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IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing Special Issue on “Fuzzy Deep Neural Networks based Plant Disease Detection and Recognition Using Earth Observations and Remotely Sensed Data”

Several research projects have presented several Deep Neural Networks (DNN) techniques for plant disease detection in recent years. However, most research has concentrated on a single form of illness or a specific plant species. As a result, further study is required to construct a generalizable and robust model that can be applied to diverse plant species and illnesses. Plant diseases pose a significant challenge to farmers due to the high economic and environmental costs of treatment. Using non-destructive remote sensing and earth observation tools to detect potential disease risks in plants provides an alternative to present laboratory approaches and leads to better plants management. There is also a demand for additional publically available datasets for training and assessing models. Fuzzy Deep Neural Networks (FDNN) is a current trend in the field that combines the learning power of a neural network with the noise-handling capabilities of Fuzzy Logic. A fuzzy neural network is a three-layer feed-forward network that includes a fuzzy input layer (fuzzification), a hidden layer that contains the fuzzy rules, and a final fuzzy output layer (defuzzification). Fuzzy sets are contained inside the (fuzzy) connections between layers, while a five-layer network including sets in the second and fourth levels can occasionally be found.

To grasp and interpret the role of Remotely Sensed Data (RSD) in Fuzzy Deep Neural Networks (FDNN) has recently emerged as prominent trends in plant disease detection and recognition. To improve the performance of DNN models, FDNN includes fine-tuning pre-trained models on a given dataset. These methods were used to improve the resilience and accuracy of plant disease detection models. To summarize, the use of the FDNN approach in plant disease detection is a quickly developing field with promising findings. Moreover, these strategies have shown promising results in reliably identifying and classifying plant diseases. There are still restrictions and problems to be overcome.

By offering valuable insights into the current state of research in this area, this special issue is a valuable resource for plant disease detection researchers, practitioners, and industry professionals to submit their valuable articles not limited to the following topics

The broad topics include (but are not limited to):

- FDNN and DNN methods for detecting plant diseases using RSD
- Identifying and mapping cropping areas and crop types
- Current developments in remotely sensed data for plant disease detection
- Identifying plant abnormalities and infestations
- Deep Conventional techniques for identifying plant diseases and pests
- Deep learning based plant disease and pests detection system
- Mapping rainfall distribution and acid rain
- Object detection networks for plant disease detection using RSD
- New very-high resolution remote sensing data types, including nighttime, lidar, and hyperspectral
- Evaluating plant disease detection using benchmark datasets
- Few-Short learning in plant disease recognition from RSD

Schedule

01-03-2024 Submission system opening

30-09-2024 Submission system closing

Format

All submissions will be peer reviewed according to the IEEE Geoscience and Remote Sensing Society guidelines. Submitted articles should not have been published or be under review elsewhere. Submit your manuscript on <http://mc.manuscriptcentral.com/jstars>, using the Manuscript Central interface and select the “Fuzzy Deep Neural Networks based Plant Disease Detection and Recognition Using Earth Observations and Remotely Sensed Data” special issue manuscript type. Prospective authors should consult the site <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9082768> for guidelines and information on paper submission. All submissions must be formatted using the IEEE standard format (double column, single spaced). Please visit http://www.ieee.org/publications_standards/publications/authors/author_templates.html to download a template for transactions. Please note that as of Jan. 1, 2024, IEEE J-STARS, being a fully open-access journal since 2020, charges a flat publication fee \$1,496 per paper.

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