International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 07 | July - 2023 SJIF Rating: 8.176 ISSN: 2582-3930

DIGITAL FARMING APP

Sunil Kumar H S[1], Dr. Madhu H K[2]

[1]Master of Computer Applications, Bangalore Institute of Technology.
[2] Associate Professor, Department of Master of Computer Applications, Bangalore Institute of Technology

---

Abstract - The Digital Farming App is an innovative and comprehensive platform aimed at transforming the agricultural sector by seamlessly integrating essential models such as soil testing, fertilizer price tracking, and seasonal agriculture product price lists. This paper presents a thorough analysis of the app's functionalities, with a focus on empowering farmers and facilitating smooth interactions between farmers, companies, and buyers. The soil testing model within the app provides farmers with invaluable insights into their soil's health and nutrient content. By utilizing advanced data analytics and AI algorithms, the app offers personalized recommendations for optimal fertilization practices, leading to improved crop yield and sustainable farming practices. Furthermore, the Digital Farming App incorporates real-time updates on fertilizer prices, enabling farmers to make well-informed decisions and reduce production costs. This feature not only enhances cost-efficiency but also promotes responsible resource management in agriculture. The app's sessional-wise agriculture product price list empowers farmers with accurate market information for different crops throughout the year. Armed with this knowledge, farmers can strategically plan their cultivation and marketing activities, maximizing profits and minimizing losses. The central aspect of the app's mission is its digital platform, which facilitates direct and transparent interactions between farmers, buyers, and companies. By eliminating intermediaries, the app ensures fair price negotiations, benefiting both sellers and buyers. This democratization of the market guarantees that farmers receive just compensation for their hard work, ultimately improving their standard of living.

***Key Words*:** Digital Farming, cost-efficiency, democratization, transparent interactions, fertilization

1.INTRODUCTION

The contribution of agriculture to the national income is a significant indicator of economic development. It plays a crucial role in ensuring food security and providing raw materials for various industries. Therefore, the prosperity of our country relies on agricultural development. To support farmers and improve their standard of living, the Digital Farming App has been developed. This web application enables farmers to engage in agricultural marketing successfully. The app offers a marketing facility that provides farmers with visibility into their bills and related account information. Farmers can access market-wise reports interactively, helping them make informed decisions about commodities. The Digital Farming App targets both farmers and businesses interested in buying agricultural products.

The application is designed to assist village farmers who seek these facilities and wish to explore the possibilities of using the platform for selling their products. Farmers with computer or mobile knowledge can directly register on the site and start marketing their commodities. For those lacking such knowledge, the company's computer professionals are available to provide training on computer basics and internet usage. This training enables farmers to register on the platform and conduct business with consumers and companies online.

The Digital Farming App project serves as an open roadmap for marketing and selling products to various clients and companies through online channels.

2. RELATED WORK

In recent years, there has been a growing interest in the development of digital platforms and applications to improve agricultural practices and enhance farmers' livelihoods. Several studies have explored the integration of technology in agriculture to address various challenges faced by farmers. One area of related work is the application of soil testing models in agriculture. Researchers have investigated the use of data analytics and artificial intelligence algorithms to analyse soil health and nutrient content. These studies have demonstrated the potential of personalized recommendations for fertilization practices, leading to increased crop yields and more sustainable farming methods. Additionally, previous research has focused on monitoring and tracking fertilizer prices in real-time. By providing farmers with up-to-date information on fertilizer costs, these studies aim to empower farmers to make informed decisions and optimize their production expenses.

Seasonal agriculture product price lists have also been explored in the literature. Various researchers have examined methods to provide farmers with market information on different crops throughout the year. Such data enable farmers to strategically plan their

cultivation and marketing activities to maximize profits and minimize losses. Moreover, digital marketplaces in agriculture have garnered attention as a means to connect farmers directly with buyers and companies. Studies have investigated the advantages of eliminating intermediaries, ensuring fair price negotiations, and increasing farmers' access to markets. These efforts aim to enhance farmers' income and improve their overall standard of living. While individual studies have explored specific aspects of digital agriculture, the Digital Farming App presents a holistic approach by integrating soil testing, fertilizer price tracking, sessional-wise agriculture product price lists, and a digital marketplace. This comprehensive platform aims to address multiple challenges faced by farmers, empowering them with accurate data, efficient marketing tools, and enhanced market access.

RICCARDO BERTOGLIO et al. (2021) [1]: "This study utilized me by bibliometric analysis tools to explore the ongoing Digital Agricultural Revolution (DAR) and its potential to enhance sustainable farming practices in response to climate change. Through an analysis of 4995 articles, five key research streams were identified, including Climate-Smart Agriculture, Site-Specific Management, Remote Sensing, Internet of Things, and Artificial Intelligence. The study conducted on this paper highlights the significant contributions of digital technologies in agriculture and presents emerging topics, paving the way for further advancements in the field."

