Artificial Intelligence and Agribusiness

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AI and the Farm System: Making the Good Better

Across the globe, it is widely recognized that one of the single most important tasks of the next century will be to provide sufficient quality of sustainable, safe, and nutrient-filled food products to meet the needs of an ever-growing world population. Smarter agricultural growth, according to the World Economic Forum, is the key. Can the technology of Artificial Intelligence be applied to our food system to improve farmer processes, crop yields, farm profitability, reduce waste and promote the health of the general population? The answer coming from tech circles seems to be a resounding yes, and the numbers are staggering.

Miniaturized sensors, coupled with 5G technology, will combine to compile and assimilate vast amounts of data relative to crop status, hydration, and soil condition, among many other things essential to quality output. Sources estimate that by 2020, more than 75M connected devices will be deployed in agricultural applications, and the average farm will generate over 4.1M data points per day by 2050.

Challenges still remain in refining applications, overcoming user apprehension in using advanced technology, understanding and applying reporting, and driving down costs to make the deployment of this technology affordable. But the benefits to be gleaned in waste reduction, yield improvement, and profitability gains indicate the effort will be well worth it in the long run.

Labor Force Takeaway

As with all technologies, the need for robotics management and maintenance is anticipated to grow exponentially in the near term. Robots working in the fields, farms and warehouses will be in need of inventory, maintenance, management, and updates/patches.

PC Age, as well as many local community colleges, offer CompTIA A+, Network and Security certifications, all aimed at the IT beginner, to gain knowledge in the areas of software installation, maintenance and update, as well as network access, security, and other IT fundamentals necessary to running a network of endpoints and devices in a farm environment, or others.

The Cisco Certified Entry Network Technician (CCENT) is the first step towards the CCNA (Certified Network Administrator) certification. It is highly valued in many fields, not just agribusiness. It covers network fundamentals, basic security and wireless, routing, switching, and configuring. This certification would be key in establishing knowledge of network fundamentals, which are a key component platform to the agbots environment.

Key agbot manufacturers, like Blue River, Abundant, Iron Ox, QUT, Rowbot, and Prospero to name just a few, will have training programs and certifications available on their products. These will be essential to fleet management.

AI EXAMPLES ACROSS THE FARMING INDUSTRY ABOUND

From precision weeding and picking to disease recognition, artificial intelligence will revolutionize farming. Examples of Artificial Intelligence application in farming include:

Automated Irrigation Systems

An Automatic plant irrigation system helps farmers for watering their yields. Automatic irrigation enhances existing watering machines with intelligence to operate irrigation systems so the deployment can occur without the intervention of an operator. This project is a boon considering shortages of help, changing weather patterns or needs. It can be combined with soil and plant sensors to automatically engage the watering process when plants need it.

Crop Spraying Drones and Automated Detection and Analysis (Farmshots, CAMP 3)

Drones are deployed to gather real-time information on crops and assess needs. Water, pesticides, weeding, all are necessary functions to crop maintenance, and drone imagery can determine what is needed and when. Crop-spraying drones can also spray pesticides on crops if it is determined to be needed. Deployment is easy and localized, since unmanned aerial vehicle (UAV) sprayers can take off and land vertically, and therefore require no special facilities or runway. They are also good for uneven or hard to reach terrain, and can control and adapt spray heights and amounts.

> Declining numbers of available workers, increased output volume needs, and improved crop turn requirements (velocity) all suggest the shift to farm AI/robotics will be essential to keep pace with food demand.

Swarming Farmbot (Picking/Weeding/Soil Analysis)

The Autonomous Micro Planter (AMP) uses swarm and gaming theory to weed and harvest planted fields. Robots would first be programmed to examine soil before planting each seed and choosing the best variety for that soil spot. This allows farm managers to maximize the productivity of each planting area. The agbots are then used to ensure the areas remained weed free. Finally, bots harvest the crop at the end of each growth phase, and begin the process again, optimizing turns.

Lettuce Thinning Robot

A lettuce-thinning robot, designed by Blue River Technology, and currently being used by eight customers across the US, is used for the thinning and weeding of lettuce to increase yield. Plants are evaluated by the vision system and then artificial intelligence algorithms are applied to make plant-by-plant decisions to eliminate unwanted plants and thereby optimizing output. Precision lettuce-thinning can maximize yield by counting plants and determining plant spacing. Data and statistics are gathered and warehoused for each planting and a plot image library can be built that contains all images and plot reconstructions for analysis, soil treatment, and future use.

Driverless Tractor

Sensors, radars, and GPS, are combined to guide the driverless tractor system. The course of a driverless tractor can be set and adjusted real time, freeing up manpower. These tractors supplant labor needs during planting and harvesting.

Hortibot

The Hortibot, a self-propelled weed pulling machine , uses global positioning system (GPS) to orient and move around plots of land for the purpose of eradicating weed growth. With the ability to identify 25 different weeds and eliminate them by using its weed-removing attachments or by spraying, the Hortibot can quickly become indispensable.

These are but a few examples of the many applications currently in use today that employ Artificial Intelligence and Robotics to improve and expand the ability of food producers and farmers worldwide to maximize crop yields and farm profitability. As adoption expands and technology improves, it is expected even more capabilities will be handled by smart agribots and their operators, that will return even greater value to the farming communities they support.

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