

AI: The science that invents the future

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There is a great saying by Allan Kay, who wins the Turing Award in 2003, “*The best way to predict future is to invent it.*” In the ego of ancient times, people invented future, from basic tools to skyscrapers, from fire to electricity. Nevertheless, the pace of this progress is much slower than that of today. With the help of computer science, we could gradually teach machines to perceive, understand, predict, or even manipulate the world.

What type of knowledge I want to learn from the course?

1. What is the state-of-the-art field in Artificial Intelligence?

Besides, I would like to get the general picture of the field of AI.

2. Is it possible that supervised learning be applied to searching techniques?

I think if models of supervised learning can be applied to searching techniques, for instance, if it is applied to heuristic function, it would get a better result and efficiency. Furthermore, can we learn while searching?

3. How can AI be applied in programming languages?

If the compilers can understand the idea of programmers, it would certainly change the world! Nevertheless, I believe the idea can more or less be applied to programming languages.

4. The principles in exacting features for learning and building models.

One of the difficulties in learning is that the features are hard to choose.

5. The techniques used for agents that communicates, perceives and acts.

I am curious about that.

What kind of AI problem I want to solve?

1. How to recognize and classify the facial expressions of all categories of human being under complex environment?

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It has triggered hot discussion among researchers to recognize and classify facial expressions. Nevertheless, the method of image processing is limited by skin, lights and so on. In order to learn features, train model and do the test, we need more accurate AI techniques to help.

2. How to make the fatigue detection of driver more precise?

Driver fatigue is one of the vital causes for the increasing number of traffic accidents. Last year, BCMI group have presented a synthesized method to detect fatigue driving based on video image. It can provide the vigilance score of the driver and thereby give warning to fatigue driving. The novelty of our work is that this algorithm is not simply based on static image, but works on complex environment using infrared cameras without constraints on the background, skin color segmentation and so on. First of all, this algorithm uses Active Shape Model and Adaptive Appearance Model to locate the position of driver's face and then by key points on the image, we locate the position of eyes and mouth. In the following, by binarization, PERCLOS analysis and behavior analysis, we got fatigue degree both from eyes and mouth. Eventually, by synthesizing the classification of image sequences, we arrive at both real-time and continuous result of fatigue detection. The performance is even improved based on infrared cameras.

We have already combined the features of eye closure, mouth closure and use it to detect fatigue degree. Nevertheless, if dynamic images could be learned, it would be more precise.

3. How to recognize the action of people and apply these techniques for human-computer interaction?

If shaking and nodding actions could be recognized, it would improve human-computer interaction.

4. How to let the computer be a teacher and teach human students step by step, in an acceptable way?

I hope this sketch of future would come true one day.

5. How to let the computer be an assistant to search the Internet automatically and write a survey automatically?

This may relate to the field of data mining but will certainly help a lot.

6. How to learn the concept of beauty so that computer can classify and rank art works and music? What about producing scores with given music?

Even an individual among human beings have different opinions on the concept of beauty. Maybe it can be used for ranking.