



Knowledge Mining from Big Data

Volgenau School of Engineering

Syllabus	
Course Information	AIT 624 – Knowledge Mining from Big Data Location: Distance Education/Blackboard
Instructor	See online course. Office hours by appointment.
Course Description	Introduction to methods and tools related to knowledge mining, representation, visualization, annotation, and retrieval for big data applications from an applied perspective with a focus on emerging research challenges in multimedia data mining across image, video, text, and audio domains.
Course Objectives	Upon completion of the course, you should be able to: <ul style="list-style-type: none">● Apply fundamental concepts, principles, and techniques of Semantic Web technology.● Explain the conceptual components of formal models, including axioms, rules, relationships, and individuals.● Apply basic multimedia semantics in a knowledge mining effort.● Create reusable formal models.● Develop processes for creating, updating, and querying. models that describe formal semantics used in a multimedia application.● Describe future trends in multimedia data mining.
Course Methodology	This course combines video lectures with in-depth presentation of concepts and techniques, explanations of how use a variety of tools to perform critical tasks, and hands-on experience completing authentic tasks in homework assignments and a project.

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Textbooks and Resources	<p>Required Textbook</p> <ul style="list-style-type: none"> Friedland, G., and Jain, R. (2014) Multimedia Computing. Cambridge University Press: New York. ISBN-10: 0521764513, ISBN-13: 978-0521764513. Steinmetz, R., and Nahrstedt, K. (2002) Multimedia Fundamentals, Volume 1: Media Coding and Content Processing (2nd Edition) Prentice Hall: Hoboken. ISBN-13: 978-0130313997, ISBN-10: 0130313998 <p>Semantic Web Resources</p> <ul style="list-style-type: none"> Ashish, N., and Sheth, A.P. (Eds.) (2011). Geospatial Semantics and the Semantic Web Foundations, Algorithms, and Applications. Springer: New York. ISBN-13: 978-1441994455; ISBN-10: 1441994459 Troncy, R., Huet, B., and Schenk, S. (Eds.). (2011). Multimedia Semantics Metadata, Analysis, and Interaction. Wiley: Hoboken. ISBN: 978-0-470-74700-1 Gupta, A., Ramesh, J., and Ozsu, M.T. (2011). Managing Event Information: Modeling, Retrieval, and Applications, 1st edition. Morgan & Claypool Publishers: Williston, VT. ISBN-13: 978-1608453511 ISBN-10: 1608453510. Stamou, G. and Kollias, S. Multimedia Content and the Semantic Web: Standards, Methods, and Tools. 1st edition. Wiley: Hoboken. (2005) ISBN-13: 978-0470857533 ISBN-10: 0470857536
Technical Requirements	<p>Computer Requirements</p> <p>Hardware</p> <p>You will need access to a Windows or Macintosh computer with at least 2 GB of RAM and to a fast, reliable broadband Internet connection (e.g., cable, DSL). For optimum visibility of course material, the recommended computer monitor and laptop screen size is 13-inches or larger. You will need computer speakers or headphones to listen to recorded content. A headset microphone is recommended for live audio sessions using course tools like Blackboard Collaborate. For the amount of computer hard disk space required to take an online course, consider and allow for the space needed to:</p> <ul style="list-style-type: none"> Install the required and recommended software. Save your course assignments. <p>For hardware and software purchases, visit Patriot Computers.</p>

