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SVM for Remote Sensing Images

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Abstract

Background: Support Vector Machine (SVM) is a supervised classification method derived from statistical learning theory that often yields good classification results from complex and noisy data [1]. It separates the classes with a decision surface that maximizes the margin between the classes. The surface is often called the optimal hyper plane, and the data points closest to the hyper plane are called support vectors.

Objectives: Accurate thematic classification is one of the most commonly desired outputs from remote sensing images [2]. Recent research efforts to improve the reliability and accuracy of image classification have led to the introduction of the Support Vector Classification (SVC) scheme. SVC is a new generation of supervised learning method based on the principle of statistical learning theory, which is designed to decrease uncertainty in the model structure and the fitness of data.

Methodology: This case study presented herein compares the GIS-based landslide susceptibility mapping methods such as conditional probability (CP), logistic regression (LR), artificial neural networks (ANNs) and support vector machine (SVM) applied in Koyulhisar (Sivas, Turkey). Digital elevation model was first constructed using GIS software.

Results and discussion: In SVM, we take the output of the linear function and if that output is greater than 1, we identify it with one class and if the output is [-1], we identify it with another class [3]. Since the threshold values are changed to [1] and [-1] in SVM, we obtain this reinforcement range of values $([-1, 1])$ which acts as margin.

Conclusions and future work: In this blog, we have tried to explain to you about the support vector machine and how it works. We have talked about linearly as well as non-linearly separable data, also discussed kernel tricks, kernel functions and degree of tolerance in SVM

References

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- [2] Benediktsson JA, Sveinsson JR, Arnason K (1995) Classification and feature extraction of AVIRIS data. IEEE Trans Geosci Remote Sens [33(5):1194–1205]
- [3] Joachims (1999) discusses methods of making SVM learning practical over large text data sets. Joachims(2006a) improves on this work.

