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ARTIFICIAL INTELLIGENCE
A STUDENT VIEW POINT

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ABSTRACT

The paper Depicts our effort to study the Start of AI , Its foundation and with the rapid advancement in technology the Field of AI is not left behind and we have been able to capture a glimpse of its new innovation across the world in the coming decades along with its past .

We have laid the stress on the entire journey of AI with various examples and demonstrated its use to make our world more efficient.

AI is the need of the hour to make our world better .we are using AI in every field from Robots ,cars to virtual Reality .

In our paper we have done research on some most important topics of AI. They are Turing Test, LISP (The language that makes AI possible) etc. we are also including its' advancement and establishment in 1950's and 1960's . the rise and fall which AI has experienced in the decade of 1980 and forthcoming decades are also the vital part of our research.

Our paper includes it's advantages in the decade of 2000 and its' forthcoming future and how it will be helpful in our coming future. Its current trends are also included in our paper.

I. INTRODUCTION

1.1 What is Artificial Intelligence?

According to John McCarthy, the man that coined the term, "[Artificial Intelligence] is the science and engineering of making intelligent machines, especially intelligent computer programs" where "intelligence is the computational part of the ability to achieve goals in the world."

An intelligent machine can be a machine that mimics the way humans think, feel, move and make decisions. It could also act in conjunction with a human to compliment and improve their ability to do those things. There are many possible approaches to the challenge and the definition has never had a static solution.

Indeed, even the name 'Manmade brainpower' has been liable to contention, as a few specialists feel it sounds unscientific. They contend "counterfeit" recommends lesser or fake knowledge, more like sci-fi than scholastic exploration. They like to utilize terms like computational neuroscience or underline the specific subset of the field they like semantic rationale or machine learning. All things considered, the term 'Counterfeit consciousness' has increased well known acknowledgment and graces the names of different global gatherings and college course offerings.

This paper does not endeavor to concoct an exact portrayal of the field. Rather, it analyzes what Artificial Intelligence has been so far by driving the per user through an in fact non-exhaustive gathering of undertakings

and standards, particularly at MIT and in the United States.

Not at all like numerous fields, Artificial Intelligence has not had a direct movement and its examination and leaps forward have not developed toward an effortlessly recognized Sun. Processing, conversely, has been noted for its exponential development and change described by Moore's law, "the exact perception that the multifaceted nature of coordinated circuits, concerning least segment cost, duplicates at regular intervals" (wikipedia). The way of AI, on the other hand, more takes after the interweaving internet, spiraling out and circling back in numerous bearings.

Here you will find a rough chronology of some of AI's most influential projects. It is intended for both non-scientists and those ready to continue experimentation and research tomorrow. Included is a taste of who the main players have been, concepts they and their projects have explored and how the goals of AI have evolved and changed over time. Many will be surprised that some of what we now consider obvious tools like search engines, spell check and spam filters are all outcroppings of AI research.

II. FOUNDATION OF AI

Though the term 'Artificial Intelligence' did not exist until 1956, the advances and ideas from the preceding decades evoked many of the future themes. At a time when digital computers had only just been invented, using programming to emulate human intelligence was barely even imaginable.

Understanding the context into which Artificial Intelligence was born helps illustrate the technological obstacles that researchers had to overcome in the search for machine intelligence as well as elucidating many of the original paths.

2.1 Beyond Number-Crunchers: Programmable Machines

The thought of machines that couldn't simply prepare, additionally make sense of how to tackle mathematical statements was seen as the initial phase in making an advanced framework that could imitate mind forms and living conduct. What might it intend to have a machine that could make sense of how to comprehend comparisons? How about we experience an illustration utilizing essential variable based math.

