Kohonen Self-Organizing Maps

By
Kyle Zeller
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ABSTRACT

Kohonen SOMs is an unsupervised machine learning technique discovered by Professor Teuvo Kohonen in the 1980s. Kohonen SOMs are generally used for taking n-dimensional information and mapping it down to a 2D representation of the input space $\mathbb{R}^n$. In this project, this machine learning technique will be applied to a clustering a set of n-dimensional input and clustering the input together by common characteristics. Then categorizing the input to have a way to interact with the program.

The application will be a form of color recognition utilizing kohonen Self Organizing Maps. The colors can be represented as vectors of (red, green, blue) components and the SOM will categorize the colors and you can then ask what color a given color vector best represents.

Incremental Design:

I will start with writing the kohonen som for this particular application using the symbolic and numerical representation above. Later I will expand on this using visualization tools to show the map adjusting during the training period. Then it could give the actual colors as what the human sees.

(Optional):

An additional part to testing the work of kohonen SOMs, could be categorizing written numbers, where the input would be the matrices or lists of the numerical data representing the written numbers. The written numbers would be of a small pixel density and the numerical data itself, could be represented again by color vectors.