International Journal for Research in Engineering Application & Management (IJREAM)
ISSN : 2454-9150 Vol-09, Issue-11, Feb 2024

Farm pro

M.Suguna[1],

Assistant Professor - Department of Computer Science and Engineering, SNS College of Engineering(Autonomous), Coimbatore, India. suguna.m.cse@snsce.ac.in

Ganesh Ram V [2], Kaviyarasi R[3], Rakshita R[4], Semmozhi Jayam G[5], Sheerin Farjana M[6]

UG Scholars - Department of Computer Science and Engineering, SNS College of Engineering(Autonomous), Coimbatore, India. miniram2705@gmail.com, kaviyadharanya2705@gmail.com, rrakshita40@gmail.com, semmo1207@gmail.com, imsheerin15@gmail.com

Abstract **For small-scale farmers, problems with plant diseases, insect infestations, soil fertility, water management, and weather patterns can reduce crop production and profitability. Particularly in isolated locations, there is limited access to knowledge and skills. We suggest an online application that links farmers with agricultural professionals, such as agronomists and entomologists, in order to solve this. The platform encourages knowledge sharing and addresses several agricultural problems. Enhancing agricultural practices, output, and sustainability is the aim in order to provide food security and economic success. Deep learning is used in our study to categorize soil textures and improve crop management. Convolutional Neural Networks examine photos of soil and identify various soil kinds. In order to improve the dataset, we employed image augmentation. We examined Baseline, Augment, Dropout, and Padding as four CNN models. Farmers may now make better judgments and increase crop yields thanks to this study. Our site offers an AI-powered soil texture prediction tool and a farmer's discussion forum, fusing conventional knowledge with cutting-edge technology. This development might increase agricultural yields, save resources, and advance sustainable farming. Farmex connects the past of agriculture with its bright future by providing farmers with information, tools, and community support.**

Keywords - ***artificial intelligence (AI), convolutional neural networks (CNNs), recurrent neural networks (RNNs), generative adversarial networks (GANs).***

I. INTRODUCTION

Farming is a critical sector that sustains human life by providing food, fiber, and other essential commodities. However, farmers face numerous challenges in the form of pests, diseases, and unpredictable weather patterns that can impact crop yield and quality. Timely interventions are crucial in mitigating these challenges, but farmers often lack access to expert advice, particularly in remote or rural areas. In recent years, several initiatives have been taken to leverage technology to improve farming practices and support farmers. One such initiative is the development of web-based applications that allow farmers to connect with experts and seek advice on their farming-related queries. This project aims to contribute to this effort by developing a user-friendly web application that meets the needs of both farmers and experts. For plantation and agricultural decision-making, soil texture is crucial. The soil type can be identified using a variety of techniques, including technology, expertise, and traditional methods. Farmers and professionals must figure out the type and texture of the soil. For an assessment of the soil texture, professionals occasionally need to travel to the geographical area. The primary issue here is its reliance on human understanding of soil texture. The soil texture varies from place to place and is influenced by a number of factors, including temperature, humidity, pH, rainfall, and others. This project aims to develop a web application that allows farmers to post their queries related to their crops or any

plant-related doubts. The experts who are registered on the website can view these queries and provide solutions to them. The goal of this application is to provide a platform for farmers to connect with experts and get timely advice, thereby increasing crop productivity and minimizing losses. This project aims to bridge the gap between farmers and experts which focuses on enhancing the communication between farmers and experts, enabling them to share

 DOI : 10.35291/2454-9150.2024.0043

information, knowledge and experiences to improve agricultural practices

II LITERATURE SURVEY

[1] In the area of image processing, the application of artificial intelligence (AI) and machine learning (ML) is helpful for identifying and detecting different soil types. The primary goal of the current study is to reliably categorize soil photographs using pre-trained weights from the Tensor flow and Keras Deep Learning (DL) frameworks. Several ML models have previously been put into practice for the categorization of soil image. 903 photos of soil from four different types—alluvial, black, clay, and red—are included in a dataset. A training dataset and a validation dataset were created from these photos. The dataset was subjected to the image augmentation procedure, and the models were trained using these enhanced pictures.

[2] In India, agriculture plays a significant role in the economy. Indian farmers now struggle with poor income owing to a lack of knowledge about government programmes, fertilizers, agricultural tools, etc. Because they reside in rural places and lack access to knowledge regarding soil characteristics, seeds, recently used equipment, fertilizers, etc., some smallholders and marginalized farmers have poor awareness. The paper suggests an intelligent, portable system that makes use of natural language processing techniques to assist farmers in implementing various agricultural techniques. It also suggests helping them by employing chatbots to answer questions and resolve basic and intermediate level problems, which will save them time.