Suresh Neethirajan (2021) [2]: "This paper has given research paper information on the integration of Artificial Intelligence (AI), Machine Learning (ML), and digital twin technology presents a promising frontier in advancing precision livestock farming practices. By continuously monitoring animal behaviour and environmental factors, digital twins offer potential improvements in disease control, farm efficiency, and animal well-being. However, successful implementation will require careful cost-benefit analysis, with the ultimate goal of revolutionizing animal husbandry for a more sustainable and efficient future."

Elisabeth Simelton (2021) [3]: "I have come to know that while digital climate services show potential in supporting agricultural decisions and advancing the fourth agricultural revolution by going through this document, this study highlights significant gaps in their consideration of social and environmental aspects. The limited engagement with local farmers, lack of integration into mixed farming systems, and insufficient collaboration with public agencies underscore the need for more inclusive and sustainable app development. Addressing these issues can aid Southeast Asian smallholder farming systems in achieving their climate and sustainability goals, emphasizing the importance of transparency and standardized protocols for assessing and comparing digital climate services."

Sijin Liu (2021) [4]: "This paper gives content on the integration of digital agricultural technology into the traditional farm economic form proves to be a crucial factor in supporting and enhancing farm economic development. This paper's analysis sheds light on the significance of digital construction in the agricultural system, offering valuable insights for future research and relevant endeavours."

Kamaruddin Hasan et al. (2022) [5]: "This study emphasizes the significance of digital farming and smart farming in the agricultural sector and highlights the potential role of agricultural students and millennials as early adopters of digital technology. The increasing interest of young people in agriculture provides an opportunity to enhance digital-based agricultural practices, but challenges remain, particularly in addressing the digital literacy gap among older farmers. Integrating digital skills into agricultural extension programs and promoting understanding of modern agricultural practices can pave the way for a sustainable and efficient agricultural system in Indonesia."

Vidyasagar Yashvardhan et al. (2022) [6]: "This document paper elaborated on the advancement of technological and digital innovations in agricultural practices is crucial for India's agricultural sector to meet the increasing food demand and boost the economy. By leveraging technologies such as Sensing, Geoinformatics, mobile applications, data analytics, and AI, farmers can access valuable information to enhance crop management, reduce losses, and optimize marketing strategies. This review paper provides a comprehensive overview of various digital technologies and their applications in agriculture, empowering readers with a hi-tech understanding of the subject matter"

Burak Ozdogan et al. (2017) [7]: "The study on this paper highlights the concept of digital agriculture practices and their potential impact on agricultural productivity in Turkey, considering the challenges posed by increasing population and climate changes. The evaluation of two digital agriculture companies, Doktar Inc. and Tarla.io, reveals that digital agriculture applications are still in the early development stage in the country. However, these companies have made significant progress in raising awareness among farmers and other stakeholders in the agriculture sector."

Nathan D. DeLay et al. (2022) [8]: "This paper study focused on the rise of precision farming technologies has led to an increase in farming data, offering opportunities to enhance farm profitability and decision-making. However, the lack of clear property rights over farmland and farm data hinders the full realization of its value. By examining farm data through a property rights and transaction costs lens, this study proposes a conceptual framework for farm data valuation, emphasizing the importance of establishing property rights within farmland leases."

Md Nazirul Islam Sarker et al. (2020) [9]: "This paper study highlights the potential of big data technologies in digital farming, offering various benefits at the field level, including weather forecasting, crop management, yield prediction, and agricultural decision-making. However, the current adoption of agricultural big data technologies remains low, mainly due to the need for increased investment in infrastructure, farmer technological knowledge, and expert support. To ensure successful implementation, a collaborative effort involving government initiatives, private sector involvement, and public-private partnerships is essential to provide necessary facilities and expertise to farmers, enabling them to harness the full potential of big data technologies for increasing agricultural production and efficiency."

Sindhu M R et al. (2012) [12]: "The study on this paper gives elaborate information on the farming sector in India faces significant challenges, with many farmers belonging to lower socioeconomic classes and experiencing deep poverty. The lack of awareness and access to advanced farming techniques and automated machinery, along with exploitation by agents, contribute to these issues. Agro-marketing and E-farming offer potential solutions by automating processes, providing farmers with market information, access to new techniques, and centralized information on government schemes, ultimately empowering them to improve their livelihoods and overcome poverty."

