

Write about current and future trend of Artificial Intelligence.

Artificial intelligence

Artificial intelligence (AI) is intelligence exhibited by machines. In computer science, an ideal "intelligent" machine is a flexible rational agent that perceives its environment and takes actions that maximize its chance of success at some goal. Colloquially, the term "artificial intelligence" is applied when a machine mimics "cognitive" functions that humans associate with other human minds, such as "learning" and "problem solving". The goal of AI research include reasoning, knowledge, planning, learning, natural language processing(communication), perception and the ability to move and manipulate objects.

Current trend

Artificial intelligence has been used in a wide range of fields including medical diagnosis, stock trading, robot control, law, remote sensing, scientific discovery and toys. AI is used in the field of computer science, finance, hospital and medicine, heavy industry online and telephone customer service, transportation, telecommunication maintenance, toys and games, music, aviation, news, etc.

Computer science

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.

Finance

Financial institutions have long used artificial neural network systems to detect charges or claims outside of the norm, flagging these for human investigation.

Hospitals and medicine

Artificial neural networks are used as clinical decision support systems for medical diagnosis, such as in Concept Processing technology in EMR software.

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 tumor.

- Heart sound analysis
- Watson project is another use of AI in this field, a Q/A program that suggest for doctor's of cancer patients.
- Companion robots for the care of the elderly.

Heavy industry

Robots have become common in many industries and 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.

Online and telephone customer service

Artificial intelligence is implemented in automated online assistants that can be seen as avatars on web pages. It can avail for enterprises to reduce their operation and training cost.^[8] A major underlying technology to such systems is natural language processing.

Transportation

Fuzzy logic controllers have been developed for automatic gearboxes in automobiles.

Telecommunications maintenance

Many telecommunications companies make use of heuristic search in the management of their workforces, for example BT Group has deployed heuristic search in a scheduling application that provides the work schedules of 20,000 engineers.

Toys and games

The 1990s saw some of the first attempts to mass-produce domestically aimed types of basic Artificial Intelligence for education, or leisure. This prospered greatly with the Digital Revolution, and helped introduce people, especially children, to a life of dealing with various types of Artificial Intelligence, specifically in the form of Tamagotchis and Giga Pets,iPod Touch, the Internet (example: basic search engine interfaces are one simple form), and the first widely released robot, Furby. A mere year later an improved type of domestic robot was released in the form of Aibo, a robotic dog with intelligent features and autonomy.

AI has also been applied to video games, for example video game bots, which are designed to stand in as opponents where humans aren't available or desired; or the AI Director from Left 4 Dead, which decides where enemies spawn and how maps are laid out to be more or less challenging at various points of play.

Music

The evolution of music has always been affected by technology. With AI, scientists are trying to make the computer emulate the activities of the skillful musician. Composition, performance, music theory, sound processing are some of the major areas on which research in Music and Artificial Intelligence are focusing. Among these efforts, Melomics seems to be ahead by powering computer-composers that learn to compose the way humans do.

Aviation

The Air Operations Division (AOD) uses AI for the rule based expert systems. The AOD has use for artificial intelligence for surrogate operators for combat and training simulators, mission management aids, support systems for tactical decision making, and post processing of the simulator data into symbolic summaries.

The use of artificial intelligence in simulators is proving to be very useful for the AOD. Airplane simulators are using artificial intelligence in order to process the data taken from simulated flights. Other than simulated flying, there is also simulated aircraft warfare. The computers are able to come up with the best success scenarios in these situations. The computers can also create strategies based on the placement, size, speed and strength of the forces and counter forces. Pilots may be given assistance in the air during combat by computers. The artificial intelligent programs can sort the information and provide the pilot with the best possible maneuvers, not to mention getting rid of certain maneuvers that would be impossible for a human being to perform. Multiple aircraft are needed to get good approximations for some calculations so computer simulated pilots are used to gather data. These computer simulated pilots are also used to train future air traffic controllers.

Typical problems to which AI methods are applied currently are:-

- Optical character recognition
 - Handwriting recognition
 - Speech recognition
 - Face recognition
 - Artificial creativity
 - Computer vision, Virtual reality and Image processing
 - Diagnosis (artificial intelligence)
 - Game theory and Strategic planning
 - Game artificial intelligence and Computer game bot
 - Natural language processing, Translation and Chatterbots
 - Nonlinear control and Robotics
-

Future prospects

In the next 10 years technologies in narrow fields such as speech recognition will continue to improve and will reach human levels. In 10 years AI will be able to communicate with humans in unstructured English using text or voice, navigate in an unprepared environment and will have some rudimentary common sense (and domain-specific intelligence).

We will recreate some parts of the human (animal) brain in silicon. The feasibility of this is demonstrated by tentative hippocampus experiments in rats. There are two major projects aiming for human brain simulation, CCortex and IBM Blue Brain.

There will be an increasing number of practical applications based on digitally recreated aspects human intelligence, such as cognition, perception, rehearsal learning, or learning by repetitive practice.

Robots take over everyone's jobs.

The development of meaningful artificial intelligence will require that machines acquire some variant of human consciousness. Systems that do not possess self-awareness and sentience will at best always be very brittle. Without these uniquely human characteristics, truly useful and powerful assistants will remain a goal to achieve. To be sure, advances in hardware, storage, and parallel processing architectures will enable ever greater leaps in functionality. But these systems will remain mechanistic zombies. Systems that are able to demonstrate conclusively that they possess self-awareness, language skills, surface, shallow and deep knowledge about the world around them and their role within it will be needed going forward. However the field of artificial consciousness remains in its infancy. The early years of the 21st century should see dramatic strides forward in this area however.

During the early 2010's new services can be foreseen to arise that will utilize large and very large arrays of processors. These networks of processors will be available on a lease or purchase basis. They will be architected to form parallel processing ensembles. They will allow for reconfigurable topologies such as nearest neighbor based meshes, rings or trees. They will be available via an Internet or WIFI connection. A user will have access to systems whose power will rival that of governments in the 1980's or 1990's. Because of the nature of nearest neighbor topology, higher dimension hypercubes (e.g. D10 or D20), can be assembled on an ad-hoc basis as necessary. A D10 ensemble, i.e. 1024 processors, is well within the grasp of today's technology. A D20, i.e. 2,097,152 processors is well within the reach of an ISP or a processor provider. Enterprising concerns will make these systems available using business models comparable to contracting with an ISP to have web space for a web site. Application specific ensembles will gain early popularity because they will offer well defined and understood application software that can be recursively configured onto larger and larger ensembles. These larger ensembles will allow for increasingly fine grained computational modeling of real world problem domains. Over time, market awareness and sophistication will grow. With this grow will come the increasing need for more dedicated and specific types of computing ensembles.