[3] India's economy and jobs are mostly based on agriculture. The most prevalent issue facing Indian farmers today is that they consistently select the wrong crop for their location and past yields. They thus experience a severe decline in output. The government hasn't used agricultural statistics and forecasts to their full potential, despite how crucial they are. The article suggests an intelligent, portable system that uses data mining and analytics to aid farmers with various agricultural methods and help them choose the best crops based on the local climate, soil, and geographic factors. There isn't a single resource available to farmers that can answer all of their questions about seeds, fertilizers, market pricing, storage options, government programmes, etc.

[4] 54.6% of Indians are farmers, however they only contribute 13.9% to the country's GDP. By enhancing farmers' access to knowledge and professional assistance (for instance, understanding which seeds to sow and how to handle pests may dramatically effect production), this egregious mismatch can be reduced. In this paper, we share our knowledge gained by creating FarmChat, a conversational bot that provides information to farmers in rural India. In order to evaluate the system's usability, the acceptance of the information supplied, and the user population's particular preferences, requirements, and difficulties utilising the technology, we performed an evaluation study with 34 farmers close to Ranchi in India. We conducted a comparison research using audio-only and audio+text as the two alternative modes.

[5] To detect and identify the different types of soil, artificial intelligence (AI) and machine learning (ML) are used in the image processing sector. employing pre-trained weights from the Tensor flow and Keras Deep Learning (DL) frameworks, to analyze the soil image data and effectively identify it.

II EXISTING SYSTEM

The existing system relies heavily on manual processes and lacks integration of advanced technologies for efficient query handling and soil analysis. There is a need for a more streamlined and technologically advanced solution to address the challenges faced by farmers in accessing timely and accurate information for agricultural decision-making.

Manual Query Posting: In the existing system, farmers manually post their queries on online forums or social media platforms dedicated to agriculture. This process involves typing out the queries, which can be time-consuming and challenging for those who are not comfortable with typing.

Manual Response from Experts: Agricultural experts or fellow farmers manually respond to these queries based on their knowledge and experience. There is no automated system in place to analyze the queries or provide accurate predictions.

Limited Access to Information Farmers rely on scattered sources of information such as agricultural publications, local news, or word-of-mouth for updates on farming practices, news, and developments in their locality.

Manual Soil Texture Analysis: Soil texture analysis is primarily done through traditional methods such as visual inspection and manual testing kits. There is no automated system for accurately predicting soil texture based on images.

Lack of Structured Data: The existing system lacks a centralized database of soil images and their corresponding texture classifications, making it difficult to leverage advanced technologies like Convolutional Neural Networks for automated soil texture recognition.

User Interface Constraints: The user interface of existing platforms may not be optimized for ease of use and navigation, making it challenging for farmers to quickly find relevant information or post queries efficiently.

 DOI : 10.35291/2454-9150.2024.0043

III. PROPOSED SYSTEM

This working model visually appeals landing page that clearly communicates the website's goal is a feature of the web application. The main page provides a navigation menu with 21 connections to various website components, such as the forum page, news section, and user profiles. The landing website also contains a search box where users can look for agricultural-related queries and answers. This tool enables users to navigate the website and get the information they require quickly and conveniently.

A login/register page in the web application allows users to create accounts and log in to the website. Input forms on the page contain the user's name, email address, password, and other pertinent information. The web application includes a forum area where users can post agricultural-related inquiries and responses.

The website offers a form for people to submit their inquiries, which can include photographs if necessary. The forum page also includes a list of recent questions and replies, arranged by the number of upvoters. This feature allows users to exchange information and share their knowledge, forming a community of farmers and agriculturalists who can help each other address agricultural difficulties. The web application includes a news page where visitors can browse the most recent news about Indian agriculture.

The web application includes the AI feature for soil texture prediction is a pivotal element, providing users with valuable insights and recommendations for their farming endeavors. By incorporating the the DL model which uses CNN algorithm, the website enhances its soil texture prediction capabilities, providing users with a robust and efficient tool for making informed decisions in agriculture.