So as to make a machine that can understand more entangled comparisons than 2+2=4, a machine needs a procedure for choosing the different steps important to concoct an answer. For instance, on the off chance that you told the machine, X+Y=7 and X=3, you might want the machine to reason that 3 + Y = 7, then that Y = 7 – 3, then that 7 – 3 = 4, lastly that Y = 4. Expecting somebody has as of now told the machine what '+', '- ', and "=" mean, you would customarily advise the machine how to tackle those straightforward issues by characterizing an orderly system called a project.

As ahead of schedule as 1930, Vannevar Bush of MIT distributed a paper around a Differential Analyzer, doing only that for another class of numerical issues. PCs had not been developed by then, but rather his paper regardless portrayed an arrangement of guidelines that would naturally fathom differential comparisons if took after definitely.

The following real thought came in Alan Turing's 1937 paper about any programmed programmable framework, known as the Turing Machine. This idea sets up the excess way of making an assortment of sorts of programmable-gadgets out of distinctive materials, in light of the fact that any one could be set up such that it

impersonates the info yield qualities of whatever other.

Hedge and Turing did not yet know how one would go about really making that all inclusive programmable gadget, however in 1949 Shannon would compose a paper called "Data Theory" that set up the establishments for utilizing advanced hardware to speak to data. This thought turned into the premise of utilizing machines to utilize images (like the X and Y in the sample above) to execute complex operation

2.2 Early 'Computers' were Room-Sized Calculators

Technology has improved by leaps and bounds since the start of World War II when computers were first coming into use. The first electronic computer, ABC, came in 1940, while the first programmable American computer, Mark I, followed in 1944.

Constructed from wires, magnetic cores and vacuum tubes, they were huge devices that literally filled rooms. They had about the functionality of a modern-day scientific calculator, but no monitor or keyboard. Instead, if you wanted the computer to compute the value of a calculation, you would punch buttons in sequence or feed in stacks of punch cards, and it would eventually print you back the results

A description of computing pioneer Grace Hopper's experience with a computer was representative of the kinds of problem computers were used for at the time:

Grace Hopper will also be remembered for discovering and naming the first computer “bug” in 1945 as well as inventing the idea of a computer compiler, a device that can translate higher level programming languages into machine language that the computer knows how to execute.

The other revolutionary electronic creation of the decade was the transistor, created by Bell Labs in 1947, soon replacing vacuum tubes. A tribute to its importance according to wikipedia, an open encyclopedia that all can edit (see bibliography), follows:

Grace Hopper

The transistor is considered by many to be one of the greatest inventions in modern history, ranking in importance with the printing press, automobile and telephone. It is the key active component in practically all modern electronics.

Its importance in today's society rests on its ability to be mass produced using a highly automated process (fabrication) that achieves vanishingly low per-transistor costs... The transistor's low cost, flexibility and reliability have made it an almost universal device for non-mechanical tasks, such as digital computing.

2.3 Analog Intelligence: Emulating Brain Function

Before the new computerized innovation got on, numerous were making an inquiry that has as of late been having a resurgence in Artificial Intelligence; If we know how the cerebrum functions, why not make machines based off the same standards? While these days the vast majority attempt to make a modified representation with the same coming about conduct, early specialists thought they may make non-computerized gadgets that had additionally the same electronic attributes while in transit to that end. As it were, while new methodologies attempt to speak to the psyche, simple methodologies attempted to impersonate the mind itself.

III. 1950'S: ESTABLISHING THE AI FIELD

The fifties saw the growth of an AI community, experimentation with the first digital AI machines, the inaugural Dartmouth Artificial Intelligence Conference, and the creation of one of its strongest initial proponents, DARPA.

3.1 The Turing Test: An AI Legend

How can one know if a machine is intelligent? While the larger issue of defining the field is subject to debate, the most famous attempt to the answer to the intelligence question is in the Turing Test. With AI's history of straddling a huge scope of approaches and fields, everything from abstract theory and blue-sky research to day-to-day applications, the question of how to judge progress and 'intelligence' becomes very difficult. Rather than get caught up in a philosophical debate, Turner suggested we look at a behavioral example of how one might judge machine intelligence.

