

International Journal of Agriculture Extension and Social Development

Volume 8; SP-Issue 2; February 2025; Page No. 14-16

Received: 13-11-2024

Accepted: 19-12-2024

Indexed Journal

Peer Reviewed Journal

Artificial intelligence for agricultural innovation initiative

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DOI: <https://doi.org/10.33545/26180723.2025.v8.i2Sa.1600>

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Abstract

The application of AI in agriculture has been considered as most one of the viable innovation is a solution to adapt the needs of farming and marketing sector. Artificial intelligence makes it possible for farmers to assemble larger amount of data from government as well as public websites, analyze all of it and provide a smarter way for a problem. This review provide a overview of AI's application on Impact on innovation initiative of agriculture. The automated systems, use of robots and drones and data generated through sensors and aerial images of crop and land which gives the deep learning technology. High number of smallholder farmers with limited agricultural support use Plantix App, around 36 percent of its over 1.3 billion inhabitants have a smartphone, one of the highest penetration figures among emerging and developing countries in the world. Farmers felt there was a great need for such a platform to assist them with the many challenges they face, seeing both the physical and digital advantage that an AI robotic tool would provide. AI innovation is rapidly increasing the impact on agricultural sector. One of the main challenges of AI for farmers is the investment of cost. It can be a significant barrier for small scale farmers, who are often have limited resources.

Keywords: Artificial intelligence (AI), agricultural innovation, smart farming

Introduction

The application of AI in agriculture was first attempted by McKinion and Lemmon in 1985. AI is an evolving set of technologies that are used to solve a variety of applied in farming recently. This work's purpose is to make a systematic review of the current studies and research in agriculture that employ the recent practices of AI technologies to solve several relevant problems (Mohd Javaid, Haleem, Ravi and Rajiv Suman, 2021) ^[13]. Remote Sensing with the use of UAVs for image capturing, processing, and analysis is making a huge impact on agriculture. (Abdullahi, Mahieddine, Sheriff, 2015) ^[1]. Application of AI in agriculture provides farmers with real-time crop insight, helping them to identify which areas need irrigation, fertilization, or pest treatment. Artificial intelligence makes it possible for farmers to assemble large amount of data from government as well as public websites, analyze all of it and provide farmers with solutions to many ambiguous issues as well as it provides us with a smarter way of irrigation which results in higher yield to the farmers. The researchers have now started emphasizing on technologies to design autonomous agricultural tools as the conventional farming machineries lacked in efficiency (Dursun and Ozden, 2011) ^[3]. The main purpose of coming up with this technology is to replace human labor and produce effective benefits on small as well as large scale productions (Manivannan and Priyadharshini, 2016) ^[11].

Review on ai innovation initiative of agriculture

AI technologies rely on automated systems, use of robots and drones and increased implementation of data generation through sensors and aerial images for crops and land use through deep learning technology. In the coming years, the application of machine learning in various agricultural practices is expected to rise substantially provided several challenges to its widespread deployment are resolved, especially among developing country farmers. They include the prohibitive costs of the technologies, lack of standardization, lack of AI awareness among farmers and limited availability of historical data. While the agricultural sector is likely to see further adoption of AI, it is important that farmers are equipped with up-to-date training to ensure technologies are used and continue to improve. Extensive testing and validation of emerging AI applications will be critical as environmental factors that cannot be controlled impact on agriculture, unlike other industries where risk is easier to model and predict. (Aziz Elbehri, Hani Eskandar and Roman Chestnov, 2021) ^[2].

Up to now the app has been downloaded well over 10 million times by users who have sent over 23 million images of their affected crops. Depending on the agricultural season, the app has about 1 million individual sessions per month, with around 80 percent of users from the current focus country, India. In Bangladesh, Pakistan, Brazil and Middle East and North Africa countries a high

number of smallholder farmers with limited agricultural support also use Plantix. (Bianca Kummer, Karan Raut.

All these figures demonstrate on the one hand the pressing need for more agricultural support and on the other that digital solutions can make a substantial contribution to enhancing the productivity of smallholder farmers. These numbers are backed by real people and individual success stories, showing a glimpse of Plantix social media channels or in Google Play Store reviews. For example, the Facebook channel has 4,20,000 followers, videos on Youtube have been clicked up to 4.5 million times and over 47,000 users evaluated the app in the Play Store, where the average rating is 4.3 out of 5. As mentioned, the target country, India, has low prices for mobile data (McCarthy, 2019)^[12] and around 36 percent of its over 1.3 billion inhabitants have a smartphone, one of the highest penetration figures among emerging and developing countries in the world (Statista, 2020)^[15].

Of the many technologies being explored in agriculture, AI is seen as one of the most powerful and promising tools for farmers and agriculture. Farmers use historical data to their benefit, with data in large quantities, rich in variety and collected and processed in ever increasing speeds.

Currently, the most popular applications of AI in agriculture appear to fall into three major categories: 1) robotics; 2) crop and soil monitoring; and 3) predictive analytics. The latter is of interest when dealing with livestock. Being able to make better predictions on what will happen, for example, enables farmers to proactively respond to the weather and prevent animal diseases.

Data for a range of crops, including the commonly grown crops of tomato, eggplant and cabbage, were collected for future data analytics work especially to develop AI solutions that could be used to determine crop yield and health. Workshop discussions focused on challenges for growers and how subsets of the digital farmhand platform could address these. In particular we noticed that having the ability to digitize agronomy, e.g., machine learning systems that can determine crop yield and health, would support these farmers by providing real time information they would not be able to obtain because of their limited access to agronomy advice. This we felt would be a significant advance on current practices. In general, the response from all who attended the on-farm trials and workshops was overwhelmingly positive and they were eager for the next steps towards introduction of the system. Farmers felt there was a great need for such a platform to assist them with the many challenges they face, seeing both the physical and digital advantage that an AI robotic tool would provide. Salah Sukkareih (University of Sydney).

Conclusion

AI innovation is mostly impact in the developed and developing countries, which enhance the farming techniques and it boost creativity and enhance the human experience. AI is a time-consuming innovation and also an automation system which can optimize workflows, increase efficiency and reduce errors.

AI innovation is rapidly increasing the impact on agricultural sector. One of the main challenges of AI for farmers is the investment of cost. It can be a significant barrier for small scale farmers, who are often have limited

resources.

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