

25. Development of Deep Learning application for Inventory of Horticultural Plantations using High Resolution Datasets

Aim

The major focus of the study is to explore the potential application of deep learning techniques for inventory of plantation crops and development of a user interface module for deep learning application for operational use.

Scope

Object-based analysis (OBA) has been followed for inventory of mango, banana, citrus and subsequently adopted in many user projects for generation of plantation crop maps. Although, OBA has shown promising results for mapping of plantation crops, further updation to improve the accuracy is time consuming, requiring lot of resources in terms of computer systems and manpower. Recently, the machine learning techniques especially deep learning showed potential applications in remote sensing image classification. One of the major advantages of machine learning is the development of trained model which can be used for classification of any scene and thus, the procedure can be partially / fully automated. Several research studies have shown tremendous success of convolutional neural networks (CNN) for classification of permanent features like buildings, roads, trees, plantations etc.

Current constraints / Challenges

Availability of optimal and latest cloud free VHR satellite data during the required season is one of the limitations. In the absence of current year's data, historical VHR datasets and data from foreign satellites can be considered. Large tilt angle associated with high resolution datasets results in shadow which may impact the classification accuracy. In some areas, the horticulture plantations are cultivated as mixed cropping systems like coconut + arecanut, mango + cashew etc. Discrimination of crop types under mixed cropping system is challenging.

Expected Outcome

- Trained DL model for horticulture crop type mapping
- Plantation crop maps for selected horticulture crops
- User interface module for DL models for operational use
- User Interface module with trained model for operational use.

Timeframe

2021 – 2024