

History of Robotics

History of Robotics – Structured Overview

1. Foundations (Ancient – 19th Century)

Era	Milestones	Key Figures / Cultures
Ancient Myths & Automata	- Tales of mechanical beings (e.g., Talos of Crete, Hephaestus’s golden assistants) - Early “automata” used in temples and festivals	Greek mythology, ancient Egypt
Classical Antiquity	First known programmable device – Hero of Alexandria (c.10CE) built a steam-powered automaton that opened temple doors	Hero of Alexandria
Middle Ages	Mechanical clocks with moving figures; early self-acting devices in Islamic world (e.g., Al-Jazari)	Al-Jazari (1206CE) – “The Book of Knowledge of Ingenious Mechanical Devices”
Renaissance	Leonardo da Vinci’s sketches of a humanoid “mechanical knight” (1495)	Leonardo da Vinci
Industrial Revolution	Development of precision metalworking, steam power, and early programmable looms (e.g., Jacquard loom, 1804) – the first use of punched cards for control	Joseph Marie Jacquard

2. Birth of Modern Robotics (20th Century)

2.1 Early Concepts & Terminology

Year	Event	Significance
1920	Karel Čapek’s play “ R.U.R. ” (Rossum’s Universal Robots)	Introduced the word “ robot ” (from Czech <i>robota</i> = forced labor).
1939	Isaac Asimov’s Three Laws of Robotics (first published 1942)	Provided a philosophical framework that still influences robot ethics.

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2.2 Pioneering Machines

Date	Robot	Designer / Institution	Notable Features
1948	The “Elektro”	Westinghouse	First humanoid robot shown on TV; could walk, talk, smoke.
1954	Unimate (prototype)	George Devol & Joseph Engelberger	First industrial robot; used a programmable magnetic drum for control.
1961	Unimate 001 installed at General Motors (Fremont, CA)	Engelberger & Devol	Marked the start of commercial robot use in manufacturing.
1966	Shakey	SRI International	First mobile robot able to reason about its actions; combined computer vision and planning.
1973	Stanford Arm (first computer-controlled robotic arm)	Victor Scheinman	Introduced six degrees of freedom , becoming a template for later manipulators.

2.3 Technological Breakthroughs

Area	Advancement	Impact
Control Systems	Development of PID controllers and early microprocessors (1970s)	Enabled precise, repeatable motion.
Sensors	Introduction of force/torque sensors, vision systems, and proximity detectors	Gave robots perception capabilities.
Programming	From punch-card/tape to high-level languages (e.g., VAL, RAPID, KRL)	Simplified robot integration and re-programming.