

Agriculture Revolutionized by Artificial Intelligence: Harvesting the Future

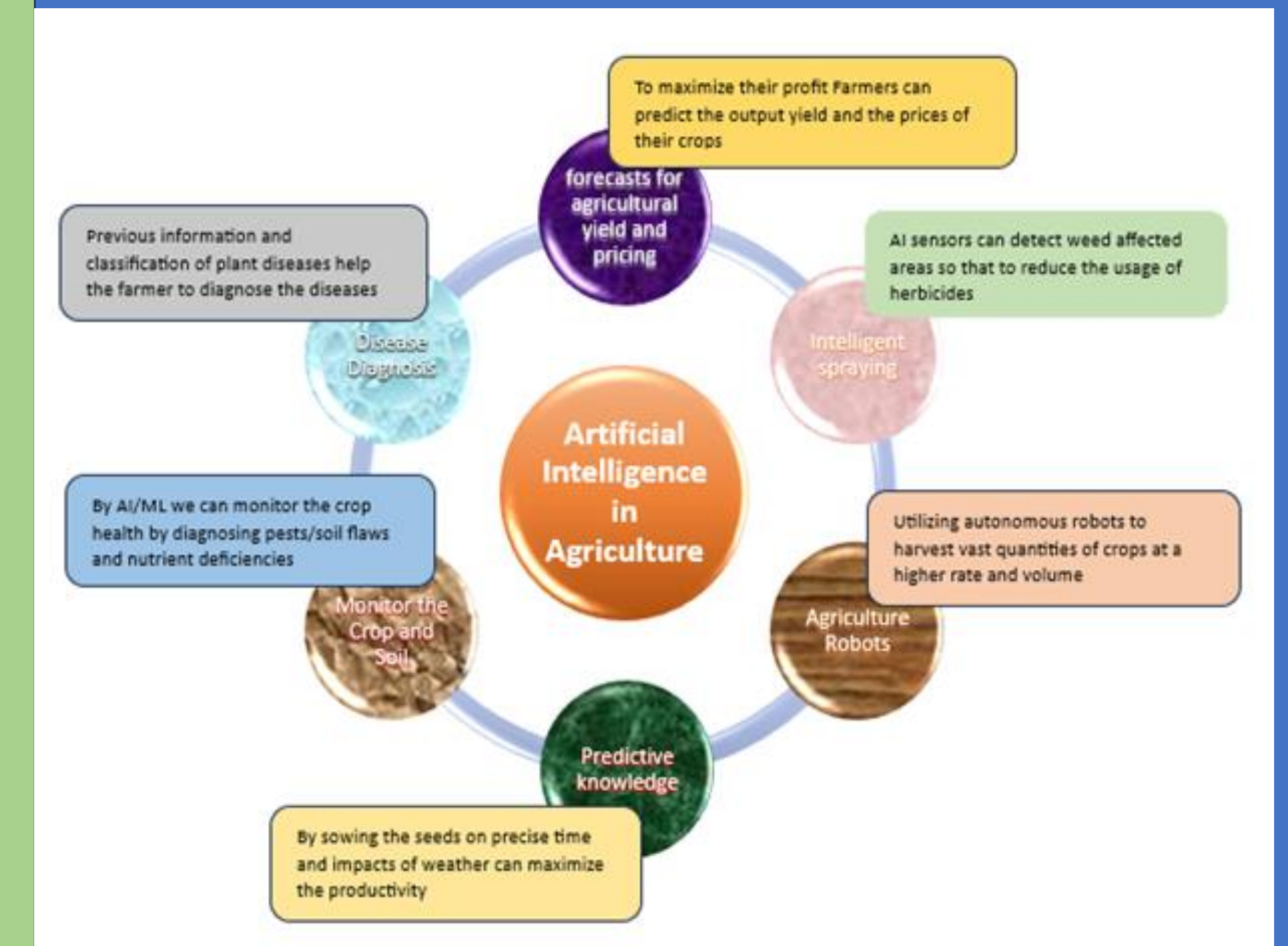
Introduction

- By 2050, the world's population is projected to reach close to 10 billion, which would need more food.
- Agriculture has a significant role in the nation's economy and in creating jobs.
 - artificial intelligence (AI) is used in agriculture, farmers can increase the yield.
- Innovative technologies have seen steady change in the last few decades.
- The use of AI-based technologies helps to increase productivity across all industries, including the agricultural.
- Real-time monitoring, harvesting, processing, and marketing of crops have all improved because to this technology.
- New automated methods using farm robots and drones have considerably improved the agro-based industry.

