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A Different Approach to Smart Phone-Based Wheat Disease Detection System Using Deep Learning for Ethiopia

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Abstract : Based on the fact that more than 85% of the labor force and 90% of the export earnings are taken by agriculture in Ethiopia and it can be said that it is the backbone of the overall socio-economic activities in the country. Among the cereal crops that the agriculture sector provides for the country, wheat is the third-ranking one preceding teff and maize. In the present day, wheat is in higher demand related to the expansion of industries that use them as the main ingredient for their products. The local supply of wheat for these companies covers only 35 to 40% and the rest 60 to 65% percent is imported on behalf of potential customers that exhaust the country's foreign currency reserves. The above facts show that the need for this crop in the country is too high and in reverse, the productivity of the crop is very less because of these reasons. Wheat disease is the most devastating disease that contributes a lot to this unbalance in the demand and supply status of the crop. It reduces both the yield and quality of the crop by 27% on average and up to 37% when it is severe. This study aims to detect the most frequent and degrading wheat diseases, Septoria and Leaf rust, using the most efficiently used subset of machine learning technology, deep learning. As a state of the art, a deep learning class classification technique called Convolutional Neural Network (CNN) has been used to detect diseases and has an accuracy of 99.01% is achieved.

Keywords : septoria, leaf rust, deep learning, CNN
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