AGRICULTURE & IRRIGATION

Technical: Data Analytics & Emerging Technologies

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Data analytics and Emerging technologies- Use cases Agriculture

Tech Hype Cycle
- Innovation trigger
- Peak of inflated expectation
- Trough of disillusionment
- Slope of enlighten
- Plateau of productivity

High Resolution Satellites
Soil Moisture
Automatic Weather stations
UAV data
Lidar data
Aerial Images
SAR, Multispectral/Hyperspectral/Thermal
APMC prices
Administrative Boundaries

Twelve areas have been identified in total, with the most popular being

- Plant- and leaf-based disease detection .
- Land cover classification.
- Plant recognition .
- Fruit counting
- Weed identification
- Yield estimate
- Soil Moisture

Upcoming areas using CNN

- ✓ such as crop phenology,
- ✓ seed identification,
- ✓ soil and leaf nitrogen content, irrigation,
- ✓ plant water stress detection,
- ✓ water erosion assessment,
- ✓ pest detection and herbicide use, identification of contaminants, diseases or defects of food,
- ✓ crop hail damage and
- ✓ greenhouse monitoring

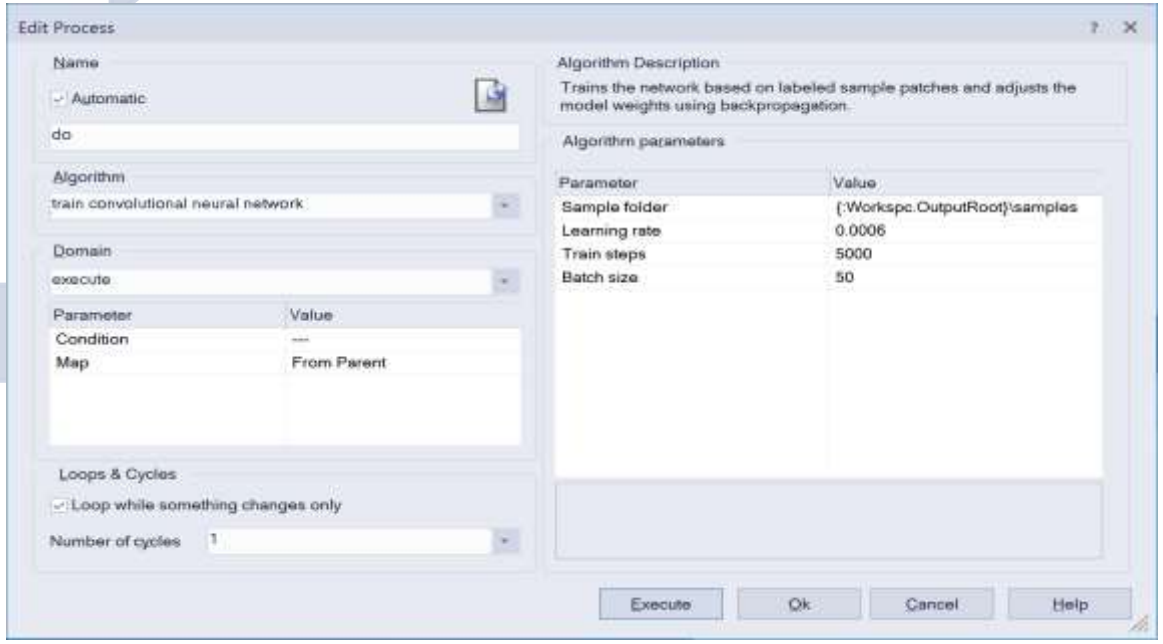
Crop suitability , Market prices , pest management ,yield, Insurances
real time insights ..or near real time

