Crop Prediction using Machine Learning

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Abstract - *It has been frequently found that there was a crop in a specific location at a specific time due to which the fee of the crop falls closely. There have been innumerable such scenarios wherein a large quantity of crop yield receives wasted due to bumper crop in a single season after which rises closely in another season. All this takes place due to terrible management and storage facilities by authorities because of loss of contingency measures and making plans for such situations. These calamities causes large losses to both widespread citizens as well as the farmers.*

1. INTRODUCTION

We as a group are making plans to apply soil records, weather information and marketplace statistics for costs of crop to build predictive models in an effort to address these situations by way of making the government aware earlier to take important action to store such crops in times of bumper crop and to apply them at instances of shortages. In this manner the authorities can pre plan to construct powerful storage answers for the unique crop that could have bumper manufacturing and use this at instances of disaster. This will save plenty of farmers and citizens from marketplace exploitation and for that reason will create a balance to fulfill the food needs of the nation.

1. We will first accumulate soil, climate and market statistics for a selected crop and train our model with it.

2. We will use this version to classify which plants can also have bumper production by means of the usage of the present statistics.

Three.

We will make a web interface for the government to have all this data below one unmarried net utility with the intention to pre plan storage measures and still have the information about all the cold storages (their ability and ultimate garage) in one location.

We will make an interface to connect the farmers as nicely if you want to have this information of bumper crop (and also acquire records of nearest storage solutions and transportation organized via government) and then can plan in conjunction with authorities to make the fine use of resources to create a balance in instances of bumper vegetation and in times of shortages.

1.1 Technology Stack

1. React is a JavaScript library for constructing consumer interfaces. It is maintained by using Facebook, Instagram and a community of character builders and companies React lets in developers to create huge net-packages that use records and might change over the years without reloading the web page. It aims by and large to provide pace, simplicity, and scalability. React strategies handiest user interfaces in packages.

2. Git is a version manage gadget for monitoring adjustments in computer documents and coordinating work on the ones files among multiple people. It is ordinarily used for source code management in software program improvement, but it is able to be used to preserve track of changes in any set of documents.

3. Redux is a predictable state container for JavaScript apps. It facilitates you write applications that behave consistently, run in specific environments (patron, server, and native), and are easy to check.

4. HTML is the same old markup language for developing web pages and internet packages. With Cascading Style Sheets (CSS) and JavaScript, it forms a triad of cornerstone technology for the World Wide Web. Web browsers get hold of HTML files from a web server or from neighborhood garage and render the files into multimedia web pages. HTML describes the shape of a web page semantically and originally blanketed cues for the appearance of the document.

5. CSS is a fashion sheet language used for describing the presentation of a report written in a markup language like HTML. CSS is a cornerstone generation of the World Wide Web, along HTML and JavaScript.

6. JavaScript is a prototype-primarily based, multi-paradigm, dynamic language, helping object-orientated, vital, and declarative (e.g. Functional programming) styles.

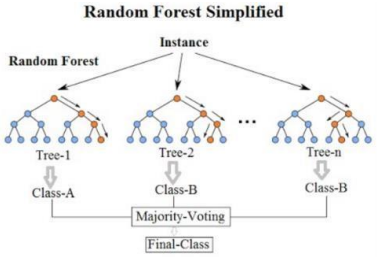
7. Ethereum is an open-source, public, blockchain-primarily based dispensed computing platform and operating machine presenting clever agreement functionality. It supports a modified version of Nakamoto consensus thru transaction-primarily based state transitions. Ether is a token whose blockchain is generated by way of the Ethereum platform. We have used Ethereum as out blockchain to enforce the supply chain System.

8. Web3.Js is a collection of libraries which allow us to have interaction with a nearby or far off Ethereum node, the use of an HTTP, WebSocket or IPC connection.

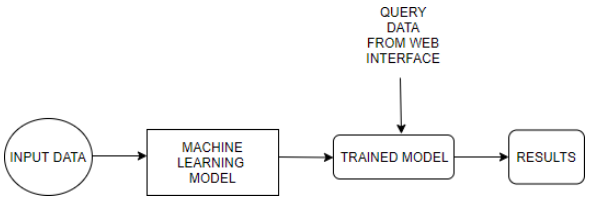
9. Solidity is an item-orientated, excessive-degree language for implementing smart contracts. Smart contracts are applications which govern the behavior of accounts inside the Ethereum nation.

