

Amrita School of Engineering

B. Tech CSE-Artificial Intelligence



MATHEMATICS FOR
INTELLIGENT
SYSTEMS -4

Semester –4

Term Project



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BONAFIDE CERTIFICATE

This is to certify that the major project report entitled for “Mathematics
For Intelligent Systems–4”

Submitted by

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In partial fulfilment of the requirements for the award of the Degree of Bachelor of Technology in Mathematics For Intelligent Systems–4 is a Bonafede record of the work carried out under my guidance and supervision at Amrita School of Engineering, Coimbatore.

Signature

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This project was evaluated by us on

Topic: Support Vector Formulation for binary classification

ABSTRACT

- The given problem involves applying Support Vector Machines (SVM) to find a linear classifier that separates two classes of objects. The problem is formulated as a Quadratic Optimization problem and can be solved using the dual formulation. The objective is to find the Lagrange multipliers that maximize the separation between the classes.
- The abstract outlines the process of setting up and solving the primal and dual problems using CVX, a convex optimization package in Python. The primal problem aims to find the linear classifier that maximizes the separation, while the dual problem involves finding the Lagrange multipliers that minimize the objective function.
- By formulating the problem in a matrix format, the dual problem is converted into a minimization problem. The data points are represented as input vectors, and the Lagrange multipliers are linear combinations of these vectors. The Lagrangian function is derived and substituted back into the dual problem. The optimization problem is then set up in CVX using the given data and solved to obtain the Lagrange multipliers.
- Once the Lagrange multipliers are obtained, the support vectors are identified as the data points for which the Lagrange multipliers are not zero. The support vectors lie on the bounding plane and are crucial for determining the equation of the classifier. Finally, the equation for the classifier is derived using the obtained Lagrange multipliers and support vectors.
- Overall, the abstract provides a summary of the problem, the formulation of the primal and dual