Open University
Faculty of Science & Technology
Computer Science Technology

Testing of ML systems

Teacher: Eitan Farchi **E-mail:** farchi@il.ibm.com

Course Description

This course covers testing and engineering of machine learning (ML) systems. ML models are statistical models; they are by design sometimes correct and sometimes incorrect. As a result, an approach that is different than traditional software testing is needed in order to develop and test business grade ML systems. In this course we will systematically motivate and discuss the art of crafting and developing ML systems. The use of experimental design and statistical control to craft ML systems will be covered. Best practices and pitfalls will also be discussed.

Key Learning Outcomes

At the successful completion of the course the student will be able to:

- ❏ Quantify ML system requirements and design experiments to test them
- ❏ Choose between design alternatives of the ML system
- ❏ Utilize non-parametric statistics to test the ML system and its components
- ❏ Integrate ML systems in the business process
- ❏ Time permitting - conduct drift analysis of ML systems

Required Background and Prerequisite Knowledge

The course has the following prerequisites.

- A basic course in probability or statistics.
- Python programming.
- Nice to have - a course in ML or data science.

Grading scheme

A test will be given at the end of the course. Some of the test questions will be variants of the exercises that will be given during the course.

Textbooks and Course Materials

The course slides are available here. The course will be based on the following book Theory and Practice of Quality Assurance for Machine Learning Systems. The book includes theoretical and programming exercises and their solution.

Tentative Course Content

The content of the course is broken below into meetings of 1.5 hours each.

Meetings	Topics & Homework
1	Testing ML systems Read chapters one and four of Theory and Practice of Quality Assurance for Machine Learning Systems and complete the exercises.
2	Testing ML systems continued Read chapters one and four of Theory and Practice of Quality Assurance for Machine Learning Systems and complete the exercises.
3	Experiment first Read chapter two of Theory and Practice of Quality Assurance for Machine Learning Systems and complete the exercises.
4	Experiment first continued Read chapter two of Theory and Practice of Quality Assurance for Machine Learning Systems and complete the exercises.
5	Statistical control Read chapter five of Theory and Practice of Quality Assurance for Machine Learning Systems and complete the exercises.
6	Statistical control continued Read chapter five of Theory and Practice of Quality Assurance for Machine Learning Systems and complete the exercises.
6	Best practices and pitfalls Read supporting slides.
6	Best practices and pitfalls continued Read supporting slides.
7	Integration of the ML system with the buisness process Read chapter eleven of Theory and Practice of Quality Assurance for Machine Learning Systems and complete the exercises.
8	Integration of the ML system with the business process Read chapter eleven of Theory and Practice of Quality Assurance for Machine Learning Systems and complete the exercises.