

TEESSIDE UNIVERSITY

Name of course: Master of Science Applied Data Science

Module Description

[CIS4057-N] ARTIFICIAL INTELLIGENCE ETHICS AND APPLICATIONS

This module will provide students with a deep insight into the business applications of Artificial Intelligence (AI) and Data Science (DS). The module will explore a range of AI and DS applications, such as, image recognition, generative AI, autonomous machines, medical diagnosis, predictive policing, criminal justice, and fraud detection. Students will analyse both the risks and opportunities of applying AI techniques in these areas. This module covers current ethical principles for designing AI systems that are fair, explainable, and secure.

[CIS4008-N] BIG DATA AND BUSINESS INTELLIGENCE

This module aims to develop the student's ability to design and implement database, big data and analytics applications to meet business needs. A case study will be used to follow the system development life cycle. The student will develop a plausible application from inception to implementation for a real-world scenario. The module will investigate the issues and technologies associated with implementing and supporting large scale databases and the services that are needed to maintain and access a repository of data. Investigations will be undertaken in several areas including big data, data warehouses, integrating legacy data, data management and approaches that support the modelling and visualisation of data for a range of use views. The module will be assessed by in-course assessment: a research report and the design and implementation of a business information solution to a complex business problem.

[CIS4047-N] DATA SCIENCE FOUNDATIONS

This module provides an introduction to core data science concepts and tools, focusing on real-life data science problems with practical exposure to relevant software. Various topics such as preparing and working with data, data visualisation and analysis are covered in the module.

[CIS4014-N] INTERACTIVE VISUALISATION

Dynamic, interactive visualisations enable the reader to explore the data for themselves through a variety of perspectives. Static visualisations are excellent for print medium but are restricted to showing a single perspective and do not handle multidimensional datasets well. Using an interactive graphic visualisation the reader can zoom in on sections of the data which are of interest, explore more than one dimension at a time, and sort and filter to discover new patterns and themes within the data. Particularly useful is the ability to provide a macro/micro view of the same data, i.e. a big picture view of the full dataset from which the reader can then 'drill down' into the lower-level detail. This module uses the JavaScript libraries such as Data Driven Documents (D3js) for creating interactive, animated, dynamic graphics for the web, and looks at other alternatives available.

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[CIS4025-N] MACHINE LEARNING

Machine learning is a subfield of computer science concerned with computational techniques rather than performing explicit programmed instructions. The methodology involves building a model of a given task based on observations in order to make predictions about unseen data. Such techniques are useful when the desired output is known but an algorithm is unknown, or when a system needs to adapt to unforeseen circumstances. Machine learning draws significantly from statistics and probability theory as (though the applications are many and various) the fundamental task is to make inferences from data samples. The contribution from other areas of computer science is also essential for efficient task representation, learning algorithms, and inferences procedures. This module provides students with exposure to a breadth of tasks and techniques in machine learning and will also investigate new developments in Neural Networks and Deep Learning.

[CIS4044-N] SOFTWARE FOR DIGITAL INNOVATION

This module provides students with an introduction to the Python programming language and its application to solving problems in Computer Science (CS), Data Science (DS), Artificial Intelligence (AI) and Financial Technology (FinTech) related to digital innovation. This involves the principles of programming, the language syntax and structure, relevant libraries and modules and how it is incorporated in existing software tools.

[CIS4055-N] COMPUTING MASTERS PROJECT

This module provides students with the opportunity to undertake a major, in-depth, individual study in an aspect of computing, IT, computer science or digital technology. Normally the Masters project will be drawn from commercial, industrial or research-based problem areas. The project involves the student in researching and investigating aspects of their specific computing discipline and then producing a major deliverable (e.g. software package or tool, design, prototype, website, model, research findings, results of an experiment, datasets etc.). The student also carries out a critical evaluation of their major deliverable, including obtaining third party evaluation where appropriate.