



MACHINE LEARNING FOR SOIL AND CROP MANAGEMENT

PROF. SOMSUBHRA CHAKRABORTY

Department of Agricultural and Food Engineering.
IIT Kharagpur

INTENDED AUDIENCE : Students of Agricultural Engineering, Agriculture, and Environmental Science

INDUSTRIES APPLICABLE TO :

1. Soil and crop testing services
2. Soil remote sensing solution services
3. AI-based agricultural startups

COURSE OUTLINE :

It is essential to upgrade traditional farming practices and prepare for a technological revolution to develop ECO-friendly systems for enhancing crop productivity. This course aims to cover the various applications of machine learning and deep learning methods for better soil and crop management. This course is specifically designed for those undergraduate students who wish to understand and apply their knowledge of machine learning, deep learning, digital soil mapping, image processing, and portable sensors for developing an integrated and advanced soil and crop management system.

ABOUT INSTRUCTOR :

Prof. Somsubhra Chakraborty is currently serving as an Assistant Professor (Soil Science) at the Agricultural and Food Engineering Department, Indian Institute of Technology Kharagpur. He was awarded various prestigious fellowships including the Australia Awards Fellowship from the Australian Department of Foreign Affairs and Trade. He did his undergraduate and M.Sc degrees from BCKV and PAU in India, respectively, and PhD degree in Agronomy (Soil Science emphasis) from Louisiana State University, USA. He started his career as a post-doctoral researcher at West Virginia University, USA. He joined IITKgp as faculty in 2016. His research interest is the use of proximal and non-invasive sensors with machine learning for soil management. He has around 80 international journal publications. He is currently serving as the member of the editorial board of Geoderma, the global journal of soil science.

COURSE PLAN :

Week 1: General Overview Of ML And DL Applications In Agriculture

Week 2: Basics Of Multivariate Data Analytics

Week 3: Principal Component Analysis And Regression Applications In Agriculture

Week 4: Applications Of Classification And Clustering Methods In Agriculture

Week 5: Diffuse Reflectance Spectroscopy: Basics And Applications For Crop And Soil

Week 6: Use Of ML For Portable Proximal Soil And Crop Sensors

Week 7: ML And DL For Soil And Crop Image Processing

Week 8: UAV And ML Applications In Agriculture

Week 9: Hyperspectral Remote Sensing And ML Applications In Agriculture

Week 10: Digital Soil Mapping – General Overview

Week 11: Digital Soil Mapping With Continuous Variables

Week 12: Digital Soil Mapping With Categorical Variables