	<p>You are strongly encouraged to back up all contents of your computer on a regular basis. Loss of data will not excuse late or unsubmitted assignments.</p> <ul style="list-style-type: none"> • Protégé, available from https://protege.stanford.edu • Weka, available from https://www.cs.waikato.ac.nz/ml/weka • Web browser (See Blackboard Support for supported web browsers) • Blackboard Collaborate (select from the course menu) <p>A variety of resources are available in the online course.</p> <p>Note: If you are using an employer-provided computer or corporate office for class attendance, please verify with your systems administrators that you will be able to install the necessary applications and that system or corporate firewalls do not block access to any sites or media types.</p> <p>Blackboard Collaborate: The final project presentation will take place on Blackboard Collaborate, a synchronous videoconferencing platform.</p> <ul style="list-style-type: none"> • Login in to mymason.com with your Mason NetID and password. • Select the Courses Tab. • Choose the course SYST568. • Select Collaborate on the left menu. • Under Blackboard Collaborate Click on the Collaborate Image to be redirected to your Collaborate. 										
Course Grading	<p>The following table displays the grading scale for numerical scores:</p> <table border="1"> <thead> <tr> <th>Percentage</th><th>Grade</th></tr> </thead> <tbody> <tr> <td>90 and above</td><td>A</td></tr> <tr> <td>80-89</td><td>B</td></tr> <tr> <td>70-79</td><td>C</td></tr> <tr> <td>< 70</td><td>F</td></tr> </tbody> </table> <p>Letter Grading Descriptions</p> <p>Listed below are grades and academic standards for each grade awarded.</p> <p>A: Consistently performs above and beyond the course/assignment requirements</p> <p>B: Meets and occasionally exceeds the course/assignment requirements</p> <p>C: Minimally meets the course/assignment requirements</p> <p>F: Fails to meet the course/assignment requirements</p>	Percentage	Grade	90 and above	A	80-89	B	70-79	C	< 70	F
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Assignment Categories and Weights	<p>The following table lists the five types of assignments in this course and the weight of each category in the final course grade.</p> <table> <tr> <th>Assignment Category</th><th>Course Grade Weight</th></tr> <tr> <td>Midterm Exam</td><td>20%</td></tr> <tr> <td>Assignments and Quizzes</td><td>20%</td></tr> <tr> <td>Final Project</td><td>20%</td></tr> <tr> <td>Survey Report</td><td>15%</td></tr> <tr> <td>Final Exam</td><td>20%</td></tr> <tr> <td>Class Discussions</td><td>5%</td></tr> <tr> <td>Total</td><td>100%</td></tr> </table>	Assignment Category	Course Grade Weight	Midterm Exam	20%	Assignments and Quizzes	20%	Final Project	20%	Survey Report	15%	Final Exam	20%	Class Discussions	5%	Total	100%
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Discussions	<p>In the class discussions, you should immerse yourself in the topics and perspectives presented in the course. You should be able to comment on the discussion topics with authority. You are encouraged to make notes on your own thoughts about the various concepts and issues and consider possible issues and outcomes. Your posts should be to the point and include sufficient technical detail for others to respond. You should present your opinions but justify them with facts and proper sources. What did you disagree with and why? Was there any content that was not clear?</p> <p>Initial/Original Post Please post what you view as the appropriate responses to the above prompts. Your initial post should be 150-300 words. Please provide response with a clear, well-formulated thesis; sentence structure, grammar, punctuation, and spelling count. Support all posts with appropriate rationale and citations from readings; appropriately document sources.</p> <p>Responding to Others Responses to at least two classmates' postings should be approximately 200 words and should be thoughtful, substantial, polite and more extensive than a simple "well done" phrase or "I agree." Consider points of agreement, disagreement, assumptions, and value judgments. You will be able to respond to others after you submit your initial post.</p> <p>Instructions Each student will make at least one original post by Friday, 11:59 PM, ET, and react to at least two of your peers' posts by Sunday 11:59 PM, ET. Review the Discussion Board Participation guidelines (including rubric) in the syllabus, as appropriate.</p>																
Homework	You will be tasked with a total of five homework assignments which, unless																