1.2 FLOWCHARTS AND DIAGRAMS

1. Working of Random Forest Algorithm



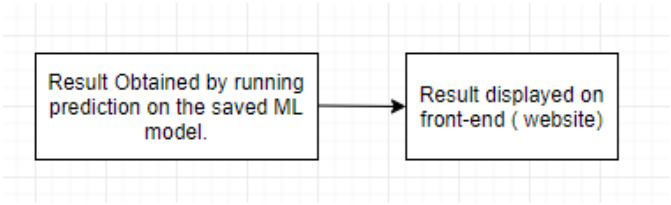
2 Usage of ML for prediction using Random Forest and Linear Regression

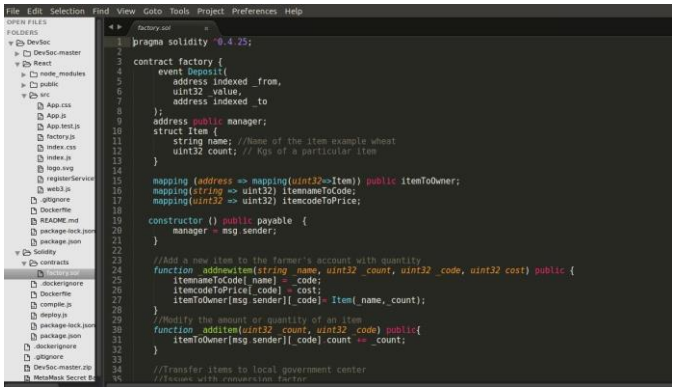


3 Working of the Website

Crop Prediction

In this component we're taking the place from the farmer or person, they could both pick out their contemporary area or can provide any location as input for which they want to are expecting the yield.





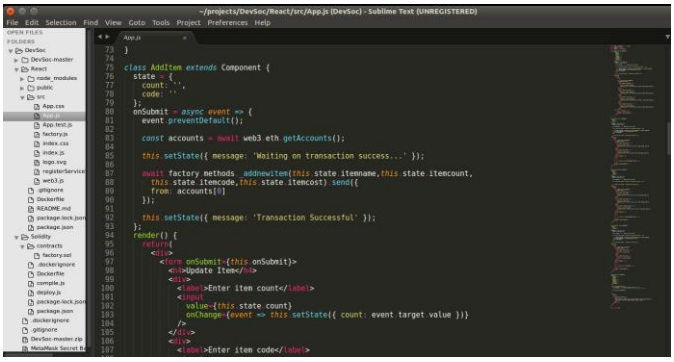
After we get the region we're offering the consumer with an option to pick any of the crop for which we're offering prediction. Once User selects the crop, we sends the area facts and the crop name to our API.

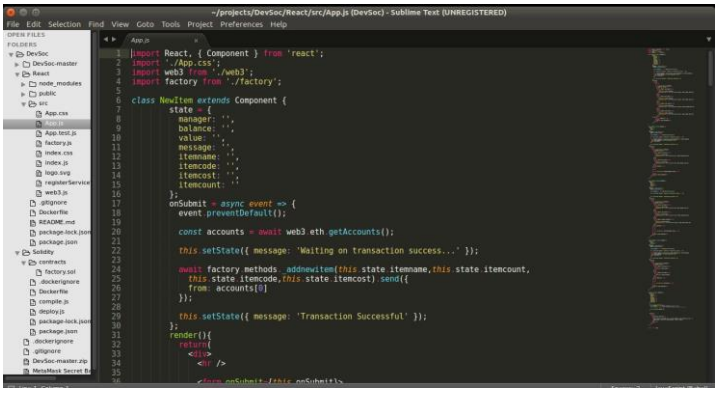
At the Backend, after you have the location and crop call, it feeds these to our trained model which we've got skilled consistent with the dataset we were given the usage of random woodland Algorithm and Linear Regression. As these enter goes to the model, it makes the selection whether the crop prediction may be ―excessive‖, ―low‖ or ―medium‖ and after predicting it sends returned the end result and we display it to the consumer.

