

Ubiquitous Artificial Intelligence

Arun Vyas

M.Tech Scholar, Department of ECE
JIET, Jodhpur

Laxmi Chaudhary

Associate Professor, Department of ECE
JIET, Jodhpur

Pooja Verma

Associate Professor, Department of ECE
JIET, Jodhpur

Aisha Jangid

M.E. Scholar, Department of Elet. Engg.
M.B.M Engg. College, Jodhpur

Abstract--The basic strategy of AI has always been to seek out progressively more complex human tasks and show how computers can do them, in humanoid ways or by brute force. With a half-century of steady progress, we have assembled a solid body of tested theory of the processes of human thinking and the ways to simulate and supplement them. The best way to develop a truly intelligent system is to use the known properties of the only intelligent system that we know: humans. Intelligent techniques are playing an increasingly important role in engineering and science having evolved from a specialized research subject to mainstream applied research and commercial products. Manufacturing systems in industries has dramatically changed as a result of advanced manufacturing technologies employed in today's factory. Factories are now trying to attend and maintain a world-class status through automation that is possible by sophisticated computer programs. The development of CAD/CAM system is evolving towards the phase of intelligent manufacturing system. A tremendous amount of manufacturing knowledge is needed in an intelligent manufacturing system. Artificial intelligence techniques are designed for capturing, representing, organizing, and utilizing knowledge by computers, and hence play an important role in intelligent manufacturing. Artificial intelligence has provided several techniques with applications in manufacturing like; expert systems, artificial neural networks, genetic algorithms and fuzzy logic. The potential power of AI is very great and it is believed that with the exploitation of AI methods, it will only possible to build well conceived and intelligent computer integrated manufacturing systems. The applications of artificial intelligence tools in design re also discussed with some examples.

Keywords: artificial intelligence, software, Nerual networks, Machine learning

I INTRODUCTION

Since the start of the 21st century, there's no question that mankind has made tremendous strides into the field of robotics. While modern robots can now replicate the movements and actions of humans, the next challenge lies in teaching robots to think for

themselves and react to changing conditions. The field of artificial intelligence promises to give machines the ability to think analytically, using concepts and advances in computer science, robotics and mathematics. While scientists have yet to realize the full potential of artificial intelligence, this technology will likely have far-reaching effects on human life in the years to come. Artificial Intelligence in the form of expert systems and neural networks have applications in every field of human endeavor. Artificial intelligence (AI) has revolutionized information technology. The new economy of information technology has shaped the way we are living. This special issue aims to report the latest advances in every aspect of artificial intelligence technology, including machine learning, data mining, computer vision, multiagent systems, evolutionary computation, and fuzzy logic.



Fig.1.AI Strategy [3]

They combine precision and computational power with pure logic, to solve problems and reduce error in operation. Already, robot expert systems are taking

over many jobs in industries that are dangerous for or beyond human ability. AI is helping people in every field make better use of information to work smarter, not harder[1]. People of the future may look back on our society and marvel at our way of life: doctors relying mainly on their memory for all the salient facts to a case, cars that can't parallel-park themselves, factories requiring human assembly-line drudgery, library books unable to recommend other relevant information sources[2]. Recently, AI algorithms have attracted close attention of researchers and have also been applied successfully to solve problems in engineering. Nevertheless, for large and complex problems, AI algorithms consume considerable computation time due to stochastic feature of the search approaches. Therefore, there is a potential requirement to develop efficient algorithm to find solutions under the limited resources, time, and money in real-world applications.

A "knowledge engineer" interviews experts in a certain domain and tries to embody their knowledge in a computer program for carrying out some task. How well this works depends on whether the intellectual mechanisms required for the task are within the present state of AI. When this turned out not to be so, there were many disappointing results. In the present state of AI, this has to be true. The usefulness of current expert systems depends on their users having common sense.

II. APPLICATIONS

A. Finance and heuristic classification

Banks use artificial intelligence systems to organize operations, invest in stocks, and manage properties. In August 2001, robots beat humans in a simulated financial trading competition. Financial institutions have long used artificial neural network systems to detect charges or claims outside of the norm, flagging these for human investigation. AI is more S/W related so the game can be easier or harder. Banks use intelligent software applications to screen and analyze financial data. Software programs that can predict trends in the stock market have been created which have been known to beat humans in predictive power.

