TRIBHUVAN UNIVERSITY

# Acknowledgement

# Abstract

Kishan Saathi is a web application project which is focused on supporting the farmers on three perspectives. First, the farmers will be able to sell their product directly into C2C market. Secondly, the farmers will be able to lend or rent the agriculture machinery from other farmers or can put their own machinery for rent in this web application. Also, the farmers will be able to buy seeds and fertilizers with the help of this application. The interesting part of this web application is that the farmer no longer has to wonder which seeds or fertilizers to buy anymore because with the help of this application farmers can provide the nutrient value of the soil and this app will tell you the suitable crops and show seed product recommendation to farmer. From where they can order suitable seed in one click. Also, if they are growing some crops already and are not getting good result, this application comes into aid to determine what the soil is lacking through nutrient value, moisture, humidity and temperature data of soil and recommend a suitable fertilizer or home remedy. We believe that with the help of this web application farmers will be able to maximize the yield and minimize the environmental impact.

This project is planned to develop with MERN Stack technology with TensorFlow JS for machine learning. Upon the successful implementation, Kishan Saathi App will transform traditional farming practices into data-driven, efficient and sustainable farming practice. The web application will facilitate data-driven decision-making by offering tools for monitoring crop health, soil conditions, weather patterns, and predictive analytics This project not only focuses on technological advancements but also emphasizes user accessibility and simplicity. Through intuitive interfaces and user-friendly design, the application aims to bridge the gap between technology and agriculture, catering to users with varying levels of technical expertise.

In conclusion, this project aims to create a powerful tool that address the challenges faced by farmers, and bring smart solution for maximizing production and profits.

# Table of Contents

[Acknowledgement i](#_Toc152778786)

[Abstract ii](#_Toc152778787)

[Contents iii](#_Toc152778788)

[List of Abbreviation iv](#_Toc152778789)

[Chapter 1: Introduction 1](#_Toc152778790)

[1.1 Background 1](#_Toc152778791)

[1.2 Problem Statement 1](#_Toc152778792)

[1.3 Objectives 2](#_Toc152778793)

[1.4 Scope and Application 2](#_Toc152778794)

# List of Abbreviation

1. C2C – Consumer to Consumer

# Chapter 1: Introduction

## Background

Agricultural sector has witness technological advancements enhancing productivity, efficiency and sustainability. However, there are several challenges particularly for small scale farmers who often face hurdles in marketing their produce, accessing quality seeds, fertilizer and adopting correct agriculture practices. To address these challenges, this proposed college project can be put into practice. This application is believed to be serve as perfect solution for farmers, facilitating online sales of their products while providing a platform for identifying suitable crops for their farm and order seeds with one click. Also provide digital solution for cure of those crops.

Agriculture sector is primary source of livelihood but there are inefficient distribution channels, limited access to markets and insufficient resources for adopting modern agricultural techniques. This project aims to bridge the gaps between farmers and modern technology by enabling them to reach wider markets, access necessary resources and implement precision agriculture methods that can significantly enhance their productivity and income.

By combining e-commerce functionalities with precision agriculture tools, this proposed web application is a powerful platform for fulfilling the specific needs of farmers. Through this innovative approach, the project aims to contribute to the overall modernization and sustainable development of the agricultural sector while improving the livelihoods of farmers and fostering economic growth in rural communities.

## Problem Definition

Agriculture sector face challenges that hinder the efficiency and prosperity of farmers, particularly those in small scale or in remote areas. One of the main problems is the limited accessibility for farmers to effective market their product and generate deserving profit. They are forced to sell their products to middlemen, supplier who will supply to wholesale who will distribute to retailer and finally reach to consumer. This raises the price of product because of involvement of middlemen. At one side, farmers are not getting deserving return and at other side consumer has to pay expensive figures. With aim of solving this problem an idea emerges to create a virtual market for farmer who can sell their product directly in C2C market.

Also, small scale farmers are unaware of maximizing their production with appropriate use of precise agriculture technique. We can implement a machine learning to train an AI which can predict the suitable seed and fertilizers to grow in the field by analysis of soil nutrients, temperature, moisture and humidity data. And recommend the suitable seeds and fertilizers to the farmers. Also cutting the effort to search the seeds and fertilizers, farmers can order these things online from the same app.

Another problem, this app aims to solve is machinery. There are very advance machineries to support agriculture but it is quite expensive to afford by an average farmer. To make it accessible to every farmer, those who own machineries can lend or put it into rent. It can be made possible with our application where numerous people can lend, borrow or rent the machineries in huge exposure of market.

## 1.3 Existing System

There are numerous researches that has addressed aforementioned problem. Different e-commerce platform has been developed in Nepal to sell farmers good online such as Krishi COOP Bazaar. Also, different machine learning model has been developed in for prediction. Different work such as Regularized Greedy Forest to see an appropriate crop sequence at a given time stamps. Other research used historical records of meteorological data as training set where model is trained to spot climate that are deterrent for the assembly of crops which efficiently predicts the yield of crops on the idea of monthly weather patterns.

