1. Support Vector Machine models (classification and regression) are very sensitive to feature scaling. I need to better understand and investigate the former statement.
2. SVM uses Hinge Loss Function. What is it?
3. Linear SVM v/s Non-linear SVM classification
4. Kernel Trick. Generally, this “Kernel Trick” is used for nonlinear SVM classification. Need to understand this better.
5. In Support Vector Machines (SVM) there is a concept called avoiding margin violations. There are actually two kinds of margins:
   1. Hard Margin: Not having the instances on the margin.
   2. Soft Margin: Trying and avoiding the number of instances on the margin.
6. The hard margin and soft margin problems are both convex quadratic optimization problems with linear constraints. There are off-the-shelf solvers, which are good for Quadratic Programming problems. The solvers are like:

There are several famous off-the-shelf quadratic programming (QP) solvers available that are widely used in optimization and numerical computing. Some of the well-known QP solvers include:

1. MOSEK: MOSEK is a powerful commercial solver that supports quadratic programming as well as other types of optimization problems. It is known for its efficiency and ability to handle large-scale problems.
2. Gurobi: Gurobi is another commercial solver that provides high-performance optimization solutions, including quadratic programming. It is known for its speed and advanced algorithms.
3. CPLEX: CPLEX is a popular commercial solver developed by IBM. It offers a range of optimization capabilities, including quadratic programming, and is widely used in industry and academia.
4. IPOPT: IPOPT (Interior Point Optimizer) is an open-source solver that supports nonlinear programming, including quadratic programming. It is known for its ability to handle large-scale and complex problems.
5. CVXOPT: CVXOPT is an open-source optimization library for convex optimization. It includes a quadratic programming solver among other optimization tools and is commonly used in scientific computing and machine learning applications.
6. Quadprog: Quadprog is an optimization library in MATLAB that provides a solver for quadratic programming problems. It is widely used due to its ease of use and integration with MATLAB.

These solvers offer a range of features, performance characteristics, and licensing options. The choice of solver depends on specific requirements, such as problem size, complexity, licensing considerations, and programming language preferences.

1. Online Learning means incrementally the model keeps learning as new data arrives.
2. Online Learning of SVM’s have the hypothesis and the cost function (this cost function needs to be minimized).
3. Part of the SVM’s online learning cost function is called Hinge Loss function.
4. The online learning SVM cost function is sought of derived from the Dual Problem.
5. The Kernel tricks are used for transforming the data to higher dimensions and later use a SVM that can linearly separate them.
6. It is also very good for binary classification.