DEPARTMENT OF COMPUTER SCCIENCE AND ENGINEERING

CROP YIELD PREDICTION IN AGRICULTURE SECTOR
USING MACHINE LEARNING

CROP YIELD PREDICTION USING ML

Agenda

- Introduction
- Problem Statement
- Existing System
- Proposed System
- Literature Survey
- Methodology
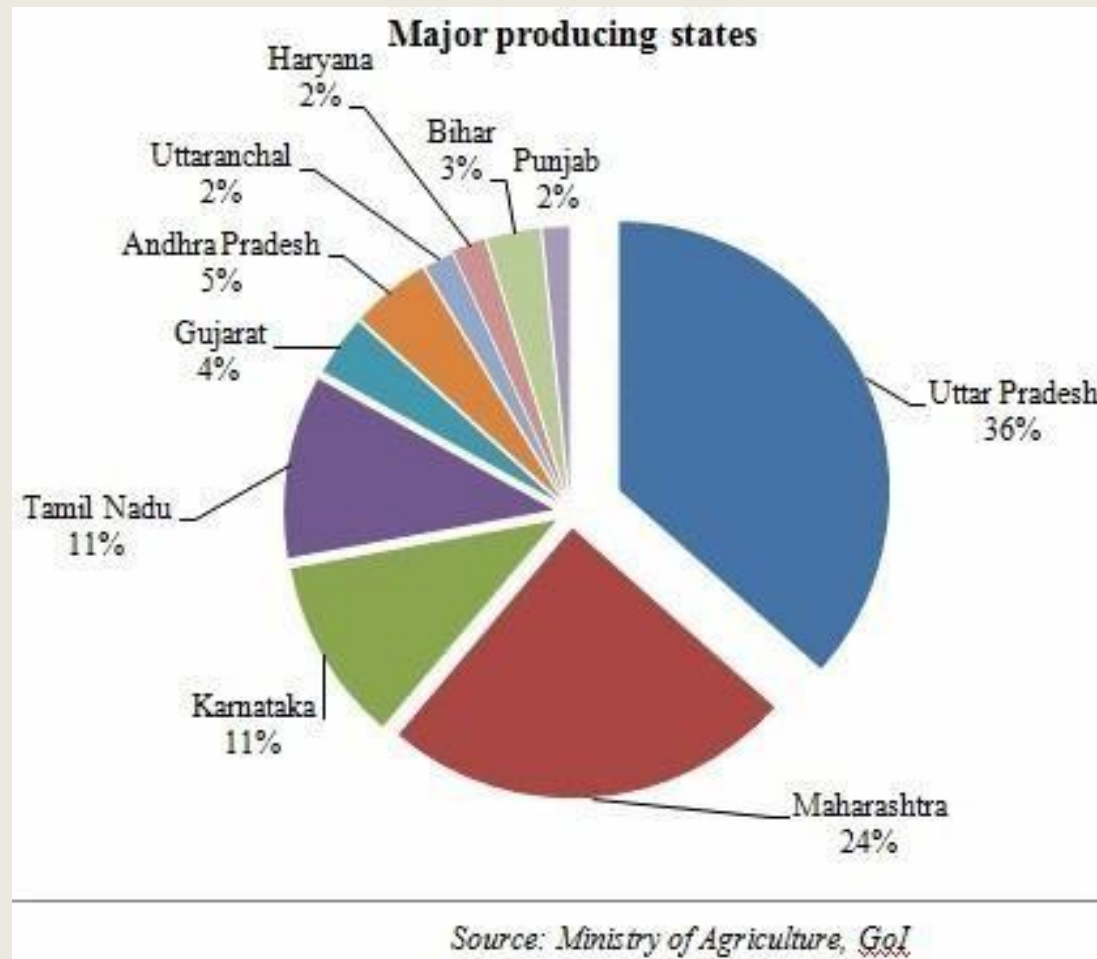- System Requirements
- Expected Outcome

Introduction

- India is an agriculture based country where most of the people derive their living from this sector. Agriculture is having a great impact on the country's economy.

