# CSCI 538 Assignment 01
# Literature Review and Case Study
# 80 Points

**Hand-in Instructions:**

- This is an individual assignment, not group work. However, you may discuss the general ideas, solutions, or algorithms with classmates and the instructor in order to help you answer the questions. But you are required to use your own words instead of copy-and-paste, not explicitly tell each other your solutions or answers, and not to get any answers from the web.
- Neither Turn-in similarity score nor AI writing detection could be more than 10%. *In your submission, please avoid including the questions from the assignment.*
- Submit your Word file (.doc or docx, not PDF file (.pdf)). No photos or other file types are allowed.
- Submit it electronically through D2L.

**Questions:**

1. **Research and Literature Review (40 pt., 5 pt. each).**
   There are ten types/categories of AI applications that have gained prominence since 2010.

| The last digit of your CWID | Type/Category |
|---|---|
| 0 | Computer Vision Application |
| 1 | Recommendation Systems |
| 2 | Healthcare Application |
| 3 | Natural Language Processing (NLP) Application |
| 4 | Finance and banking Application |
| 5 | Education |
| 6 | Autonomous Driving |
| 7 | Environmental Monitoring |
| 8 | Cybersecurity |
| 9 | Smart city |

Based on the last digit of your CWID, select the category. In your selected category, find out two notable AI computer system/tool instances and answer the following questions for each notable AI application.

(a) What is the last digit of your CWID and what are the two AI computer system/tool instances (specific programs/systems/tools) of that category?

(b) What specifically does the program accomplish (for example, control a spacecraft, diagnose a photocopier, or provide intelligent assistance to computer users)? List three main functions of each program

(c) What AI technologies does it leverage (for example, model-based diagnosis, belief networks, Heuristic search, semantic networks, constraint satisfaction)? List at least three main technologies that have been used to enable each application. Please include an explanation of the data used.

(d) How well does it perform? (How does it compare to humans? How do you know how well it works)
(e) Is this an experimental or fielded program? (How many people are using it? What expertise do these users require?)
(f) Why is it intelligent? What characteristics distinguish it as an intelligent system?
(g) What programming language and environment did they use to create it? What kind of user interface is it?
(h) References: Where did you acquire the application information? What books, publications, or online sites should people interested in the application read?

***Note:***

- *You can use a range of resources, including AI tools, internet research, books, and articles, to get the answers to the questions above. However, it is crucial to remain concise and clear in your answers while also following the rules of academic integrity and avoiding plagiarism.*
- *Turn-in similarity checking and AI writing detection are enabled in the course shell.*
- *List all the references.*

**2. Case Study (20 pt., 4pt. each).**

Based on the definition of AI and Agent learned in our lectures, please explain to what degree the following computer systems instances of artificial intelligence:

(a) Supermarket bar code scanners.
(b) Voice-activated telephone menus.
(c) Spelling and grammar correction features in Microsoft Word.
(d) Internet routing algorithms that respond dynamically to the state of the network.
(e) Virtual Assistants like Siri, Google Assistance, and Alexa

**3. Agent and Environment (20 pt., 5pt. each).**

To save energy efficiently, we consider building a simple thermostat agent that turns on an Air Conditioner (AC) when the temperature is at least 3 degrees below the setting and turns off an AC when the temperature is at least 3 degrees above the setting.

(a) Give a PEAS description of the task environment.
(b) Characterize the environment in terms of its properties. (Examples can be found on P20 of 02-csci538_lecture_Agents.pdf)
(c) How many possible states by referring to the state space on P11 of 02-csci538_lecture_Agents.pdf?
(d) Is a thermostat an instance of a simple reflex agent, a model-based reflex agent, a goal-based agent, a utility-based agent, or a learning agent. Explain why by comparing it to other types of agents.