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Prevention of Agricultural Commodities using Artificial Intelligence

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Abstract – In India the major source of living and economy is through agriculture and agricultural industry. Rotting or over ripening of agricultural commodity has always been a major problem for the farmers. Farmers aren't able to keep a check on every single crop that turns out to be the reason of crops getting destroyed resulting in less amount of fertile crops. This paper mainly focuses on proposing a model which will help the farmers in crop monitoring and to know about the rotting of their crops before the crop gets rotten or over ripe. This paper also includes techniques of Artificial Intelligence in agriculture that will help the farmers to prevent the agricultural commodities. The objective of this project is to build a system which protects the crops from rotting and over ripening. The aim is to propose a new framework and develop a system to make some advances towards prevention of crops.

Keywords: Prevention of Agriculture Commodity, Artificial Intelligence, Artificial Intelligence Techniques, Fertile Crops, Crop Monitoring.

I. INTRODCTION

The simulation of human's intelligence processed by machines and computer systems is known as Artificial Intelligence. AI is an emerging technology in the field of agriculture. In this paper, overview and description of the Artificial Intelligence techniques that are applied to agriculture are described. Rotting of crops and over ripening of crops is a big problem for farmers and farmers aren't able to check every single crop resulting in ruination of crops. This is the reason behind increased rate of suicides of farmers. Previously prevention of crops was done by checking crops and using pesticides to prevent the crop from insects which resulted in rotting of crops. Suppose we are available with the sensors that can be installed on crops which can give an alert to farmer if the crop is about to get rotten. In this way the farmer can have maximum amount of good crops at the time of harvesting.

A. Background

There's an old saying "food is predominant necessity of people". Activities on agricultural field or farms requires efforts in form of planting, harvesting and in maintenance of crops. These activities needs labour, money, energy and resources. In this new era, where every thing is technology, agriculture is also becoming digital. We can make use of technology for replacing some of the human activities in the agricultural field and can guarantee productivity.

B. Motivation

Agriculture and agricultural activities are slowly becoming digital and Artificial Intelligence is an emerging technology in the field of agriculture. There are three major categories in which Artificial Intelligence is emerging at a very fast pace (i)agricultural robotics, (ii)crop and soil monitoring, (iii)predictive analytics. A lot of technical companies are investing in building up various algorithms that are becoming beneficial in the field of agriculture. Image Recognition, Satellite Imagery, Crops Monitoring by Drone are some AI techniques used in Agriculture.

II. LITERATURE SURVEY

A. Technology in Agricultural Field

India is an agriculture based country and farmer community is the backbone of the agriculture sector. Agribusiness is one of the important segments of agriculture sector. This paper aims to minimize agribusiness risk by deploying the agribusiness knowledge to the farmer community. In this context, this paper intends to build a system which helps in protecting the crops from rotting and over ripening. The aim is to propose a new framework and develop a system to make some advances towards prevention of crops.

Various sensors have been introduced and brought to use in agriculture and agricultural field. Technology is being increasingly used in farms for growing crops to harvesting them, from tracking systems to watering, ploughing and seeding. Satellite, Drone, GPS, etc. are being continuously used in the agricultural field for better results in farming practices. Agri-Robots are being newly introduced to the farming practices which will help in reducing labour efforts and can be beneficial to farmers.

Engineers have come up with a new wearable sensor (fig.1) in plants that can help in measuring the water consumption in crops.



Fig.1. Wearable Sensor attached in Plants

B. Artificial Intelligence in Agriculture Commodities

According to Abdul Rehman (2016) – "Earlier some basic technologies likes machines, tractors have changed the

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agricultural process. But now adoption of modern technologies like GPS locators, self-steer programs, electronic sensors can helpful in better production of crops and saving fertilizers and seeds". [1]

According to Dieisson Pivoto (2018) – "Smart Farming i.e. using Cloud Computing, Artificial Intelligence and Internet of Things into farming should be introduced in farming methods. A survey was conducted in Brazil which resulted in lack of Smart Farming evolution and farmers are not educated enough and doesn't have the ability and skills to understand and use Smart Farming tools". [2]



Fig.2. Wearable Sensor attached to tomato plant

Fig. 2, shows a sensor connected to fruit tomato to determine its shape, size, color and firmness.

