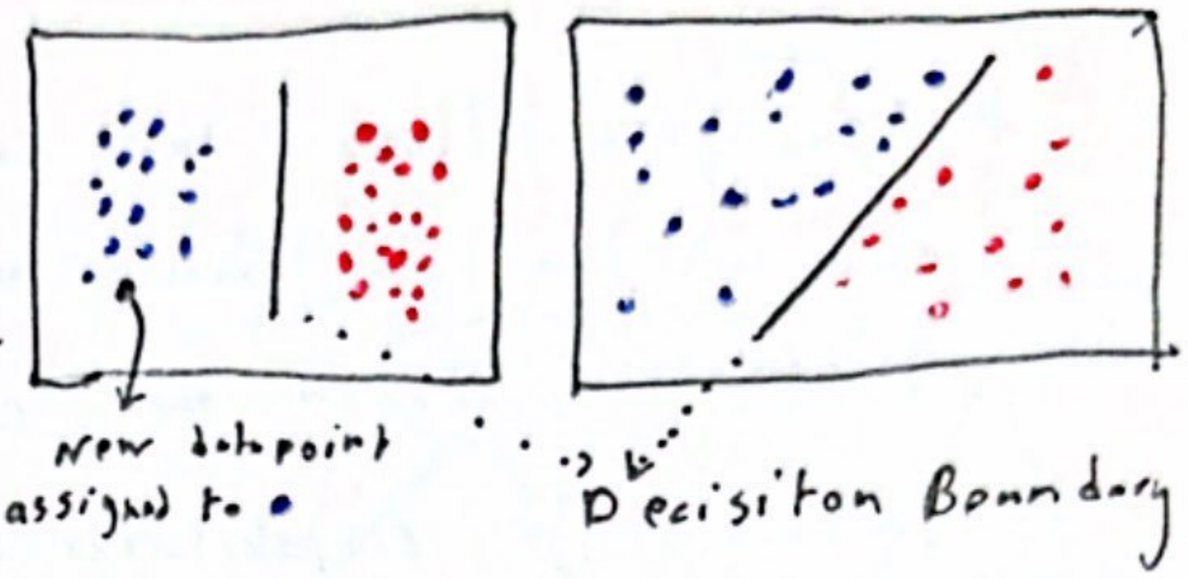
Support Vector Machine (SVM) (- supervised learn - classification - Regression)

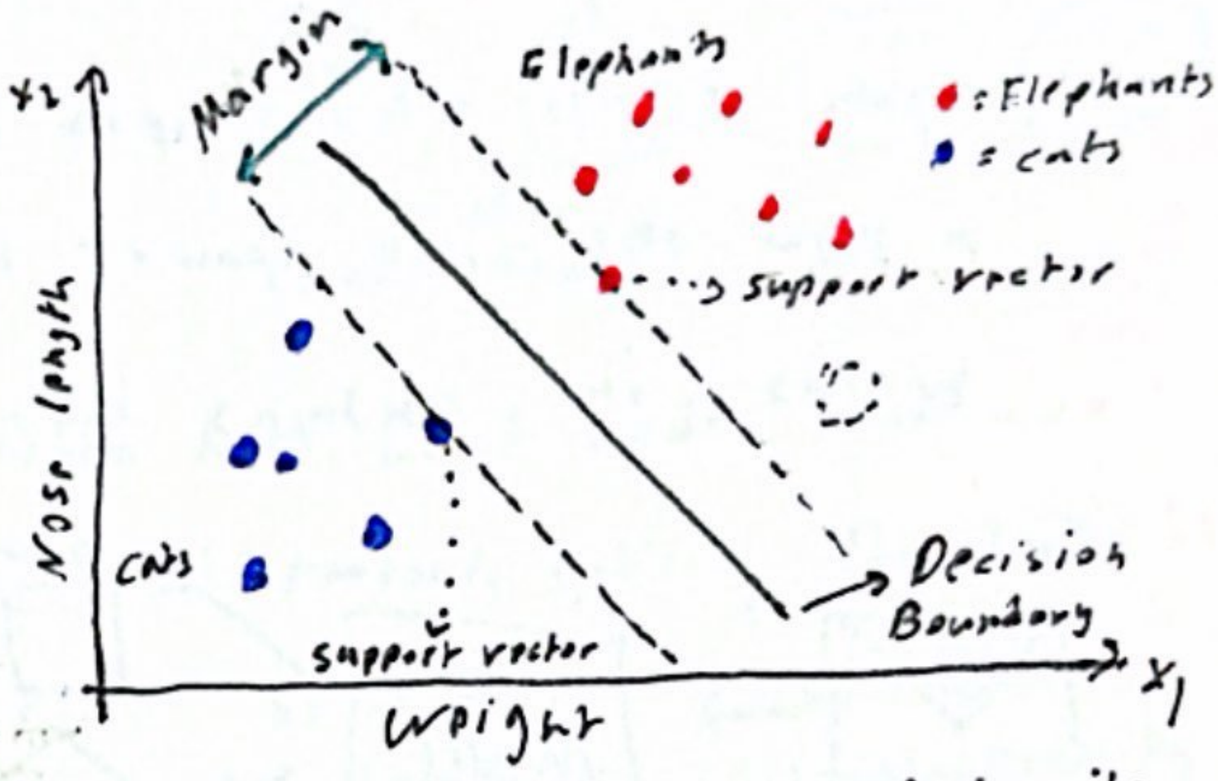
1 - The core concept of the algorithm is to draw a decision Boundary Between data points that seperate data points of the training dataset as well as possibly

2 ✱ unlike KNN a new data point is assigned to the side of the boundary is falls on the nearest data point does not matter



3 ✱ Ex: lets try to classify animals based weight and len of nose in this case the Decision Boundary is straight the SVM tries to find the line that seperates classes with largest margin possible it Maximize space between classes this helps it Generalize well to new data, reduce noise and prevent outliers

4 ✱ the support vectors are the datapoints that sit on the edge of the margin knowing the SV is enough to classify new Datapoints which makes it memory efficient



5 - if New data point assigned to its class based on the desion boundary [:] would be classified as Elephant

6 ✱ one Benifit of SVM is that its powerfull in High dimentions ie if # of features is large compared to the data in those cases the decision boundary is complex and called a hyper plane

Kernal functions

7 - another feature of svm's is the use of kernal functions which allow for identification of complex non-linear decision Boundaries

Kernal Functions are a implic way to turn Original Features in to new complex Fetures using kernal trick, basicall make new Features for a non-linear Boundary this is called implicit Feature engineering. NN als. do this

8 Possible kernal functions for SVM
- Dot product
- RBF
- signoid
- polynomial

9 ✱ Kernal functions Example

— = Non linear Decition Boundary 22