

6 AUTOMATION AND ROBOTICS

UNIT 1 • AUTOMATION



1

While reading the text below underline the most significant sentences.

Over the years, the social merits of automation have been **argued** by **labour leaders**, business executives, government officials, and college professors. One of the biggest controversies has focused on how automation affects employment, but there are other important aspects of automation, including its effect on productivity, economic competition, education, and quality of life.

Nearly all industrial installations of automation, and in particular robotics, involve a replacement of human labour by an automated system. Therefore, one of the first effects of automation in factory operations is the dislocation of human labour from the workplace. The long-term effects of automation on employment and unemployment rates are under **debate**. Workers have **indeed** lost jobs through automation, but population increases and consumer demand for the products of automation have compensated for these losses.

Of particular concern for many labour specialists is the impact of industrial robots on the work force, since robot installations involve a direct substitution of machines for humans, sometimes at a **ratio** of two to three humans per robot. The opposing **argument** is that robots can increase productivity in factories, making these firms more competitive and ensuring that jobs are not lost to overseas companies. The effect of robotics on labour has been relatively **argument**, because the number of robots in factories is small compared with the number of human workers.

Automation affects not only the number of workers in factories but also the type of work that is done. The automated factory is oriented toward the use of computer systems and sophisticated programmable machines rather than manual labour. Greater emphasis is placed on **knowledge**-based work and technical skill rather than physical work. The types of jobs found in modern factories include more machine maintenance, improved scheduling and process optimization, systems analysis, and computer programming and operation. Consequently, workers in automated facilities must be technologically skilled to perform these jobs.

GLOSSARY



to argue: discutere

argument: tesi

debate: discussione

indeed: davvero

labour leaders: rappresentanti dei lavoratori

minor: scarso

ratio: rapporto

knowledge: conoscenza, competenza



2

Join the sentences you have underlined in Activity 20 into a short text. Then report it orally.

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3

Read the following text about Numerical Control machinery and fill in the blanks with the words below.

according • achieve • advantages • afford • complex • continuous • costs • disadvantages
 • geometries • high • kept • needs • offers • operators • perform • personnel • plants •
 salaries • same • skilled • specifications • tax • warehousing • workpiece

NC machinery has given great (a) to manufacturers: NC equipment can be quickly reprogrammed (b) to the needs and, differently from conventional manual machines, NC machinery (c) the possibility of machining (d) shapes at reduced (e)

Unfortunately, NC equipment has extremely (f) initial costs, especially for small firms with small-quantity production and simple (g): they often cannot even (h) the initial investment. Besides, NC machinery should be (i) continuously busy to pay off and this is almost impossible for small manufacturing (j) Moreover, (k) programmers are necessary for NC machinery and they are not easy to find and they usually ask for high (l) This equipment also requires special and (m) maintenance at very high costs: in fact, highly skilled maintenance (n) are uncommon and ask for high salaries as well.

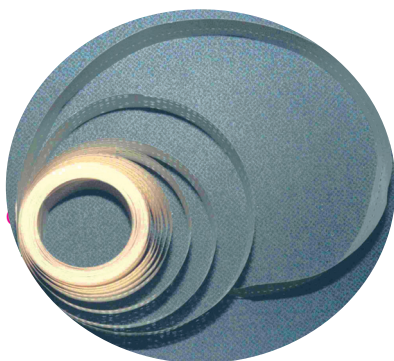
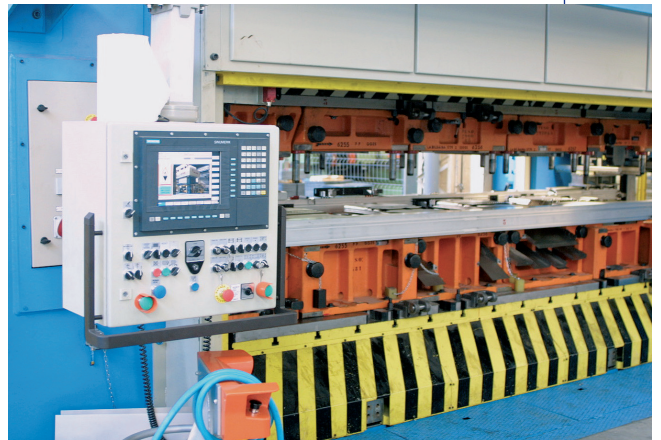
However, advantages surely outweigh (o) NC machines enable manufacturers to (p) higher levels of accuracy and precision: it goes without saying that a manual machine tool cannot meet the product (q) as easily as updated NC machines do. Furthermore, thanks to NC machinery, (r) costs are reduced: spare parts can be quickly produced to satisfy the customers' requests and also rapidly modified according to the (s) ..; they do not become obsolete and are not subjected to a property (t) Finally, we must also consider that NC (u) do not necessarily require the (v) skills as the machinists of manual machine tools: they tend to (w) simpler tasks such as loading or unloading the (x), pushing buttons to start or stop the operations.