- In the last decade India has seen serious natural calamities like drought or flood if not this then there may be sudden pest attack destroying the crop.

Major Crop Producing States

Major producing states

- Haryana 2%
- Uttaranchal 2%
- Andhra Pradesh 5%
- Gujarat 4%
- Tamil Nadu 11%
- Karnataka 11%
- Bihar 3%
- Punjab 2%
- Uttar Pradesh 36%
- Maharashtra 24%

Source: Ministry of Agriculture, GoI

Prediction of crop yield in advance can help the farmers and the Government bodies to plan for storage, selling, fixing minimum support price, importing /exporting etc.

System Architecture

System Architecture
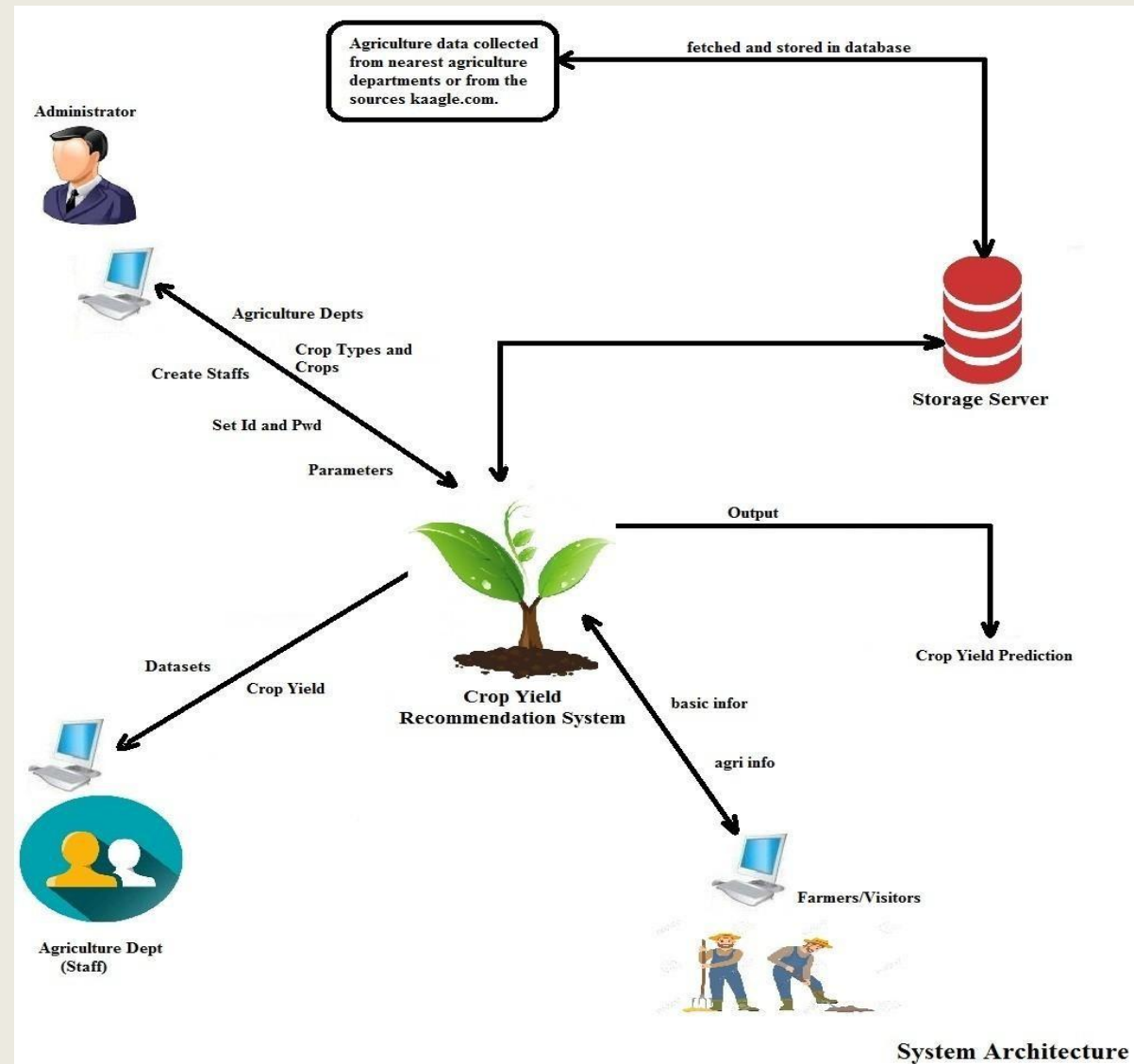
Problem Statement

- Crop yield prediction based on the effect of temperature, rainfall, humidity and other constraints is an essential factor to deal with storage of crops.