Material and Method

An ecosystem for smart, efficient, and sustainable farming is emerging with the development of cutting-edge technologies like artificial intelligence (AI), cloud machine learning (ML), satellite imagery, and sophisticated analytics. The average crop yield per hectare increased by 30% as a result of this pilot project's use of an AI-based sowing application that makes recommendations to farmers regarding sowing date, preparation of cultivable land, fertigation based on soil analysis, FYM requirement and application, seed treatment and selection, and optimization of sowing depth. Using real-time Moisture Adequacy Data (MAI) from daily rainfall statistics, soil moisture, and statistical climate data, AI models may be used to build forecast charts and provide farmers advice on when to plant in different seasons. Drones with AI-capable sensors could photograph the entire farm and analyze the images nearly instantly to identify problems and offer solutions. Farmers will be able to deal with the issue of a shrinking labor force and operate more productively while spending less on wages if they use robots

Material and Method



This flowchart describes the 6 strategies which can improve the crop productivity by using the smart ways such as Forecasts for Agricultural yield and Pricing, Intelligent spraying, Agriculture Robots, Predictive knowledge, monitor the Crop and Soil, Disease Diagnosis. These all-strategies work on the base of Artificial Intelligence.

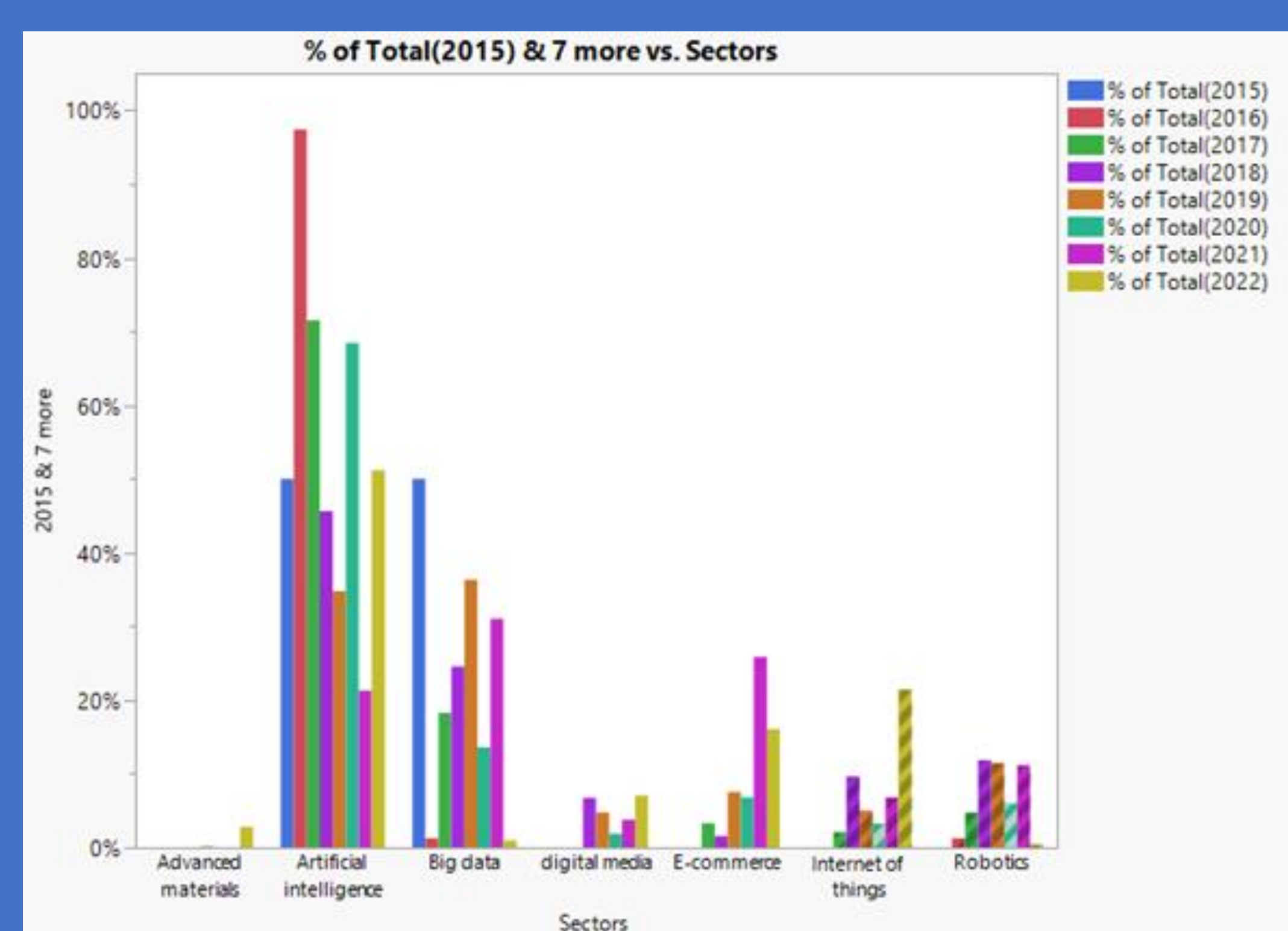
Results and analysis

AI applications are important in agriculture to resolve agricultural problems and assure more harvest. Farmers depends on climate and environmental condition for the cultivation of crops. AI and machine learning function as predictive analysts by assessing previously collected data and identifying the optimal time to plant seed, defining the crop alternatives, and choosing hybrid seed to improve production.

Utilization	Algorithm	Findings
monitoring plant growth indicators	Machine learning, threshold segmentation, CIE	obtained a really nice outcome
monitoring grape growth	Computer vision	Accurate barrier and grape bunch identification was made