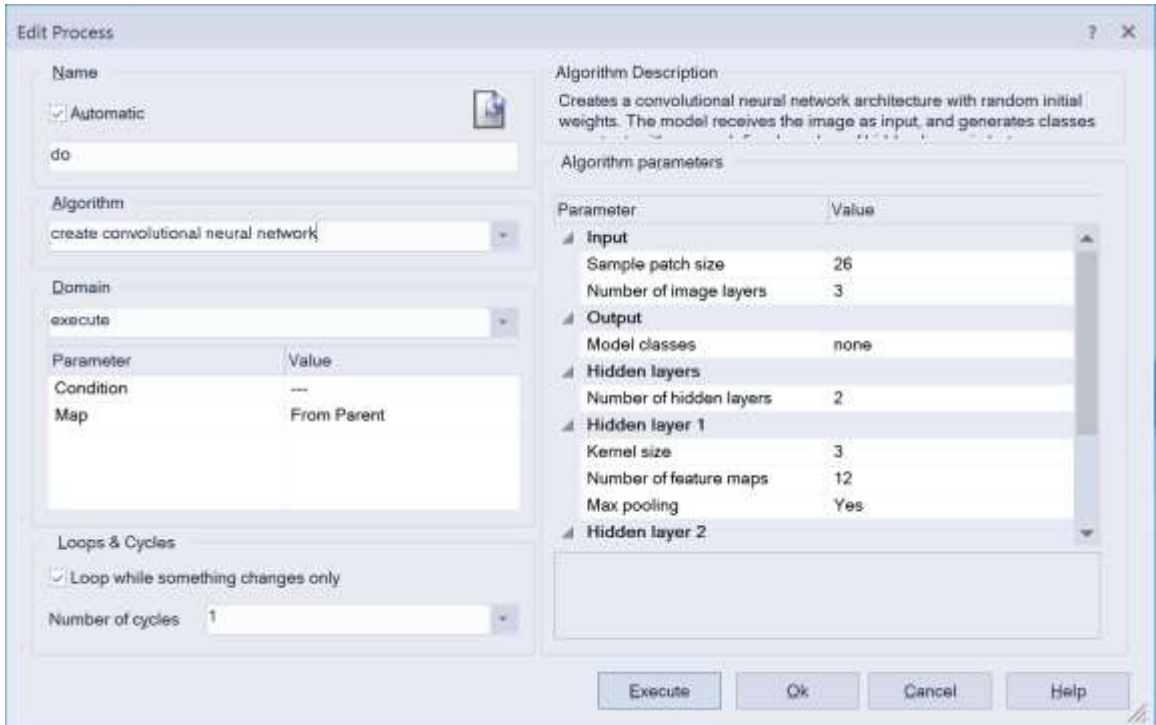
CNN – How does it work in eCognition?

- Collect Sample Data
- Create Model
- Train Model
- Apply model

Convolutional neural networks

- generate labeled sample patches
- shuffle labeled sample patches
- create convolutional neural network
- train convolutional neural network
- apply convolutional neural network
- save convolutional neural network
- load convolutional neural network
- convolutional neuronal network accuracy



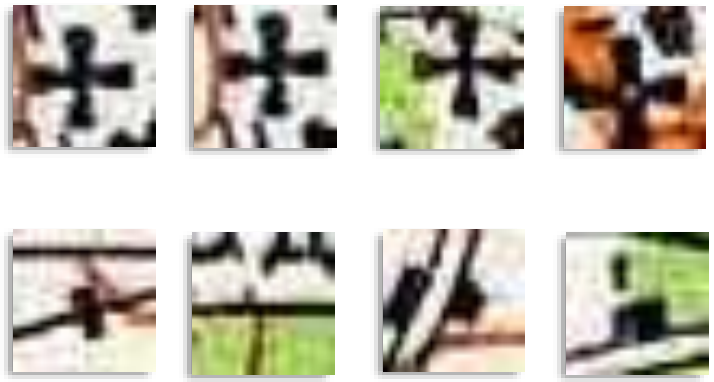


CNN in eCognition (I)

Sample Patches

TARGETS

NON-TARGETS



1. Selecting Samlpes

2. Creating model

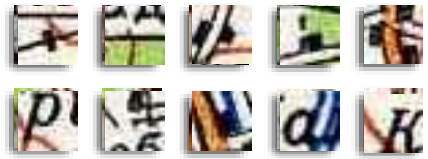
CNN Model

CNN in eCognition (I)