- Predicting the crop yield with high accuracy is one of the challenging task in the current agriculture sector.

Existing System

- Current system is manual where we compare the previous results with the present.

- There is no automation to predict the crop yield using the constraints temperature, rainfall, humidity, area and region.
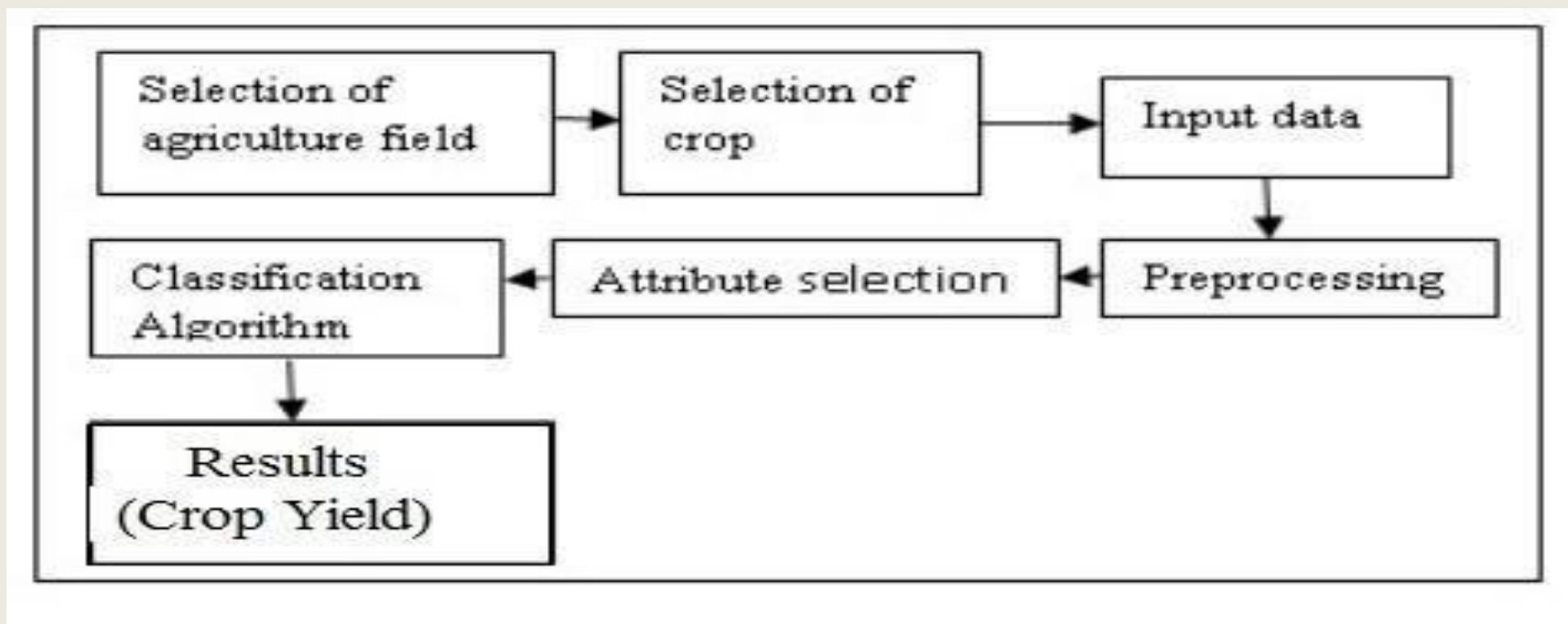
Limitations

- Manual Search
- Time Consuming
- Less Reliable
- Less Efficient
- Less User Satisfaction

Proposed System

Proposed system is an agriculture application which analyzes the previous data related to rainfall, temperature, humidity and crop yield.

