

# **SIT799 Human Aligned Artificial Intelligence**

## **Pass Task 1.1: Case study for AI and Society**

---

### **Artificial Intelligence in Agriculture:**

The role of AI and its impact on various industries has led to many research and experiment of its implementation in various new areas. One such is in the field of agriculture precisely for grain production which plays a vital role in the global economy. The increasing need and demand for efficient and safe food production has required for innovative solutions, of which AI algorithm techniques like DBN (Deep Belief Networks) along with Computer Vision (Shah, 2016) has helped in construction of robust methods to be applied in field of agriculture.

In agriculture the use of image process and computer vision applications have vastly grown, as tasks such as manual grain assessment can be challenging even for a trained eye. That is how these techniques have grown popular due to their reduced equipment costs, higher computational powers and many other advantages over the traditional approaches (Barbedo, 2016).

The use of neural network algorithms enables for analysis of massive volumes of data, regardless of complexity, quickly and accurately. In terms of agriculture the use of such algorithms combined with computer vision and high computational powers can help in pattern recognition amongst the grains either for disease detection (Chung, 2016) or factors for higher quality and quantity of the yield. Image pre-processing such as collecting data, feature extraction and feeding the relevant data to train the algorithm and automating the entire process in the end. The extraction of attributes that characterize the important and influential feature is equally or more important than the algorithm that trains on it to provide the necessary desired outputs. Factors such as grain disease and insect infestation, detection and evaluation of leaf spots, recognition of fungal colonies (Boniecki, 2014) which are visual are the deciding factors for the quality and quantity of any yield. It is here where the ANN (Artificial Neural Network) based on MLP with layers can be used to detect and curb the problem at an early stage for the greater benefit of the produce.

The use of AI in the field of agriculture can only be of great importance and not of any harm or drawbacks to the industries which is

applying and making use of this available technology. In fact, it is one such field where the use of such tools can only bring positive feedback and none of the negatives.

Application of AI tools such as these which are for the greater good of the mankind while adhering to the ethics are growing at a greater scale through out every possible industry. While automation can lead to a more efficient solutions, there is still yet to be a widespread acceptance of the same.

## References:

1. Barbedo, J., 2016. A review on the main challenges in automatic plant disease identification based on visible range images. *Biosystems Engineering*, 144, pp.52-60.
2. Boniecki, P., Piekarska-Boniecka, H., Świerczyński, K., Koszela, K., Zaborowicz, M. and Przybył, J., 2014. Detection of the granary weevil based on X-ray images of damaged wheat kernels. *Journal of Stored Products Research*, 56, pp.38-42.
3. Shah, J.P., Prajapati, H.B., Dabhi, V.K., 2016. A survey on detection and classification of rice plant diseases. In: 2016 IEEE International Conference on Current Trends in Advanced Computing (ICCTAC), pp. 1–8. doi:<https://doi.org/10.1109/ICCTAC.2016.7567333>.
4. Upov.int. 2020. [online] Available at:  
<[https://www.upov.int/edocs/pubdocs/en/upov\\_pub\\_221.pdf](https://www.upov.int/edocs/pubdocs/en/upov_pub_221.pdf)>  
[Accessed 26 July 2020].
5. Chung, C., Huang, K., Chen, S., Lai, M., Chen, Y. and Kuo, Y., 2016. Detecting Bakanae disease in rice seedlings by machine vision. *Computers and Electronics in Agriculture*, 121, pp.404-411.