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Agriculture Robots-The future of farming

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Introduction:

A robot is a mechanical or virtual, artificial agent. It is usually an electro-mechanical system, which, by its appearance or movements, conveys a sense that it has intent or agency of its own. The word robot was derived from the Czech word *robota* – forced labour or work. A robot is able to work autonomously according to the programme or under the control of a man and carry out the most dangerous, difficult, laborious, persevering and precise tasks. Agricultural Robotics is the logical proliferation of automation technology into bio systems such as agriculture, forestry, green house, horticulture etc. In the fully-automated "Farm of the Future", dedicated robots will take on the tough farming jobs that once could be done only by people. It is not just on the ground that technology promises to transform farming. Unmanned Air Vehicles, or drones, are also coming into play on farms. Robots need a lot of sensors and controls that let them move in environments they don't know much about. Usually, a robot has five parts: sensors, a controller or computer, a drive or actuator, an arm, and "end effectors" that do the work. The controller receives feedback in the form of electronic signals from the sensors that contain information. Sensors are able to provide information about the environment to the controller of the robot. Robots have the potential to be created and programmed to acquire knowledge that is not readily available to humans through their senses. The terms "controller" and "computer" are often used interchangeably. The controller is the "brain" of the robot, and it enables the robot to be networked to other systems so that it can collaborate with other equipment, processes, or robots. It also allows the robot to be programmed to perform certain tasks. The "engine" of the robot is referred to as its drive or its actuator. An actuator is also defined as "a mechanical device that produces motion". In most cases, the arm of a robot is designed to resemble the arm of a human, complete with a shoulder, elbow, wrist, and fingers. The arm of the robot is the component that is responsible for positioning the end-effectors and sensors so that they may carry out the tasks that have been pre-programmed for them. The term "end effectors" refers to the final link in the chain of the robot's assembly. At this particular

juncture, the tools are fastened. End effectors are, in a more general sense, the components of a robot that are responsible for interacting with the working environment. Robotics can be utilised in a variety of ways to accomplish various agricultural tasks. It takes a significant quantity of manpower to complete tasks such as tilling the soil, sowing seeds, applying fertiliser, pulling weeds, harvesting crops, and spraying. Therefore, in order to lessen this requirement and save both time and money, robots are being used and can be used. In order to maintain domestic agriculture, facilitate operations 24 hours a day, enhance safety, reduce the amount of labour required, and cut down on chemical use, among other things, robotic agriculture is an absolute necessity. The robot is able to perform the appropriate actions at the appropriate time, in the appropriate location, using the appropriate method. There are two primary classes of robots, which can be summed up as follows: autonomous robots, and tele-controlled or remote-controlled robots. Robots that operate totally under the command of a computer programme are characterized as autonomous robots. Robots that are tele-controlled or remote-controlled, on the other hand, operate either under the command of people or computer programmes. Humans use a controller, which could be a joy stick or some other type of hand-held device, to direct and control the actions of robots. Weed control robots, Forester bots, Fruit pickers, Drones, and an agriculture robot suit are some of the many types of agricultural robots currently in use. Dementers have the ability to follow a path with a precision of up to three centimetres. It is equipped with cameras that have the capability of distinguishing between crop that has been cut and crop that has not been cut yet. The cutter head can be driven, steered, and controlled by it, freeing the operator to concentrate on other responsibilities. It is able to harvest crops such as wheat and alfalfa. The purpose of the tool designed to get rid of or eradicate the weeds. An intelligent hoe is equipped with vision technologies that can recognize the row of crops based on colour photography. It can then properly drive itself between the rows and remove the weeds, which significantly reduces the amount of herbicide that is required. A clever and self-sufficient robot known as vitirover is being developed by a company in France. The little robot gets its power from the sun, which it utilises to run its electric motors. This self-driving agricultural machine could operate continuously for one hundred hours if it were equipped with a solar panel. It has a speed that allows it to work at a rate of 500 metres per hour and can chop grass and weeds

to within 2-3 centimetres of the vine. Forest robots are a specialised subset of robots that are employed in the harvesting of wood, the care and maintenance of trees, and the shaping of Christmas trees. In the woods, it is put to use in the extraction of both pulp and solid wood. When cutting through the branch, it makes use of specialised jaws as well as axes. A fruit picking robot is able to harvest ripe fruit without causing any damage to the tree's branches or foliage. Through the use of video image capture, the robot is able to differentiate between different types of fruit and leaves. In the event that a match is found, the fruit will be plucked. Mobility is a top issue, and the harvesting robots need to be able to reach every part of the tree they are harvesting. The use of drones provides a fast and simple method for monitoring the progress of crops and identifying areas that could require further planting or the application of pesticides. In addition to this, it can be utilized to control weeds, pests, and diseases. The harsh agricultural task, such as pulling radishes, can be made easier with the assistance of the agriculture robot suit, which was developed expressly for this purpose. The power of the user can be increased thanks to the eight motors that have been integrated into the suit and are located on the shoulders, elbows, back, and knees. The currently available model has a weight of 25 kilograms and operates with the help of 16 sensors. Robots come with a whole host of benefits, but in addition to them, they also have a few drawbacks. Robots, unlike humans, are unable to readily adjust their behaviour in response to novel circumstances (e.g. if an item on the line is not in correct place, a human worker would notice and correct it). As a result of robots taking over people's jobs, unemployment rates are rising. The cost of a robot is so high that it may take several years to recoup the investment.

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