NON-TARGETS

TARGETS

Sample Patches



Input Image

- Define number of hidden layers
- Kernel Size
- Number of feature maps

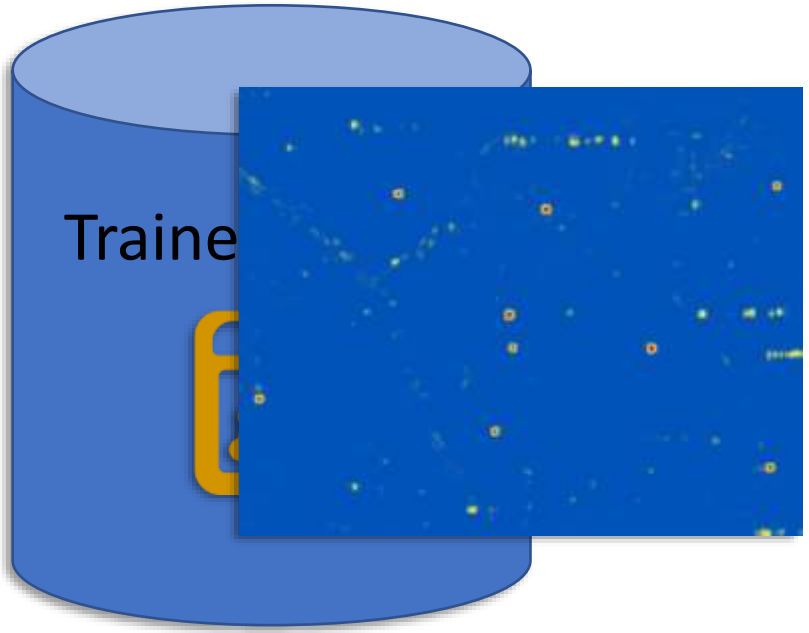
- New CNN algorithms
  - Create samples patches
  - Create model
  - Train model

CNN in eCognition (II)

Sample Patches

- New CNN algorithms
  - Train model
  - Apply Model

Input Image



Class Heatmap

Methodology adopted for Agroforestry mapping in Telangana

Dr Neelima PJTSAU

Downloading Satellite data from Copernicus website/Planet Earth website

Preprocessing (Layerstacking, Mosaicking)

Subsetting using Mandalshape file

Clipping NRSC forest area from district FCC image

Extracting forest cover area from FCC image

FCC image without forest area (obtained by clipping FCC image of study area with binary FCC forest image)

FCC image without forest area

Ground truth Samples (80 %) for Classification

Ground truth Samples (20 %) for Validation

Object Oriented Classification In E-cognition software

In eCognition , FCC image without forest area

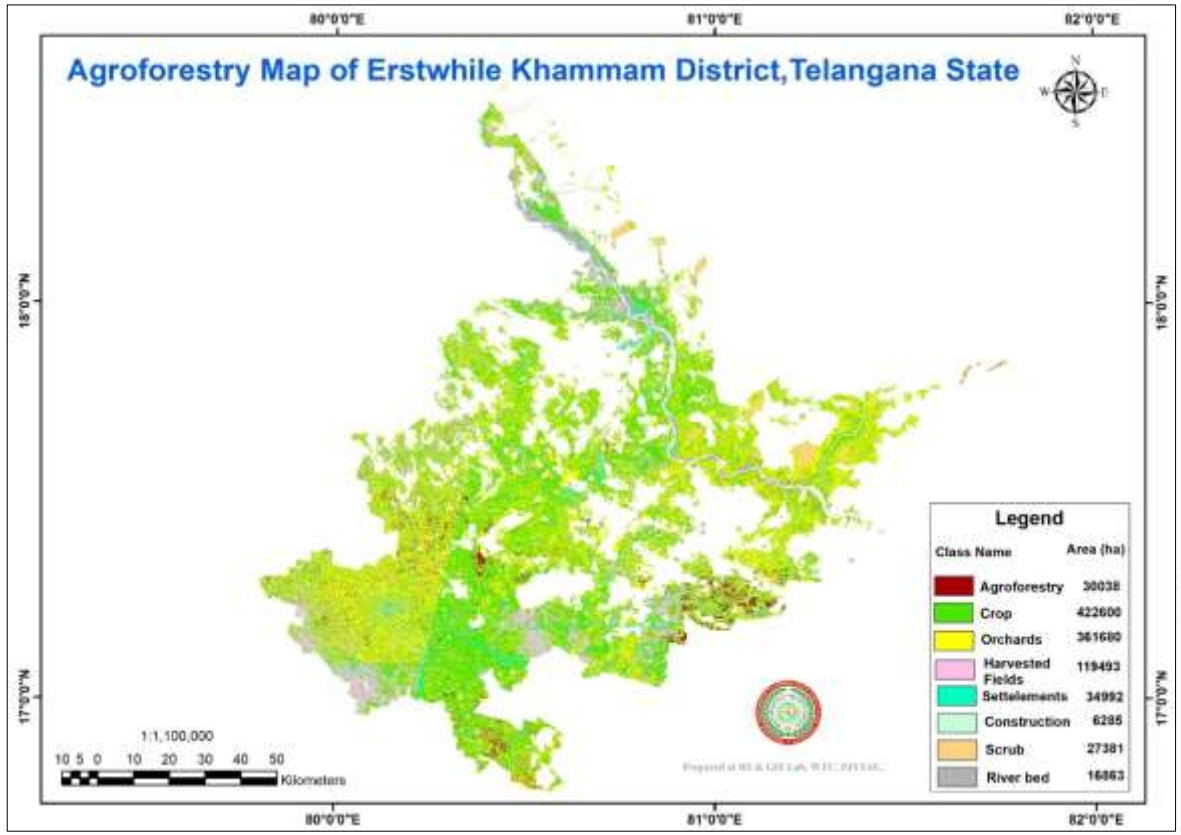
MultiResolution Segmentation with scale factor 42: shape: 0.1 and compactness:0.9