According to Anup Vibhute (2014) – "Image processing is an effective technique used in agriculture. Image processing techniques with distinct spectrum like infrared, X-ray and hyper spectral imaging were used. This technique can be used for analysing agronomic parameters". [3]

According to Hooman Fetanat(2015) – "Data mining is used to find coorelations and patterns in a lot of fields with large relational database. Regression technique displayed the effect of chlorophyll content on number of flowers" [4]. According to Abraham Gastelum Barrios (2011) – "Image Processing technique was used to determine the quality of fruit 'Tomato' shape, size, color and firmness". [5]

According to Xiao Chen(2010) – "Varieties of corns were identified based on its shape, colour and geometric features using Neural networks and discrimination analysis". [6]

According to Neha Kaushik (2017) – "Robots can be used on agricultural field for harvesting, ploughing and seeding purposes. All these farm activities can be done by one robot to reduce labour efforts".

According to Ronald P. Haff (2008) – "X-ray Imaging technique can be used for detecting the defects in food and contamination in food. X-ray technique detected that packed food in plastic, metal, glass etc contained much more defects than fresh produce". [7]

According to Sushil Kumar Choudhary (2016) – "Cloud Computing can be very helpful for all the agricultural related data like soil, fertilizer, pesticides, weather etc. This will improve Nation's economic condition, prices of foods etc., enhance the GDB of country and growth in agricultural commodities". [8]

According to D Ramesh (2013) – "Techniques of biclustering can be adopted for identifying useful and important information from agriculture and agricultural-related data sets". [9]

According to D.K. Sreekantha Desai (2016) – "Monitoring of Crops has been made easier and efficient with the help of Internet of Things by using wireless sensors. With the help of these sensors farmers are aware of their crops conditions everytime and anywhere". [10]

According to Yunseop Kim [11] and R Balamurali (2010) – "Wireless Sensors can be used for water irrigation monitoring and control that contains numbers of sensor nodes with network capability. This system is very is to install and can be installed in local residence for monitoring water irrigation system using wireless sensors and networks". [12]

According to M.C.S Geetha (2007) – "Information Technology can play a major role in crop yield prediction and help in better decision making". [13]

According to Yichun Xie (2008) – "Remote Sensors like MODIS, TM, LANDSAT, ASTER, SPOI etc can be used for mapping the vegetation that provides information of natural and manmade environments". [14]



Fig.3. "CI-340" A portable photosynthesis system tool

Fig. 3, CI-340, is a portable, light-weight and durable photosynthesis system tool to measure respiration, transpiration, internal CO2 etc.

According to S Pongnumkul (2015) – "Smart Phones can be used in agricultural field for beneficial results as now-a-days smart phones are built up with many physical sensors that can be used in various farming practices and these phones are easily affordable. Various Applications can be created for these smart devices to help in better agricultural practices". [15]

III. PROPOSED MODEL

This paper includes a system which can help in protecting the crops from getting rotting or over ripe. This model includes a sensor which can be installed on the leaves or crops and the sensors already have the database attached, the

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database consist of different images of rotten crops and over riped crops.

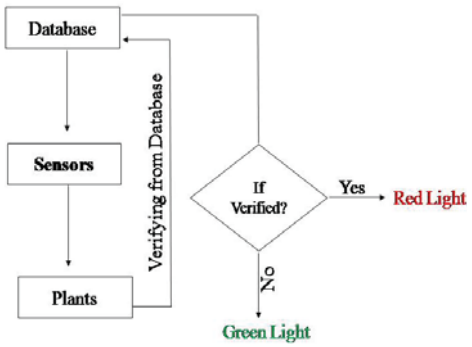

Fig.4. Figure.4 – Flowchart for Prevention of Agricultural Commodities

As shown in fig. 4, Sensors will be attached to crops. A database is connected to sensors having different images of rotten crops, if the current image of crop is matched with any of the image in database then the sensors gives Red light as an alert and if the crop is in good condition it gives Green light as alert.

If the sensor gives red light as alert, this means that the crop is getting rotten or is being over ripe. This alert will help the farmer to cut the crop and get rid of it so that this problem doesn't spread in any other part of the crop.

IV. CONCLUSION

This system is proposed to provide help to the farmers for checking and knowing the condition of the growing crops easily. Also, the farmer will easily be able to know about rotten and over riped crops. This system will help the farmers to monitor their corps in the field easily and to get rid of bad crops resulting in harvesting maximum amount of good crops.

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