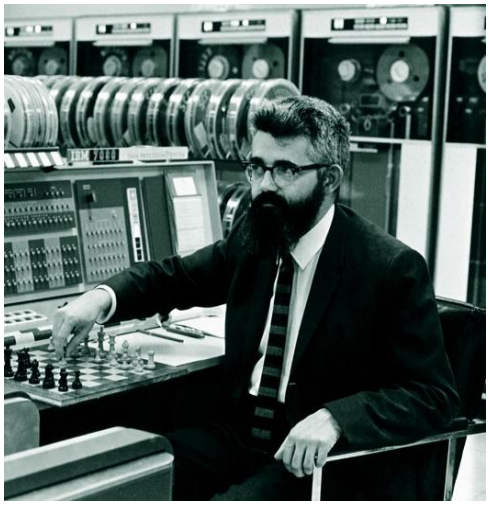
The genuine test includes looking at a transcript of an on screen discussion between a man and a PC, much like moment flag-bearer. On the off chance that an outsider couldn't tell which one was the human, the machine would then be named canny. The test was expected only to outline a point, however has subsequent to rose to the level of legend in the AI group.

In spite of the fact that its procedure and selective spotlight on human-style correspondence is antagonistic, one can not find out about AI without recognizing what the Turing Test is. It is a typical element in any AI diary, class or gathering and still serves to persuade the AI group however its exacting objective is still a long way from being accomplished.

3.2 LISP: The language that made AI possible

John McCarthy introduced LISP in 1958, heralded as the language that made AI programming possible. LISP is special because it was the first language that allowed information to be stored as list of objects rather than just lists of numbers. An object is essentially a placeholder or symbol that is defined somewhere else. This structuring makes it possible to program recursive functions and abstract ideas directly into the machine.

As part of the shift of batch-processing to interactive computers, McCarthy designed LISP to have an interactive environment, in which one could see errors in the code real time. The capability of evaluating and seeing on screen feedback one function at time, rather than having to run the entire file can greatly facilitate finding bugs in one's code.



John McCarthy 1967

While numerous other early dialects have vanished, LISP remains the most widely recognized programming dialect for Artificial Intelligence in the United States and is utilized keeping pace with Prolog as a part of Europe and Japan. By Norvig, originator of Google and writer of a well known course reading on the subject, one explanation behind the proceeding with prevalence of Lisp is the adaptability of its straightforward rundown information structure. In his words, "The rundown is an exceptionally flexible information structure, keeping in mind records can be executed in any dialect, Lisp makes it simple to utilize them. Numerous AI applications include arrangements of continually evolving size, making settled length information structures like vectors harder to utilize." (Norvig 25)

It is also easily extensible because there are no limitations on how one defines and manipulates both programs and data, so one can easily rename or add functions to better fit the problem at hand. Its simple elegance has survived the test of time while capturing all the necessary functionality; functions, data structures and a way to put them together.

IV. 1960'S: EXPERIMENTING WITH MACHINE GENIUS

In terms of projects, the sixties saw the creation of the first comprehensive mathematics programs, an attempt to decoding sentence meaning in word problems and the creation of now integral operating system tools like user faces and word processors. In addition, a conversing parody of a psychoanalyst gained notoriety, the first industrial robot made its appearance and the expert system DENDRAL derived conclusions in the area of chemistry. If this section seems like something of a laundry list, that is because there are so many different subareas which saw their beginnings in these seminal projects.

As years advanced, each new PC would frame another picture in the strobe light transforming from huge cumbersome machine to intuitive PC. The developing capacities opened up new potential outcomes for AI. For instance, envision having a PC without a screen. It was Lincoln Labs' PC LINC that joined a TV-style CRT screen into a business PC, giving a client quick input as opposed to making the client sit tight for a printout. Everything from design to word preparing to client interfaces has depended on that expansion.