	otherwise stated in Blackboard, are due on Sundays, 11:59 PM, ET.
Midterm and Final Examinations	<p>The Midterm Exam addresses the course material for Modules 1 through 4 and is due in week 4 on Sunday, 11:59 PM ET.</p> <p>The Final Exam addresses the course material in Modules 5 through 8 and is due in week 8 on Sunday, 11:59 PM ET.</p> <p>These are open-book exams. From the moment you open each exam, you will have 4 hours (240) minutes to complete the exam. The assignment pages in the Module 4 and Module 8 Assignments folders contain complete details.</p>
Term Project	<p>The AIT624 course project is a semester-long research assignment consisting of two parts:</p> <ul style="list-style-type: none"> • Deliverable 1-Survey Report, due in Module 3 — Write a report on a survey (review) of a research paper on a topic of your choice. • Deliverable 2-Final Project Report, due in Module 8 — Write a paper on the same topic that you surveyed in Deliverable 1. <p>For details of on both deliverables, including the list of choices for research papers to survey, you may download AIT624 Project Guide.pdf from the online course in Blackboard.</p> <p>You will also need the sample research paper template for submitting your final project in peer-reviewed journal format, AIT624 FinalPaperTemplate.docx, which is also available in the online course.</p>
Student Services	<p>Student Support Resources</p> <p>George Mason University offers a broad support system. For details, see Student Support Resources on Campus.</p> <p>Services include:</p> <ul style="list-style-type: none"> • University Libraries • Writing Center • Counseling and Psychological Services
Mason Honor Code and Course Policy	<p>Mason Honor Code</p> <p>To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set forth this honor code:</p> <p>Student members of the George Mason University community pledge not to</p>

	<p>cheat, plagiarize, steal, or lie in matters related to academic work.</p> <p>Academic Integrity</p> <p>Students are responsible for their own work, and students and faculty must take on the responsibility of dealing with violations. The tenet must be a foundation of our university culture.</p> <p>All work performed in this course will be subject to Mason's Honor Code. Students are expected to do their own work in the course. For the group project, students are expected to collaborate with their assigned group members.</p> <p>In papers and project reports, students are expected to write in their own words, rather than cutting-and-pasting from sources found on the Internet. BlackBoard's SafeAssign service will be used to review selected student assignments.</p>
University Policies	<p>Diversity</p> <p>George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth.</p> <p>Responsible Use of Computing</p> <p>Students must follow the university policy for Responsible Use of Computing.</p> <p>University Calendar</p> <p>Students must follow the university policies. [See Catalogue]. Students with Disabilities Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See http://ods.gmu.edu].</p> <p>Family Educational Rights and Privacy Act (FERPA)</p> <p>The Family Educational Rights and Privacy Act of 1974 (FERPA), also known as the "Buckley Amendment," is a federal law that gives protection to student educational records and provides students with certain rights. See George Mason University's FERPA page.</p> <p>Netiquette</p> <p>Students are expected to follow courteous Internet etiquette practices.</p>



Email Policy	<p>Web: masonlive.gmu.edu</p> <p>Mason uses electronic mail to provide official information to students. Examples include notices from the library, notices about academic standing, financial aid information, class materials, assignments, questions, and instructor feedback. Students are responsible for the content of university communication sent to their Mason e-mail account and are required to activate that account and check it regularly.</p> <p>Students are also expected to maintain an active and accurate mailing address in order to receive communications sent through the United States Postal Service.</p>
Individuals with Disabilities	<p>The university is committed to providing equal access to employment and educational opportunities for people with disabilities.</p> <p>Mason recognizes that individuals with disabilities may need reasonable accommodations to have equally effective opportunities to participate in or benefit from the university educational programs, services, and activities, and have equal employment opportunities. The university will adhere to all applicable federal and state laws, regulations, and guidelines with respect to providing reasonable accommodations as necessary to afford equal employment opportunity and equal access to programs for qualified people with disabilities.</p> <p>Applicants for admission and students requesting reasonable accommodations for a disability should call the Office of Disability Services at 703-993-2474. Employees and applicants for employment should call the Office of Equity and Diversity Services at 703-993-8730. Questions regarding reasonable accommodations and discrimination since disability should be directed to the Americans with Disabilities Act (ADA) coordinator in the Office of Equity and Diversity Services.</p>
Course Schedule	<p>See the Course Schedule page in Blackboard (on the Navigation pane, select Course Schedule) for a list of assignments due in each week.</p>