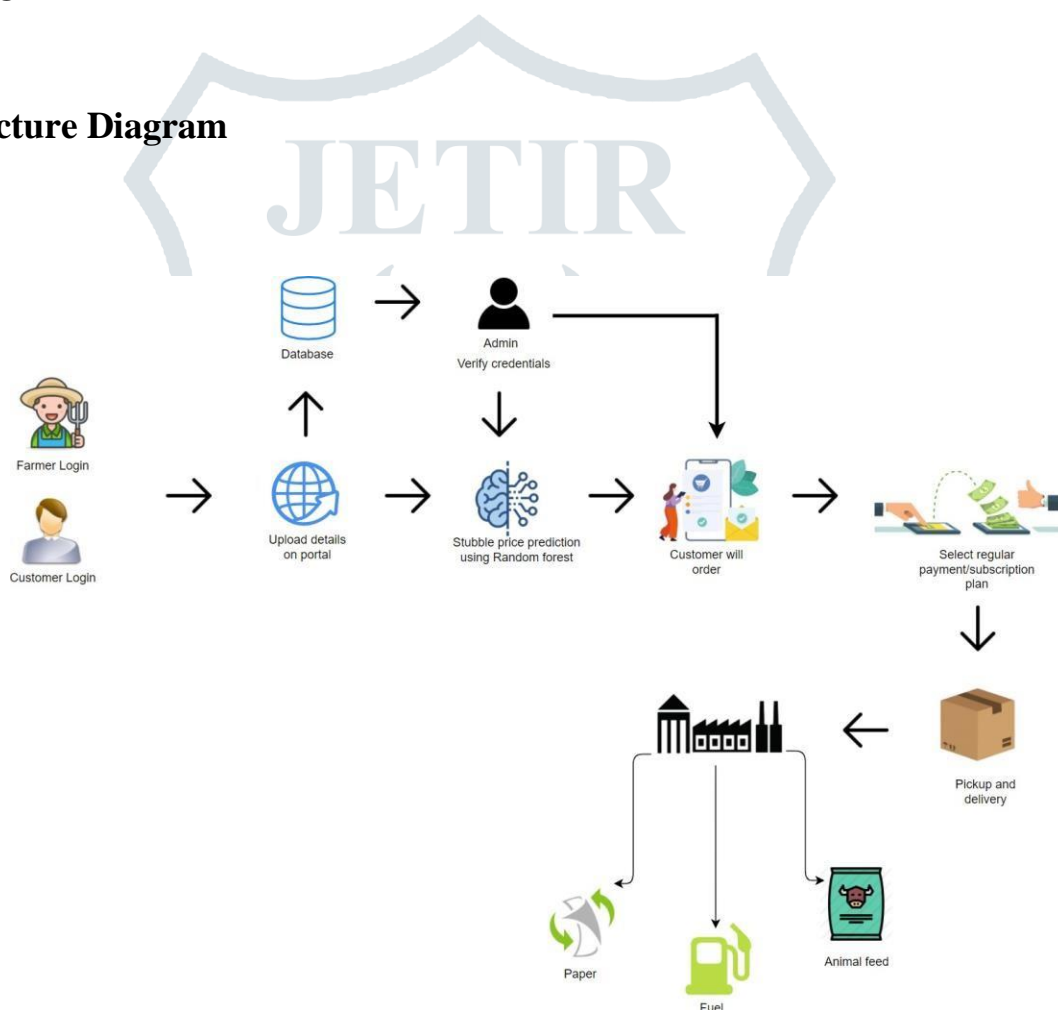
Full Stack web development with ML model can streamline and automate the process of collecting crop residue (stubble) and disposing it in an environment friendly way. Our portal will include buying and selling of stubble which will be recycled into products.

We will predict the price of stubble based on market price using machine learning. Our Machine Learning model is based on the central theme that factors like weather conditions, soil parameters, mode of collection and historic details of the crop residue have an effect on the current yield of stubble. Certain Machine Learning algorithms are taken into account for developing the models of the data obtained from the past historical yield of the crop residue and reflecting them in predicting the crop residue generated in the present.This paper focuses on developing a system which accurately predicts the price of the stubble using Random Forest algorithm.

Modeling of data involves creating a data model for the data to be stored in the database. The process of modeling means training a Machine Learning Algorithm to predict the labels from the features, tuning it for business need, and validating it on the hold out data. The output from modeling is a trained model that can be used for inference, making predictions on new data points.

This system will help businesses to identify stubble production and purchase the same. It will also generate extra income for farmers and reduce environmental pollution.

The process which we followed to implement the algorithm for stubble price prediction is as follows:

A. Data collection

The data is compiled from a different source and optimized for datasets. Data sets consisting of nature of soil, climatic conditions, mode of collection,type of fertilizers are used for stubble price prediction.
Google Dataset Search, Kaggle, Data.Gov., Datahub.io, etc are the online platforms to get collections of old series of datasets.

B. Pre-processing of Data

Pre-processing of data is considered as an essential step in the machine learning phase. Pre-processing includes adding missing values and the correct data set.

C. Feature Extraction

Feature extraction would reduce the size of the data to characterize an extensive data collection. This approach selects characteristics based on the correlation matrix in characteristics that have more the correlation value is selected to be a significant value.

D. Data prediction

By applying Random forest regressor, the data is trained with output and input data. Before this step the data must be split into train dataset and test dataset. In this way, the data are tested until the accuracy is achieved. Random Forest is a popular machine learning algorithm that belongs to the supervised learning technique. It can be used for both Classification and Regression problems in ML. It is based on the concept of ensemble learning, which is a process of combining multiple classifiers to solve a complex problem and to improve the performance of the model.

3.2 Advantages:

- This system will accomplish proper disposal of stubble which will avoid emission of harmful gases and improve the air quality.
- Farmers can directly upload the stubble details and he/she can sell directly to customers without any intervention of middlemen.
- Effective prediction technique which helps farmers make informed decisions and attain profit.

● Extra income will be generated for farmers by selling the stubble which was once burnt.

● Using stubble as raw material many industries also get benefitted by recycling it and selling biodegradable products like food packaging material, paper etc.

3.3 Implementation:

Step 1 : Any User will first land on the Home-page of the portal where they can get a brief about the project.

Step 2 : Farmers and Customers will be able to login to their specific dashboards through verifying the login credentials.

Step 3 : Farmer will be asked to enter the necessary details based on which we will forecast the price of stubble which will help them to sell the stubble at the market price and take informed decisions.

Step 4 : Customers (Industries) will inturn buy their desired quantity of stubble through the Farmers.

Step 5 : Which can then be used to create recycled products like construction materials, food packing materials, paper etc.

Step 6 : Payment feature is integrated in our portal using Razorpay Payment Gateway.

3. CONCLUSION

● The waste which was once burnt before will now generate extra income for farmers.

● Since the stubble will be delivered to various industries and factories, air pollution will be reduced.

● This system will also help businesses to procure stubble and purchase the same to create recycled products for the market.

● So, it is a win-win situation for both farmer and customer.

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