On the other coast at the Stanford Research Institute (SRI), Doug Englebart concocted the mouse and on-screen cursor in his examinations with various types of client appearances, and windows and numerous raster screens,

all of which he demoed in 1967.

The PC frameworks in those days were a long way from safeguard. In 1960, one Defense PC erroneously distinguished the moon as an approaching rocket which naturally brought about extraordinary alarm. Another illustration came amid the Cuban Missile emergency, when interchanges were hindered for a few days. These deficiencies would persuade abnormal state consolation and support for the PC business.

At the same time. computer science was gaining growing acceptance as a field. First, IBM declared separate departments for software and hardware, meaning pure programmers officially would have a declared place to develop programs and environments. In the academic sphere, universities began granting the first degrees in Computer Science. The decade also saw the birth of the BASIC programming language, designed to be easy to understand, and UNIX, a way of structuring and communicating with an operating system that now underlays all Macs and Linux-based computers.

With the new DARPA funding in 1963, MIT created a new research group Project MAC. Mirroring the wide range of research it would inspire, Project MAC brought together disparate researchers from departments across the institute, including those from the AI Project. All moved over to Tech Square, originally occupying two floors, complete with machine shop and research areas, including Minsky's beanbags and project testing haven, the Play-Pen.

Playing Chess, 1968

The lab, under Bob Fano's initial leadership, focused on mimicking higher cognitive levels of human intelligence. They worked on systems that could play chess, do SAT analogy problems, higher level math, and infer logical conclusions from a given set of preconditions. One fun invention was Ivan Sutherland Virtual Reality head-mounted display, the first of its kind.

4.1 Math Programs at MIT: Saint, Macsyma, Student (Analogy)

Slagle, Moses, Bobrow, Evans MIT

The initial use of programs to solve complex mathematics was not a matter of rote application of straightforward computations, but rather involved programs that could actively figure out what that solution or a close approximation might be.

The first step at MIT, SAINT, was created by PhD student James Slagle and could solve basic integrations. It also had the dual fame of being the first LISP program ever written. CSAIL has a reading room that preserves

the collection of all these early thesis projects, and although not the only institution that could claim this, early titles read much like a timeline of developments in AI and Computer Science at that time.

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4.2 LOGO, 1967: early AI language.

Papert, MIT

There is a large presence of LOGO and LOGO turtle videos in the TechSquare film clips. Invented by Seymour Papert of MIT, LOGO is famous for being an easier-to-understand programming language. It pioneered the idea of educational children programming programs, the first of which occurred down the street from MIT in Lexington, MA.

Students and researchers could type in the human-friendly commands over teletype, a typewriter-like contraption that was wired into the main computer and could make simple math, word or whatever-else-they-could-imagine programs.

LOGO Turtle

The next major innovation came when they hooked the system up to a 'turtle' robot whose movements were scripted by the LOGO programs. It provided a way for the students and researchers to immediately see their program in action and test out their algorithms by watching its motion.

By strapping a marker or pencil to the turtles and initiating some simple rules for movements, the robots became famous for tracing complex and beautiful patterns on the paper beneath it. Use the same algorithms to create a

path in pixels and they created some of the first screensaver-like graphics.

4.2 ELIZA, 1965: A pattern-matching psychologist

Weizenbaum, MIT

ELIZA is a simple pattern matching conversational machine, the first of her kind, created by MIT computer scientist Joseph Weizenbaum in 1966. It has now become part and parcel of all Emacs programs and crudely simulates a psychotherapist using pattern matching.

Weizenbaum was not a proponent of AI. In fact, in the paper about his invention, he says, "Machines are made to behave in wondrous ways, often sufficient to dazzle even the most experienced observer. But once a particular program is unmasked, once its inner workings are explained in language sufficiently plain to induce understanding, its magic crumbles away; it stands revealed as a mere collection of procedures, each quite comprehensible."

