USE OF ARTIFICIAL INTELLIGENCE IN AGRICULTURE

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Abstract : Since the initiation of human race, we have been rapidly consuming resources in order to survive on this planet later, also for wants and leisure . The human race is expanding rapidly , UN quoted that the earth's population will reach above 2 billion and as the population expands so will the basic and leisurely needs and wants will, but one of the most basic needs that we have is food , it is essential for the proper functioning of human body and mind and in Post green revolution we witnessed an increase in the output of the agriculture. But in order to sustain the ever increasing population we need another revolution. In this article we will discuss how we can implement IoT (internet of things) and AI (artificial intelligence) in modern agriculture in order to increase output and to decrease the input.

SCOPE OF ARTIFICIAL INTELLIGENCE IN AGRICULTURE

In a country like India where 58% of rural population is still dependent on agriculture in indirect or direct manner.Most of the farming done by farmers in the rural area is of an organised manner and very scattered agriculture techniques. The industry is in dire need of skilled and educated farmers.
Adoption of artificial intelligence and machine learning both in terms of agricultural production in field farming techniques can be a game changing move in the sector.
Some of the search techniques is cognitive computing which uses various predetermined data sets and special monitoring tools to monitor each specific batches of crops in order to analyse their growth and health to maximize efficiency and effectiveness. Farmers can also be given advice by experts of each specific fields of agriculture based on on the data that is being recorded by the system.Adopting such techniques would mean that more manual labour can be utilised in order to increase output.
Now will talk about some of these techniques which can be implemented in the agricultural sector

IMAGE PROCESSING

With the help of drones and high resolution cameras in constant 24 hour surveillance of each and every single plant in batches ,we can collect the data and process it with the help of a machine learning algorithm trained it with pre-determined data sets in order to determine the health and growth of individual types of plant as well as to group the relevant data together in order to organise the data and inform the certified person regarding the issues found.
This technique can also help in harvesting where it can inform the farmer regarding where each batch of crops in terms of harvesting status which will result in decrease in wastage of resources by constantly monitoring and responding the data to the machine learning algorithm, which in turn will organise the data and inform the farmer regarding the status of the crops.

Internet Of Things (IoT)

With the help of arduino and different type of sensor we can gather huge volumes of data everyday both in organised and unorganised format . Historical data such as weather patterns rainfall research pattern pest infestation, high resolution data for soil testing and proximity sensors can help analyse

the soil and provide better characterization of the soil based on the crops that will be cultivated on it. Cognitive IoT solutions can process all this data and provide strong insight towards the the conditions of the plants as well as the environmental conditions.

Sensors such as moisture sensors and heat sensors can also collect data and process it within the predetermined threshold and take any actions necessary if required or inform the farmer regarding the issues and provide them what measures have to be taken.