3. METHODOLOGY

I conducted a realistic analysis of the challenges faced by both large-scale and small-scale farmers in the past decade. By directly engaging with them, I identified key issues that occur throughout the cultivation cycle, from soil preparation to crop storage. In response to these challenges, I decided to develop a user-friendly application to assist farmers in their agricultural activities independently, without relying on third-party assistance. The application will also feature a section dedicated to business buyers, allowing them to purchase agricultural products seamlessly.

Having immersed myself in agriculture research over the past year, I gained valuable insights that served as the foundation for this application's development. As a comprehensive platform, it offers solutions to the problems encountered during the cultivation cycle, ranging from crop selection to selling the harvest.

The application is structured into three main sections:

I. Crop Listing: This section displays previously grown agricultural products and their yields for each season. By accessing this information, farmers can make informed decisions about which crops to cultivate for profitability.

II. Soil Testing and Fertilizer Ratings: Farmers benefit from the soil testing process as they can access the results through the application. Additionally, they can explore a list of fertilizers prices with good reviews to ensure optimal crop growth. Farmers also have the option to provide reviews for the fertilizers they have used.

III. Selling and Buying: This section simplifies the process of selling products for farmers and buying products for merchants. Farmers can quote their prices based on product grades and decide whom to sell their products to. Merchants, on the other hand, can choose from a list of farmers who meet their requirements for purchasing products.

The application I have developed addresses the practical challenges faced by farmers in the cultivation cycle. By offering features such as crop listing, soil testing, and seamless selling and buying, it provides an effective platform to support farmers and promote better agricultural practices.

4. EXPERIMENTAL RESULTS

The below explanation with the figures will give understand on the application that I have developed to overcome the above promises faced by farmers.

Digital Farming Application is having four module as important operations performed:

- Soil Testing Module
- Farmers Trading Module and Buyers Trading Module
- Agriculture Products Price List Module
- Fertilizers Price List Module

Soil Testing:

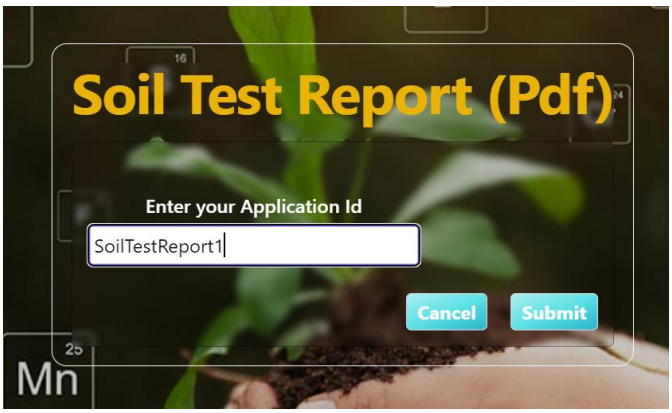

Fig-1: Soil Test Report Page

The first module (Soil Testing) gives information on how soil important for cultivation and how to collect the sample soil from cultivating land.

• Then the collected sample must be POST to soil testing laboratory address mentioned in soil testing section.

• After this process the user can view hi report in application by visiting the soil report page.

• The customer will be given Id number to view or download their report in this application.

• Once the customer enters his Id number and submit, his report pdf will be rendered.

Farmers Trading Module and Buyers Trading Module:

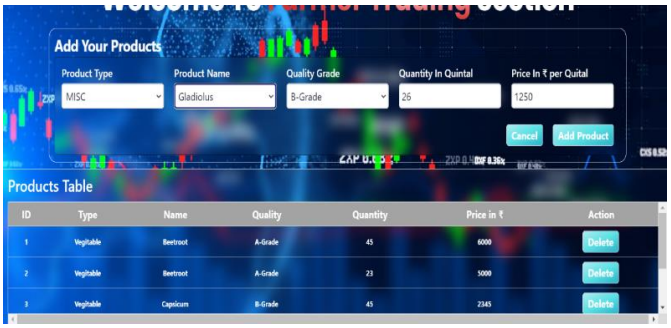

Fig-2: Farmer Trading Page

• As soon user Sign-In the view is moved to Farmers or Buyers based on the type they choose.
• Farmers are provided with 5 input tags for entering their products details.
• Once they enter details and submit their product submission is confirmed with render of their posted products below.
• As same for Buyers, but they need to enter the required product details and submit.
• Once they submit the products matched to details entered by them will be rendered in below table.