4

Pair work. With a class-mate discuss advantages and disadvantages of numerical control equipment. Use the table below as a guide.

Advantages	Disadvantages
<p>FLEXIBILITY</p> <p>NC machines can be quickly reprogrammed to produce different items.</p> <p>PRODUCTION OF DIFFICULT GEOMETRIES</p> <p>NC equipment can machine complex shapes that would be prohibitively expensive with conventional manual machines. It permits engineers to design products that would otherwise be uneconomical.</p> <p>REPEATABILITY</p> <p>NC machines can make high numbers of parts exactly the same, without deviation. A good machinist with a manual machine tool could not achieve the same accuracy: no two parts would be exactly alike and they would not easily meet the product specifications.</p> <p>REDUCTION OF WAREHOUSING COSTS</p> <p>Spare parts are no longer stored in a warehouse: NC machines are quickly and easily set up to start production of the replacement parts as required. Investment is reduced, capital is not tied up in the warehouse and it is not subjected to a property tax; spare parts do not become obsolete and engineers can change the design any time they desire.</p> <p>LOWER OPERATOR SKILL REQUIREMENT</p> <p>NC operators do not direct the operation of the machine tool: they simply load/download the workpiece, push the buttons to start or stop operations. They do not require the same skills as the machinists of manual machine tools, they are easier to find and train. Their salaries are not high.</p>	<p>INVESTMENT</p> <p>NC equipment has high initial costs and machinery must be kept continuously busy to pay off: sometimes they must run two or three shifts per day and at weekends. Small firms cannot afford the investment, especially if they rely on small-quantity production with simple geometry.</p> <p>SKILLED PROGRAMMERS REQUIRED</p> <p>NC systems need trained personnel responsible for programming commands, setting up and running production. High skilled programmers are not easy to find. Salaries are high.</p> <p>HIGH MAINTENANCE COSTS</p> <p>NC machines can be very complex and need special and continuous maintenance: production cannot be stopped for long repairs. Maintenance personnel must be experts on both mechanical and electrical systems: a difficult combination of skills to find.</p>



GLOSSARY



- to pay off: essere redditizio
- shift: turno
- spare part: ricambio
- tied up: vincolato
- warehousing costs: costi di immagazzinaggio

UNIT 2 • ROBOTICS



1

The following is an article on the “10 greatest robots” in movies according to the author. Complete the description of each of them by providing the missing title choosing from the list below.

- a. ‘A.I.: Artificial Intelligence’
- b. ‘Forbidden Planet’
- c. ‘I, Robot’
- d. ‘Robocop’
- e. ‘Short Circuit’
- f. ‘Star Trek: Generations’
- g. ‘Star Wars: A New Hope’
- h. ‘The Iron Giant’
- i. ‘The Terminator’
- j. ‘WALL-E’

TOP 10 ROBOT MOVIES

by DAVID NUSAIR

Though the appearance of robots has changed over the years, the artificial life-forms have remained a steady staple within the science-fiction genre since the beginning of cinema itself. The following 10 films are the best of the best in terms of their portrayal of robots:

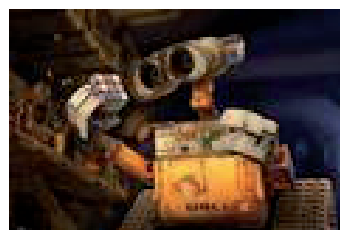
1.



