A

PROJECT REPORT ON

**Soil Fertility Analysis And Crop Recommendation**

Submitted in partial fulfillment of the requirements of the degree of

**Bachelor of Engineering**

By

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**CERTIFICATE**

This is to certify that the project entitled **“Soil Fertility Analysis And Crop Recommendation”** is a bonafide work of **Chakola Dereck Jos (118IT1153A), Harish Natarajan (118IT1400A), Mahadik Omkar Uday(119IT3251A)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **“Undergraduate”** in **“Information Technology”.**

(Faculty In charge)

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**ACKNOWLEDGEMENT**

The success and final outcome of this project required a lot of guidance and assistance from many people and we are extremely fortunate to have got this all along the completion of our project work. Whatever we have done is only due to such guidance and assistance and we would not forget to thank them.

It is matter of great pleasure for us to submit the project report on “Soil Fertility Analysis And Crop Recommendation­”, as a part of our curriculum.

First and foremost, we would like to thank to our director, for giving us an opportunity to do the project work. We would like to thank our H.O.D Prof. Swati Sinha and subject in charge Prof. Yogesh Sahare, for the valuable guidance and advice.

And last but not the least a special thanks goes to my team members, who helped me to assemble the information and gave suggestions to complete our project.

**ABSTRACT**

Chemical imbalance in the soil can disrupt the natural growth of plants. So by knowing the fertility level of soil good quality of plants can be grown.

This project is divided into 3 steps:

1)Soil nutrient values and rainfall level is given.

2)Fertility level is predicted.

3)Based on prediction crops are recommended.

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**CHAPTER 1:-**

**Software Requirements Specification**

1.1 **Product Perspective**

The proposed system is a Machine Learning based web app built using python. The App Focus on “***Predicting fertility level and recommending crop for the farmers***”. Farmers can input nutrient and rainfall level to get accurate prediction.

1.1.1 **Specific Requirements**

The whole project is developed using Flask Framework which uses python programming language. So the overall software requirements of the project are:-

* Flask version 1.1.2
* Pycharm or any other IDE
* Windows 7 or another Operating system

As an end product the web app developed by us will be implemented in mobile or a web browser.

**Chapter 2:-**

**2.1 Fertility Prediction Model:-**

Based on available nutrients such as Nitrogen, Sulphur, Phosphorus, Barium, Potassium, Iron, Magnesium in ppm, parameters such as organic carbon and electrical conductivity, the app predicts the fertility level of the soil using machine learning algorithm known as Random Forest Classifier.

**2.2 Crop Recommendation Model:-**

Based on above fertility prediction and rainfall level the app predicts suitable crops that can be grown in the soil.

K-Means clustering algorithm is used to recommend crops. Elbow plots was used to calculate the number of clusters. The optimum number of cluster was six.

**Chapter-3**

**UML DIAGRAM:-**

**Diagram

Description automatically generated**

**Chapter 4:-**

**Screenshots of Project:-**

**1)Fertility Prediction Model:-**

**A screenshot of a computer

Description automatically generated**

Fig (a) Nutrient input page

A picture containing text, outdoor, field, dry

Description automatically generated

Fig(b)Soil fertility level prediction

**2)Crop Recommendation:-**

**Graphical user interface, text, application, chat or text message

Description automatically generated**

Fig (c) Crop recommendation

**Chapter 5:-**

**Conclusion And Future Scope**

**5.1 Conclusion**

The manual task of examining the soil and analysing the nutrient is simplified and a GUI is provided using machine learning to easily predict the fertility level

**5.2 Future Scope**

1. Currently we are not using live data for predicting the fertility level of soil but in future we will use live data.
2. Currently we are not using database for storing data but in future we will use.
3. Currently our application is web based but in future we will convert to android app.
4. Currently we are not recommending crops based on location but in future we will add GPS support.

References:-

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