The basic algorithm is the following: (1) Look at user's input, (2) Find a pattern that matches the input, (3) Look up the and print out the corresponding response. Though you can, of course, form your own opinion, I find it amazing that such a simple setup can result in such an amusing and complex situation.

V. 1980'S: RISE AND FALL

The start of the eighties was the golden age for Artificial Intelligence in the US, as the field caught the imagination of the larger population. Institutions across the board were suddenly springing up departments of Artificial Intelligence from video game companies to Campbell's Soup. The most common utilities came in the form of MYCIN-style expert systems, wizards that could give advice or information about how to do something in its area of expertise.

These master frameworks were specific, serving the learning base of masters in a field. For instance, on account of Campbell's soup, a processing plant chief may be interested about the tub-cleaning necessities between making diverse bunches of soup. As related in the meeting with on AAAI Fellow, in the event that you were going from Chicken Broth to Chicken Noodle, you could continue right way, yet in the event that the requesting was Clam Chowder to Vegetarian Minestrone, the tanks better be spic and compass in the middle.

Family and work computers started to become commonplace in the 1980's with six million computers sold in 1983. Most of the tool builders at MIT left the lab in the eighties to work in new companies and bring their work to the consumer. IBM introduced its 'PC' and Xerox, LMI and Symbolics had a variety of Lisp machines. In addition, Apple's LISA and then Macintosh hit the market and ARPANET opened up to civilians, a precursor to the Internet. Despite these advances, by the end of the decade, the 'AI Winter' left the field, especially companies, struggling to defend their funding and reputation with a downturn in public interest.

The MIT AI lab was also in full swing, directing its talents at replicating the visual and mobility capabilities of a young child, including face recognition, object manipulation and the ability to walk and navigate through a room. Tomas Lozano-Perez pioneered path search methods used for planning the movement of a robotic vehicle or arm. There was work done on legged robots by Marc Raibert and John Hollerback and Ken Salisbury created dexterous robot hands. This decade was also when famed roboticist and current director of CSAIL Rodney Brooks built his first robots.

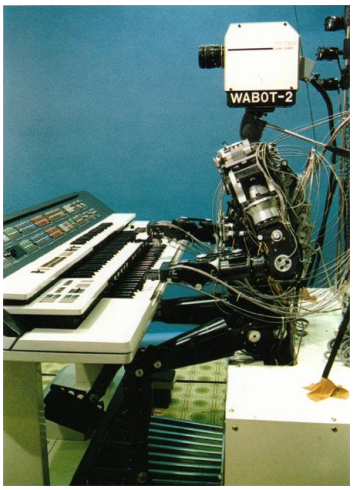
5.1 Wabot-2, 1980: Robot that reads Sheet Music and plays Organ

Waseda University, Japan

The name WABOT is from 'WAseda roBOT', honoring the University in Japan at which it was designed. In this case, the story is best told by its originators. The description of the project on the Waseda University website follows:

It has been forecast that robots will penetrate society in 21st century... In that case, robots will be required to have anthropomorphic appearance sand faculties... Developing the anthropomorphic intelligent robot WABOT (WAseda roBOT) [aimed] to finally develop a "personal robot" which resembled a person as much as possible.

In 1980, our laboratories... commenced the WABOT-2 project. Playing a keyboard instrument was set up as an intelligent task that the WABOT-2 aimed to accomplish, since an artistic activity such as playing a keyboard instrument would require human-like intelligence and dexterity.



WABOT playing music

The robot musician WABOT-2 can converse with a person, read a normal musical score with is eye and play tunes of average difficulty on an electronic organ. The WABOT-2 is also able of accompanying a person while he listens to the person singing. The WABOT-2 was the first milestone in developing a "personal robot."

It is interesting to note that the research group sees WABOT-2 as the first generation of an oncoming class of personal robots. It may seem far-fetched at the moment, but look how far personal computers have come since they were first conceived of fifty years ago.