As of 2010, roughly half of world stock trades are driven by artificial intelligence-based software. These programs rely on algorithms to spot patterns in the market and predict price changes based on these patterns. Some can even buy or sell shares based on these predictions, while others issue an alert to human brokers and advise them of the changes to come. This technology results in better performance and improved returns for investors. Artificial intelligence software may soon be able to protect consumers from

fraud by spotting changes in spending or credit card use. If cards are lost or accounts are breached, the program can shut down the account and alert the holder of a potential problem to help limit losses. Artificial intelligence software can spot patterns in the stock market, which can be beneficial to investors.

One of the most feasible kinds of expert system given the present knowledge of AI is to put some information in one of a fixed set of categories using several sources of information. An example is advising whether to accept a proposed credit card purchase. Information is available about the owner of the credit card, his record of payment and also about the item he is buying and about the establishment from which he is buying it (e.g., about whether there have been previous credit card frauds at this establishment)

B. Hospitals and medicine

A medical clinic can use artificial intelligence systems to organize bed schedules, make a staff rotation, and provide medical information. Artificial neural networks are used as clinical decision support systems for medical diagnosis, such as in Concept Processing technology in EMR software[4]. 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. AI has embraced medical applications from its inception, and some of the earliest work in successful application of AI technology occurred in medical contexts. Space-Age Medicine Artificial intelligence in medicine is already helping doctors detect diseases and save lives. Cedars-Sinai Medical Center relies on special software to examine the heart and stop heart attacks before they occur. Artificial muscles feature smart technology that allows them to function more like real muscles, and the latest intelligent devices can distinguish between life-saving medications and fake or tainted pills. Perhaps the most exciting aspect of smart medical technology is the use of robotic surgery assistants, who can not only pass the correct tools to doctors, but also keep track of these tools and learn about a doctor's preferences. Even a primary care physician can benefit from artificial intelligence, with software that tracks changes in health records to diagnose patients or warn doctors of potential risk factors and problems with medications. Medicine in the twenty-first century will be very different than medicine in the late twentieth century[5]. Fortunately, the technical challenges to AI that emerge are similar, and the prospects for success are

high." One of the first expert systems was MYCIN in 1974, which diagnosed bacterial infections of the blood and suggested treatments. It did better than medical students or practicing doctors, provided its limitations were observed. Namely, its ontology included bacteria, symptoms, and treatments and did not include patients, doctors, hospitals, death, recovery, and events occurring in time. Its interactions depended on a single patient being considered. Since the experts consulted by the knowledge engineers knew about patients, doctors, death, recovery, etc., it is clear that the knowledge engineers forced what the experts told them into a predetermined framework.

C. Heavy industry

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. Japan is the leader in using and producing robots in the world. In 1999, 1,700,000 robots were in use worldwide [5]. Heavy Industries and Space: Robotics and cybernetics have taken a leap combined with artificially intelligent expert systems. An entire manufacturing process is now totally automated, controlled and maintained by a computer system in car manufacture, machine tool production, computer chip production and almost every high-tech process. They carry out dangerous tasks like handling hazardous radioactive materials. Robotic pilots carry out complex maneuvering techniques of unmanned spacecrafts sent in space. Japan is the leading country in the world in terms of robotics research and use.

D. Online and telephone customer service /Telecommunications

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. A major underlying technology to such systems is natural language processing.

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, agent training by automatic mining of best practices from past interactions, support automation and many other technologies to improve agent productivity and customer satisfaction.

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 [6].

E. Transportation

Fuzzy logic controllers have been developed for automatic gearboxes in automobiles (the 2006 Audi TT, VW Toureg and VW Caravell feature the DSP transmission which utilizes Fuzzy Logic, a number of Škoda variants (Škoda Fabia) also currently include a Fuzzy Logic based controller). Driverless Transport concept uses the foll: Imagine cars that warn you of potential obstacles to help you avoid accidents, or even allow you to sit back and take in the sites as they drive themselves. Artificial intelligence may soon make all this possible, using cameras, sensors and special software built into the vehicle. Manufacturers already rely on this technology to make backing up and parking safer, while both the Toyota Prius and certain Lexus models can self-park at the touch of a button. Driverless trains carry passengers from city to city in Japan without the need for human help, and self-driving cars may be closer than you think. In 2010, Google began testing its own line of driverless cars, which rely on lasers and sensors to spot obstacles, interpret signs and interact with traffic and pedestrians. Artificial intelligence not only takes the responsibility away from the driver, but also eliminates the danger of distracted driving and boasts a reaction time much faster than that of any human. The Palm Monorail in Dubai, UAE, is a fully automatic driverless train that can shuttle up to 6,000 passengers an hour [7].

