An approach implements artificial intelligence into human life with new technologies and application

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ABSTRACT : This paper presents an examination of artificial intelligence, the ability of computers to 'think' like humans. It shows how although many argue that artificial intelligence is an impossible concept because it takes humans to program the computers, artificial intelligence is already here to stay and is being improved every day. A look at the limitations of artificial intelligence and how scientists are working towards creating the perfect machine that will be confused with humans. This paper explains that while computers can be programmed to respond and react like human, they cannot cause themselves to do this on their own. This is the goal of scientists and their quest for pure artificial intelligence. Here we discuss the social impact of robots on children, particularly in terms of how the child relates to the robotic games.

I. INTRODUCTION

This paper presents some of the advantages of applying artificial intelligence within the social system and also discusses some negative aspects.

Artificial intelligence. It is the intelligence of machines and the branch of computer science that aims to create it.It has been defined the field as "the study and design of intelligent agents," where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success. John McCarthy, who coined the term in 1956, defines it as "the science and engineering of making intelligent machines." Typical applications include game playing, language translation, expert systems, and robotics. Artificial intelligence, the science and engineering of making intelligent machines through intelligent programs, is not just about modeling human behavior. It's more about making life easier and better by developing new tools with advanced capabilities. Artificial intelligence, like technology, advances rapidly as time moves on. It needs to be worked on before considered satisfactory, let alone perfect. A standard definition of artificial intelligence, or AI, is that computers simply mimic behaviors of humans that would be regarded as intelligent if a human being did them. Artificial intelligence is the search for a way to map intelligence into mechanical hardware and enable a structure into that system to formalize thought.

Artificial Intelligence is the study of human intelligence such that it can be replicated artificially. The demarcation of concepts holds true to these clauses for systems that:

- Think and act like humans
- Think and act rationally

II. ARTIFICIAL INTELLIGENCE TECHNOLOGIES

Artificial Intelligence (AI) could be defined as the ability of computer software and hardware to do those things that we, as humans, recognize as intelligent behavior. Traditionally those things include such activities as:

Searching: finding "good" material after having been provided only limited direction, especially from a large quantity of available data.

Surmounting constraints: finding ways that something will fit into a limited space, taking apart or building a complex object, or moving through a difficult maze.

Recognizing patterns: finding items with similar characteristics, or identifying an entity when not all its characteristics are stated or available.

Making logical inferences: drawing conclusions based upon understood reasoning methods such as deduction and induction.

In the AI area, these processes have manifested themselves in a number of well-recognized and maturing areas including Neural Networks, Expert Systems, Automatic Speech Recognition, Genetic Algorithms, Intelligent Agents, Natural Language Processing, Robotics, and logic Programming.

III. THE NEURAL NETWORK

This technology is based loosely upon the cellular structure of the human brain. Cells, or storage locations, and connections between the locations are established in the computer.
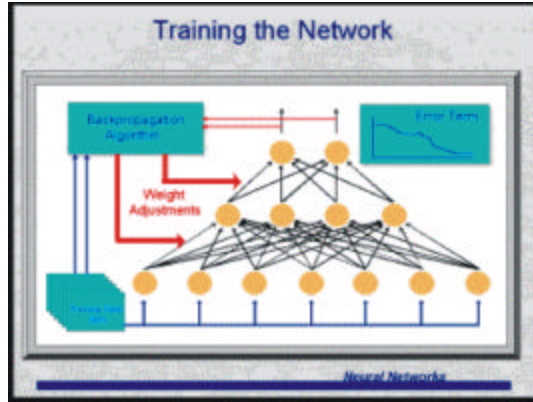
Using a tree identification system as an example, the diagram and process below demonstrates how a simple neural network operates. The outputs (top 2 circles) of this system are tree types - conifer (left circle) and deciduous (right circle). The inputs (bottom 7 circles) are tree characteristics such as color, shape, leaf type, bark type, etc.

IV. EXPERT SYSTEMS

These systems are usually built using large sets of "rules." An expert, who has developed them mentally after perhaps a decade or more of practice in a specialty area, establishes these rules. Expert Systems are established for processes where there is a need;

(1) for a narrow area of expertise to be more widely known, or

(2) to allow sophisticated processes to be run without human intervention.

V. AUTOMATIC SPEECH RECOGNITION (ASR)

This technology takes the sound waves produced by our speech and converts them into text content. The process, made possible by lots of computer memory and fast processors, works like this:

- First your continuous voice sound waves, captured by a microphone, are fed into a digital converter.

- This converter takes many samples (like capturing a snapshot) at a very high rate, e.g. 20,000 times per second.

- These samples are compared against a large stored template of sounds, which match specific text. The computer then outputs the text, which most closely matches the template.

VI. GENETIC ALGORITHMS

To evaluate and locate the best candidates for a task, the Genetic Algorithm (GA) has been found to be a very effective method. GA's borrow from scientific discovery about the evolutionary nature of our genes. They utilize

fitness functions, which are relationships among criteria, to grade candidates.

How does a detail genetic algorithm process work? It follows 5 simple steps

1. Evaluate the population against "high fitness" criteria;

2. If a candidate in the population meets the   criteria stop, else

3. Select the best of the current set using a selection strategy and diversity maintenance, then

4. Reproduce using crossover & mutation, and

5. Return to 1

Population-candidate/possible solutions to a problem
Selection   Strategy-strategy   for   selecting chromosomes to move forward in current cycle

Diversity Maintenance-strategy for assuring that generations do not get caught in local minima

Crossover-part of one chromosome is combined with another through mating

Mutation-random alteration of a gene High Fitness Criteria-an "ideal" candidate

Genetic Algorithms have been used to help police work with witnesses to quickly narrow down the possible perpetrators of a crime. They use a system known as FACEPRINTS.