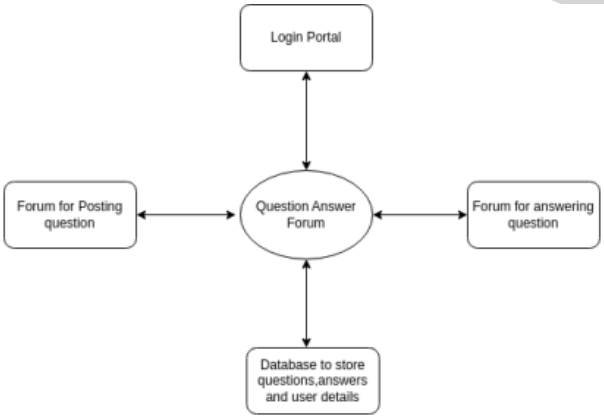

Fig 1: Proposed idea

IV ARCHITECTURE

The process of developing an agricultural web application involves several pivotal stages to ensure its functionality and usability. Firstly, it begins with the design of a visually appealing landing page, which serves as the initial point of interaction for users. This landing page must effectively communicate the website's purpose, while also providing intuitive navigation menu connections to various components such as the forum page, news section, and user profiles. Additionally, including a search box dedicated to agricultural-related queries enhances user convenience and facilitates quick information retrieval.

Moving forward, the implementation of a login/register page becomes essential to enable users to create accounts and access the web application's features. This involves the creation of input forms where users can provide necessary information such as their name, email address, and password. Furthermore, integrating a submit button finalizes the account creation and login process, ensuring a seamless user experience.

Subsequently, the integration of a forum area within the web application allows users to engage in discussions, post inquiries, and share insights related to agriculture. Providing a user-friendly form for submitting inquiries, along with options to attach photographs if necessary, enhances the functionality of the forum. Moreover, displaying recent questions and replies sorted by upvotes promotes user engagement and facilitates knowledge sharing within the agricultural community.Another integral component of the agricultural web application is the integration of a news page, which features the most recent news and developments in Indian agriculture. This page serves to keep users informed about industry trends, innovations, and policy changes, thereby supporting informed decision-making in farming practices.

Lastly, implementing an AI soil texture prediction feature utilizing a Deep Learning (DL) model with a Convolutional Neural Network (CNN) algorithm enhances the application's analytical capabilities. This feature provides users with valuable insights and recommendations for their farming endeavors, leveraging CNN's proficiency in image processing and geospatial data analysis to deliver accurate predictions and tailored recommendations. Through these carefully orchestrated steps, developers can create a comprehensive agricultural web application that meets the needs of users and fosters knowledge exchange within the agricultural community.

V.DISCUSSION

1. AgriTech Insights: Soil & Disease Prediction Challenges

This forum could focus on providing insights into the latest agricultural technologies (AgriTech) relevant to soil and disease prediction. It may host discussions, webinars, and expert panels to address challenges in predicting soil quality and managing plant diseases. Members could share

 DOI : 10.35291/2454-9150.2024.0043

their experiences, research findings, and innovative solutions.

manipulated or synthetic media content known as "deep fakes, The primary function of a deep fake AI detector is to analyze various forms of digital media to discern any signs of manipulation. These detectors employ sophisticated algorithms, machine learning models, and pattern recognition

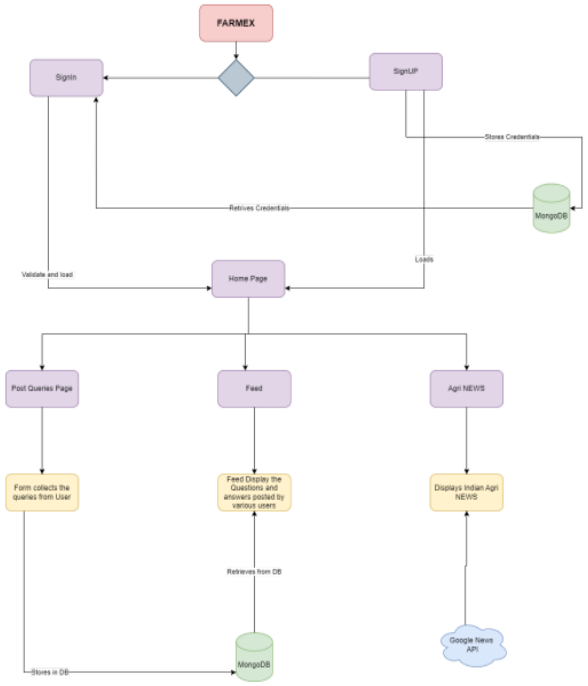

Fig 2 : Proposed idea OUTPUT representation

2.Sustainable Farming Solutions: Overcoming Soil & Disease Challenges

This forum might emphasize sustainable farming practices and solutions for overcoming challenges related to soil quality and plant diseases. It could feature discussions on organic farming, integrated pest management, and regenerative agriculture techniques. Additionally, it might offer resources and case studies showcasing successful strategies for sustainable soil and disease management.

3.Precision Ag Forum: Advancements in Soil & Disease Prediction

The Precision Ag Forum could focus on advancements in precision agriculture technologies for soil and disease prediction. It might explore topics such as satellite imaging, drones, and sensor-based monitoring systems. The forum could also provide guidance on adopting precision agriculture practices to optimize resource use and minimize environmental impact.

