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Paper 1

IOT’s Impact on Agriculture

Technology is defined as “the application of scientific knowledge for practical purposes, especially in industry”. (Merriam Webster). Throughout time technology has been used to make tasks easier for the individual. Presently technology in this era is mostly electronics/computers and Internet of things (IOT) and these types of technology are becoming more integrated into almost every field. Business, medical, education, and many more fields including agriculture. People are often surprised about the amount of technology that is becoming more available to farmers because there is this concept in our heads that farming is an anti-computer industry and it’s all about manual labor. However, that’s not the case anymore. The agriculture industry has adopted several different technologies and modern techniques like vertical farming, AI to track cow behaviors, ground sensors, and others that are changing the way agriculture is conducted.

Technology has always been changing and improving, and that technology has made its way into agriculture. One type of technology that is becoming more available is drones. The use of drones in farming has saved farmers time and gave them an increase in efficiency because the drones would be used to scan the land. Over the last couple of years, drones have become a popular tool to take photographs, use for military operations, and has been used for recreational use. Petkovic mentions the use of drones in agriculture in the article *IOT vs. Drones for Data Collection in Agriculture*and how they are becoming more popular and beneficial to farmers. Petkovic states “Drones, unlike IOT devices, are not fixed to a geographic location, the data collected by their sensors and cameras are suitable for different kinds of analysis (recordings of thermal sensors can be analyzed from the point of view of water presence on the area…soil and plant temperature) Given the fact that drones are cheap, and the prices of the necessary drones show a decreasing tendency, the investment into drone powered solutions is solid and advisable.” (Petkovic 14). Petkovic is saying that drones are beneficial to the agriculture industry because they are mobile and can have different sensors that can record different measurement levels which can be useful with large amounts of land. Also, the price of drones is a reason why this piece of technology is becoming more popular in agriculture. Some of the drones used in agriculture can cost up to $1000 to $9,000 depending on the model and these are reasonable prices for complex machines that are going to be used almost every day. (Prices from dji.com).

 Diva Joshi states in the article *what are drones good for? Common commercial applications of drones in agriculture, business and the military* “A PricewaterhouseCoopers (PwC) report pegs the agriculture drone market to be worth $32.4 billion, second to infrastructure.” Drones are becoming more popular in agriculture use and are becoming a big investment for farmers in today’s society. Their investment in drones shows that technology is becoming more prevalent and that farmers want to increase their efficiency and make their work easier.

   Aside from the popularity of drones in agriculture, another piece of technology that is trending is IOT. IOT or internet of things is defined according to IOT Agenda as “IOT is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a data network without requiring human to human or human to computer interaction.” IOT has been making its way into society and all of our lifestyles with devices like amazon echo, google home, and devices that can control aspects of a person’s home. Vertical farming is an example of how IOT was implemented into agriculture because IOT, AI (artificial intelligence) can control the conditions of the warehouse so that plants can grow efficiently. Another example of IOT in agriculture is mentioned in the article *Robot Farm*by Katie Weidenboerner. Weidenboerner states “The collars help lead her through separate parts of the barn, making her unable to approach the milking station before her time.” This collar is an example of IOT because it eliminates the need for a human to guide and feed the cow. The computer takes care of moving, feeding, and milking the cow and then that data gets recorded and stored on the farmer’s network. As mentioned before vertical farming is an example of IOT in the agricultural industry and Fan Tongke in the article *Smart Agriculture Based on Cloud computing and IOT*mentions the used of IOT within vertical farms. Tongke discusses how computers monitor the conditions of the crops within the facility and can measure to see if a plant needs more of one element or another. The computer then creates a solution to make sure that the plant can grow. The IOT system is a way of making sure plants can grow efficiently and can help reduce the amount of deceased plants, which means more food produced. Farmers that use IOT devices and networks have a chance to free up their time because a computer can create all the right conditions to make sure crops/livestock are in stable conditions and are being cared for.

   Nothing is perfect in this world and technology might seem perfect, however, it can be unreliable. These technologies are recently developed and of course, they are going to have their bugs and issues, especially IOT. Some issues with IOT technology are compatibility, complexity, security, and safety. These issues came from Prateek Saxena’s article, *The advantages and disadvantages of internet of things*, and there is a big security issue because all the data that is collected needs to be secure from hackers because data is valuable. Also, the technology is relatively new and people are still understanding how it works. As technology advances so does the threat of it because technology is a tool. Technology can be used for good or it could be used for evil and it all depends on the user.

   Technology has been becoming popular in agriculture and has many benefits to the industry. These technologies are relatively new but, there is a desire to integrate more because of the efficiency and productivity it produces.

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