Lucasfilm

The entire series is full of robots and cyborgs and various other artificial life-forms, but it's 1977's film that first introduced the world to a pair of loveable bots named C-3PO and R2-D2. The pair's unusual friendship – C-3PO seems to be the only one who can understand R2's beeps and whistles – stands as the backbone of the entire original trilogy, which confirms their place as perhaps the most iconic non-living characters in cinematic history.

2.



Pixar

It's hard to believe that this robot doesn't speak a word of dialogue throughout Pixar's 2008 masterpiece, as the character eventually becomes as compelling and sympathetic a figure as his human counterparts. His pursuit of a fellow robot, named EVE, is genuinely romantic and thoroughly engaging, and it's impossible not to feel a burst of emotion when the pair finally do get together at the end of the movie.

3.



Warner Bros. Pictures

With this film, Steven Spielberg introduced viewers to David, a lifelike robot that's been designed to look, sound, and behave like a young boy. Haley Joel Osment's flawless performance as David plays a key role in the character's placement on this list, and it's also worth noting that the movie boasts several other memorable robotic characters – including David's sidekick and companion, a walking, talking teddy bear named Teddy.

4.

The granddaddy of evil robots, this robot (played by Arnold Schwarzenegger) is a vicious killing machine that will do whatever it takes to kill his target, Sarah Connor (played by Linda Hamilton) – including murdering other folks that just happen to share her name. And although the sequels have featured some pretty impressive robots in their own right, it's James Cameron's original creation that remains the bona fide classic.

5.

The title character may not be a robot – he's actually a cyborg, if you want to get technical about it – but this film still deserves a place on this list because of ED-209. ED-209 is a fierce, absolutely frightening robot that's been outfitted with an intimidating voice and a pair of enormous machine guns. (The latter of which are memorably used against a hapless employee during a board meeting.)

6.

For anyone that grew up in the 1980s, Number 5 is probably the first robot that comes to mind when the subject of movie robots is broached – as the character, also known as Johnny 5, possesses a friendly, outgoing demeanor that's utilized to great (and often comedic) effect in this 1986 film. It's hard not to immediately sympathize with Number 5's efforts at evading the military's advances, although, as we eventually learn, the character has been outfitted with enough firepower to easily defend himself (and the people he comes to love).

7.

In the 1950s, filmmakers began toying with a number of different science-fiction oriented ideas and elements – with robots becoming more and more prominent as a result. One of the most well-known robots from that era is Robby the Robot, as the character's oversized, rather clunky design became the standard by which artificial life-forms followed for the next several years. (The robot on the '60s *Lost in Space* television series, for example, looks quite similar.)

8.



MGM



MGM



MGM



MGM



Paramount Pictures

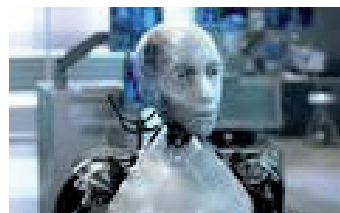
It's impossible to compile a list of famous robots without including at least one of these movies, as Data (Brent Spiner) remains one of the most well-known and iconic robots within the pop culture landscape. In these films, the brilliant and beloved android finally received the emotion chip that he had been coveting for much of the series production – with the hilarious nature of his subsequent efforts at dealing with simple feelings like happiness and sadness providing the otherwise fast-paced adventure film with its heart and soul.



Warner Bros. Pictures

9.

Brad Bird's film fulfils a dream that many of us had when we were kids, in that it details the unlikely friendship that ensues between a small boy and a 50-foot, metal-eating robot. Despite his intimidating appearance, the title character eventually becomes a surprisingly sympathetic figure that the viewer can't help but root for – with Vin Diesel's commanding voice performance playing a pivotal role in cementing the movie's success.



20th Century Fox

10.

Based on the famous short story collection by Isaac Asimov, this film transpires in a world that's virtually overrun by robots – as the artificial life-forms perform a variety of mundane (and not-so-mundane) tasks and jobs. At the center of the storyline is Sonny (Alan Tudyk), a robot who possesses a desire to overcome his rigid programming and become more than just another cog in a very large machine.



2

Look at the list of the "10 greatest robots" in movies again. Is there a film on/with robots not mentioned which you would definitely include in this list?



3

From the list of films above, choose one that you have seen and provide a synopsis making special reference to the robotic aspects of it.