

EEEN40690 Quantum Computing

Homework Problem Set for Topic 11: Quantum Algorithms

Instructions

- This is homework set 8 of 8. This homework set accounts for 5% of the marks for this module.
- In your report, please provide answers to the questions of this homework set. Explain clearly how the answers are obtained and what are their meaning or interpretation. Include relevant intermediate steps of the solution and explain your approach.
- Make sure that the report is readable, and the graphs (if any) are presented according to scientific/engineering standards.
- Some of the questions of the homework sets and the projects in this module may be open-ended and include a research component. Please formulate clearly your hypothesis and explain what will prove (or disprove) your hypothesis. Make sure that you provide sufficient evidence (analytical results, numerical results, modelling and simulations, evidence from the literature) to support your answer to open-ended or research problems.
- The report must be submitted online through UCD Brightspace:
My Brightspace → EEEN40690 → Assessment → Assignments → Homework 8 (Homework for Topic 11: Algorithms)
- Late submissions will be accepted but a penalty will apply. In the case of late submissions, this module applies the standard UCD policy.
- Plagiarism and copying are offences under the terms of the Student Code, and you should be aware of the possible consequences.

Aim

The aim of this homework assignment is to introduce classical support vector machines.

Problem Set

Consider the dataset on heart attack analysis attached to this assignment. Construct a support vector machine to get the most accurate classification of heart attack cases. In particular, illustrate and discuss the following

1. What is the best kernel? (Common options include a linear kernel, an RBF kernel)
2. What are the metrics of successful classification?
3. What is the minimum amount of the training data subset should you allocate for a successful classification?