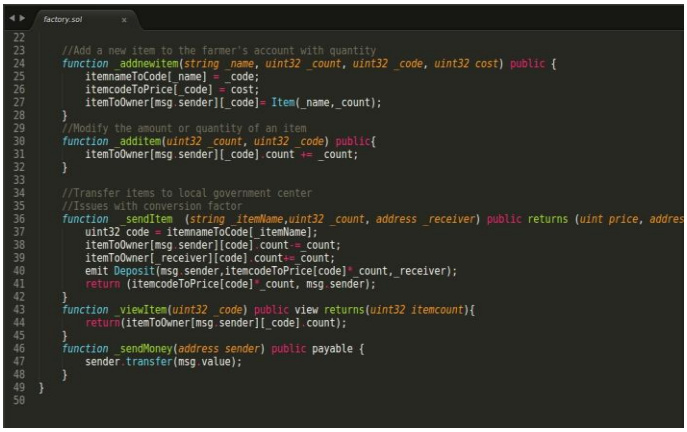
Supply chain using Blockchain

The second portal is largely meant for farmers and the nearby authorities enterprise to percentage the crop which is produced by using the farmers directly without the intervention of any middle guy. This will result it farmers getting direct and honest charge of their production and additionally government will get all the right plants statistics which has been produced within the locality.

We have used blockchain for cozy storage of crop records so that everyone the records might be saved in a decentralized and in immutable fashion and consequently no one can bog down the facts. We have written smart contracts to shop the crop info into the blockchain and extensively utilized meta-mask as a pockets for transfer of cash between authorities employer and farmers. Farmers can add a crop, get records of the crop, ship cash and obtain money and can also switch the crop through this portal.







```
import pandas as pd
from sklearn.ensemble import RandomForestRegressor
from sklearn.model_selection import train_test_split
import numpy as np
import os

def predict(crop,rf,tm):
        if(rf==0): return 0
        if(tm==0): return 0
        features = pd.read_csv(os.getcwd()+'/prediction/crop_data/'+crop+'.csv')
        features = pd.get_dummies(features)
        labels = np.array(features['YIELD'])
        features.drop('YIELD', axis=1)
        feature_list = list(features.columns)
        features = np.array(features)

        train_features, test_features, train_labels, test_labels = train_test_split(features,labels,test_size=0, random_state=42
        test_features = np.array([[0,rf,tm]])
        rf = RandomForestRegressor(n_estimators=1000, random_state=42)

        #training
        rf.fit(train_features, train_labels)

        #predicting
        predictions = rf.predict(test_features)

        return predictions[0]
```

```
from flask import Flask, jsonify, Response, request
import sys, os
sys.path.insert(0, './addon')
sys.path.insert(0, './config')
sys.path.insert(0, './prediction')
import getCondition
import devfest_0
app = Flask(__name__)

# @app.route('/pos',methods=['post','get'])
# def index():
#     lat=request.args.get('lat')
#     lng=request.args.get('lng')
#     crop=request.args.get('crop')
#     return jsonify(getCondition.exec(12.97535830000   0002,79.1604862))

@app.route('/',methods=['post','get'])
def latlng():
    lat=request.args.get('lat')
    lng=request.args.get('lng')
    crop=request.args.get('crop')
    if(crop not in ['rice','bajra','maize']): return ''
    if(not float(lat) or not float(lng)): return ''
    cond=getCondition.exec(float(lat),float(lng))
    print(cond)
    yieldAmount=devfest_0.predict(crop,cond[0],cond[1])

    yieldType=0 #0->low;1->normal;2->bumper
    if(yieldAmount>3000): yieldType=2
    elif(yieldAmount>300): yieldType=1
    return jsonify({'yield':yieldAmount, 'type': yieldType})
# print(getCondition.exec(12.975358300000002,79.1604862))
```

