

MULTI-AGENT SYSTEMS EXAMPLES

As we said before, there could be an entire class on multi-agent systems and there hopefully will be such a class someday soon at OU. For now, I have added a few examples that I often show in the in-person class just to show the variety of multi-agent systems. Your task is to augment this list!

- Robocup
 - [Robocup](#) is a really cool multi-agent robot soccer competition. Eventually they want to be able to play against humans. They have a variety of leagues including simulation and different sized robots. Check out their [webpage](#) and make a point to go to [their YouTube channel](#) and watch some of the videos of the different kinds of robots.
- Search and rescue robots
 - Another fun example of multi-agent systems is search and rescue robots. Here the robots can work together as a team but they must also coordinate with humans. While there are lots of people working on search and rescue with robots, here is one [center](#) to learn more about the topic.
- Transportation Systems
 - One cool example is a transportation system with multiple different bus agents that need to coordinate with each other to make sure that they don't run into each other along with getting to their correct destinations in case of construction or other obstacles.
- OpenAI games
 - I remember watching [this video](#) a few years ago thinking it was one of the neatest things I've ever seen. It's a simple game of hide and seek with a couple of blocks and a ramp to move around, offering both the hiders and seekers opportunities to manipulate the world and learn. I think it does a great job showcasing how multi-agent systems can operate.
- Air Traffic Control Systems
 - I stumbled across a research article, which you can find [here](#) that talks about using multi-agent systems to be able to better analyze and understand patterns of planes in the air. Their research even has a section on how their system could be used to monitor movements of airplanes in the air to track whether the plan is off track and can supposedly be used to identify plane hijacking.

- Pistonball
 - There is a fun little [project](#) that the goal is to make the ball move from 1 side to the other using pistons. These pistons are all on the same level going up and down and need to share the information to move the ball across the screen
- Satellite coordination
 - The many different satellites that orbit Earth have to communicate with each other if they're all attempting to perform one task since no one satellite can see the entire planet at once. For example, satellites that provide an internet connection must communicate with the ground receivers as they fly over them, and the receivers must communicate with the satellites to choose the closest one. Additionally, consider geographic satellites which work together to photograph and map the planet.
- Military coordination
 - Looking towards the future, we are seeing the defense industry continue to develop solutions with an increasing level of autonomy and research into multi agent systems for the military is a growing space. Situational awareness is key to winning a battle so having assets in the battlefield like autonomous drones that could communicate in a split second to work together would be a frightening adversary.
- Tesla FSD network
 - I think that Tesla's network of Full Self Driving vehicles could be considered a multi-agent planning system, for example - if you're at an intersection, you wouldn't want vehicles going left to right in front of you when your light is green. Also, you don't want two cars trying to merge into the same lane at the same time. I think there are many other examples from this network/ tech that we could think of here. (Andy M)
- Amazon Warehouse Robots
 - Some of [Amazon's warehouses](#) use robots, and the robots are used to transport items to amazon workers for shipping. They have to work together to avoid crashing into one another or any humans, as well as keep track of what inventory is going where.
- Drone Light shows
 - There are companies that have an abundance of light-up drones that are programmed to perform a choreographed routine and create visual displays. These drones have to work together to be synchronized so as to not run into one another and to be able to create these great visual displays.
- Modeling Evacuation Plans
 - I have read that multi-agent systems are sometimes used in the modeling of evacuation plans. It can be applied to individual buildings, ships, or entire cities. These kinds of models can help identify bottlenecks for emergency planners. The agents have to work together to evacuate the area in a safe way.