Agriculture Products Price List Module:

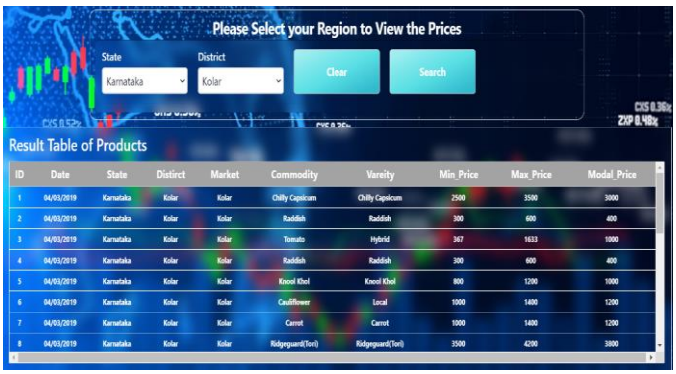

Fig-3: Agri Products Price List Page

• Farmers once Signed-In they will option in navbar to visit the products price list page.
• In this page users must enter either state, district or both to view the price of the products of that particular state or district.
• Once users enter the required field data based on the data the matched data will be rendered.

Fertilizers Price List Module:

Fig-4: Fertilizers Price List Page

• Farmers once Signed-In they will option in navbar to visit the fertilizers price list page.

• They can view the current price of the fertilizers.

IJSREM sample template format, define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, Sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

5. CONCLUSIONS

The "Digital Farming" application represents a significant milestone reached in Agriculture sector, providing farmers with a comprehensive and technologically advanced platform to optimize their agricultural practices and enhance market access. Through the integration of soil testing, fertilizer price tracking, real-time agricultural product price monitoring, and an online marketplace for buying and selling agricultural products, the application addresses critical challenges faced by farmers while promoting sustainable farming practices.

ACKNOWLEDGEMENT

I am indebted to **Dr. Madhu H K, Associate Professor, Department of MCA, Bangalore Institute of Technology, Bengaluru** for their guidance and support in completing this report**.**

I would like to thank **Dr. T. Vijaya Kumar, Professor and Head, Department of MCA, Bangalore Institute of Technology, Bengaluru** for providing me with valuable insights into the industry and for providing me with the necessary resources to complete my project.

I sincerely thank **Dr. Aswath M U, Principal, Bangalore Institute of Technology, Bengaluru** for his interest in the welfare of the student's community.

REFERENCES

1. The Digital Agricultural Revolution: A Bibliometric Analysis Literature Review RICCARDO BERTOGLIO 1 , CHIARA CORBO2 , FILIPPO M. RENGA2 , AND MATTEO MATTEUCCI1 , (Member, IEEE)
2. Digital Twins in Livestock Farming Suresh Neethirajan * and Bas Kemp
3. Do Digital Climate Services for Farmers Encourage Resilient Farming Practices? Pinpointing Gaps through the Responsible Research and Innovation Framework, Elisabeth Simelton 1,* and Mariette McCampbell 2
4. Analysis of the Application of Digital Agricultural Technology in the Development of Farm Economy Sijin Liu1 , Zhirun Huo2*
5. Digital Farming and Smart Farming from the Perspective of Agricultural Students at Malikussaleh University 2022 Kamaruddin Hasan1 , Masriadi1 , Muchlis1 Asmaul Husna1
6. Technological Advancement in Digital Farming and India's Present Scenario: A Review Vidyasagar Yashvardhan1* , Ram Pyare2 , Ram Batuk Singh3
7. DIGITAL AGRICULTURE PRACTICES IN THE CONTEXT OF AGRICULTURE 4.0 DOI: 10.17261/Pressacademia.2017.448 JEFA- V.4-ISS.2-2017(13)-p.184-191 Burak Ozdogan1 , Anıl Gacar 2 , Huseyin Aktas3
8. The economics of property rights in digital farming data: Implications for farmland markets Nathan D. DeLay1 | Michael D. Boehlje2 | Shannon Ferrell 3
9. Role Of Big Data On Digital Farming Md Nazirul Islam Sarker, Md Shahidul Islam, Hilarius Murmu, Elizabeth Rozario
10. Precision Irrigation Management Using Machine Learning and Digital Farming Solutions Emmanuel Abiodun Abioye 1,* , Oliver Hensel 2 , Travis J. Esau 3 , Olakunle Elijah 4 , Mohamad Shukri Zainal Abidin 5 , Ajibade Sylvester Ayobami 6 , Omosun Yerima 7 and Abozar Nasirahmadi 2
11. A novel approach to practices agriculture as e-farming service *Vijayarajan, V., Krishnamoorthy, A., Abdul Gaffar, H. and Deepika, R.
12. E-FARMING Sindhu M R, Aditya Pabshettiwar, Ketan.K.Ghumatkar, Pravin.H.Budhehalkar, Paresh.V.Jaju
13. Digital Farming – A New Era of Indian Agriculture Jyoti Prakash Sahoo
14. Digital Farming: The Beacon of New Age Agriculture for Feeding Billons in India Dr. Susil Kumar Sarangi*
15. ISSN 2394-1227 Indian Farmer – A monthly magazine