F. Movies, Music, 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. Hollywood has remained fascinated with the field of artificial intelligence since 1968, when the film "2001: A Space Odyssey" introduced the world to smart computer HAL. Since then, the "Terminator" films have shown the world the good and bad sides of

cyborgs, while 2001's "A.I. Artificial Intelligence" revealed the softer side of robots. 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 [8].

You can buy machines that can play master level chess for a few hundred dollars. There is some AI in them, but they play well against people mainly through brute force computation--looking at hundreds of thousands of positions. To beat a world champion by brute force and known reliable heuristics requires being able to look at 200 million positions per second.

G. Weather Forecast

Neural networks are used for predicting weather conditions. Previous data is fed to a neural network which learns the pattern and uses that knowledge to predict weather patterns. Taming the Weather concept has made possible for Meteorologists to analyze large volumes of data in order to predict the weather, and even the most experienced weatherman isn't always accurate. Soon, scientists may be able to predict the weather better by using artificial intelligence software, which can sift through complex data and spot patterns missed by the human eye. When this software sees a big storm coming, it will automatically issue alerts to warn residents and the media, and this may help save lives. By increasing the accuracy of weather predictions, artificial intelligence software may also offer important benefits in crop development, forestry and agriculture. NASA is even working on programs that will guide aircraft around potential storms and danger spots, even in remote areas, which could increase the safety of air travel in the near future.

H. Aviation

Aviation: Air lines use expert systems in planes to monitor atmospheric conditions and system status. The plane can be put on auto pilot once a course is set for the destination. 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. The system used by the AOD in order to measure performance was the Interactive Fault Diagnosis and Isolation System, or IFDIS. It is a rule based expert system put together by collecting information from TF-30 documents and the expert advice from mechanics that work on the TF-30. The system allowed the regular workers to communicate with the system and avoid mistakes, miscalculations, or having to speak to one of the specialized workers. The AOD also uses artificial intelligence in speech recognition software. The air traffic controllers are giving directions to the artificial pilots and the AOD wants the pilots to respond to the ATC's with simple responses[10]. The programs that incorporate the speech software must be trained, which means they use neural networks. The program used, the Verbex 7000, is still a very early program that has plenty of room for improvement. The improvements are imperative because ATCs use very specific dialog and the software needs to be able to communicate correctly and promptly every time. The Artificial Intelligence supported Design of Aircraft, or AIDA, is used to help designers in the process of creating conceptual designs of aircraft. This program allows the designers to focus more on the design itself and less on the design process. The software also allows the user to focus less on the software tools[9]. The AIDA uses rule based systems to compute its data. This is a diagram of the arrangement of the AIDA modules. Although simple, the program is proving effective. In 2003, NASA's Dryden Flight Research Center, and many other companies, created software that could enable a damaged aircraft to continue flight until a safe landing zone can be reached. The software compensates for all the damaged components by relying on the undamaged components. The neural network used in the software proved to be effective and marked a triumph for artificial intelligence. The Integrated Vehicle Health Management system, also used by NASA, on board an aircraft must process and

interpret data taken from the various sensors on the aircraft. The system needs to be able to determine the structural integrity of the aircraft. The system also needs to implement protocols in case of any damage taken the vehicle. In the near future, advances in artificial intelligence will allow scientists to travel well beyond the limits of 20th-century space travel and explore more of the universe beyond our solar system. Today, NASA relies on unmanned shuttles to explore distant galaxies that would take years for humans to reach. Driverless land rovers also allow researchers to explore and photograph on Mars and other planets, where inhospitable conditions make human exploration impossible. These smart vehicles sense obstacles, like craters, and find safe paths of travel around them before returning to the shuttle[8]. Artificial intelligence technology will also help scientists react more quickly to emergencies during manned flights. For example, a radio message from Mars takes roughly 11 minutes to reach Earth. Rather than waiting for advice from scientists on the ground when trouble arises, astronauts will work with onboard software systems to spot and prevent problems before they happen.

