State Vector Classification Algorithm:

Previous Works: Quantum Machine Learning, Measurements in of Hermitian operators on a uniform orthonormal eigen basis, Linear Mappings to R, Superposition.

Methodologies: Uses the notion of collapsing a measurement in a given basis as our classification.

Our classification can be defined as the following

Basic explanation of an SVCA:

The intuition behind how the SVCA learns and classifies data. The SVCA can be defined as the following transformation of an input vector into the proper classification set C.

Now that we have defined our prediction vector in terms of i orthogonal vector basis, we can define our prediction as the class mapped to the component of our prediction vector with the largest component.

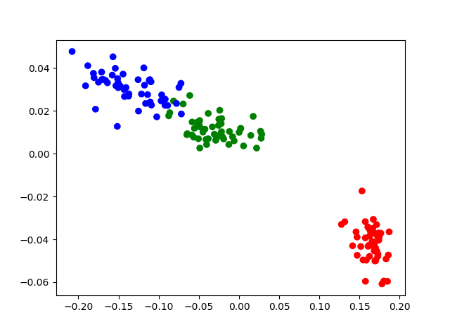
Ex: Look at the graph below in which we observe a 2x1 p vector in purple.

The red and blue vectors are orthogonal to one another and represent the basis vectors of our prediction vector. The which means that the vector has a larger component in said X class vs the Y class. Thus, our prediction vector “collapses” onto the X axis and the corresponding class is chosen.

This is just an example of one output of a single SVCA for a single input. The model is trained using backpropagation using a traditional gradient decent framework.

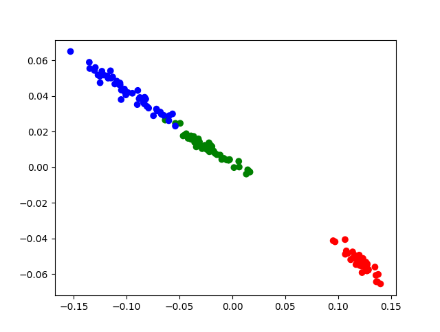
The following images are of a 2d-cross section of the projection vector fields of the sklearn cancer, and iris data sets

Cancer Data set Iris Data set



Chart, scatter chart

Description automatically generated



Chart, scatter chart

Description automatically generated