

# Protocol (Friday Sept 24, 2021)

## Sources:

[Stanford HAI Video](#)

[Intelligent Agents Intro Video](#)

GitHub

## Housekeeping:

### AIMA exercises:

We were asked to look at the chapter 2 exercises from the AIMA book and work on one or more for next week. Some of the questions are about material we haven't covered yet, but by before fall break we should be able to answer them.

## Session Topic: 5 Agents types & Small data issues (MB)

### Lecture

The lecture was about different agent structures and types. On GitHub, there are different diagrams showing different ways on how the agent processes and uses information from their sensors to be able to do its job. An example of an AI agent that follows one of the models presented is the Mars Rover. The Mars Rover uses its sensor to recognize the surface of mars.

MB Didn't like how the models looked from AIMA, so instead he found a video that explained the agents better titled "Intelligent Agents Intro".

The video described many different agents and how it operates:

#### Simple Reflex Agents

These agents operate based on the input of the sensors. They usually are built with rules that the programmer set and can have some random behavior. They will most likely follow the rules and does not have the ability to make decisions based on the inputs they got

#### Model Based Agents

These agents operate by solving partially observable problems. It takes in how the environment is like using inputs and trigger the rules set by the programmer after recognizing the environment. Agent can also estimate the state of the world by itself using their inputs. Random behavior can still occur.

#### Goal Based Agents

These agents have a goal/task and the system evaluates the goal through performance measures. The sensors take input and evaluate the state of the environment, and then the agent will use this information to see if their goals are met. Since these agents evaluate itself, non-deterministic behavior is more common.

### Utility Based Agents

Similar to goal based agents but the goals are evaluated according to utility function (numbers). What this means is that their performance measures can be quantified (ie for cleaning agents, instead of making the goal to be cleaning the target environment, the goal changes to be till what amount of cleanliness will the agent run).

### Intelligent Agents

These are agents have a goal to improve their performance (they need to do better than the last performance). They are self-evaluating, and usually work with utility based agents and create rewards and penalties after evaluating their performances (ie: problem solvers).

## AI and the State of the Art

We started a little bit on this topic and looked at the struggles of AI implementation to different industries of the world due to the small amount of data the industries have. From the Stanford HAI video, Andrew Ng uses the cracked smartphone example of how consumer internet uses data to be able to produce large number of smartphones without cracks. He also used an example of AI and chest x-rays and talked about how it recognizes 11/14 pathologies and have a high accuracy, but AI and learning algorithm does not do well with rare occurrences, which is important for hospitals to have (which is also true in many other industries because the rare occurrences do matter and cannot be ignored).

Small data algorithms are continuously evolving. Andrew Ng uses examples of GANs, which is a synthetic data generation. He explains how GANs are used to detect synthetic scratches of cars. Other examples are One/Few Shot learning, Self-Supervised Learning, Transfer Learning, and Anomaly Detection. These small data algorithms help AI researchers to overcome challenges they face with small data.

## Reflection

I thought that the class session had a lot of information and concepts that we learned. Personally, this class have been challenging me to think more abstractly (like how different model operates). I would have never really thought of how different AI models go through processes that are very specific to the model itself and I do find it interesting how with these simple concepts, AI robots like the Roomba cleaner bots and the Mars Rover are able to be produced. I also think that through learning different models I can think of which models my team's project is going to use

From the Stanford AI video, I found it interesting how Andrew Ng viewed AI. It felt like he wants to implement AI into the world but also recognizing the failures AI might have in different industries (such as failing to detect rare occurrences accurately through chest x-rays).

### References:

Stanford HAI (Sep 23, 2020) Andrew Ng: Bridging AI's Proof-of-Concept to Production Gap [video]. [Online: youtube.com](https://www.youtube.com/watch?v=8p333333333)

Francisco Iabelli (May 15, 2021). Intelligent Agents Intro [video]. [Online: youtube.com](https://www.youtube.com/watch?v=8p333333333)