

AGROHEALTH

PROJECT REPORT SUBMISSION

BACHELOR'S OF TECHNOLOGY

in

***COMPUTER SCIENCE AND ENGINEERING AND
ELECTRONICS AND COMMUNICATION ENGINEERING***

by

ARYAN (111916012)

GARVIT RAJPUT (111915034)

PRACHHI SABITA MISHRA (111916034) PUNIT

PATHADE (111915096)



Indian Institute of Information And Technology Pune

Near Bopdev Ghat, Kondhwa Annexe, Yewalewadi, Pune, Maharashtra

411048

BONAFIDE CERTIFICATE

This is to certify that the project report entitled “**AGROHEALTH**” submitted by **Aryan, Garvit Rajput, Prachhi Sabita Mishra, Punit Pathade** bearing the **MIS No: 111916012, 111915034, 111916034, 111915096** respectively, in completion of his project work under the guidance of **Dr.Chandrakant Guled** is accepted for the project report submission in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Computer Science and Engineering in the Department of Computer Science and Engineering and Electronics and Communication Engineering in the Department of Electronics and Communication Engineering respectively, Indian Institute of Information Technology, Pune, during the academic year 2021-22.

Dr.Chandrakant Guled

Project Guide

Assistant Professor

Department of Mathematics

IIIT Pune

Dr.Nagendra Khushwaha

Head of the Department

Assistant Professor

Department of ECE

IIIT Pune

Dr.Tanmoy Hazra

Head of the Department

Assistant Professor

Department of CSE

IIIT Pune

Project Viva-voce held on

Internal Examiner

External Examiner

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Chapter 1

Introduction

Agriculture and Healthcare are the two important pillars for any nation. Strengthening the two important pillars through the use of technology will improve the further nation building. Agriculture is considered as the main and the foremost culture practiced in India. Today also agriculture contributes to 14% of total country's economy and about 42% of total employment to people.

Along with agriculture, healthcare also forms an important factor for the nation. The hospital industry in India is forecast to increase to Rs.8.6 trillion by FY22. With the introduction to more advanced AI models in healthcare sector, the industry would grow more.

1.1 Problem Statement

There are various problems faced by workers in this field. A farmer's decision about which crop to grow, which fertilizer to use on the particular soil type is generally clouded by lack of awareness about market demand, overestimating a soil's potential to support a particular crop type. Also in healthcare many people fail to detect disease at an early stage which eventually becomes life threatening at last moment. Determination of severe problems at early steps increases life expectancy and happiness index of a nation.

The need of the hour is to design a system that could provide predictive insights to the workers from both sectors, thereby helping them make an informed decision. So with resources within our reach we have proposed a system which can address real-life problems in the Agricultural sector and Healthcare sector based on machine learning models trained considering essential environmental and economic parameters and also making a full-fledged application. It can be also considered as the

Chapter 2

Motivation

Farming & Healthcare System are major sectors that influence a country's economic growth and human Resources. Resolving the major issues in this sector with the help of technology can improve the overall output of the country. Use of machine learning algorithms to address this problems and finding viable solution with better accuracy rate will improve them further.

In-country like India, the majority of the population is dependent on agriculture for their livelihood. At the same time the lack of awareness among farmers results in less yield of crop. The dependence on external factors and their own intuition to know about crops sometimes yields them less profit. A need of full-fledged application is always felt off.

Also in Recent times of pandemic the need for healthcare to adopt technology to work efficiently has been encountered. Be it vaccine certificate or robots serving in wards for patients, technology has proved an important player for them. Need of new application for detection has become an important need now.

Chapter 3

Literature Review

3.1 Agriculture

A technique named CSM to select sequence of crops to be planted over season. CSM method may improve net yield rate of crops to be planted over season. The proposed method resolves selection of crop (s) based on prediction yield rate influenced by parameters (e.g. weather, soil type, water density, crop type). It takes crop, their sowing time, plantation days and predicted yield rate for the season as input and finds a sequence of crops whose production per day are maximum over season.

AgroConsultant, a system that was successfully proposed and implemented an intelligent crop recommendation system, which can be easily used by farmers all over India. This system would assist the farmers in making an informed decision about which crop to grow depending on a variety of environmental and geographical factors. We have also implemented a secondary system, called Rainfall Predictor, which predicts the rainfall of the next 12 months.

3.2 Healthcare

Various Research shows the implementation of machine learning model to predict heart stroke. They used various machine learning techniques like Decision tree, Naïve Bayes etc. They obtained an accuracy of approx. 80% from the used algorithms which was pretty less.

Authors used a combination of the Decision Tree with the C4.5 algorithm, Principal Component Analysis, Artificial Neural Networks, and Support Vector Machine. But the CHS Dataset taken for this work had a smaller number of input parameters.

Chapter 4

Research Gaps

Over time, many papers related to our project have been published and worked upon. So upon researching we found few gaps which we tried to cover up in our project:

1. Performance and accuracy of CSM method depends on predicted value of influenced parameters. So there is a need to adopt a prediction method with more accuracy and high performance.