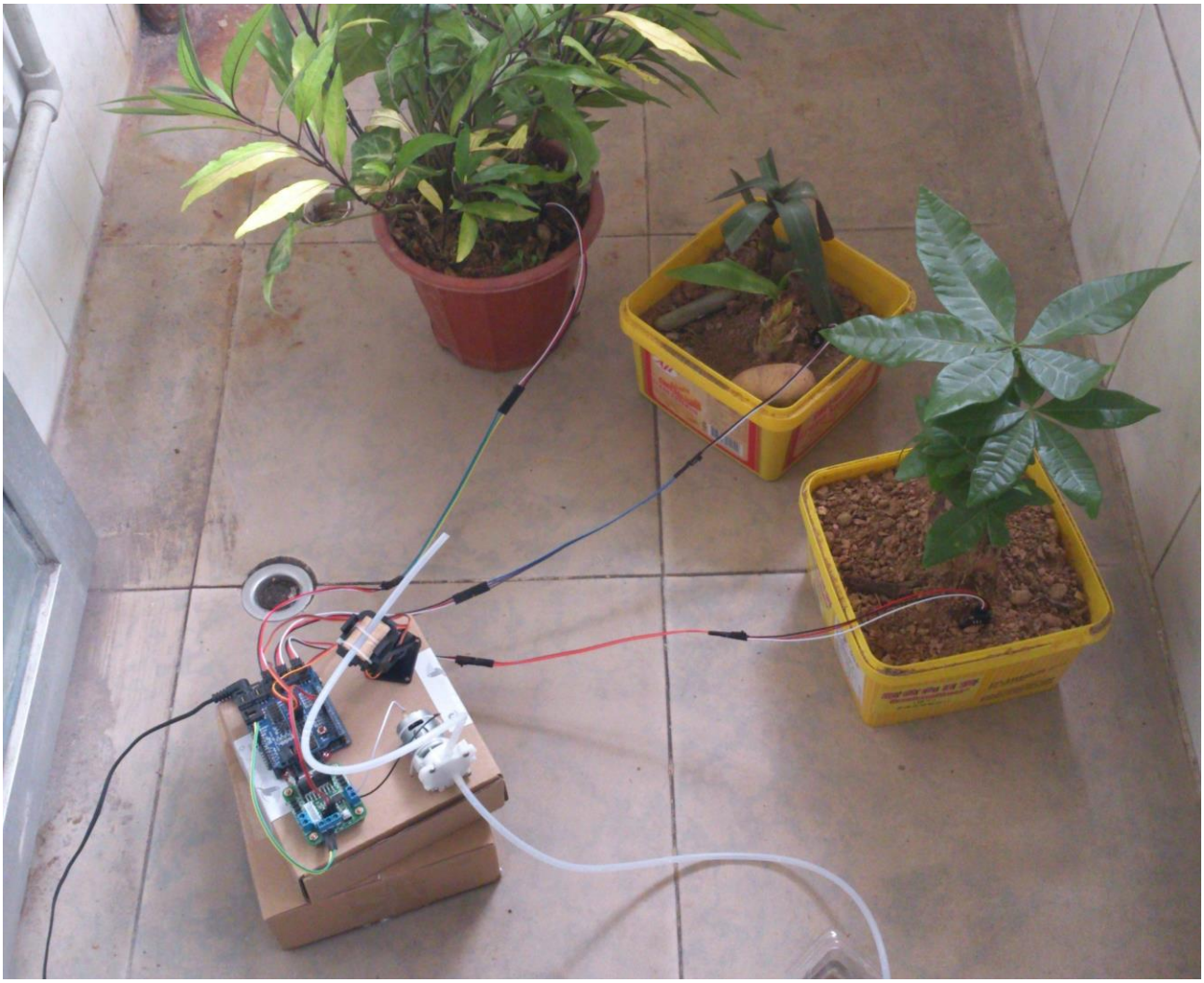
Such solutions can also help analyse the use of fertilizers and pesticides effectively so as to reduce the toxicity levels of the plants and as well as provide better utilisation of resources.

Certain different other sensors can also be used to detect pest such as recently seen desert locust this type of tools will work by monitoring the crops and analysing whether the crop is being attacked by any pest or not, if it detects any type of pest it will produce certain frequencies which can hopefully get rid of pest infestations

Automatic irrigation

With the help of IoT, we will have a huge amount of database that we can analyse and then we can determine how, when and how much of irrigation has to be done to a certain type of crop as different batch of crops require different levels of irrigation and have different times also.

Automatic irrigation system will work on the basis of predetermined data sets and also current information of different enviromental components and analyse how and when the plant needs water and regulating the exact amount of water and hence other resources that have to be put in the crops in order to reduce wastage of resources which once again helps in the ultimate cause of increasing output and decreasing input



Crop Prediction

Knowledge of the areas under different crops is important for agriculture, predicting crop areas for smaller areas such as States has generally not been attempted due to lack of available data from service from these area

The machine learning model will analyse the different environmental components and regulate the control components in such order that the yield of the crop is maximized. Further by the help of data such as future weather prediction and previous year data. The dynamic components of the environment can be somewhat predicted and damage due to such components can be prevented. Here satellite data in association with farm level survey observation has been the subject of considerable research .
Recently, in US (United States) county, there have been attempts to predict the area under corn and soybean farms .A linear regression model specified for the relationship between the reported hectares of corn and soybeans within sample segments in an area for a certain period of time. A nested error model defines correlation structure among regulated crop hectares within the countries.
in this system mean hectares of the crop per segment is obtained by the sum of component involving unpredicted parameter and the dynamic component to be predicted.Variance component estimator in the nested error model are defined and the generalized least square estimators of the parameter of the linear model are obtained.Predictors of the mean crop hectares per segment are defined in terms of these estimators.An estimator of the variance of the error in the Predictor is constructed including terms arising from the estimation of parameter of the model. In this model the mean hectare of crops of soyabean and corn is predicted. Standard as of the predictions are compared with the competing predictors .The suggested predictor for the county mean crop area per segment has standard error that is considered very less than mean of the traditional methods of agriculture.
This suggest that machine learning and algorithm can prove very effective and efficient tool to increase the output and decrease the input in cultivation of crops.The suggesting that these techniques have infinitely many many purposes for different areas in the upcoming future.

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