

Congratulation for seeking Govt. Sponsored Project

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Project Title: **Crop Characterization using Multi-polarization L and S bands & Biomass Estimation using Novel Deep Learning Algorithms.**

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Abstract: **Crop Characterization using Multi-polarization L and S bands & Biomass Estimation using Novel Deep Learning Algorithms.**

Crop characterization has played a significant role in numerous applications ranging from precision agriculture, natural resource management, land surface monitoring, hydrological modelling and many more. A better understanding of the complex interaction of the canopies, stress conditions and many more aspects are required to rectify the menace of climate change. The crop characterisation, either in terms of biophysical parameters, namely, fCover (fractional cover of green vegetation), FAPAR (Fraction of Absorbed Photosynthetically Active Radiation), LAI (Leaf Area Index), Chlorophyll content, fNPV (fractional cover of non-photosynthetic - brown - vegetation) or standing biomass, plays an important role in providing the insight of the crop growth status and yield modelling. Crop growth is a dynamic process, and so are the crop characteristics. The dynamic behaviours of these changes are hard to capture for which an understanding of the complexities associated needs to be monitored and understood. For example, the LAI barely changes during the grain filling stage, but the standing biomass increases. But in the tillering stage, both the aforementioned parameters change proportionally. The role of Remote sensing as a tool for crop characterisation has been a key methodology for a long time, offering extensive spatiotemporal coverage. The SAR (Synthetic Aperture Radar) and optical data have been used for crop characterization as well as biomass estimation. For ecological and environmental targets, like crops, there is an associated challenge of the scattering mechanisms that sharply varies during the phenological stages. The variation is attributed to the structures also, for example, the geometry of the crop canopies. **Due to the complexity involved in mapping the scattering to the phenological stages and the structures, retention of all the scattering power components is a must for a complete crop characterization.** The project is aimed at the data fusion of L and S Bands datasets for **Crop Characterization & Biomass Estimation using novel deep learning algorithms.**

This data fusion will result in harnessing the potential of L-band and S-band radar datasets to enhance the accuracy of crop characterization, which is crucial for efficient crop growth monitoring and yield modelling. The importance of L & S bands in capturing the forest canopy & identification of vertical structure due to its advance capability of penetration makes these bands an ideal choice for crop characterization followed by biomass estimation. The proposal is aimed at utilizing the fusion of these bands along with the data captured through field survey for building the model of crop characterization and biomass estimation using deep learning algorithms.