

Preface

Intelligence is the new paradigm for any branch of engineering and technology. *Intelligence* has been defined in many different ways including as one's capacity for logic, understanding, self-awareness, learning, emotional knowledge, planning, creativity and problem solving. Formally speaking, it is described as the ability to perceive information and retain it as knowledge to be applied towards adaptive behaviours within an environment or context.

Artificial intelligence is the study of intelligence in machines, which was coined during the 1950s, and this was a proposition much before to this may be well back to fourth century B.C. Let us take a brief look at the history of intelligence. Aristotle invented syllogistic logic in fourth century B.C., which is the first formal deductive reasoning system. In thirteenth century, in 1206 A.D., Al-Jazari, an Arab inventor, designed what is believed to be the first programmable humanoid robot, a boat carrying four mechanical musicians powered by water flow. In 1456, printing machine using moveable type was invented and Gutenberg Bible was printed. In fifteenth century, clocks were first produced using lathes, which were the first modern measuring machines.

In 1515, clockmakers extended their craft for creating mechanical animals and other novelties. In the early seventeenth century, Descartes proposed that bodies of animals are nothing more than complex machines. Many other seventeenth-century thinkers offered variations and elaborations of Cartesian mechanism. In 1642, Blaise Pascal created the first mechanical digital calculating machine. In 1651, Thomas Hobbes published "*The Leviathan*", containing a mechanistic and combinatorial theory of thinking. Between 1662 and 1666, Arithmetical machines were devised by Sir Samuel Morland. In 1673, Leibniz improved Pascal's machine to do multiplication and division with a machine called the step reckoner and envisioned a universal calculus of reasoning by which arguments could be decided mechanically. The eighteenth century saw a profusion of von Kempelen's phony mechanical chess player.

In 1801, Joseph-Marie Jacquard invented the Jacquard loom, the first programmable machine, with instructions on punched cards. In 1832, Charles Babbage and Ada Byron designed a programmable mechanical calculating machine, the

Analytical Engine, whose working model was built in 2002. In 1854, George Boole developed a binary algebra representing some “laws of thought”. In 1879, modern propositional logic was developed by Gottlob Frege in his work *Begriffsschrift* and later clarified and expanded by Russell, Tarski, Godel, Church and others.

In the first half of twentieth century, Bertrand Russell and Alfred North Whitehead published *Principia Mathematica*, which revolutionized formal logic. Russell, Ludwig Wittgenstein and Rudolf Carnap lead philosophy into logical analysis of knowledge. In 1912, Torres Y. Quevedo built his chess machine “Ajedrecista”, using electromagnets under the board to play the endgame rook and king against the lone king, the first computer game.

During the second part of twentieth century, the subject was formally taken a shape in the name of traditional artificial intelligence following the principle of physical symbolic system hypothesis to get great success, particularly in knowledge engineering. During the 1980s, Japan proposed the fifth-generation computer system (FGCS), which is knowledge information processing forming the main part of applied artificial intelligence. During the next two decades, key technologies for the FGCS were developed such as VLSI architecture, parallel processing, logic programming, knowledge base system, applied artificial intelligence and pattern processing. The last decade observed the achievements of intelligence in mainstream computer science and at the core of some systems such as communication, devices, embedded systems and natural language processor.

This volume covers some of the recent developments of intelligent sciences in its three tracks, namely intelligent computing, intelligent communication and intelligent devices. Intelligent computing track covers areas such as intelligent and distributed computing, intelligent grid and cloud computing, Internet of Things, soft computing and engineering applications, data mining and knowledge discovery, Semantic and Web Technology, hybrid systems, agent computing, bioinformatics and recommendation systems.

At the same time, intelligent communication covers communication and network technologies, including mobile broadband and all optical networks that are the key to groundbreaking inventions of intelligent communication technologies. This covers communication hardware, software and networked intelligence, mobile technologies, machine-to-machine communication networks, speech and natural language processing, routing techniques and network analytics, wireless ad hoc and sensor networks, communications and information security, signal, image and video processing, network management and traffic engineering.

The intelligent device is any equipment, instrument, or machine that has its own computing capability. As computing technology becomes more advanced and less expensive, it can be built into an increasing number of devices of all kinds. The intelligent device covers areas such as embedded systems, RFID, RF MEMS, VLSI design and electronic devices, analogue and mixed-signal IC design and testing, MEMS and microsystems, solar cells and photonics, nanodevices, single electron and spintronics devices, space electronics and intelligent robotics.

We shall not forget to inform you that the next edition of the conference, i.e. 3rd International Conference on Intelligent Computing, Communication and Devices

(ICCD-2017), is going to be held during June 2017 in China, and we shall be updating you regarding the dates and venue of the conference.

I am sure that the readers shall get immense ideas and knowledge from this volume on recent developments on intelligent computing, communication and devices.

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Recent Developments in Intelligent Computing,
Communication and Devices

Proceedings of ICCD 2016

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2017, XVIII, 164 p. 68 illus., Softcover

ISBN: 978-981-10-3778-8