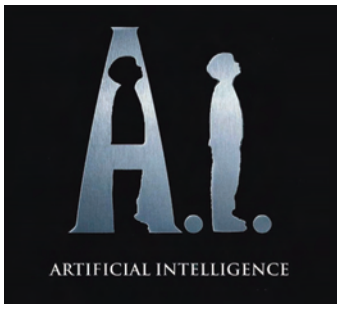
MODULE 6

AUTOMATION AND ROBOTICS

1 *Read the following text and find the English terms for these Italian words.*

a. etichettare / classificare
b. tradizionale
c. azioni / titoli
d. reclamo
e. mancanza
f. maneggiare / trattare

A. APPLICATIONS OF ARTIFICIAL INTELLIGENCE



Artificial intelligence has been used in a wide range of fields including mechanical diagnosis, stock trading, robot control, law, scientific discovery and toys. However, many AI applications are not perceived as AI because once something becomes useful and common enough, it is not labelled AI anymore.

AI researchers have created many tools to solve the most difficult problems in computer science. Many of their inventions have been adopted by mainstream computer science and are no longer considered a part of AI. All of the following were originally developed in AI laboratories: time sharing, interactive interpreters, graphical user interfaces and the computer mouse.

Banks use artificial intelligence systems to organize operations, invest in stocks and manage properties. Financial institutions have long used artificial neural network systems to detect charges or claims outside of the norm, flagging these for human investigation.

A medical clinic can use artificial intelligence systems to organize bed schedules, make a staff rotation and provide medical information. Other tasks in medicine that can potentially be performed by artificial intelligence include computer-aided interpretation of medical images. Such systems help scan digital images, e.g. from computed tomography, for typical appearances and to highlight conspicuous sections, such as possible diseases. A typical application is the detection of a tumour. Robots have become common in many industries. They are often given jobs that are considered dangerous to humans. Robots have proven effective in jobs that are very repetitive, which may lead to mistakes or accidents due to a lapse in concentration and other jobs which humans may find degrading. Artificial intelligence is implemented in automated online assistants for ▶

enterprises to reduce their operating and training cost. Similar techniques may be used in answering machines of call centres, such as speech recognition software to allow computers to handle first level of customer support, text mining and natural language processing to allow better customer handling. The use of artificial intelligence has also proved to be very useful in other sectors such as music, toys and games, transports, aeronautics, air traffic controllers, news and publishing.

2 *Decide if the following statements are true (T) or false (F) and correct the false ones.*

	TRUE	FALSE
1. The use of AI is limited to specific sectors.	☐	☐
2. As soon as something becomes useful and common enough, it is not labelled AI anymore.	☐	☐
3. The operating system of a PC was conceived as part of AI.	☐	☐
4. Robotics is not strictly connected to AI.	☐	☐
5. Robots have proven effective in jobs that are very repetitive which may lead to mistakes or accidents because workers are not paid enough.	☐	☐
6. Artificial intelligence is implemented in automated online assistants for enterprises to reduce their operating and training cost.	☐	☐

3 *Answer the following questions.*

1. Why are many AI applications not considered as the result of AI studies?
2. What do banks use AI for?
3. How is AI used in the medical sector?
4. What are robots used for in industries?
5. In what other sectors have AI inventions been adopted?

4 *Before reading the text, look up these terms in a dictionary.*

a. purpose
b. gear
c. pulley
d. belt
e. shaft
f. cam
g. crank
h. unit drive

B. MECHANIZATION

Mechanization is the process of doing work with machinery. In an early engineering text a machine is defined as follows: "Every machine is constructed for the purpose of performing certain mechanical operations, each of which supposes the existence of two other things besides the machine in question, namely, a moving power, and an object subject to the operation, which may be termed the work to be done."
In some fields, mechanization includes the use of hand tools. In modern usage, such as in engineering or economics, mechanization implies machinery more complex than hand tools. ▶

Devices that cause speed changes or changes to or from reciprocating to rotary motion, using means such as gears, pulleys and belts, shafts, cams and cranks, usually are considered machines. After electrification, when most small machinery was no longer hand powered, mechanization was synonymous with motorized machines. Electrification allowed individual machines to be powered by a separate motor in what is called *unit drive*. Unit drive allowed factories to be better arranged and allowed different machines to run at different speeds. Unit drive also allowed much higher speeds, which was especially important for machine tools.
In manufacturing, mechanization replaced hand methods of making goods and powered machinery today usually means powered either by electric motor or internal combustion engine. Prime movers are devices that convert thermal, potential or kinetic energy into mechanical work. Prime movers include internal combustion engines, combustion turbines (jet engines), water wheels and turbines, windmills and wind turbines and steam engines and turbines.
Powered transportation equipment – such as locomotives, automobiles and trucks, and airplanes – is a classification of machinery which includes subclasses by engine type, such as internal combustion, combustion turbine and steam.
A step beyond mechanization is automation, the use of machines, control systems and information technologies to optimize productivity in the production of goods and delivery of services.

5 *Match the English terms with the correct definition.*

1. gear: .....
2. pulley: .....
3. belt: .....
4. shaft: .....
5. cam: .....
6. crank: .....

a. Piece of equipment for moving heavy objects up or down, consisting of a small wheel over which a rope or chain fixed to the object can be easily pulled or released slowly.
b. Device for transmitting rotary motion, consisting of a handle or arm attached at right angles to a shaft.
c. Device, often consisting of connecting sets of wheels with teeth (= points) around the edge, that controls how much power from an engine goes to the moving parts of a machine.
d. Flat strip of material in a machine that moves round continuously to keep another part turning, or to keep objects on it moving round.
e. Device for converting a regular rotary motion into an irregular, fast and slow, intermittent rotary or reciprocating motion.
f. Rod which forms part of a machine such as an engine, and which turns in order to pass power on to the machine.

6 *Answer the following questions.*

1. What is mechanization?
2. What are machines?
3. What happened as a consequence of electrification?
4. What is a unit drive?
5. What did the unit drive allow?
6. What are prime movers?
7. What is automation?