

Short Title:	Multimedia Mining APPROVED
Full Title:	Multimedia Mining
Module Code:	ADSA H6016
ECTS credits:	10
NFQ Level:	9
Module Delivered in	1 programme(s)
Module Contributor:	Simon McLoughlin
Module Description:	<p>Module aims include: Traditional data mining has proved to be a successful approach to extracting new knowledge from collections of structured digital data usually stored in databases. Whereas data mining was done in the early days primarily on numerical data, the tools needed today are tools for discovering relationships between objects or segments within multimedia document components, such as classifying images based on their content, extracting patterns in sound, categorising speech and music, and recognising and tracking objects in video streams. This module will introduce the fundamental concepts of multimedia data mining and will demonstrate how to apply proven mining techniques to large multimedia datasets.</p>
Learning Outcomes:	
<i>On successful completion of this module the learner will be able to</i>	
<ol style="list-style-type: none"> 1. Describe techniques for feature extraction, selection and combination on multimedia data 2. Compare and contrast models and algorithms for mining multimedia datasets 3. Pre-process or clean multimedia data 4. Reduce the dimensionality of multimedia data whilst conserving the relevant information 5. Apply proven mining techniques for finding implicit patterns in large multimedia datasets 6. Characterise the performance of various mining algorithms on multimedia data 	

Module Content & Assessment

Indicative Content
Data Collection and Pre-processing Data cleaning, normalisation, transformation. Feature construction and interaction.
Multimedia Mining Techniques Classification Models, Decision Trees, Artificial Neural Networks, Support Vector Machines, Clustering Models, Association Rules, Statistical Mining Techniques.
Image and Video Mining Image Databases, Image pre-processing (noise reduction), Dimensionality reduction, Image Transformations (e.g. Fourier, Wavelet), Image Categorisation, Image segmentation, Object Identification, Feature extraction and representation, Semantic content analysis, Automatic View Selection, Detection of unusual video events and activity, Video indexing and retrieval, Video search engines.
Audio and Speech Mining Audio signal processing and Feature Extraction; Speech Analysis and Recognition; Speech to text; Searching and Indexing Audio data; Emotion Recognition; Automatic summarisation; Meeting mining; Music Information Retrieval.
Application and Systems Commercial Projects, Research Projects, Future Trends.

Indicative Assessment Breakdown	%
Course Work Assessment %	100.00%

Course Work Assessment %				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Lab work	Continuous assessment will include weekly practical exercises, a major assignment and problem sheets based on lecture material	1,2,3,4,5,6	100.00	n/a

No Final Exam Assessment %

Indicative Reassessment Requirement
Coursework Only <i>This module is reassessed solely on the basis of re-submitted coursework. There is no repeat written examination.</i>

ITB reserves the right to alter the nature and timings of assessment

Indicative Module Workload & Resources

Indicative Workload: Full Time	
Frequency	Indicative Average Weekly Learner Workload
Every Week	2.00
Every Week	2.00
Every Week	6.00

Resources
<i>Recommended Book Resources</i>
<p>Zhongfei Zhang, Ruofei Zhang,, <i>Multimedia Data Mining: A Systematic Introduction to Concepts and Theory</i> [ISBN: 978-1584889663]</p> <p>Chabane Djeraba (Editor), <i>Multimedia Mining : A Highway to Intelligent Multimedia Documents</i> [ISBN: 978-1402072475]</p> <p>Christopher Bishop, <i>Pattern Recognition and Machine Learning</i> [ISBN: 978-038731073]</p>
<i>Supplementary Book Resources</i>
Richard Szeliski, <i>Computer Vision: Algorithms and Applications (Texts in Computer Science)</i> [ISBN: 978-184882934]
<i>This module does not have any article/paper resources</i>
<i>Other Resources</i>
<p>Internet based resource: <i>Special Interest Group in Knowledge Discovery and Data Mining</i> http://www.sigkdd.org/</p> <p>Internet based resource: <i>IBM Research in Data Mining and Knowledge Discovery</i> http://domino.research.ibm.com/comm/rese arch.nsf/pages/r.kdd.html</p>

Module Delivered in

Programme Code	Programme	Semester	Delivery
BN_KADSA_R	Master of Science in Computing in Applied Data Science & Analytics	3	Elective