

# The Future of Agriculture

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**Abstract—** Artificial intelligence is the theory and development of computer systems that are capable of performing specific tasks that would typically require the intelligence of humans. Language translation, decision-making, speech recognition, and other tasks that typically require human intelligence are included. The purpose of this study is to compare artificial intelligence in computer vision about technologies in fruit farms and to analyze the advantages and disadvantages of different types of these technologies. In this study, questions to the CEO of Imagine AI Sdn Bhd, observations, data analysis, and references were used. This study clearly shows that IoT solutions such as smart farming systems and AI fertilization ease the worker's workload and save time. This is important in increasing worker productivity which is measured by the output of workers within a specific time frame. However, it also requires a large amount of cost to acquire the AI system.

**Keywords—** Artificial intelligence; computer; vision; imaging component, formatting, style, styling, insert

## I. INTRODUCTION

Artificial Intelligence is the creation of computer systems that are capable of carrying out tasks that would need human intelligence. These include things like speech recognition, decision-making, and language translation, to name a few. Artificial intelligence (AI) has grown from its modest origins to become a discipline with broad applications. Over time, there have been changes in the definition of AI and in what should and should not be covered. In the industry, experts jokingly describe AI as anything that computers can't accomplish right now. Although it seems ludicrous, making intelligent computers and robotics entails constructing something that doesn't already exist. The field of artificial intelligence is dynamic. One of the most practical ways to address food shortages and adjust to the needs of a growing population has been widely recognized as the application of AI in agriculture.

## II. COMPARATIVE ANALYSIS OF EXISTING TECHNOLOGIES

### Technology at Eastern Park

**Author (s), year and citation:** Alexey Shalimov, CEO at Eastern Peak. Shalimov, A. (2020, July 7). *IoT in Agriculture: 5 Technology Use Cases for Smart Farming (and 4 Challenges to Consider)*. Eastern Peak - Technology Consulting & Development Company. Retrieved from <https://easternpeak.com/blog/iot-in-agriculture-technology-use-cases-for-smart-farming-and-challenges-to-consider/>.

### Their proposed solution

#### 1. The hardware

The sensors for your device must be chosen to design an IoT solution for agriculture (or create a custom one). The information you choose to gather and the overall goal of your solution will determine your choice. The dependability and precision of the data that is collected will ultimately determine the success of your product, so the quality of your sensors is essential.

#### 2. Maintenance

For IoT solutions in agriculture, the difficulty of hardware maintenance is crucial because the sensors are frequently used in the field and are easily broken. Therefore, you must ensure that your hardware is robust and simple to maintain. If not, you'll have to replace your sensors more frequently than you'd like.

#### 3. The mobility

Smart farming applications should be tailored for use in the field. A business owner or farm manager should be able to access the information on-site or remotely via a smartphone or desktop computer. Plus, each connected device should be autonomous and have enough wireless range to communicate with the other devices and send data to the central server.

### Weakness of their research

#### 1. Connectivity

The adoption of smart farming is still hindered by the requirement to transmit data between numerous agricultural facilities. It goes without saying that the connection between these facilities needs to be dependable enough to endure inclement weather and provide uninterrupted operations. Although efforts to create unifying standards in this area are now under progress, IoT devices still use a variety of connectivity protocols today. Hopefully, a solution to this issue will be found with the introduction of 5G and technologies like space-based Internet.

## 2. Data security in the agriculture industry

Working with huge data sets required for precision agriculture and IoT technology, raises the possibility of security flaws that criminals can use for data theft and hacker assaults. Unfortunately, the concept of data security in agriculture is still largely undeveloped. For instance, many farms employ drones to convey data to farm equipment. This equipment has an Internet connection but little to no security measures in place, such as user passwords or remote access authentications. Basic IoT security guidelines include keeping an eye on data traffic, protecting critical data with encryption, utilizing AI-based security tools to quickly spot signs of suspicious activity, and storing data in the blockchain to guarantee its integrity

## Technology at Imagine AI

**Author (s), year and citation:** Mr. Edwin Loh, CEO of Imagine AI Sdn.Bhd. *Our Services - Imagine AI | Imagine The Possibilities*. (2021, July 23). Imagine AI | Imagine the Possibilities | Automation - Shape the Future Production Landscape. Retrieved from <https://imagineaigroup.com/our-services/>.

## Their proposed solution

Smart Farming systems.

### 1. IOT sensor nodes /data digitization and analysis.

-The sensor must be used in client farming. The reason why they use it is to check the quality of soil and fruit. The sensor will check the quality of fruit in any situation by using the wireless connection to the employer's device or mobile phone. The sensor will keep the data and will automatically analyze the data. The employer does not need to check the quality of fruit by observing the tree one by one. Let us think if the area of the farm is so wide, how much time that the employer needs to check it? This saves the employer's time. They give the package which includes sensor node, soil EC, soil moisture and soil temperature, and also big data of cloud to store the data. They also give internet connection for only 1000 nodes.

### 2. AI fertilization

This company also provides the AI fertilization machine and also software. This technology will fertilize all the trees widely. The employer does not need to find a worker and foreign worker to handle the farm. The employer will just hire a worker if they need to control the technology.

## Weakness of their research

### 1. Internet interference

As we know in Malaysia the connectivity of internet for villages is so badly. The company will have problems with it. They need to corporate with internet service providers to make the connection of the internet reach at their client's farm.

### 2. The weather.

Weather also make the technology have a problem. Such as if the weather at the village always rains then the probability to flood is highly. It risk the technology and can make the technology disrupt because of flood. Not only flood the lightning from thunderstorm also make the technology reset if it doesn't have the wired of earth.

## III. OPINIONS (CRITICAL THINKING)

The technology offers services in the agriculture sector that help the farmers prevent loss. This is because IOS sensor nodes can monitor the soil condition. This will help the farmer observe the plants in a more detailed way as the sensor can tell them whether the condition of soil is optimum for the plant to grow or needs some changes. Then, by using the AI-Fertigation-Dripping it will save a lot more cost in investing in fertilizer. This is because it can give a more precise observation of how much the plant needs fertilizer in different environmental conditions.

Even when both of the technologies make our day the farmers' day to day work more efficient in less period of time the cost of buying the technology is still considered high. This is because developing the technology that is suitable for different types of plants takes a long time as more research needs to be done. To maintain the system and monitor it we need a few professional technologists. The cost to employ a technologist is so much higher than to employ a labor worker. Thus the technologies can only be used by the farmer that is already stable in the agriculture industry.

## IV. CONCLUSION

The adoption of Artificial intelligence solutions will have a significant impact on the future of AI in farming. Even though some extensive studies are ongoing and some apps are currently available on the market, the agricultural industry still needs more support. Additionally, the development of predictive solutions to address a genuine problem encountered by farmers in farming is still in its early stages. Artificial intelligence in computer vision about technologies in fruit farms are compared and the advantages and disadvantages of different types of these technologies are analyzed where smart farming systems and AI fertilization are more likely to be selected in AI in Computer Vision technologies. In conclusion, AI protects the agriculture industry from a number of concerns, including food safety, population increase, climate change and job issues. Crop production, real-time monitoring, harvesting, processing and marketing are also been enhanced by Artificial Intelligence.

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