Ollscoil
Teicneolaíochta
an Oirdheiscirt

South East
Technological
University

Module Descriptor

Data Visualisation (Computing and Mathematics)

Data Visualisation
(A13555)

Short Title: Data Visualisation
Department: Computing and Mathematics
Credits: 5   **Level:**   Advanced

Description of Module / Aims

This module will expose the learner to statistical and other methods that will enable them to create a variety of visualisations from different types of data, using both traditional and contemporary methods. Issues pertaining to the collection of data will be presented as will cautions on the potential for statistics to mislead. A basic introduction to the statistical tools used in data analytics is also given.

Programmes

	stage/semester/status
COMP-0629 BSc (Hons) in Creative Computing (WD_KCRCO_B)	4 / 7 / M
COMP-0629 BSc (Hons) in Multimedia Applications Development (WD_KMULM_B)	4 / 1 / M

Indicative Content

- Data: Sourcing; Primary and secondary data; Sampling mechanisms; Validity checks – outlier detection, data cleaning etc; Big data

- Traditional approaches: Review of conventional statistical charts – elementary (histograms, boxplots, pareto, pie charts etc.); Advanced (multiple, clustered, stacked, contour etc.); Selecting suitable charts for a given purpose

- Lies and statistics: Misrepresentation and deception in statistics in general and in statistical charts in particular; Historical case studies

- Contemporary visualisation charts: Static (linear, planar, multidimensional, temporal, tree/hierarchical etc.) and dynamic

- Software: Statistical visualisation and graphics tools – using both industry standard software (e.g SAS visual analytics etc.) and non-commercial software (e.g. GGobi, R etc.)

- Statistical methods: Overview of methods used in data analytics using appropriate software. (E.g. significance testing, multiple regression, cluster analysis etc.)

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Discuss the issues pertaining to the collection and preparation of data.
2. Choose an appropriate, traditional, statistical chart that will successfully convey information contained in a data set.
3. Determine in statistical metrics or charts, potential to accidentally or deliberate misrepresent information in a data set.
4. Select and utilize suitable software that creates data visualisations – both traditional (elementary and advanced) and contemporary (static and dynamic).
5. Select and utilize suitable software that implements statistical methods used in data analytics.

Learning and Teaching Methods

- Lectures will be used to present the principles and the constructs of data visualisation as well as to demonstrate industry standard application. The importance of practice will be emphasised with a philosophy of learning by doing being fostered in the laboratory sessions.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	36	
Practical	12	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Final Written Examination	50%	1,2,3
Continuous Assessment	50%	
Assignment	50%	4,5

Assessment Criteria

<40%: Unable to apply data visualisation methods at a basic level.

40%–49%: Able to apply basic data visualisation methods.

50%–59%: Able to apply a range of data visualisation methods.

60%–69%: As above. And demonstrate a reasonable comprehension of the potential and limitations of data visualisation.

70%–100%: As above. And demonstrate am excellent comprehension of the potential and limitations of data visualisation.

Supplementary Material(s)

- "Statsoft Electronic Statistics Textbook." www.statsoft.com
- Tufte, E.R. *The visual display of quantitative information.* Connecticut: Graphics Press, 2001.

Requested Resources

- Room Type: Computer Lab