Course Competency

CAI 1001C Artificial Intelligence (AI) Thinking

Course Description

A survey of artificial intelligence (AI) where students explore different technologies utilizing concepts and skills widely accepted for AI and digital competency. Classification algorithms, supervised vs. unsupervised learning, data preparation, and training/using learning models for predictions are presented. CGS1060C and MAT1033 are recommended, but not required. (2 hr. lecture, 2 hr. lab)

Course Competency	Learning Outcomes
Competency 1: Student will examine the field of AI and machine learning by:	1. Numbers / Data 2. Critical thinking 3. Computer / Technology Usage 4. Ethical Issues
1. a) Describing Digital Literacy, Practical Functional Digital Skill, Digital Collaboration, Curating Information, and Data Sources – Internet of Things b) Describing the history of AI c) Describing and using the AI project cycle; d) Identifying supervised vs. unsupervised learning, neural networks and discovering their application; e) Researching enterprise applications of AI and implementation readiness such as computing scalability, technical tradeoffs, and data pipelines	
Competency 2: The student will demonstrate an understanding of ethical and legal considerations in AI by:	1. Numbers / Data 2. Critical thinking 3. Ethical Issues 4. Computer / Technology Usage
1. a) Defining key vocabulary terms related to computing ethics such as algorithmic privacy and algorithmic fairness; b) Identifying and explaining issues in	

computing ethics at the levels of system development, implementation, and administration	
Competency 3: The student will explore data sets by:	1. Numbers / Data 2. Critical thinking 3. Computer / Technology Usage 4. Ethical Issues
1. a) Defining and describing data, data acquisition, data visualization, and data transformation; b) Identifying data sources and their production; c) Using and manipulating data sets to train learning models	
Competency 4: The student will explore machine-learning algorithms for classification by:	1. Numbers / Data 2. Critical thinking 3. Ethical Issues 4. Computer / Technology Usage
1. a) Describing classification algorithms including linear classifiers, support vector machines, quadratic classifiers, kernel estimation (k-nearest neighbor), decision trees, and neural networks; b) Reproducing linear classifiers, support vector machines, k-nearest neighbor, and neural net learning models using Python	
Competency 5: The student will examine computer vision and facial recognition by:	1. Numbers / Data 2. Critical thinking 3. Ethical Issues 4. Computer / Technology Usage
1. a) Explaining computer vision and facial recognition, image segmentation, object and motion detection and object classification	

Competency 6: The student will examine Natural Language Processing by:	1. Numbers / Data 2. Critical thinking 3. Ethical Issues 4. Computer / Technology Usage
1. a) Defining and explaining machine translation, sentiment analysis, application of deep learning to NLP, speech recognition, and synthesis; b) Reproducing Chatbots using Python	
Competency 7: The student will examine Robotic Sensing and Manipulation by:	1. Numbers / Data 2. Critical thinking 3. Ethical Issues 4. Computer / Technology Usage
1. a) Defining and explaining robotics, sensing and manipulation, human-robot interaction, navigation and path planning, reinforcement learning, and autonomous vehicles technologies and impacts	

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