## 1.4 Proposed System

Our proposed system implements both e-commerce functionalities and machine learning models for crop recommendation and soil analysis. We also believed that not only either soil nutrients or weather data should be taken consideration for training the model but all the appropriate parameters such as temperature, rainfall, geography and soil condition to predict crop suitability.

## 1.5 Objectives

* To build an efficient C2C e-commerce platform to empower farmers.
* To build platform where farmers can exchange the machineries and supplies.
* To build a robust model to provide correct and accurate prediction of crop sustainability in a particular place for a particular soil type and climatic condition and recommend the seeds of that crop to buy online.
* To provide fertilizer recommendation based on soil nutrients and order it online.

# Chapter 2: Literature Review

## Literature Survey

1. Low-cost IOT + ML design for smart farming with multiple application paper authors Fahad Kamraan Syed, Agniswar Paul, Ajay Kumar, Jaideep Cherukuri in proposed system for water management systems and improve current irrigation methods. An IoT and ML based farming system always keeps farmers aware of the upcoming weather possibilities and gives them the best suggestions about irrigation methods and crops thereby helping in better yield.
2. In paper [2] authors proposed a smart system that can assist farmers in crop management by considering sensed parameters (temperature, humidity) and other parameters (soil type, location of farm, rainfall) that predicts the most suitable crop to grow in that environment.
3. Reference Paper [3] determines real time sampling of soil properties using MODIFIED SUPPORT VECTOR REGRESSION, a popular machine learning algorithm and four modules. The Modules include Sensor interfaced to IoT device, Agri cloud, Analyzing the real time sensor data and Agri user interface (AUI). The first module is portable IoT device (NodeMCU) with soil moisture sensor and pH sensor, environmental sensors. Agri cloud module consists of storage. Analyzing the real time data module is processing of types of crops and small plants suggested using modified support vector machine algorithm. Agri-user interface is a basic web interface. Thus, with the help of soil properties farmer will be able to get types of crops and small plants is grown in farmland with help of Modified support vector machine algorithm.
4. In paper [4] author’s proposed new technologies include the use of Internet of Things (IOT) and Machine Learning. The real time data from the field area can be collected using IOT system. The collected data from the field area is fed to the trained model. The trained model then makes the predictions using the data. The result produced by the model greatly helps is sowing the suitable crops in the particular field area.
5. In Reference paper [5] determines a model is proposed for predicting the soil type and suggest a suitable crop that can be cultivated in that soil. The model has been tested using various machine learning algorithms such as KNN, SVM and logistic regression. The accuracy of the present model is maximum than the existing models.
6. Aruul Mozhi Varman S proposed an IOT and deep learning based smart agriculture systems. This system monitors and collects the soil parameters from the field with the help of a wireless sensor network. The collected data is then uploaded in the cloud. Finally, the systems suggest best irrigation practices to the farmers by predicting the crop to be sown for next crop rotation. This information will be sent as an SMS to the farmers. The parameters include soil temperature, atmospheric temperature, and humidity [6]. This system suggests further improving the effectiveness by predicting the suitable time for applying pesticides, fertilizer, and manures.
7. In paper [7] proposed a system would assist the farmers in making an informed decision about which crop to grow depending on a variety of environmental and geographical factors. The ML and IoT based suggestions will significantly educate the farmer and help them minimize costs and make strategic decisions by replacing intuition and passed-down knowledge with far more reliable data-driven ML models. This allows for a scalable, reliable solution to an important problem affecting hundreds of millions of people.

# Plan Of Implementation

# References

[1] 2019, 10th International Conference on Computing, Communication and Networking Technologies, “Low-cost IOT+ML design for smart farming with multiple applications”, Fahad Kamraan Syed, Agniswar Paul, Ajay Kumar, Jaideep Cherukuri.

[2] 2019 IEEE “Smart Management of Crop Cultivation using IoT and Machine Learning” Archana Gupta, Dharmil Nagda, Pratiksha Nikhare, Atharva Sandbhor

[3] Radhika, Narendiran, “Kind of Crops and Small Plants Prediction using IoT with Machine Learning,” International Journal of Computer & Mathematical Sciences, 2018.

[4] “Crop Recommendation on Analyzing Soil Using Machine Learning” Anguraj.Ka, Thiyaneswaran.Bb, Megashree.Gc, Preetha Shri.J.Gd, Navya.Se, Jayanthi. Jf, 2020.

[5] “Classification of Soil and Crop Suggestion using Machine Learning Techniques”, A. Mythili , IEEE 2019.

[6] Mehta, P., Shah, H., Kori, V., Vikani, V., Shukla, S., & Shenoy, M.,2018. “Survey of unsupervised machine learning algorithms on precision agricultural data”, IEEE

[7] “IOT based Crop Recommendation, Crop Disease Prediction and Its Solution” Rani Holambe, Pooja Patil, Padmaja Pawar, Saurabh Salunkhe , Mr. Hrushikesh Joshi, 2019 IRJET