

Project/Lab

Classifying Radar Returns

Team members:

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(No third yet)

Overview – Find method to classify radar returns from the ionosphere as good or bad corresponding to the presence of an object for a good return or no reflection for a bad return. The dataset we plan on using is from a radar system with a phased array of 16 antennas. The received signals were processed using an autocorrelation function which provides 34 values (17 complex and 17 real values) for each return. Each radar return was classified as good or bad by a human expert. We found a paper (1) that used neural networks train a classifier. Our current plan is to make a similar classifier using a neural network. Depending how easy it is we also may look into comparing it to other methods like the support vector machine.

Why did we choose it? The topic was fitting because it is relevant to electrical engineering and signal processing as well as machine learning. It's a great fit.

Challenges/Interesting: In order to do this we will have to learn how to implement neural networks, and what the steepest descent method is. There are many variations of ways to solve this problem so we can learn a lot by experimenting with those variations.

Core Concepts:

- Classifier
- Neural network
- Steepest descent method
- Support Vector machine

(1) Sigillito, V. G., Wing, S. P., Hutton, L. V., \& Baker, K. B. (1989). Classification of radar returns from the ionosphere using neural networks. Johns Hopkins APL Technical Digest, 10, 262-266.

Dataset:

<http://archive.ics.uci.edu/ml/datasets/Ionosphere>