



# Extending Artificial Intelligence into Agriculture

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**Abstract:** Agriculture plays a major role in the economic sector. Being the backbone of major nations like India, Agriculture do face lot more challenges than any other domain. Automation in agriculture is a major concern and a topic that is emerging around the world. The population is growing and with this increase in demand for food and work is increasing. The traditional methods used by farmers were not sufficient to meet these needs. Therefore, new automated methods are introduced. These new methods have met the needs of the diet and provided jobs for billions of people. Artificial Intelligence in agriculture has brought about change in agriculture. These technologies have protected crop yields from a variety of factors such as natural disaster, climate change, population growth, employment issues and food safety issues. Of particular concern to this paper is the research into various applications of Artificial intelligence in agriculture such as irrigation, sensory spraying and other methods installed on robots and drones. This technology saves excess water consumption, pesticides, maintains soil fertility, and aids in the efficient use of human energy and increases productivity and improves quality. This paper examines the work of many researchers to get a brief overview of the current use of automated agriculture. Smart decisioning and language understanding are the key techniques that facilitates Agriculture easing out manual labour with pre-programmed machine learning.

**Index Terms - AI, Cloud, Agriculture, Azure, Data, Prediction, Algorithms, Testing, AI Services, Indexes, Analytics, Sensors.**

## I. INTRODUCTION

Artificial Intelligence mimics human intelligence in machines. Imitation is achieved through a system of human behavior and communication. Powerful AI will handle complex tasks and try to be like humans. There are consequences involved when we want a complex algorithm to be used in the beginning. It requires a thorough and detailed analysis of the largest amount of data taken from around the world. Insightful responses are provided by Cloud-based AI services.

## II. AI SERVICES

### 1.1 Smart Decisioning

Enabling Anomaly detection can help mitigating risk at the earlier stage. Integrating time series data from multiple sources can help providing accurate results. There can be many levels setup in Anomaly detection and hence providing more control into the machine that is programmed with Anomaly detection. Metrics advisor helps monitor the performance of the data we have. It also supports Micro level analysis and configuration of Alerts in case of any emergency. Personalized UI with user needs tailored and displaying appropriate and critical content is also available to make smart decisions at ease.

### 1.2 Language Understanding

Provides reading skills that can enable the user to hear translated the content in his or her own language. Focussing on key content can help user to have a pair of focussed eye on it. The source of data could be any format such as audio or video or in text format. It will process data and highlight important events, climate change, forecast weather and anticipating natural disaster, thus raising a warning alert to farmers and take necessary precautions as and when needed. Transliteration is also possible, which will convert the language to a language that is known to the user based on user's language. Asian nations like India being multi-lingual, has same languages literated in different cultures. So, educating farmers in this line is way upward than ever.

## III. AZURE COGNITIVE SERVICES

Azure Cognitive Services are AI based service provided by Microsoft in its cloud platform. The services are available in PaaS and SaaS model. The data available in cloud and providing a way to customers to upload custom modelled data is a significant step for end users.

Most of the services are available out of the box and all we need to is to plug in at right place and customise to satisfy our needs. Azure stays on top in providing excellent and easy to understand services with minimal expertise needed on Machine Learning. Thus efforts saved on development can be invested into research based on culture and climate in different parts of the world.

Weather forecasting services can be integrated into the software to detect and forecast heavy rainfall. Notifications and alerts can be raised and communicated to farmers via email, sms and social media. Thus, farmers can be informed well in advance and get necessary preventive support from neighbourhood and Government. In this way, the wastage of crops can be avoided.

Farm land needs to be irrigated in a gentle flow without getting stagnated. At times, when water level reaches to top height in dams and other reservoirs, breaches can happen which cannot be easily stopped. To mitigate this, we will setup a cross constructed pipe lines, which will be opened up in case of any breach alert. The breach alert can be configured to raise alarms as well based on the pressure and amount of water flow. In this way, we prevent only regular flow of water for irrigating crops in farm land. This regulated flow of water and predicting climate changes upfront, does maintain the soil fertility level and yields more. Manual intervention is very less and does not have to be available round the clock.

Sensors are fixed in IOT based minute devices which are attached to a drone or a movable object. This device is connected to cloud database and are up to date with recent and more accurate data. This device can also be controlled from remote location based on the criticality of the environment. Pesticides are filled up and can be sprayed only on need basis not as a mandate procedure over a period of cycle. Farmers can understand the farm land environment, from remote based on insightful information from AI Cloud services, and can act accordingly.

### 1.5 Conclusion

The results obtained from AI based services conveys that it is widely adoptable in geo-specific regions. However, for effective results, it is recommended to get data sources from within the region of nation where we will apply this solution. Knowing the climate and monsoon changes being unique in its own way in different geographic regions, it is fair enough to agree on this recommendation. AI being a top notch service in reducing manual labours and saving cost in a long run, it is the way ahead of all other domains. When incorporated into Agriculture, this can take nation's economy to higher levels and sustain people healthy and safe without any risk.

### REFERENCES

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