I. News, Publishing & Writing/ Natural Language Processing/ speech recognition

The company **Narrative Science** makes computer generated news and reports commercially available, including summarizing team sporting events based on statistical data from the game in English. It also creates financial reports and real estate analyses. Another company, called **Yseop**, uses artificial intelligence to turn structured data into intelligent comments and recommendations in natural language. Yseop is able to write financial reports, executive summaries, personalized sales or marketing documents and more at a speed of thousands of pages per second and in multiple languages including English, Spanish, French & German. Just getting a sequence of words into a computer is not enough. Parsing sentences is not enough either. The computer has to be provided with an understanding of the domain the text is about, and this is presently possible only for very limited domains.

In the 1990s, computer speech recognition reached a practical level for limited purposes. Thus United Airlines has replaced its keyboard tree for flight information by a system using speech recognition of flight numbers and city names. It is quite convenient. On the other hand, while it is possible to instruct some computers using speech, most users have gone back to the keyboard and the mouse as still more convenient.

J. Computer Science

Researchers in quest of artificial intelligence have created spin offs like dynamic programming, object oriented programming, symbolic programming, intelligent storage management systems and many more such tools. The primary goal of creating AI still remains a distant dream but people are getting an idea of the ultimate path which could lead to it. The world is composed of three-dimensional objects, but the inputs to the human eye and computers' TV cameras are two dimensional. Some useful programs can work solely in two dimensions, but full computer vision requires partial three-dimensional information that is not just a set of two-dimensional views. At present there are only limited ways of representing three-dimensional information directly, and they are not as good as what humans evidently use.

K. Swarm Intelligence

This is an approach to, as well as application of AI, similar to a neural network. Here, programmers study how intelligence emerges in natural systems like swarms of bees even though on an individual level, a bee just follows simple rules. They study relationships in nature like the prey-predator relationships that give an insight into how intelligence emerges in a swarm or collection from simple rules at an individual level. They develop intelligent systems by creating agent programs that mimic the behavior of these natural systems.

L. Saving the Planet

With artificial intelligence, scientists may soon be able to use robots or other devices to clean up the environment and reduce the effects of air and water pollution. Advanced software programs will allow these machines to distinguish between biological organisms and potential pollutants like oil or hazardous waste. Tiny microbes will consume waste products and leave good biological matter intact, minimizing damage to the ecosystem. Smart software can also limit the effects of air pollution from manufacturing and industrial processes. As factories burn fuel, they release byproducts in the form of carbon dioxide and other gases. Some of these factories already use artificial intelligence programs to identify patterns during combustion and modify manufacturing processes to minimize pollution. Others rely on this software to capture dangerous chemicals before they enter the smokestack and end up in the air outside.

M. Staying Safe

Artificial intelligence technology will soon help keep your family safe by protecting it from international threats as well as home burglaries. The U.S. Department of Homeland Security relies on virtual smart agents to supplement its human workforce, or to replace an agent when he or she is unavailable. The agency also incorporates artificial intelligence software into its monitoring systems. Artificial intelligence technology will soon help keep your family safe by protecting it from international threats as well as home burglaries. The U.S. Department of Homeland Security relies on virtual smart agents to supplement its human workforce, or to replace an agent when he or she is unavailable. The agency also incorporates artificial intelligence software into its monitoring systems, which scan phone calls and other communications. These programs can sift through large volumes of data quickly and are even capable of distinguishing between casual conversation and potential threats. Homes equipped with smarter security systems alert the homeowner and local law enforcement when an intruder enters the property. While older systems simply relied on motion detectors and sensors, modern security includes artificial intelligence that allows the system to distinguish between occupants and unknown persons.

N. Robotic assistants

While the world may not be ready for flying cars, families may soon enjoy the perks of robotic servants to handle housekeeping tasks. These intelligent robots will not only clean your living room and do the dishes, but may also tackle jobs like assembling furniture or caring for kids and pets. Through the use of artificial intelligence software, these machines will be able to recognize and sort objects, and even learn to minimize future mistakes as they work. Robotic assistants not only stand to benefit the average family, but may also offer help to the elderly or disabled. Through voice-recognition software, these personal servants will guide the blind or even fetch items on command. Virtual assistants are also likely to take the place of traditional secretaries and medical assistants [6]. They'll greet clients, interact with patients and handle typing and correspondence, all without ever taking a sick day. Tackling Dangerous (or Boring) Tasks

If you have a robotic vacuum cleaner in your home, you're already taking advantage of artificial intelligence to tackle one of life's more tedious tasks. These devices not only clean your floor according to schedule, but are also able to maneuver around obstacles like stairs, furniture and even the cat. Facilities with large turf areas, like golf courses, rely

on similar technology to mow their lawns without the need for human intervention. The same technology may soon allow robots to perform boring or repetitive tasks along an assembly line, or even sort trash and recycling at waste processing centers. Artificial intelligence may also allow machines to perform tasks too dangerous for humans, such as mining or firefighting. Some countries have already put smart robots to work disabling land mines and even handling radioactive materials in order to limit the risk to human workers.

O. Transhumanism /The Robot-Human Species

Transhumanism represents the ultimate application of artificial intelligence to human life. Proponents of transhumanism believe that artificial intelligence can improve the overall human experience by expanding the limits of the mind and body. As humans incorporate more and more technology into their everyday lives, transhumanism offers the opportunity to eliminate disabilities, slow aging and even stop death. Some picture transhumanism resulting in cyborgs, while others picture an entirely new species that people have yet to imagine: a being that's developed beyond the current human state to enjoy a higher level of reasoning, culture and physical capabilities. While members of the World Transhumanist Association celebrate the coming of this new creation, others call it the most dangerous threat to humanity. With significant ethical implications, particularly those related to cloning and eugenics, transhumanism must be pursued with extreme care to let mankind maintain its sense of humanity [6].

With all the ethical controversy surrounding the field of artificial intelligence, it's hard to predict whether true cyborgs will become a reality.

P. Data Mining

Extracting and abstracting useful information from massive data is becoming increasingly important in many commercial and scientific domains. The process of data mining includes generating predictive models; clustering or segmenting database events into coherent groups; and finding patterns, anomalies and trends, and other abstractions. The second part of this double issue will feature articles on data-mining techniques, with an emphasis on practical usefulness, scalability, and the capability to handle noisy data.

III. OTHER FIELDS OF AI APPLICATION

A. Typical problems to which AI methods are applied

- Pattern recognition
- 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

B. Other fields in which AI methods are implemented

- Artificial life
- Automated reasoning
- Automation
- Biologically inspired computing
- Concept mining
- Data mining
- Knowledge representation
- Semantic Web
- E-mail spam filtering
- Robotics
 - Behavior-based robotics
 - Cognitive
 - Cybernetics
 - Developmental robotics
 - Epigenetic robotics
 - Evolutionary robotics
- Hybrid intelligent system
- Intelligent agent
- Intelligent control
- Litigation

C. Potential topics include, but are not limited to:

- Artificial neural network
- Computer vision
- Evolutionary algorithms
- Swarm intelligence
- Pattern recognition
- Image processing and analysis
- Natural language processing
- Global optimization
- Machine learning
- Knowledge representation
- Social intelligence
- Control theory
- Uncertain reasoning
- Mathematical tools used in AI
- Fuzzy Logic and applications in control

IV. PRESENT AND FUTURE STATUS

There have been numerous applications of AI for CAD/CAM for almost all design and manufacturing activities; from feature recognition to optimization. ES is widely used in design, process planning, scheduling, material handling, quality control,

machine diagnosis, machine layout and other operations. ANNs can be used for; quality control, pattern recognition, resource allocation, optimisation, scheduling, maintenance and repairing, control and planning, database management, simulation, and robotics control. FL has been preferred for those problems in which there are conflicting process parameters, while GAs have been generally used for the optimisation issues such as optimisation of cutting parameters and operation sequences.

The impact of Artificial Intelligence (AI) tools (like Expert Systems, Neural Networks, Genetic Algorithms, and Fuzzy Logic) on the planning of manufacturing processes has been proven by recent research projects and actual implementations. There are numerous packages being developed for almost any manufacturing activity [11]. A conservative estimate is that only 5% of all research endeavours have found their place in the factory. This may be a very discouraging reality; but there are following reasons for this problem:

- The tools for building intelligent systems are not sufficiently developed and are difficult to apply.
- The methods for acquiring knowledge from experts to develop expert systems are not very well understood.
- There are too few qualified people available who really know how to apply AI tools.

Using or developing right tools, methods and environments can solve these problems. However, the potential and power of AI is very great and it is believed that with the exploitation of AI methods it will only be possible to build well conceived and intelligent CAD/CAM systems in which many routine jobs (which may become very repetitive and boring, after the skill has been acquired) are taken out of the experienced manager so that his creativity can be devoted to solving more complex problems in factory.

The development of powerful, intelligent, optimised and flexible CAD/CAPP/CAM systems in IMS concept will only be possible with the extensive and true use of Artificial Intelligence. AI tools like ESs, ANNs, GAs, FL, SA offer promising solutions in the areas of product definition, layout design, process planning, optimization and so on [9]. The next generation of intelligent manufacturing systems will hopefully integrate the computational paradigms of expert or knowledge based systems and artificial

neural networks, as well as other promising methodologies like fuzzy logic and genetic algorithms. Different techniques related to AI must be used in amalgamation to eliminate and to take the disadvantages and advantages of individual methodologies, respectively. Thus, it will be possible to realise the goals of IMS.

V. CONCLUSION

Over the past 40 years, AI has produced a number of powerful tools. This paper has reviewed four of those tools, namely, expert system, artificial neural networks, fuzzy logic, and genetic algorithms. Applications of the tool in CAD/CAM have become more widespread due to the power and affordability of present-day computers. It is anticipated that many new applications will emerge and that, for demanding tasks, greater use will be made of hybrid tools combining the strengths of two or more of the tools. Other developments in AI that will have an impact in engineering include data mining, or the extraction of information and knowledge from large databases, and multi-agent systems, or distributed self-organising systems employing entities that function autonomously in an unpredictable environment concurrently with other entities and processes. The appropriate use of these new AI tools and the tools presented in this paper will contribute to the creation of more competitive engineering systems.

Is artificial Intelligence really possible? Can intelligence like a human mind surpass itself and create its own image? The depth and the powers of the human mind are just being tapped. Who knows, it might be possible, only time can tell! Even if such intelligence is created, will it share our sense of morals and justice, will it share our idiosyncrasies? This will be the next step in the evolution of intelligence. Hope I have succeeded in conveying to you the excitement and possibilities this subject holds

REFERENCES

- [1] Russell, Stuart J.; Norvig, Peter (2003). *Artificial Intelligence: A Modern Approach* (2nd ed.). Upper Saddle River, New Jersey: Prentice Hall. ISBN 0-13-790395-2
- [2] Kurzweil, Ray (2005). *The Singularity is Near: When Humans Transcend Biology*. New York: Viking. ISBN 978-0-670-03384-3
- [3] **Liliana Rogoza**, "Towards ethical aspects on artificial intelligence", Proceedings of the 8th WSEAS Int. Conf. on ARTIFICIAL INTELLIGENCE, KNOWLEDGE ENGINEERING & DATA BASES (AIKED'09).
- [4] National Research Council (1999). "Developments in Artificial Intelligence". *Funding a Revolution: Government Support for Computing Research*. National Academy Press. ISBN 0-309-06278-0. OCLC 246584055.
- [5] Moghaddam, M. J., M. R. Soleymani, and M. A. Farsi. "Sequence planning for stamping operations in progressive dies." *Journal of Intelligent Manufacturing*(2013): 1-11.
- [6] <http://www.buzzle.com/articles/applications-of-artificial-intelligence.html>
- [7] <http://dsc.discovery.com/tv-shows/curiosity/topics/ways-artificial-intelligence-will-affect-our-lives.htm>
- [8] Congdon, C., B. 2001. *Machine Learning for the Masses. Intelligence: New Visions of AI in Practice*, 12, 2 (Summer 2001), 15-16, ACM.
- [9] *Computer Science Curriculum 2008: An Interim revision of CS 2001*. ACM, IEEE Computer Society, <http://www.acm.org/education/curricula/ComputerScience2008.pdf>.
- [10] **Lutz, R.** "A Survey of Product-Line Verification and Validation Techniques," JPL-NASA Technical Report, 2007, <http://trsnew.jpl.nasa.gov/dspace/bitstream/2014/41221/1/07-2165.pdf>.
- [11] http://en.wikipedia.org/wiki/Applications_of_artificial_intelligence