4.Farming Innovations Hub: Tackling Soil & Disease Challenge

This forum could serve as a hub for discussing innovative farming technologies and strategies for addressing soil and disease challenges. It may highlight emerging trends in agricultural innovation, such as AI-driven decision support systems, block chain technology for supply chain management, and biotechnology solutions for disease resistance. Members could exchange ideas and collaborate on pilot projects to test new innovations in real-world farming contexts.

5.Crop Health Network: Solutions for Soil & Plant Disease Prediction

The Crop Health Network might focus on building a community of farmers, researchers, and agricultural experts dedicated to improving crop health through effective soil and disease prediction methods. It could offer networking opportunities, educational resources, and diagnostic tools for identifying and managing plant diseases. Additionally, the forum could facilitate collaboration on research projects aimed at developing sustainable solutions for crop health management.

6.AgriData Exchange: Discussions on Soil & Disease Prediction Technologies

This forum could facilitate the exchange of agricultural data and information related to soil quality and plant diseases. It might provide a platform for sharing datasets, research findings, and predictive models for soil and disease prediction. Members could engage in discussions on data management, analysis techniques, and data-driven decision-making strategies for improving agricultural productivity and sustainability.

7.Grower's Knowledge Base: Addressing Soil & Disease Challenges

The Grower's Knowledge Base could serve as an educational resource hub for growers seeking information and guidance on soil and disease management. It might offer educational materials, tutorials, and best practice guides for diagnosing and treating common soil and plant diseases. Additionally, the forum could feature expert Q&A sessions, case studies, and success stories from experienced growers

V. CONCLUSION

The suggested online application for a farmers and agriculturalists forum holds substantial promise in providing valuable resources and support to its users. By incorporating capabilities for plant disease prediction and weather reports, this innovative tool can significantly enhance the agricultural sector, contributing to improved crop management techniques, increased agricultural yields, and greater food security. One of the standout features of this application is its plant disease prediction functionality. Through the utilization of machine learning algorithms and

 DOI : 10.35291/2454-9150.2024.0043

data gathered from sensors or photos, the tool effectively predicts and diagnoses plant illnesses. This empowers farmers to take prompt preventive action, thereby mitigating The integration of additional data sources, such as data from soil sensors and satellite photography, could further enhance the precision of these disease predictions, making them even more effective in safeguarding crops.

REFERENCES

[1] Sawant D, Jaiswal A, Singh J, Shah P. AgriBot-An intelligent interactive interface to assist farmers in agricultural activities. In2019 IEEE Bombay section signature conference (IBSSC) 2019 Jul 26 (pp. 1-6). IEEE.

[2] Agustiono, Wahyudi. "DESIGNING AN ENVIRONMENTAL INFORMATION MANAGEMENT SYSTEM (EIMS): THE CASE OF WEB MAPPING PORTAL FOR FARMERS." Jurnal Ilmiah Kursor 7.4 (2014).

[3] Pentek, Adam, and Tünde RÓZSA. "Dynamic Web portal solution for farmers." Local Organizers: 174.

[4] Lanjewar, Madhusudan G., and O. L. Gurav. "Convolutional Neural Networks based classifications of soil images." Multimedia Tools and Applications 81, no. 7 (2022): 10313-10336.

[5] Tegegne, Asnakew Mulualem. "Applications of convolutional neural network for classification of land cover and groundwater potentiality zones." Journal of Engineering 2022 (2022): 1-8.

[6] Tegegne, A.M., 2022. Applications of convolutional neural network for classification of land cover and groundwater potentiality zones. Journal of Engineering, 2022, pp.1-8

[7] Agustiono, Wahyudi. "DESIGNING AN ENVIRONMENTAL INFORMATION MANAGEMENT SYSTEM (EIMS): THE CASE OF WEB MAPPING PORTAL FOR FARMERS." Jurnal Ilmiah Kursor 7.4 (2014).

[8] Muksin, U., Riana, E., Rudiyanto, A., Bauer, K., Simanjuntak, A.V.H. and Weber, M., 2023. Neural network-based classification of rock properties and seismic vulnerability. Global Journal of Environmental Science and Management, 9(1), pp.15-30.

[9] Muksin, U., Riana, E., Rudiyanto, A., Bauer, K., Simanjuntak, A.V.H. and Weber, M., 2023. Neural network-based classification of rock properties and seismic vulnerability. Global Journal of Environmental Science and Management, 9(1), pp.15-30.

 DOI : 10.35291/2454-9150.2024.0043