

8 HUMAN MACHINE TEAMING

PJD's Opening Remarks

To this point we have discussed several kinds of AI machines: rule-based, supervised learning, and unsupervised learning. They follow a progression of increasing machine learning power.

What's next? How about machines increasing human learning power?

In the mid 1990s, Luis van Ahn, a professor at Carnegie-Mellon University, invented the "captcha", a kind of reverse Turing test to tell if an entity trying to log in to an account is a human or machine. The captcha asked the entity to say what letters and numerals appeared in distorted text, or which of 16 photos contains an automobile. These are easy tasks for humans but in the current state of the art still beyond the capabilities of machines. With captchas, website operators can have high confidence that no robots are logging in.

Van Ahn also invented a category of games where two humans play against each other in performing a function, achieving results that neither could do alone. One of his more famous games came in the era when Google had a large number of online images but could not search them because they had no keywords. In his game two random players would be shown the same image and asked to type a keyword. If they both typed the same keyword, it became a label for the image and the first to finish typing got a game point. With this game Google was able to mobilize thousands of players who labeled many thousands of images. The game deftly blended what the human is good at (labelling images) and what the machine is good at (managing a huge database of images). Today's AI software is quite good job at labeling images and Van Ahn's game is no longer of use. But at the time, it illustrated how humans and machines working together could accomplish what no human or machine could do alone.

A more famous example in the same time period occurred in 1997 when IBM Big Blue machine beat world grandmaster chess player Garry Kasparov. The newspapers were filled with stories that a major goal of AI had been met and chess was dead. Kasparov disagreed with the death conclusion. He invented a new kind of chess, Advanced Chess, in which the players are teams of humans and their chess programs; the human player sought advice from the program about possible moves before committing to one. It was soon found that a team of a good human player and a good chess program could beat the supercomputer chess program. Again this illustrates how a human-machine team can accomplish a task that neither can do alone.

It can be said that humans and machines have cooperated for a very long time – after all, every software program has a human interface. Mostly those interfaces were used to give a human access to an automated function. What's different in this level of AI machines is that the machines and interfaces give each entity a job it is best at.

Today's speaker is Professor Rudy Darken. He is a pioneer at human-machine interaction, which he has been teaching at NPS for over 20 years. He is affiliated with the MOVES institute. He will be speaking with you today about how to design human-computer interaction that is more powerful than either the human or the computer acting alone.