2. Crop demand and supply as well as other economic indicators like farm harvest prices and retail prices can also be considered as parameters to the Crop Suitability Predictor model. This would provide a holistic prediction not only on the basis of environmental and geographical factors, but also depending on the economic aspects.

3. Still better understanding need to be developed among the farmers through various resources. Basic understanding needs to be developed among farmers for better yield and results.

4. Stroke prediction is limited to only textual data which may result in predicting poor outcomes. Using Brain CT Scan it can be more efficient and provide more favourable outcomes. Also text report would be read by neuroradiologists in one hospital, an external validation using data from another hospital is needed to determine whether the algorithm would demonstrate the same performance in predicting stroke outcomes.

5. For a very large area, used set of parameters can vary largely which could adversely affect the predicted output from the model.

6. Healthcare Sector is one of the primary concern and crucial sectors, so the model's accuracy should be precise. A slight change in accuracy can prove to be extremely fatal.

Chapter 5

Objective

In this Project, we will Design web applications for the prediction of some of the common problems and issues faced in the Agricultural and Healthcare sector by the use of Data Analysis and Machine learning. Also for each problem we will use various classification models and compare each model accuracy. The model having the highest accuracy will be used further.

After Building the model for the prediction we will develop a full-fledged web application for the models using various web frameworks. And then deploy them on the cloud technologies for public use. After deploying the models we will integrate all the web application on the website for use in public.

Chapter 6

Methodology

The basic working of our model:

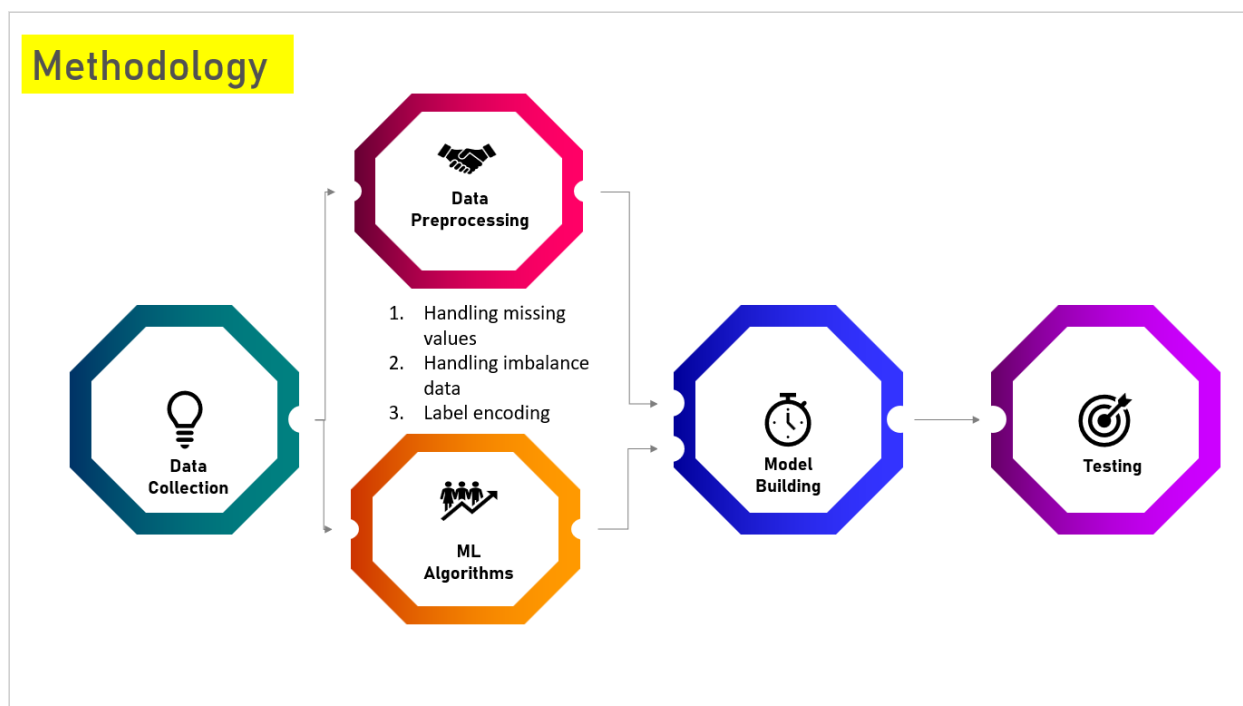


Figure 6.1: Workflow

Chapter 7

The very first step involves collecting data from authenticated sources and verifying it. After collection of data, it will be processed into the program by using pandas library. After processing the data set, we will handle the missing values and handle the imbalanced data. The next step involves label encoding the data. Label encoding refers to converting the data to numeric form. It is an important pre-processing step for the structured data set in supervised learning. The next step involved finding correlation and distribution of data. We used histogram and heat-map to show the distribution of independent variables. After all data pre-processing steps we choose 5 ML algorithms and trained the models. The one with highest accuracy will be used further for making web application. The libraries used for this was scikit-learn.

