

# Deep Hyperspectral Image Classification Algorithm for Identification of Soil Properties

Presented  
by  
  
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# Introduction

- By combining
  - ❑ imaging and
  - ❑ spectroscopy technology,
    - ❖ hyperspectral remote sensing can get spatially and spectrally continuous data simultaneously.
- The hyperspectral image can yield
  - ❑ higher classification accuracies and
  - ❑ more detailed class taxonomies.



# Soil Classification

- The remote sensing techniques has a rapid, large-scale and nondestructive characteristic feature access to information provides an effective means access to soil information.
- technology provides significant potential for rapid acquisition of soil nutrients using its continuous spectral information.
- Soil hyperspectrum can be used to discover certain soil properties through statistical comparison between soil reflectance and physiochemical properties.



# Soil Properties

- Soil reflectance in the visible near-infrared and mid-infrared regions has been widely used in many studies. Some of the soil properties predicted from reflectance data are
  - ❖ organic matter (OM),
  - ❖ soil organic carbon (SOC),
  - ❖ total nitrogen (TN), pH,
  - ❖ moisture content (MC),
  - ❖ electrical conductivity (EC),
  - ❖ Phosphorous (P),
  - ❖ Pottasium (K),
  - ❖ Calcium (Ca),
  - ❖ Magnesium (Mg),
  - ❖ Sodium (Na),
  - ❖ Manganese (Mn),
  - ❖ Zinc (Zn) and
  - ❖ Iron (Fe) with various levels of prediction accuracy.

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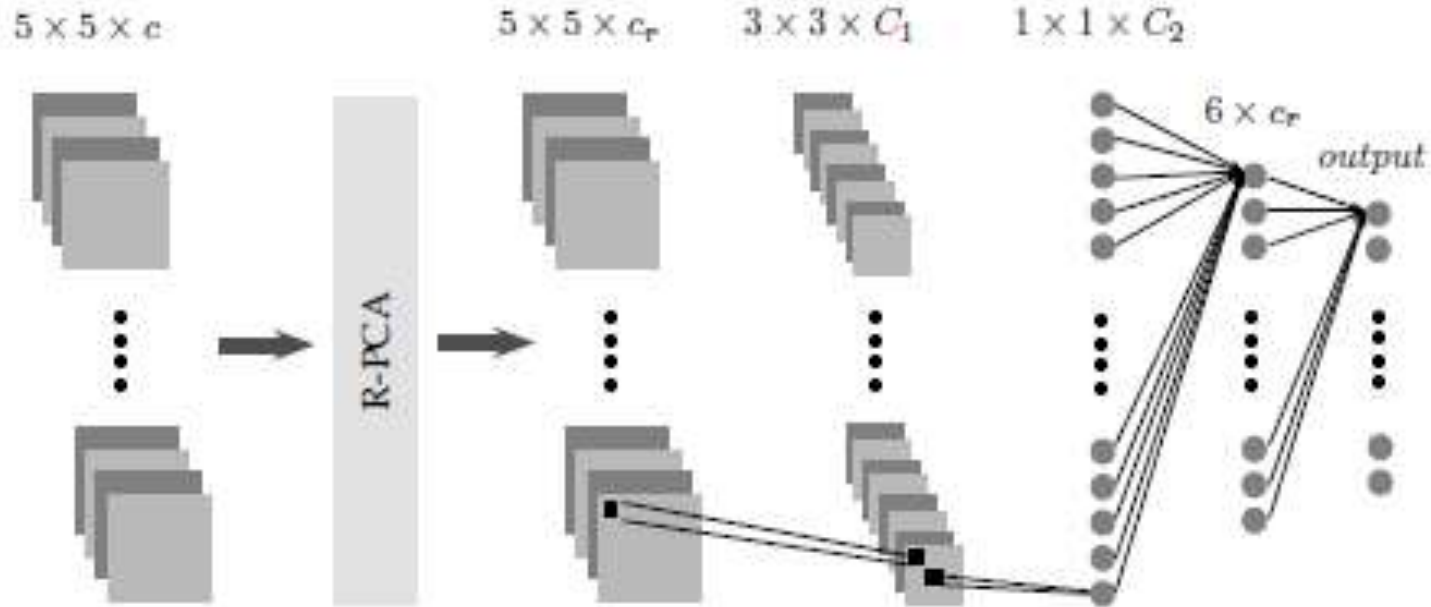
# Deep Learning

- Deep learning learns hierarchical representation, and the higher layer represents increasingly abstract concepts and is increasingly invariant to transformations and scales.
- In this paper, we focus on the Deep Hyperspectral classification, which identifies the soil properties.
- However, large marginal machines like Support Vector Machine (SVM) deals well on the classification problem.
- In most cases, SVM based methods can obtain better classification accuracy than other widely used pattern recognition techniques on HSI data.
- In this paper, we introduce deep learning based SVM algorithm for identification of soil properties using Hyperspectral Image Classification.

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# Deep Learning Architecture



Thank you

