

# Technical Review- NLP and AI Startups in AgriTech

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## Introduction

Industry and practitioners of machine learning are finding new areas of application for machine learning. Natural Language Processing (NLP) i.e., Text retrieval and analysis as well as Computer vision are such machine learning technologies that finds application in helping improve day-to-day life for humans in service industry ([call centers, chatbots](#)), healthcare and drug discovery, agriculture, and others that are data intensive and data driven. This document explores the use of machine learning (NLP, Computer vision) as well as startups that use these technologies in the agriculture and Agro sectors

## Application of NLP and AI in AgriTech

According to International Fund for Agriculture Development ([IFAD](#)) there are around 500 million small and medium-sized farmers that are unorganized and lack access to machine learning technology both in developing countries as well as in developed countries. These small and medium-size farmers are typically generational farmers and have a very good understanding of their land and crops that they cultivate. Use of Machine learning technology can immensely help improve the productivity for agriculture sector and enable access to food, improve quality of food produce for general population.

NLP in agriculture would enable farmers from various regions that speak various regional languages to exchange their knowledge and information in their local languages and be able to be consumed by others in the target local languages. Additionally, illiterate farmers can use voice assistant that uses NLP and share the knowledge to illiterate farmers. This will remove the barriers for information exchange between the farmers and consume knowledge that can help farming and overall productivity. Governmental organizations can share the knowledge they have about soil types, rainfall patterns and minimum support prices for the crops that farmer grows in farmer's local language using NLP (Opensource packages: [Wink](#))

Startups like WeFarm<sup>[3][6]</sup> have implemented a platform that runs on Cloud and uses NLP and SMS to enable information sharing amongst farmers. This has enabled farmers to identify pests in their crops, diversifying crops, getting access to organic seeds and gaining knowledge of prices for the crops they grow. WeFarm's NLP libraries have created models that identify regional languages in Africa and as well as English. WeFarm also ensures that disinformation is prevented by monitoring the information exchange. All of this is possible due to NLP and machine learning technologies that are deployed. Startups have access to cutting edge GPUs that are made available by Cloud providers (AWS, GCP, Azure, OCI) which enables them to innovate in machine

learning in a much faster pace. Platforms such as WeFarm can be a way for governmental organizations to collaborate with for-profit organizations to share the resources that government makes available for small farmers. The information sharing by small farmers will also enable technology to capture the patterns of disease in various regions and enable government/agriculture business to direct their products where the resources are most needed.

Companies like Libelium employ IoT and Machine learning technology for enabling precision agriculture to increase crop yield, raise productivity and reduce consumption of agricultural inputs. Libelium makes use of IoT devices to collect the data regarding the soil types and climate/weather. This enables farmers to monitor their large fields and capture the micro-climate of the farmland. Once the data is collected, AI is used to generate predictive models for irrigation as well as create real-time monitoring and analysis reports to provide suggestions on use of the quantity of agro-chemicals.

[Superb AI](#) is another company that uses Computer vision to create data labels for agricultural and aggrotech companies. This company's technology enabling increase crop yields, pest control implementation with the help of visual data and image-based analytics. Data is captured through IoT sensors, aerial and still images. The image and data collected is used by Computer vision and machine learning is used to label the data and provide recommendations for soil moisture monitoring to enable precision irrigation, enable animal health checks, enable crop health diagnosis, plant recognition and classification of weeds.

## Conclusion

Application of Machine learning in agriculture requires lot more research and work. Especially in the areas of Text mining for agriculture and need for its availability in multiple languages. With the increase in world population growth and impacts of climate change on agriculture, the food security for humans can be secured by optimizing the use of natural resources by applying machine learning techniques on data collected through IoT sensors and imagery, increasing information sharing using NLP techniques to increase farm productivity as well as using text mining and retrieval methods to detect disease patterns to help dissemination of solution to mitigate problems in crop yield. Overall, machine learning helps optimal use of natural resources to create food security for the world population. Machine learning can kick-off a industrial revolution through its vast application in Agriculture, Healthcare and other areas that impact day-to-day life of humans.

## References

- [1] <https://winkjs.org/blog/nlp-in-agriculture.html>
- [2] Superb-AI - <https://www.superb-ai.com/solution/agriculture-agritech>
- [3] WeFarm - [how-wefarm-using-nlp-and-sms-powered-cloud-help-farmers-share-knowledge](#)

- [4] Libelium - <https://www.the-iot-marketplace.com/precision-agriculture/>
- [5] <https://www.ifad.org/documents/38714170/40706188/Smallholders+can+feed+the+world>
- [6] <https://wefarm.com/moja>
- [7] [Top 8 AI Applications in Agriculture | AI in Agriculture \(revolveai.com\)](#)
- [8] [Agrobot: An Agricultural Advancement to Enable Smart Farm Services Using NLP by Susheel Gounder, Mahaleppa Patil, Vishal Rokade, Nikita More :: SSRN](#)
- [9] <https://www.frontiersin.org/research-topics/35711/semantics-and-natural-language-processing-in-agriculture>
- [10] <https://www.wur.nl/nl/artikel/Application-of-NLP-for-a-question-answering-system-for-novice-farmers.htm>