Chapter 8

Results and Discussion

So, we plan to offer suitable IT solutions to the global issues in the domain of agriculture and health care for society using Machine learning algorithms and making a full-fledged web application for it.

We want to scale this app to as many farmers as possible to reduce local hypotheses and make farming efficient and profitable.

Also by creating Digital health that can prevent disease at lower healthcare costs while helping patients monitor and manage chronic conditions. This can provide a better human resource to the nation. This will help in suggesting a country which area should be given importance in order to efficiently improve the life expectancy of its population.

Chapter 9



MODELS



Crop Recommendation



Fertilizer Prediction

Chapter 10



Stroke Prediction



Life Expectancy

Chapter 11

Details for predicting Stroke

Age of the patient
Hypertension (0:No and 1:Yes)
Heart Disease (0:No and 1:Yes)
Glucose level
BMI
Gender
Marital Status
Work Type
Residence Type
Smoking Status
Predict

Chapter 12

Nutrient Percentage for Crop Recommendation

Nitrogen Content eg. 50

Phorsporus Content eg. 50

Pottasium (K) eg. 40

Temperature eg. 25

Humidity Level eg. 70

pH value eg. 6

Rainfall eg. 100

Predict

Chapter 13

Details for predicting Life Expectancy

STATUS (Developing:0&Developed:1)

ADULT MORTALITY

ALCOHOL

EXPENDITURE

HEPATITIS B

MEASLES

BMI

UNDER 5 DEATHS

POLIO

TOTAL EXPENDITURE

DIPHThERIA

HIV/AIDS

GDP

POPULATION

Prevalence of thinness among children and adolescents

Prevalence of thinness among children

Income composition of resources

SCHOOLING

Predict

Chapter 14

Details for Fertilizer Prediction

Temperature eg. 30

Humidity eg. 60

Moisture eg. 40

Nitrogen eg. 20

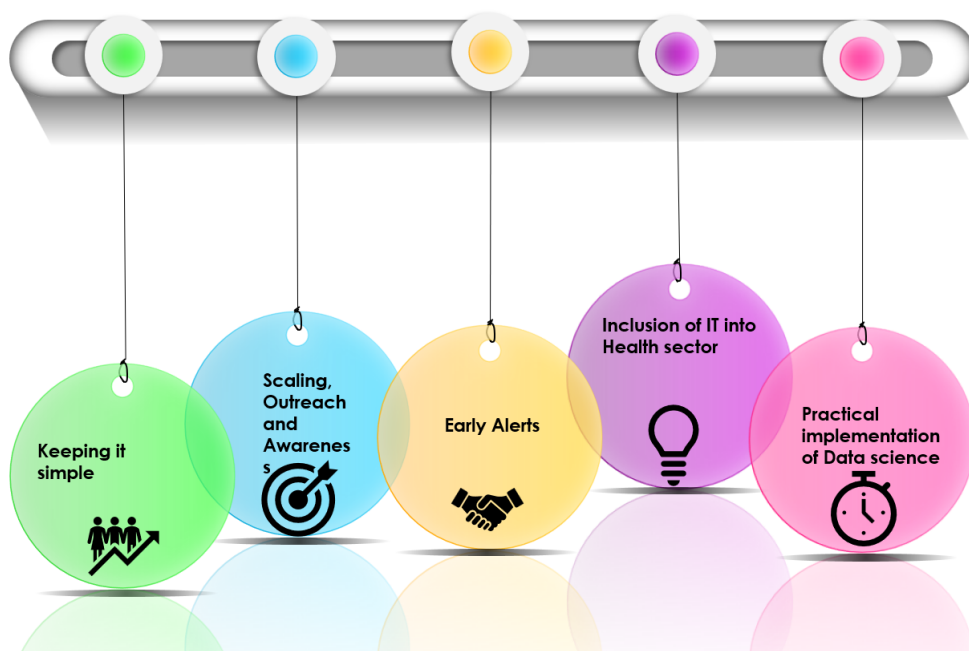
Phosphorous eg. 15

Select Soil Type

Select Crop Type

Predict

Conclusion and Future Work



As today government has started sampling the soil regularly every farmer has the data but they have no knowledge how to use that knowledge for crop production. Supplying the necessary nutrient through desired fertilizer to particular crop will further yield better results. So we plan to implant a website for real life use for better crop and farmer future.

Chapter 16

Also by addressing problems related to healthcare will improve the overall output and improve human resources. Stroke prediction and life expectancy model would help the workers in healthcare industry. In future it can be a regular thing as tech will progress and knowledge increases it can be a common thing and will with research the test and web tech can blend in for better results.

By introducing IoT in the model, we can fetch the real-time data and make the human error as low as possible. This can pave a path to Smart Farms in future. Along with that notifying the real-time weather data to farmers would make them alert. For healthcare part we can introduce possible precaution part which can acknowledge the patients.

Chapter 17

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