nitrogen concentration in rice through diagnosis	MATLAB	Process of changing blades quantified
Observation of the wheat's heading date	Computer vision	Compared to other methods, the method's absolute inaccuracy is 10.14 percent days.
Observation of paddy growth	Remote sensing	Achieved a good result

Results and analysis

One of the most crucial areas in agriculture where drone-based solutions are offered in conjunction with computer vision and AI is crop monitoring and crop health assessment. Drones equipped with high-resolution cameras collect precise field photos that can be run through a convolution neural network to identify weed-filled areas, crops that need more water, and the stress levels of plants at different growth stages.



To increase yields and achieve the aim of a sustainable food supply by 2050, agriculture technology entrepreneurs are deciding on task-specific AI and vision solutions. Agriculture technology businesses like Ceres Imaging, Sky squirrel technology, and Blue River Technologies use computer vision technology to acquire images and analyze them spectrally utilizing robotics and drones. Startups like Centaur Analytics, Spenser Technologies, and Sen Crop are using diverse sensor data to detect anomalies in crop yields and inconsistencies in resource delivery.

Discussion

AI offers tremendous potential for agriculture applications, there is currently a lack of understanding of cutting-edge high-tech machine learning solutions in farms all over the world. Agriculture is highly exposed to external elements such as weather, soil, and insect attack vulnerability. AI systems also need a lot of data to train their algorithms and make accurate forecasts and predictions. The collection of geographical data is simple in cases when there is a very vast amount of agricultural land, but the collection of temporal data is more difficult.

Conclusion

The farming industry is still not receiving enough support and is still underserved, despite the fact that extensive research is still ongoing and numerous apps are already available. This would make it easier to make decisions in real time and use the right model or program in the proper order to effectively acquire contextual data.