Scope And Objectives

- System objective is to estimate or forecast the yield of crop.

- System meant for multiple regions.

- System makes use of data collected from agriculture department.

- Proposed system makes use of data science in agriculture for decision making.

- System uses "*Classification Rules*" technique - Naive Bayes Algorithm for crop yield prediction.

Literature Survey

| Authors	Methodology	Advantage	Limitation	Performance Metrics
Kumar et al [6]	SVM	The SVM method has implemented a cascade of two SVM classifiers for achieving the accuracy, specificity and precision metrics	The developed model was not given the proper extensive analysis of the defective outlines such as color, shapes and texture. Hence, it is failed to identify the infected surface on the defective patterns	Accuracy=97.77% Sensitivity=96.55% Precision =99.24%
Tiwari and Shukla [7]	CNN, Modified Convolutional Neural Network (MCNN)	The CNN model was developed which utilized spatial features as input and trained by backpropagation that reduced error of prediction as well.	The developed model reduced the relative error as well as decreased the prediction efficiency of crop yield.	MCNN RMSE value = 1396.4 Relative Error=9.8465
Shastry and Sanjay [13]	(H-ANN) Hybridized ANN,	The developed (H-ANN) was used to forecast agricultural data such as air temperature and crop yield estimation. IN H-ANN, the LN algorithm was used to train the ANN	The developed model was incapable of capturing the nonlinear bond between input and output variables.	RMSE=4.72
Gopal and Bhargavi [17]	ANN and Multiple Linear Regression (MLR).	The developed model is a combination of backpropagation algorithm with ANN to evaluate the exact crop yield.	The developed model showed difficulties in training the neural network model	MLR RMSE=9.8% MAE=6.9% R=89% ANN RMSE=5.1% MAE=6.4% R=99%
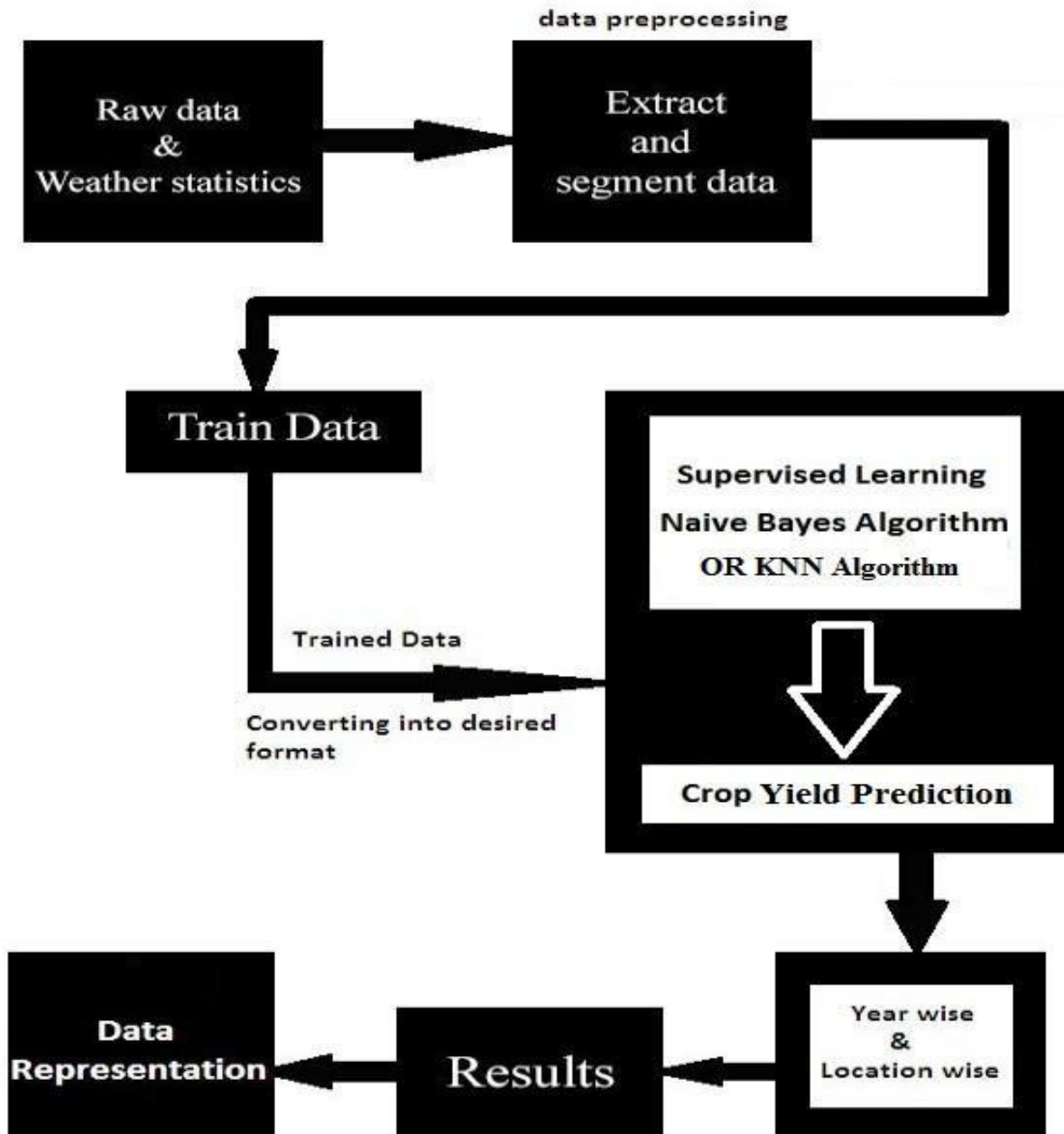
Methodology
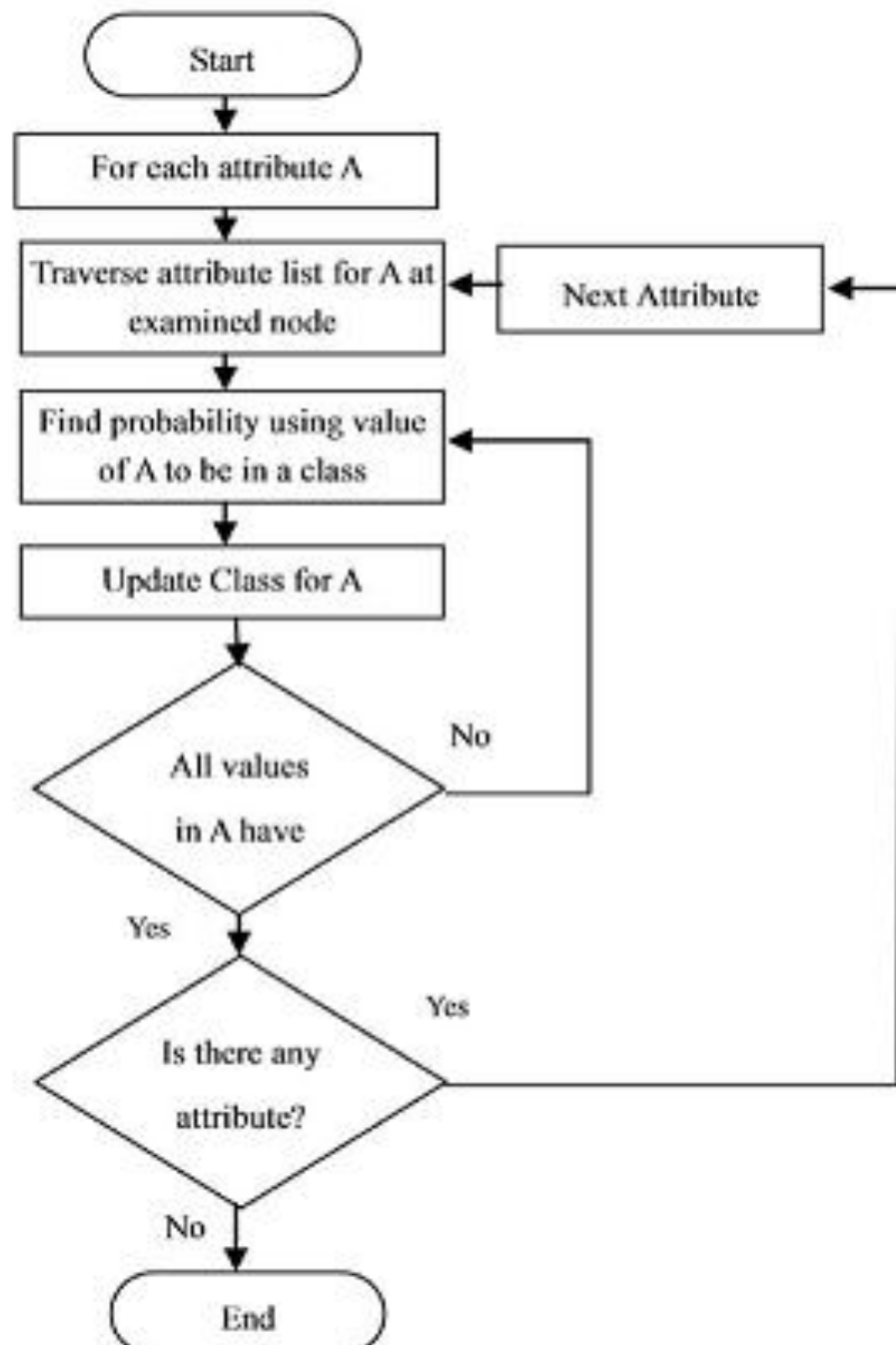
Naïve Bayes Algorithm

