Course Unit Overview

URL: syllabus.cs.manchester.ac.uk/pgt/COMP61021/

Username: **comp61021**

Password: **ml2-2017**

Please read FAQs before the first Lab session!

Introduction

The Big Picture:

- Advanced yet research-oriented ML module involving a significant amount of mathematical content, practical and research skills

- Pre-requisite: COMP61011 and Matlab Programming

- 30-hour Lecture/Lab/Presentation and 120-hour self-learning

  - Four lectures (9:00-12:00, Weeks 7-10)

  - Presentation Session/Revision (8:45-17:00, Week 11)

  - Four lab sessions mainly coordinated by TAs (13:30-17:00, Weeks 7-10). Week 11 will be used for the presentation session mainly and revision.

  - Self-learning: reading (**assigned** vs. extension), coursework, research, ...

- **Aim**

  "That was hard work, but I really learned a lot…"

Lecture Schedule

- **Topics in Lectures**
  - Background
  - Mathematics Basics
  - Principal Component Analysis (PCA)
  - Linear Discriminant Analysis (LDA)
  - Self-organizing Maps (SOM)
  - Multi-dimensional Scaling (MDS)
  - Isometric Feature Mapping (ISOMAP)
  - Locally Linear Embedding (LLE)

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Lab Schedule

- ## Lab Sessions (Room 2.25, Kilburn Building)

  - Week 7 (14:00-17:00)
    - Lab for "Math Basics" with Matlab (non-assessed)
  - Week 8 (14:00-17:00)
    - Lab for PCA (starting the 1st Lab Exercise)
  - Week 9 (13:30-17:00)
    - 1st Lab Exercise Marking (Deadline: 13:30)
    - Lab for SOM (starting the 2nd Lab Exercise)
  - Week 10 (13:30-17:00)
    - 2nd Lab Exercise Marking (Deadline: 13:30)
    - Prepare for the Presentation
  - Week 11 (8:45-17:00, **Room 2.19**)
    - Group Presentation Marking (Deadline: 8:45)
    - **Briefing of Exam and Revision Information**

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Paper Presentation

- ## Week 11 (8:45-17:00, Room 2.19)

    - Group Presentation (30 minutes)

    - Group Formation

        - Seven students/group (occasionally, fewer or more students/group)
        - Naturally, group formation with the alphabetic order of last name
        - Only allowing individuals to swap groups with **mutual agreement** without involving the lecturer/TAs (14:00-17:00, **Deadline: 17:00 Today**)

    - Paper Allocation

        - **Draw lots from the list of selected papers in the Lab this afternoon**

    - Presentation Time and Venue

        - Final schedule will be published on the teaching page after 1st Lab
        - Venue: Room 2.19, Kilburn Building

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Assessment Method

- ## Examination (50%)

  - Sect. A: 15 T/F questions and 15 MCQs (30 marks)

  - Sect. B: several questions (20 marks)

  - All compulsory

- ## Assessed Exercises (50%)

  - Exercise 1 (15 marks): Applications of PCA

  - Exercise 2 (15 marks): SOM Implementation/Application

  - Exercise 3 (20 marks): Paper Presentation

  Note: *   Lab Ex. marked by TAs in the Lab (2.25, KB)

  ** Group paper presentation *must* be completed in Week 11.

  Students must attend all the presentations.

Recommended Reference

The lecture notes along with tutorial materials and Matlab source code supplied on the teaching page should be used as the main information source of this module. The following text books are recommended to be supplements only.

[1] Title: Introduction to Machine Learning (3rd Edition)
   Author: Alpaydin, Ethem
   ISBN: 9780262012430
   Publisher: MIT Press
   Year: 2014

[2] Title: Pattern Recognition and Machine Learning
   Author: Bishop, Christopher M.
   ISBN: 9780387310732
   Publisher: Springer
   Year: 2006

[3] Title: Neural Networks and Learning Machines (3rd edition)
   Author: Haykin, Simon
   ISBN: 9780131293762
   Publisher: Pearson
   Year: 2008