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Architecture and basic principles of the multifunctional platform for plant disease detection

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The aim of our research is to facilitate the detection and preventing diseases of agricultural plants by combining deep learning and programming services. The idea is to develop multifunctional platform for plant disease detection (PDD) that will use modern organization and deep learning technologies to provide new level of service to farmer's community. Web-platform for PDD consists of a set of interconnected services and tools developed, deployed and hosted in the JINR cloud infrastructure. We are going to use the only free software and to provide open access to our image database. The platform will include web-interface and a mobile application allowing users to send photos of sick plants with some accompanying text and then obtain a reply explaining a possible cause of the illness. PDD is intended for the data management of various crop data bases needed to train and test corresponding deep neural model. The platform will also provide effective, reliable, secure and convenient tools for storing, transferring and mining of the farmer's text and photo materials. We considered several models to identify the most appropriate type and architecture of deep neural network. The PDD basic principles together with results of comparative study of various deep neural models and their architecture are presented. Up to now we reached promising accuracy result on the level over 90% in the detection of three concrete diseases on the dataset of images of grape leaves.

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