SM3807: MACHINE LEARNING AND ROBOTICS STUDIO

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Machine Learning and Robotics Studio

Subject Code
SM - School of Creative Media
Course Number
3807

Academic Unit
School of Creative Media (SM)

College/School
School of Creative Media (SM)

Course Duration
One Semester

Credit Units
6

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
SM2715 Creative Coding

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

Understanding robotics as embodied artificial intelligence, this workshop-based course aims at providing students with basic knowledge of both Machine Learning and Robotics in artistic practice and in human-computer interaction studies.

This hybrid studio (3 hours), discussion-lecture (3 hours) course (6 hours total) explores a set of interactive strategies for working with machines and computers. We will utilize input methods like controllers, depth sensing, wearable technology, and biometric data. We will build stories around machine interactions, including gestural interactions, the hero's quest paradigm, point-of-view, and environmental narrative design. We will also explore creative coding technologies for artistic expression, including VR, AR, projection, and mixed media practice. In consideration of these technologies, we will iteratively prototype interactions and scientifically test hypotheses about human-machine interactions, using wizard of oz, paper, arduino, and digital methods, and analyze audience perception using HCI scientific and user research methodologies. The course will also cover machine learning, including techniques of computer vision, natural language processing, and image and video processing applications. Weekly explorations will contribute to a semester-long project that will be documented as a video project and a written submittable publication.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Review the basics of sensors, actuators and software/hardware robotic control		x	x	
2	Describe the essential features of robotic art as observed in examples of contemporary practice, together with an historical perspective of robotic art		x		
3	Adapt previously learnt coding skills to the Python programming language		x	x	x
4	Describe the basic concepts of machine learning		x		
5	Design and critique students' own robotic art projects with concepts and strategies presented in the course			x	x
6	Implement working prototype of students' robotic art projects with concepts and strategies presented in the course			x	x
7	Associate, combine and integrate knowledge from machine learning (specially deep learning) into course assignments			x	x

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Lectures by faculty	1, 2, 3, 6, 7	
2	Critiques	Students and teachers critiquing contemporary artworks and student’ s artworks	4, 5, 6	
3	Presentations	Students presenting and defending their production	4, 5, 6, 7	
4	Projects	Final project involving all the concepts learnt in the course	1, 2, 3, 4, 5, 6, 7	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Participation and documentation	1, 2, 3, 4, 5, 6, 7	10	-	Yes
2	Assignments/ Presentation	1, 2, 3, 4, 5, 6, 7	10	-	Yes
3	Final project paper	3, 4, 5, 6, 7	40	-	Yes
4	Final project video	4, 5, 6, 7	40	-	Yes

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

0

Minimum Examination Passing Requirement (%)

0

Assessment Rubrics (AR)

Assessment Task

1. Participation and documentation

Criterion

- Active in-class participation, positive listening, strong ability to stimulate class discussion and comment on other points.
- In-depth pre-class preparation and familiarity with peer reports and other materials.
- Interpret others’ views with an open mind and ready to negotiate.
- Readiness to share personal insight via analysis and synthesis with informed views.
- Constructively critical, thus facilitating the discovery of new issues.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not reaching marginal levels

Assessment Task
2. Assignments/ Presentation

Criterion
- Excellent grasp of material, able to explain key concepts, assumptions and debates. In-depth and extensive knowledge of the subject matter.
- Rigorous organization, coherent structure, properly argued with strong narrative.
- Insightful interpretation of the subject matter with distinct themes and thesis.
- Critical analysis with insightful comments opening up new issues, or suggesting the ability to theorize.
- Ability to approach a text or a theme using a variety of theories and analytical tools.
- Strong bibliography suggesting breadth and depth of coverage and informed insights.
- Superior presentation skills: distinct pronunciation, fluent expression and appropriate diction, exact time-management.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not reaching marginal levels

Assessment Task
4. Final Project

Criterion
- Work has strong affective quality and the articulation of personal styles and signature.
- Excellent appreciation, exploration and/or application of the aesthetic and expressive qualities of the medium.
- Work raises questions and instill insights about the process of conception, creative planning and production.
- Innovative exploration by combining knowledge from different disciplines (e.g. mathematics, psychology, physics, anthropology, etc.) to create an inter-disciplinary project.
- Efficient adjustment of plans and strategies in response to resources (time, space, equipment, etc) available with constructive adjustment.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not reaching marginal levels

Additional Information for AR
All A+/A/A- grade assignment should comply with the highest performance of Discovery-oriented learning.

Part III Other Information

Keyword Syllabus
Contemporary art, robotics, art theory, mechanical engineering, electronic engineering, electrical engineering, software engineering, motion control, sensors, actuators, control devices, embedded systems, physical computing, hardware hacking, artificial intelligence, embodiment, machine learning, deep learning

Reading List

Compulsory Readings

	Title
1	Robots and Art - Exploring an Unlikely Symbiosis http://www.springer.com/gp/book/9789811003196
2	Origin and Development of Robotic Art http://www.ekac.org/roboticart.html

Additional Readings

	Title
1	Art in the Age of Technoscience: Genetic Engineering, Robotics, and Artificial Life in Contemporary Art by Ingeborg Reichle, Gloria Custance and Robert Zwijnenberg
2	Robotics: Modelling, Planning and Control (Advanced Textbooks in Control and Signal Processing) by Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani and Giuseppe Oriolo
3	Introduction to Autonomous Mobile Robots (Intelligent Robotics and Autonomous Agents series) by Roland Siegwart, Illah R. Nourbakhsh and Davide Scaramuzza
4	Learning Theory: An Approximation Theory Viewpoint, by F Cucker and D.X. Zhou. Cambridge Monographs on Applied and Computational Mathematics, Cambridge Univ. Press, 2007.