RESULTS

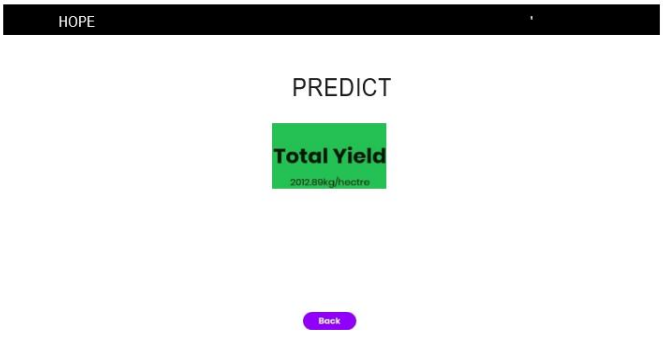
Our project is divided into two elements,

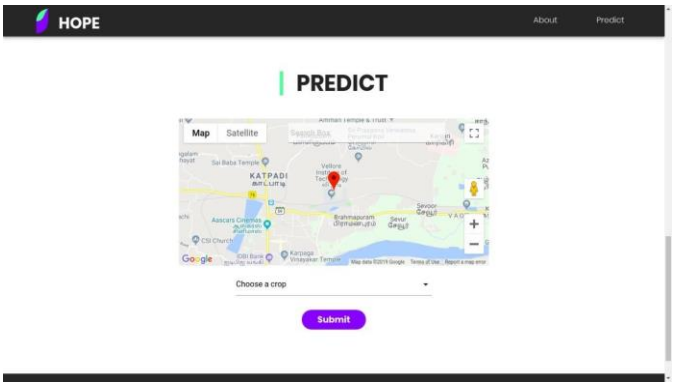
A) Crop prediction- The place is both the contemporary vicinity of the person or any area which the person desires to test about. Once we get the vicinity, we generate the yield at that current location.

Once we get the region from the person, the following step might be to get the kind of crop and as a result we go ahead with the prediction. After we get the crop kind, the place records and the crop call are dispatched to the API.

The model is educated the usage of Random Forest set of rules and Linear Regression. The output is of three types- —Low‖, —High‖ and —Medium‖

We are attaching the photo of more than one locations in conjunction with the crop yield at that particular place-

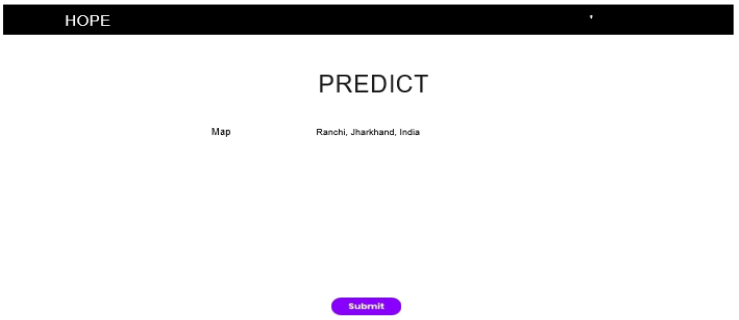




B) Supply Chain

Main motive to put into effect that is to put off the concept of corruption which takes area within the agriculture industry as properly. There is no want of a center guy among the farmer and the neighborhood authorities. This hereby makes certain that the farmers get the truthful charge in their crop manufacturing. It additionally keeps a song of all of the records and is absolutely validated and tested via all means and no one can alternate the data in anyway. The government takes under consideration the whole lot. The concept of blockchain is used to keep the facts in a right manner in order that no person can trade the contents of the production. We have used meta-mask as a pockets for transfer of cash among authorities employer and farmers. Farmers can upload a crop, ship money and get hold of money and do the transactions vital thru this portal

We have connected the transaction info as a demo-



CONCLUSION

Agriculture Industry is the backbone of Indian economy and so we need to find methods to decorate its productiveness and contend with farmers and do justice with their work. Through this undertaking we have tried our fine to beautify the experience of the farmers the use of generation along with Machine Learning and Block Chain. Our challenge is split into 2 foremost segments. In the first section we're efficaciously predicting the yield of the crops the use of device studying algorithms and within the 2nd section we've created corruption loose transaction portal where they may buy and promote vegetation immediately to authorities and

on appropriate fee without bearing any loss because of middlemen within the system of transaction. Thus our assignment has capacity to reduce the difficulty of the farmers which they dealing with in these international days.