UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Engineering, Built Environment and Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en Inligtingtegnologie

School of Information Technology

Department of Computer Science

Genetic Programming (COS 710)

Lecturer:
Prof Nelishia Pillay

Assistant Lecturer:
Ms. Gisele Marais

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1 Overview

1.1 Description

This module provides an in-depth study of genetic programming. The course firstly presents the genetic programming algorithm and related areas and examines various applications including symbolic regression and data classification. Variations of genetic programming will be presented with grammar-based genetic programming and grammatical evolution being looked at in detail. Advanced topics including iteration, recursion, memory, data structures, modularization and architecture altering operations are also covered. Recent developments in the field, namely, structure-based genetic programming and transfer learning will also be examined.

1.2 Credits

COS 710 is 15-credit module.

2 Plagiarism policy

The Department of Computer Science considers plagiarism as a serious offence. Disciplinary action will be taken against students who commit plagiarism. Plagiarism includes copying someone else's work without consent, copying a friend's work (even with consent), copying material (such as text or program code) from the Internet, giving your work to another student to copy and collusion (working together) on an individual assignment.

Plagiarism will not be tolerated in this course. For a formal definition of plagiarism, students are referred to `http://www.ais.up.ac.za/plagiarism/index.htm` (from the main page of the University of Pretoria site, follow the `Library` quick link, and then click the `Plagiarism` link). If you have any question regarding plagiarism, please ask one of the lecturers to avoid any misunderstanding.

3 Instructors and assistants

The instructors for COS 710 are as follows:

Name	E-mail
Nelishia Pillay (Course coordinator)	nelishia.pillay@up.ac.za
Gisele Marais	gisele.marais@gmail.com

Please note email is the preferred means of communication for this module.

4 Study material

4.1 Prescribed Book

There are no prescribed books for the course. Slides and notes will be provided via clickUP. The following books will be useful resources for the module:

- Koza, J.R. Genetic Programming: On the Programming of Computers by Natural Selection, 1992, MIT Press.
- Poli, R., Langdon, W.B., McPhee, N.F. A Field Guide to Genetic Programming, 2008.

4.2 COS 710 Online Resources

ClickUP will be used to host the study material for this course, and is thus the primary point of contact for electronic information and resources including announcements, file downloads, slides and notes, and assignment specifications.

5 Assessment

The assessment for the module will be continuous assessment. There will be three assignments and two tests.

Lecture	Day	Time	Venue
Lecture	Monday	16:30-18:30	IT 4-3 +online

5.1 Semester assessments

Assessments for the semester mark are assignments and tests. There will be two tests and three assignments.

The semester tests are scheduled on the following dates:

Test	Day	Time	Venue
Semester Test	31 March	08:30-18:30	Take-home test via clickUP
Examination	TBA	08:30-18:30	Take-home exam via clickUP

Assignments are individual take-home programming tasks. The specification of each assignment will be released on clickUP. Solutions must be submitted via the online submission system on clickUP. No late submissions of assignments will be allowed for medical or other reasons. Please find the assignment schedule below:

Assignment	Due Date
Assignment 1 - Regression	24 March
Assignment 2 - Transfer Learning	22 April
Assignment 3 - Structure-Based GP	19 May

Queries for assignments must be submitted to the discussion forum for the particular assignment.

5.2 Final Mark Calculation

The final mark for COS 710 will be calculated as follows:

Final Mark = Test average x 0.5+ Assignment average x 0.5

6 Lecture

Lecture time is as follows:

7 Course Content and Lecture Schedule

Lecture	Topic
10 February	Course overview
17 February	Introduction to Genetic Programming Initial Population Generation
24 February	Fitness Evaluation Selection
3 March	Genetic Operators Distributed Computing
10 March	Regression
24 March (online)	Transfer Learning Assignment 1 due
31 March	Semester Test
7 April	Structured-Based Genetic Programming
22 April (online)	Classification Assignment 2 due
5 May (online)	Iteration Recursion
12 May (online)	Memory Data Structures
19 May	Modularization Architecture Altering Operations
26 May	Variations of Genetic Programming Assignment 3 due