5.2 HEARSAY, 1982: Speech Understanding Program

Erman, Hayes-Roth, Lesser, Reddy at CMU

HEARSAY was a speech understanding program developed at CMU in 1982 that pioneered a useful model for solving perceptual problems, that is, problems in which a machine is trying to derive meaning out of complex input signals. That process might involve decoding words from someone's voice, recognizing someone's face from a set of vision data or tactilely distinguishing different kinds of textures.

Because it is a widely applicable problem, below you will find a textbook summary of the steps one must consider in figuring out how a machine can glean information from sensory data. As HEARSAY was a CMU project, it seems appropriate to include a summary from the an Artificial Intelligence textbook by Elaine Rich of

CMU:

5.3 Techniques Used In Solving Perceptual Problems

It is important to divide the overall understanding process into manageable pieces. We can do this by dividing the process of analyzing either a speech sample or a picture into the following five stages:

Digitization: Divide the continuous input into discrete chunks. For speech recognition, this can be done by measuring the amplitude of the signal at fixed intervals, such as 20,000 times per second...

Smoothing: Eliminate sporadic large variations in the input. Because the real world is mostly continuous, these spikes in the input are usually the result of random noise.

Segmentation: Group the small chunks produced by digitization into larger chunks corresponding to logical components of the signal. For speech understanding, these segments correspond to logical components of the signal... such as *s* or *a*. These segments are often called *phones*...

Labeling: Attach to each of the segments a label that indicates which, of a set of building blocks, that segment represents... So the labeling procedure can do one of two things. It can assign multiple labels to a segment and leave it up to the later analysis procedure or choose the one that makes sense in the context of the entire input. Or it can apply its own analysis procedure in which many segments are examined to constrain the choice of label for each segment.

Analysis: Put all the labeled segments together to form a coherent object... when surrounding pieces are considered, the number of interpretations that lead to a consistent overall interpretation [also known as constraint satisfaction] is considerably reduced.. In speech, this results from such things as intonation patterns that cover whole sentences. (Rich 349)

The actual HEARSAY program parsed audio information using a 'blackboard model' that follows the above techniques in a way that traces up and down the complexity levels of sound, syllable, word, as well as right to left, in sentences where there are ambiguous signals. Like constructing a jig saw puzzle, the fastest method is invariably putting together the easily parsed border and then filling in the less obvious pieces. This method becomes particularly useful when words are not enunciated clearly.

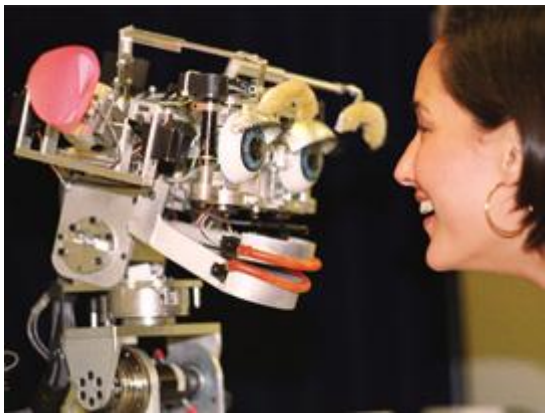
VI. NEW GEN TRENDS FOLLOW UPS

Since the eighties, several projects stand out as major new shifts and developments in the field. When Deep Blue beat world chess champion Garry Kaspacov in 1996, some say it marked the end of an era in which specialized programs and machines reigned. One new potential direction, the first official RoboCup, kicked off that the very same year posing and requires integrating all kinds of intelligences. Their goal is to be able to beat the winning World Cup soccer team by 2050.

RoboCup 2006

With the results of the DARPA Grand Challenge this year, that potentially rash aspiration seems more plausible. After the first year's race when none of the autonomous vehicles made it even ten miles past the start of the 131.2 mile course, this year saw five of the twenty-three DARPA Grand Challenge competitors reach the finish with time to spare.

