Applying Artificial Intelligence for tools and data aggregation for enhancing Agriculture productivity in Tanzania (AI4Agric)

Deep Learning Techniques for Early Detection of Crop Diseases

Crop diseases are substantially problematic for agricultural yield management and a major threat to food security. Compounded with insufficient information to correctly diagnose crop diseases, can lead to significant economic loss and yield inefficiencies. However, identifying the diseases rapidly is still a difficult task in many parts of the world including Tanzania due to the lack of the necessary infrastructure. Maize and banana are among the important staple food and cash crops that are largely produced by smallholder farmers with more than 70 million people producing throughout the humid and sub-humid tropic of Africa. Regardless of their importance in the household food security and subsistence, these crops are largely affected by diseases particularly maize lethal necrosis and maize streak for maize and black sigatoka and fusarium wilt race 1 for banana. Automated detection and quantification of plant diseases would enable more rapid gains in plant breeding and faster scouting of farmers' fields. However, training a deep learning model to accurately detect a given disease from images taken in the field requires a massive amount of human-generated training data. Since, there is a lack of publicly available datasets to facilitate machine learning activities in Africa, this project proposes to generate datasets for maize and banana images and develop deep learning techniques for early detection of crop diseases.