**Crop pest and disease detection and classification**

**Introduction**

A crop is either a plant or a product of a plant that is grown and later harvested for either commercial or subsistence purposes. Crops contribute highly to the diet of both human beings and animals. Due to the rapid growth of the population of the world, there is an urgent need for the worldwide agricultural production to be doubled by 2050, so as to meet the increasing population. This has however not been achieved, on the contrary the has been a 36% decrease worldwide in crop production due to weeds, plant diseases and insects. Diseases alone have contributed to 14% decrease in crop yields.(Mohd Yatoo *et al.*, 2021). The impact of pests and diseases could happen before and after harvest. It is estimated atleast 30-40% of global production in agriculture is destroyed by pre- and post-harvest pests and diseases. (Guest, 2016). The losses by plant pests and diseases are a global problem, since they endanger food security and cause serious losses in production.(Niekawa *et al.*, 2021). Crop pests and diseases are also a health hazard to plants, animals and humans. Plant diseases interfere with some common plant processes, such as photosynthesis and can cause infections to humans and animals (Al-Sadi, 2017). It is very important to detect crop pests and diseases so as to mitigate the losses they cause and also to boost production in agriculture(Ahmed and Yadav, 2023). Artificial intelligence has played a major role in plant pests and disease detection and classification.

According to (Liu and Wang, 2021) Plant diseases and pest detection is a technology that uses machine vision equipment to acquire images and then determines whether there are diseases and pests in the images. This technology is currently being used and has replaced the traditional approach of identification using the eye. This technology uses either conventional image processing algorithms or classifiers plus manual design of features by making use of different properties of plant disease and pests to design an imaging scheme that can choose the appropriate light source and shooting angle producing images with uniform illumination.

According to (Liu and Wang, 2021) the requirements of plant disease and pest detection are divided into three levels i.e. what, where and how which correspond to classification task, location task and segmentation tasks in computer vision respectively. *What* gives only the category information of the image, *where* gives the type and specific location of diseases and pests existing in the images and lastly, *how* equals to the segmentation task in computer vision.

According to (Ahmed and Yadav, 2023) Machine learning, AI and deep learning have been used to automate the plant leaf disease detection. Deep learning however is the most common in agriculture since it has been utilized in smart farming which includes image classification, feature extraction, feature transformation and analysis of pattern, all which are often solved using deep learning.

**Plant diseases and pest detection methods based on deep lelar**

**What is a crop pest and disease detection and classification?**

**Impact of crop pest and disease detection and classification?**

**Application of big data analytics in processing crop pest and disease data**

**what still needs to be done**

**what would the impact be if we accuractly classify and detect crop pests and diseases**