Machine Learning and Artificial Intelligence

Module Information

2022.01, Approved

Summary Information

Module Code	5554NCCG
Formal Module Title	Machine Learning and Artificial Intelligence
Owning School	Computer Science and Mathematics
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 5
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Nelson and Colne College Group

Learning Methods

Learning Method Type	Hours
Lecture	60

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-PAR	PAR	January	12 Weeks
SEP-PAR	PAR	September	12 Weeks

SEP_NS-PAR	PAR	September (Non-standard start date)	12 Weeks

Aims and Outcomes

Aims	This module will introduce the basic theories of machine learning and artificial intelligence. It will consider the most efficient machine learning algorithms and practical implementation of these algorithms. It will cover the main areas of Artificial Intelligence. Students will gain hands-on experience in getting these techniques to solve real-world problems

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Analyse the theoretical foundation of artificial intelligence, current trends and issues to determine the effectiveness of AI technology.
MLO2	2	Develop an AI or machine learning application using an appropriate programming language or machine learning tool for solving a real-world problem.
MLO3	3	Investigate and discuss a range of emerging AI technologies to determine future changes in industry.

Module Content

Outline Syllabus	Definitions and terminologies of machine learning. Types of learning problems. Supervised learning, unsupervised learning, reinforcement learning, semi-supervised learning, deep learning.Programming languages and tools. Mathematics of machine learning. Machine learning algorithms. Using the programming language or a tool to implement a learning algorithm.Problem definition. Data analysis. Data preparationImplementation of an algorithm. Improving models' accuracy. Under-fitting situations. Over-fitting situations.Discussion of intelligence and artificial intelligence. Strong AI vs. Weak AI. Top-down approach of AI: Knowledge-based system, natural language processing, fuzzy logic. Bottom up approach of AI: Artificial neural networks, evolutionary computing, swarm intelligence. Applications of AI. Issues of AI.Investigate and demonstrate an AI or ML technique using a programming language or a tool for at least one of the following: knowledge based system, fuzzy logic system, natural language processing.Investigate and demonstrate the technique using the programming language or a tool for at least one of the following: artificial neural network: supervised learning algorithms, single perceptron, MLP & backpropagation learning algorithms. Evolutionary computing: problem model, fitness evaluation, selection method, crossover operator, evolution scheme, observation. Swarm intelligence: swarm intelligent approaches, swarm robotics, team size and composition, team configurability, communication pattern and range.
Module Overview	
Additional Information	

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Presentation	Individual Case Study Seminar	50	0	MLO1
Report	Assignment	50	0	MLO2, MLO3

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Silvester Czanner	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings