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Artificial Intelligence for Agriculture: Issues, Challenges and Opportunities

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Abstract

Background: For the stability of a country's economy, agriculture is one of the essential cornerstones. In the past, three agricultural revolutions have gradually brought the transformation of the traditional agricultural system towards a new high-yielding agricultural system [1]. At present, the agriculture sector is facing numerous challenges such as reducing soil fertility, improper soil analysis, irrigation, weed, pest infestation, disease infestation, etc. According to United Nations Food and Agriculture Organization, the world population would grow by ~2 billion in 2050 [2]. This increased world population would require around a 70 percent increase in overall food production. For developing countries like India, there would be a need to almost double the food production. So, in order to address numerous challenges, there is an urgent need to have a major transformation in agricultural practices, and advanced technologies like Artificial Intelligence (*AI*) can play a key role in dealing with diverse farming-related issues with major objectives like accuracy, cost-effectiveness, flexibility and higher performance [3].

Objective: To study the applications of *AI* in different agricultural activities. Further, issues, challenges and opportunities in adopting artificial intelligence in several agriculture domains are presented.

Methodology: Existing literature related to various applications of *AI* for agriculture, such as sowing of seeds, irrigation management, soil management, crop management, weed management, and crop disease detection have been reviewed.

Result and discussion: Various implementation challenges of adopting *AI* in several agricultural domains have been elicited. It is inferred that *AI* play a key role in analysing agricultural data to assist the farmers in making better, timely and cost-effective decisions.

Future Work: The use of *AI* technologies in agriculture would reduce the load and effect on ecosystems and resources, enhance safety of workers, optimize utilization of herbicides, pesticides and fertilizers thereby result in increased food production that would enable to keep pace with the global increase in the population. Further, machine learning or deep learning, a branch of *AI*, can be used to infer and obtain valuable insights from the agriculture data.

References

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