Course: MMO: introduction to Machine Learning

Video Number:01-03

Estimated Length: 5 min

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|  | **Script text or talking points** | **Visuals / Actions on Screen** |
| 1 | This is a picture of astronaut Alexander Gerst taking a new personal assistant CIMON through its paces in the International Space Station. He started with simply asking it to play music and moved on to running through more complex procedures. All the while he reported back to ground control on the performance of CIMON.  At some point CIMON started acting defensive stating, “Don’t be so mean.” And "Don't you like it here with me?". Alexander was quite amused in his reaction and it was humorous to watch this AI give responses that its creators didn’t intend.  Of course, underlying this are thoughts back to 2001 A Space Odyssey’s HAL and wondering if this is how it all gets started. Was CIMON going to open the pod bay doors for Alexander if he could instead keep them closed? | Slide 1 |
|  | Artificial intelligence is loosely defined as computer systems doing tasks that are normally reserved for humans. What this means has been a moving target. In the 1970’s simple decision systems could have been considered a type of artificial intelligence while today such work is normal table stakes in most applications. Today, more complex systems and problems are considered to be artificial intelligence.  One of the interesting areas that has been seeing a lot of momentum in the past few years are AI’s that can solve much more open-ended problems with a wide variety of inputs and situations. The most common example of this is self-driving cars.  Another example I like is an AI that can win against a human playing StarCraft without “cheating” as is normally done to make game AIs competitive. While you may think that AIs for games have been around for years, it has always been considered very difficult to have a true AI in a game as complex as StarCraft that can beat a human using human limitations in visibility, ability to operate with the system using a mouse, etc. This has now been done. That must have been a fun team to be a part of.  Machine learning is a very specific portion of AI that generally deals with programs that can learn or draw insight from data. This is very different from traditional rules engines, were programmers code specific rules into the system. Instead, Machine Learning models look at sample data and results and experiment to learn what rules apply. | Slide 2 |
|  | There are several challenges and weaknesses of AI. First and foremost, they require a large amount of data and for that data to be clean. That is to say, the data can’t be inaccurate or incomplete and needs to be sufficient. There is a significant effort that usually needs to apply to the data before a model can be trained.  Models also tend to answer a single question. They are not far reaching Ais like HAL but instead focus on a limited problem like driving a car or playing StarCraft.  When dealing with supervised learning the engineer needs a fair amount of domain knowledge. Not enough to manually code the rules, but at least enough to accurately understand what the expected results are.  The models cannot handle nuance and cassation. That is to say they will not intrinsically understand real world limitations. Microsoft published a model not too long ago that guessed a person’s age. Sometimes it would guess a negative age as it did not have the understanding that zero was the lower bound on age.  Finally, the models produced are a bit of a black box. The math used to reach their results is extremely complex and time consuming to do manually. When dealing with information such as a person’s gender or race, it would be very difficult to know how much the model was relying on this to come to its result. This can lead to models that are inherently biased in ways at are not legal. The only way to ensure this is not happening is to starve the training of such data which can lead to other issues around accuracy of the results if those were indeed relevant factors. |  |