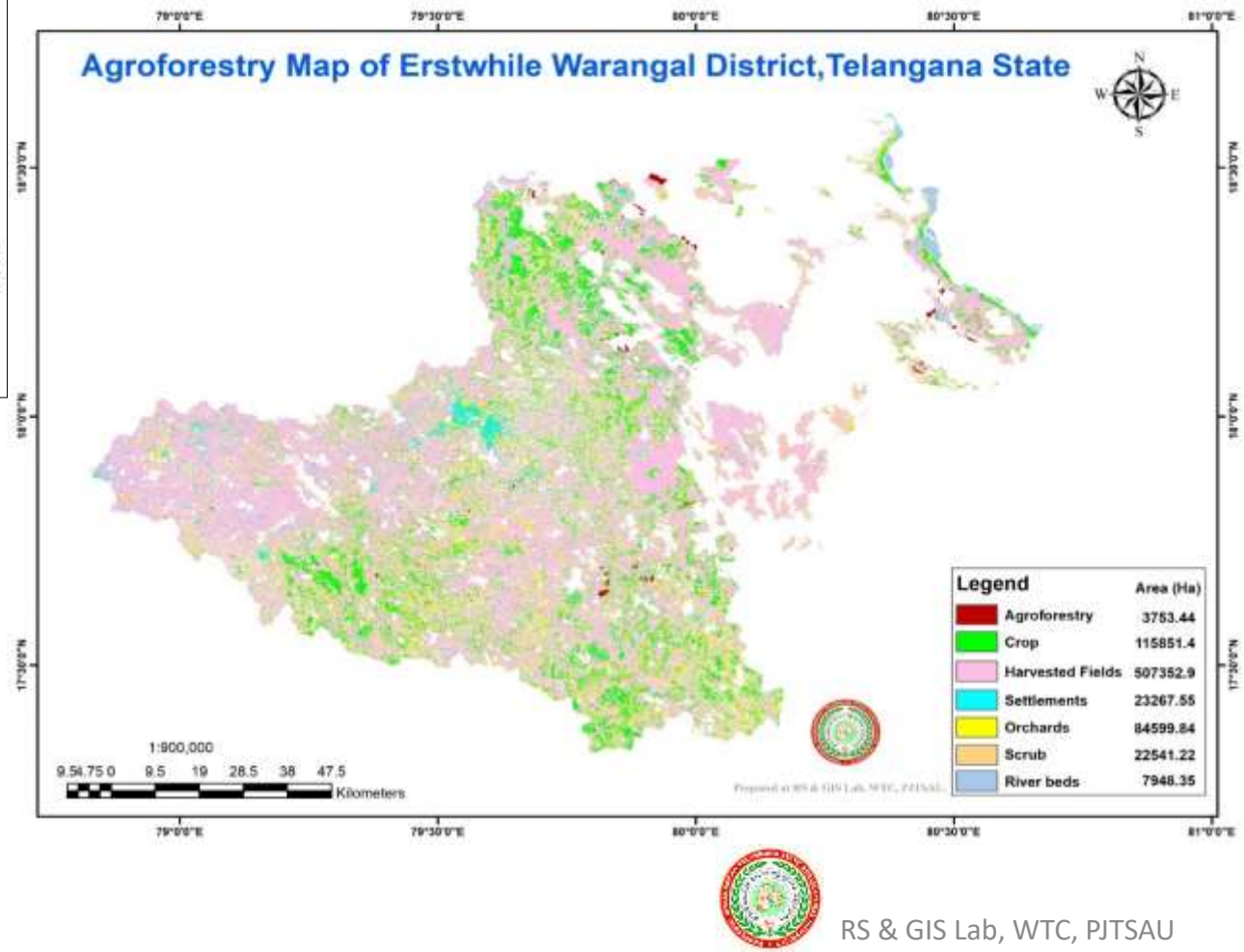
Preparing the Sample Statistics for Classification

Training and Applying the Samples with Class Names

Random forest classification (Supervised classification)

Mango Orchard Area estimation and Accuracy Assessment





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