How will AI change our daily life in the future?

Tsz-Chiu Au
chiu@unist.ac.kr

Ulsan National Institute of Science and Technology (UNIST)
South Korea
Information Revolution

• The automation of information processing tasks by computers.
• Computer science is the main driving force.
• Artificial Intelligence is the key to the ultimate success.
What is Artificial Intelligence?

- Systems that *think* like humans
- Systems that *act* like humans
- Goal: imitate human intelligence
Superintelligence

• Systems that think *better* than humans
• Systems that act *better* than humans
• Goal: achieve a high level of intelligence *beyond* human intelligence.
A Short History of AI

1930s-1940s  Digital computers
1950s-1960s  Machine translation
             Game-playing programs
             Automated theorem proving
1970s        Artificial neural networks
1980s        Expert systems
             Probabilistic reasoning
1990s-2000s  Increasing specialization of the field
             Machine learning
2010s-2020s  Deep learning
             (i.e., large-scale artificial neural networks)
Artificial Neural Networks

Systems of **artificial neurons** inspired by the biological neural networks that constitute animal brains.
Performance of Visual Recognition

![Graph showing the performance of visual recognition error rate from 2010 to 2017. The error rate decreases significantly over the years, and a red line indicates the human error rate.](image)
AI for Decision Making
IBM Deep Blue – the Chess Playing Program
Alpha Go
IBM Watson – the Question-Answering Machine

Who is SpongeBob?
Game Theory and Its Applications

How can we design an environment such that players can behave in a desirable way?

» Encourage cooperation
» Maximize fairness

Prisoner’s Dilemma:

<table>
<thead>
<tr>
<th>Prisoner A</th>
<th>Prisoner B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Remain silent</strong></td>
<td><strong>Confess</strong></td>
</tr>
<tr>
<td>A gets 2 years</td>
<td>A gets 8 years</td>
</tr>
<tr>
<td>B gets 2 years</td>
<td>B gets 1 year</td>
</tr>
<tr>
<td><strong>Confess</strong></td>
<td><strong>Remain silent</strong></td>
</tr>
<tr>
<td>A gets 1 year</td>
<td>A gets 5 years</td>
</tr>
<tr>
<td>B gets 8 years</td>
<td>B gets 5 years</td>
</tr>
</tbody>
</table>
Recommendation Systems
Intelligent Robots
Boston Dynamics

https://www.youtube.com/watch?v=tF4DML7FIWk
Robotic Dog

https://www.youtube.com/watch?v=BMPWxcc-Xbk
Service Robots
AI for Transportation
Self-driving Cars

https://www.youtube.com/watch?v=NJDypGjLoSs
Autonomous Traffic Management

What if these drivers are not humans but computers?
Parking Lots for Autonomous Vehicles

**High-Density Parking (HDP):** utilize autonomous driving to greatly increase the capacity of conventional parking lots

Source: https://www.youtube.com/watch?v=pCzI-l8tsPY
Fully Autonomous Drones
Cognitive Tasks
Text Recognition
Visual Recognition
We will have one exam and one project throughout the semester. For project, you have to team up with others.
Speech Recognition
AI for Art and Design
5. A propaganda poster depicting a cat dressed as French emperor Napoleon holding a piece of cheese.
DALLE-2

https://www.youtube.com/watch?v=qTgPSKKjfVg
Architecture
Music Generation

https://www.youtube.com/watch?v=LSHZ_b05W7o
Tune Mixer

Tune Mixer is a tool for generating new tunes by mixing tunes. You can use Tune Mixer to explore different ways of combining tunes so as to create new tunes with new musical styles.

To use Tune Mixer, you first click “Generate” in the table to generate some new tunes and listen to them by clicking the “Play” buttons (i.e., the circles). After that, click “Select” to choose two tunes you like to mix.

You can use this slider to control the similarity between the new tune and the selected tunes. By default, Tune Mixer will inherit the musical styles of the selected tunes equally when generating the new tune, but you can use the slider to ask Tune Mixer to generate a new tune that is more similar to one of the selected tunes. Finally, click “Mix” and a new tune will be generated.

You can download the tunes as MIDI files and then upload the MIDI files to Tune Mixer in the future. Currently, Tune Mixer can only work with the MIDI files previously generated by Tune Mixer only—you cannot upload other MIDI files except those generated by Tune Mixer. But you can edit a MIDI file to modify the tune before uploading it. On this website you can edit the MIDI files.

https://ai.unist.ac.kr/~chiu/Tune_Mixer
AI in the future

The ongoing information revolution will continue to lead our economic and social development.

Artificial Intelligence is the key to the success of full automation of information processing tasks.

AI will change every aspect of our daily life in the future.
Thank You!