Chapter 2
Artificial Intelligence and Its Applications in Agriculture With the Future of Smart Agriculture Techniques

Harshit Bhardwaj
Gautam Buddha University, India

Pradeep Tomar
Gautam Buddha University, India

Aditi Sakalle
Gautam Buddha University, India

Uttam Sharma
Gautam Buddha University, India

ABSTRACT

Agriculture is the oldest and most dynamic occupation throughout the world. Since the population of world is always increasing and land is becoming rare, there evolves an urgent need for the entire society to think inventive and to find new affective solutions to farm, using less land to produce extra crops and growing the productivity and yield of those farmed acres. Agriculture is now turning to artificial intelligence (AI) technology worldwide to help yield healthier crops, track soil, manage pests, growing conditions, coordinate farmers' data, help with the workload, and advance a wide range of agricultural tasks across the entire food supply chain.

INTRODUCTION

Solutions for the future include AI (Hudson et. al., 2000) and Machine Learning (Pecht et. al., 2019). Artificial Intelligence stands for AI. Two types of AI— narrow and general (Togelius et. al, 2018) are different. Narrow AI is written software — often combined with hardware and sensor systems — that performs linear tasks. For agriculture, an autonomous farm car is something you find to use a specific AI, like a driverless tractor.

General AI is the second type of AI. We are intelligent beings who are self-aware and who can carry out a variety of tasks. Farmers are recruiting data firms using AI to track crops in areas such as pesticide monitoring. Additional examples are robots with human features including recognition of voice and decision-making to improve farmers ' production. The AI already used in agriculture today are examples of robots that sow seeds, can manage water, clean ground, pick cultivations. Where do we go about the future of AI in agriculture, the question is in the future?

Farming is the cornerstone of any economy's sustainability. Nonetheless, it can vary by countries and play a key role in long-term economic development and structural change. Farming was historically limited to the production of food and crops. Nevertheless, in the last two decades the production, manufacturing, marketing and distribution of crops and animal products has evolved(Jha et. al., 2019). Currently agriculture is the fundamental source of livelihood, improves GDP, constitutes a source of trade, reduces unemployment, produces raw materials in other industries and develops the economy. In order to provide innovative solutions to support and improve the farming activities, the global geometric population rise requires a review of agricultural practices. Other technological developments, including Big Data Analytics (Geng, 2017), Robotics (Hajja, 2016), the Internet of Things (Hassan, 2016), availability of cheap sensors and cameras and drone technology and even wide internet coverage in geographically scattered fields, will allow the introduction of AI in agriculture. AI systems can provide predictive insights about which crop to plant crop in a given year and the optimal date to seed / harvest in a given region to increase crop production and decrease the use of water, fertilizers, and pesticides by analysing soil-management data such as temperatures, weather, soil-analysis, soil moisture and historic crop performance. The effect on natural ecosystems can be minimized through the implementation of the AI technologies and safety of employees that increase, thereby keeping the food prices low and ensuring that food production keeps pace with the population increasingly.

BACKGROUND

Agriculture automation(Jha et. al., 2019) is a major concern and an evolving challenge for every region. The population worldwide is growing rapidly and the need for food is growing rapidly with the increase in population. Traditional methods used by farmers to serve growing demand are not enough and therefore they must hinder the soil through intensified use of harmful pesticides. This has a great influence on agriculture, and, at the end of the day, the earth remains unfertile. There are fields that affect agriculture issues such as crop pests, lack of storage space, pesticide control, plant management, irrigation and water management. Artificial intelligence will overcome all of this.

The history that follows covers AI state-of - the-art and agriculture's potential.The expert systems focused on smart agriculture systems were developed by (Shahzadiet al., 2016). The IoT concept in this

Related Content

Feed-Forward Artificial Neural Network Basics
Lluís A. Belanche Muñoz (2009). *Encyclopedia of Artificial Intelligence (pp. 639-646).*
www.irma-international.org/chapter/feed-forward-artificial-neural-network/10314

Implementing a Fuzzy Logic Based Algorithm to Predict Solar and Wind Energies in a Hybrid Renewable Energy System
Sanaa Faquir, Ali Yahyaouy, Hamid Tairiand Jalal Sabor (2015). *International Journal of Fuzzy System Applications (pp. 10-24).*
www.irma-international.org/article/implementing-a-fuzzy-logic-based-algorithm-to-predict-solar-and-wind-energies-in-a-hybrid-renewable-energy-system/127309

Design and Usage of a Process-Centric Collaboration Methodology for Virtual Organizations in Hybrid Environments
Thorsten J. Dollmann, Peter Loos, Michael Fellmann, Oliver Thomas, Andreas Hoheisel, Peter Katranuschkovand Raimar Scherer (2011). *International Journal of Intelligent Information Technologies (pp. 45-64).*
www.irma-international.org/article/design-usage-process-centric-collaboration/50485

Mining E-Mail Messages: Uncovering Interaction Patterns and Processes using E-Mail Logs
Wil M.P. van der Aalstand Andriy Nikolov (2008). *International Journal of Intelligent Information Technologies (pp. 27-45).*
www.irma-international.org/article/mining-mail-messages/2437

Differentially Fed Artificial Neural Networks for Speech Signal Prediction
Manjunath Ramachandra Iyer (2008). *Intelligent Information Technologies: Concepts, Methodologies, Tools, and Applications (pp. 935-946).*
www.irma-international.org/chapter/differentially-fed-artificial-neural-networks/24325