Other developments include the efforts started in 2002 to recreate a once wonder-of-the-world-status library in Egypt as online e-book called Bibliotheca Alexandrina. The transition to computerized medical records has been sluggish, but in other areas of medicine from imagery to high precision surgery, the new facilitates machines can give a surgeon has saved lives and made new diagnosis and operations possible.



Cynthia Breazeal with Kismet

While we have all heard about NASA space robots, but less known were the $400,000 'His' and 'Her' robots featured in the 2003 Niemen Marcus Christmas catalog. Clearly, our relationships with machines in society is in transition. One of the most important examples of that was Cynthia Breazeal's research on machine emotion and social interaction with her MIT thesis-project Kismet in 2002.

New versions of ELIZA-like programs are becoming commonplace with AOL Instant Messenger's SmarterChild, an agent that can answer questions and try to search the web to answer your questions about Movie times or tell you not to have a 'potty mouth.'

While we do not have full realization of Licklider's man-machine symbiosis, the idea of machines and tools becoming agents that work hand and hand with human beings seems more and more natural with each generation. IRobot's vacuum cleaner Roomba is kickstarting a new household robotics industry with record sales.

John McCarthy trusts that essential new thoughts are required before AI can achieve human-level knowledge, as opposed to simply requiring huge databases and speedier PCs. He announces on his site, "My own assessment is that the PCs of 30 years prior were sufficiently quick if just we knew how to program them."

Regardless of whether human-level insight is even the primary objective of the field any longer, it is one of the numerous that allure our advantage and creative energy. It is clear that AI will keep on affecting and add to a scope of utilizations and the truth will surface eventually which ways it will go along the way.

Heather Knight received her B.S. in Electrical Engineering with a minor in Mechanical Engineering from MIT in 2006 and has been accepted into their EECS Masters of Engineering program. She has also worked at the MIT Media Lab since 2002 with Professor Cynthia Breazeal of the Robotic Life as well as Professor Deb Roy of Cognitive Machines.

VII. CONCLUSION

This paper concludes that AI is an integral part of our life since many decades.it can make our life very easy and it has the ability to help us in each and every step of our life.ai can think like a human being and we can make a number of expert systems with the the help of ai which can be used in every working area. the full potential of ai is still unexplored and many bigeer organisations are still researching on ai so that it can be utilised with its entire potential.

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1. Grace Hopper (San Diego Supercomputer Center) <http://www.sdsc.edu/ScienceWomen/hopper.html>
2. John McCarthy (Computer History Museum) <http://www.computerhistory.org/about/press_relations/chess/>
3. PDP-1 (Computer History Museum) <http://www.computerhistory.org/timeline/timeline.php?timeline_category=rai>
4. Chess (Project Website) <http://projects.csail.mit.edu/films/pictures/Screenshots/13-cubechess2.jpg>
5. LOGO Turtle (Project Website) <http://projects.csail.mit.edu/films/pictures/Screenshots/22-turtle.jpg>
6. Shakey (Computer History Museum) <http://www.computerhistory.org/timeline/timeline.php?timeline_category=rai>
7. Cube Stacking (Project Website) <http://projects.csail.mit.edu/films/pictures/Screenshots/13-cubechess.jpg>

8. WABOT (Waseda University) <http://www.humanoid.waseda.ac.jp/booklet/kato02.html>

9. AARON (SciNetPhotos) <http://www.scinetphotos.com/aaron.html>

10. RoboCup (RoboCup Website) <http://www.robocup2006.org/sixcms/detail.php?id=117&lang=en>

11. Kismet (MIT Media Lab) <http://web.media.mit.edu/~cynthiab/NewFiles/research.html>

12. Lucy on Minsky-Bennett Arm (Project Website) <http://projects.csail.mit.edu/films/pictures/Screenshots/61-arm.jpg>