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$

Posterior — Likelihood — Prior — Normalizing constant

$$P(B) = \sum_{Y} P(B|A)P(A)$$

14

System Requirement

SOFTWARE REQUIREMENT

- IDE : **PyCharm**
- Programming Language : **Python**
- End : **DB-Lite**

HARDWARE REQUIREMENT

- RAM : **2GB+**
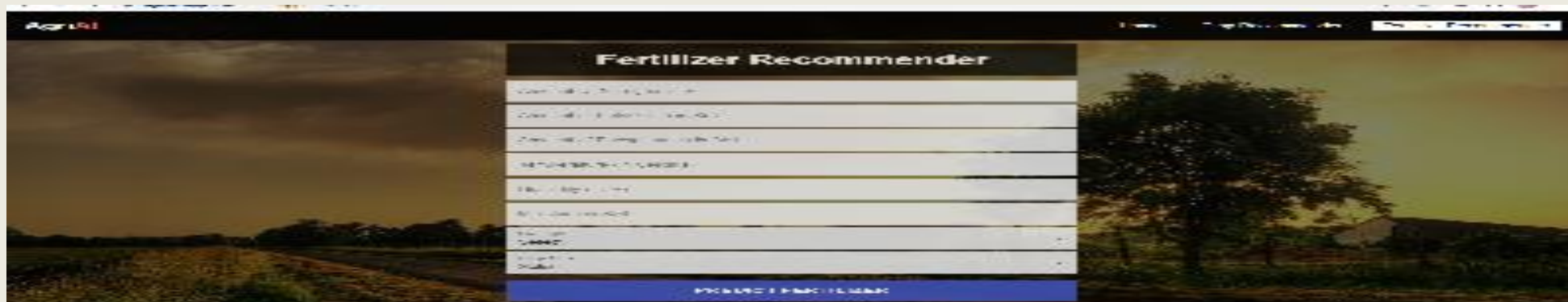- Processor : **Pentium 4+**
- Processor Speed : **2ghz+**

Expected Output

System uses different agriculture parameters for yield prediction, parameters such as temperature, rainfall, PH value, nitrogen, potassium, zinc, iron etc. Training datasets trained using ML algorithm "bayesian classifier" and crop yield for future will be predicted in tons.

Expected Output

Thank You