Georgia CTAE

Artificial Intelligence Applications (11.44500) (2021)

Adopted 2021

Demonstrate employability skills required by business and industry. IT-AIA-1	1. **Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.** IT-AIA-1.1 2. **Demonstrate creativity by asking challenging questions and applying innovative procedures and methods.** IT-AIA-1.2 3. **Exhibit critical thinking and problem-solving skills to locate, analyze and apply information in career planning and employment situations.** IT-AIA-1.3 4. **Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.** IT-AIA-1.4 5. **Apply the appropriate skill sets to be productive in a changing, technological, diverse workplace to be able to work independently and apply teamwork skills.** IT-AIA-1.5 6. **Present a professional image through appearance, behavior and language.** IT-AIA-1.6
Identify, research, and analyze current artificial intelligence developments. IT-AIA-2	1. **Identify, research, and analyze current events in the field of Artificial Intelligence, considering new technology developments, social and ethical impact, and future implication.** IT-AIA-2.1 2. **Identify and describe current challenges and opportunities in Artificial Intelligence technologies using non-Machine Learning aspects of Artificial Intelligence (e.g., genetic algorithms, robotics, computer vision, etc.).** IT-AIA-2.2 3. **Make predictions about the future trends or developments in the field of Artificial Intelligence based on current Artificial Intelligence applications.** IT-AIA-2.3
Identify and research artificial development solutions and development tools. IT-AIA-3	1. **Identify and research networks and cloud services that use Artificial Intelligence solutions (Neural Networks, data management, different industry-specific solutions and services, Edge AI).** IT-AIA-3.1

	2. Identify Artificial Intelligence in a variety of industry solutions and services and make appropriate recommendations of Artificial Intelligence applications based on an industry need. IT-AIA-3.2
	3. Define open source and identify open-source Artificial Intelligence tools (e.g., Tensorflow, Scikit- Learn, Spark ML, PyTorch). IT-AIA-3.3
	4. Define proprietary and identify proprietary Artificial Intelligence tools (e.g., Microsoft Azure AI, Amazon Web Services, Google AI, IBM Watson). IT-AIA-3.4
Design and develop programs using Artificial Intelligence to solve problems. IT-AIA-4	1. Define and apply a team-based software development process (e.g., Agile) using professional tools (e.g., Version Control System, GitHub). IT-AIA-4.1
	2. Define and evaluate computational complexity, time complexity, and space complexity in programs. IT-AIA-4.2
	3. Identify and use IDEs (e.g., VS Code, PyCharm, Jupyter, Sublime) and packages in program development (e.g., Fast AI, Scikit-Learn, Pandas, Runway ML, Tensorflow, Make Code, PyTorch) to build and train machine learning models. IT-AIA-4.3
	4. Define and research an interest or problem that could be enhanced or solved with Artificial Intelligence. IT-AIA-4.4
	5. Design and develop an Artificial Intelligence software solution that addresses a researched interest or problem that could be enhanced or solved. IT-AIA-4.5
	6. Develop an online portfolio that showcases your software development skills and projects. IT-AIA-4.6
Identify, evaluate, and manipulate data using reliable and ethical practices. IT-AIA-5	1. Define and distinguish between balanced and imbalanced datasets. IT-AIA-5.1
	2. Identify potential problems with imbalance datasets. IT-AIA-5.2
	3. Define and explain the difference between training, validation, and test datasets. IT-AIA-5.3
	4. Discuss how bias can be present in datasets and analyze the implications, including ethical implications, of bias in data. IT-AIA-5.4
	5. Define data collection, manipulation, cleansing, and transformation and describe how these can be used to improve datasets. IT-AIA-5.5
	6. Identify different factors to consider when evaluating sources of data. IT-AIA-5.6
	7. Identify, evaluate, and utilize existing datasets from reliable sources (e.g., Kaggle) to train machine learning models. IT-AIA-5.7

	8. Explore and utilize packages from a data analysis and manipulation tool when training a machine learning model (e.g., Pandas). IT-AIA-5.8
	9. Utilize visual reporting and statistical tools to perform, understand, and interpret statistics such as regression analysis, ANOVA, hypothesis testing, and sampling distributions. IT-AIA-5.9
Apply problem-solving skills to design solutions for social and ethical issues. IT-AIA-6	1. Identify and research a real social or ethical problem in your community that might be solved with Artificial Intelligence. IT-AIA-6.1
	2. Use a problem-solving process (e.g., Design Thinking) to collaboratively investigate the identified problem in your community. IT-AIA-6.2
	3. Collaboratively design a solution that uses Artificial Intelligence for the problem identified in your community. IT-AIA-6.3
	4. Develop a prototype or working model of your Artificial Intelligence solution. IT-AIA-6.4
Design Artificial Intelligence solutions using embedded computing. IT-AIA-7	1. Identify and define the function of circuits, sensors, microcontrollers, motors, and other components used in embedded systems. IT-AIA-7.1
	2. Assemble an embedded or robotic system that use circuits, sensor(s), microcontroller, microcomputers, motor(s) to complete a specific task. IT-AIA-7.2
	3. Write a program for an embedded or robotic system that makes a decision based on sensor/user input, controls mechanics of the robot, and completes a "human" task (e.g., delivers items, opens a door for someone, solves a puzzle, etc.). IT-AIA-7.3
	4. Use a problem-solving method to debug hardware issues. IT-AIA-7.4
Examine how related student organizations are integral parts of career and technology education courses through leadership development, school and community service projects and competitive events. IT-AIA-8	1. Explain the goals, mission, and objectives of the career-technical student organization (CTSO). IT-AIA-8.1
	2. Explore the impact and opportunities a student organization can develop to bring business and education together in a positive working relationship through innovative leadership and career development programs. IT-AIA-8.2
	3. Explore the local, state, and national opportunities available to students through participation in related student organization including but not limited to conferences, competitions, community service, philanthropy, and other CTSO activities. IT-AIA-8.3
	4. Explain how participation in career and technology education student organizations can promote lifelong responsibility for community service and professional development. IT-AIA-8.4

5. **Explore the competitive events related to the content of this course and the required competencies, skills, and knowledge for each related event for individual, team, and chapter competitions.** IT-AIA-8.5