VII. INTELLIGENT AGENTS

Intelligent agents (IA), now often known as "bots", are software technology that performs difficult or repetitive tasks for a user. Using direct commands or on a scheduled timetable, the IAs execute a provided list of instructions known as a script. The intelligent agent technology typically "borrows" from capability inherent in other AI techniques, especially in the area of search. The IA capability can then add the "ever diligent" capability provided to us by computer processors that can stay awake and work 24 hours a day 7 days a week. A simple script follows that checks for stories about the stock market and then notifies the user via e-mail when one of interest appears.

```
When HOUR = (11:00 or 13:00 or 15:00 or 16:30)
Start ieexplorer.exe
Load URL = http://www.msn.com
     Search site for text = "DJIA"
If present THEN
     Start outlook.exe
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Address = saunders@ndu.edu

Subject = "Story on Dow Jones Industrial Average"

Body = "At HOUR There was a story on the

DJIA posted on the MSN Web site. Click here to retrieve it"

Else END

Scripts that are well crafted can perform actions such as periodically:

Checking for a stock price to hit a certain level and then executing a buy or sell at that price.

Checking a web site to see if any new documents have been deposited.

Intelligent agents take many forms. The web site http://www.botspot.com lists the following general categories

Chatter Bots Commerce Bots Data Mining Bots E Mail Bots Fun Bots Game Bots Gov Bots Knowledge Bots Miscellaneous Bots News Bots Newsgroup Bots Search Bots Shopping Bots Software Bots Stock Bots

VIII. AGENT BASED SYSTEM

An agent-based model **(ABM)** (also sometimes related to the term multi-agent system or multi-agent simulation) is a class of computational models for simulating the actions and interactions of autonomous agents (both individual or collective entities such as organizations or groups) with a view to assessing their effects on the system as a whole. It combines elements of game theory, complex systems, emergence, computational sociology, multi-agent systems, and evolutionary programming. Monte Carlo Methods are used to introduce randomness.

Techniques

- Cellular automata were used in the early days of artificial life, and they are still often used for ease of scalability and parallelization. Alife and cellular automata share a closely tied history.

- Neural networks are sometimes used to model the brain of an agent. Although traditionally more of an artificial intelligence technique, neural nets can be important for simulating population dynamics of organisms that can *learn*. The symbiosis between learning and evolution is central to theories about the development of instincts in organisms with higher neurological complexity, as in, for instance, the Baldwin effect.

Figure shows that areas of research could be in optimizing hardware and algorithms to allow extensive commercializing of iris recognition and voice recognition tools. Multiple biometric systems are also expected to become increasing popular in future.
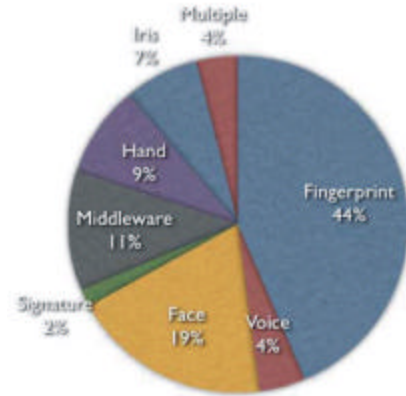

Percentage of the biometric market by technology [source: International Biometric Group, (2006)]

IX. NEW TECHNIQUE

The REVERB project, which involves BAE Systems and a number of other leading UK Universities, is aimed at developing new technologies, which will enable robots to respond to events and multi-task in similar ways to humans and animals.

"The Vision Chip will be based on the retina of the human eye and will work in a similar way giving the robot excellent peripheral and central vision. Like the human eye, the Chip will process very complex images at rapid rates filtering them through to the robot's brain and enabling it to react in real time."
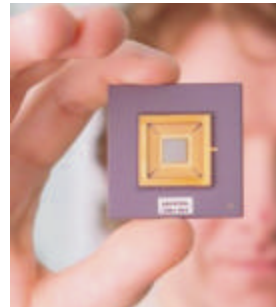
X. COMPUTATIONAL LANGUAGES

The first computational language was LISP, developed by John McCarthy, 1960 [52]. This is a combination of information processing language (IPL) and lambda calculus. In the early 1970's another language was developed for AI use, that of PROLOG The language's formal logic background made it suitable for many AI applications [1]. ConAg, 2003 [53] is a reusable Java framework developed to produce intelligent software agents by the Conscious

Software Research Group (CSRG). It was developed with the intent of reducing AI implementation costs and development time. The intelligence model used is based on Baar's Global Workspace theory [23, 24].

More recently, this trend has continued with the introduction of freely distributed computer simulations of

robots or agents for other researchers to work with. This includes tools such as Web Bots, NRM [39], and the SIMNOS program [54] used to simulate the CRONUS robot.

Moreno and de Miguel, 2005 [55] created the CERA (Consciousness and Emotion Reasoning Architecture) for autonomous agents. This is a software architecture based on Baar's global workspace theory. The purpose of the system was to allow different conscious components to be integrated together.

A computer language developed expressly for implementing artificial intelligence (AI) research. on the Logic Theorist and GPS, two early AI programs, Allen Newell and J. Clifford Shaw of the Rand Corporation and Herbert Simon of Carnegie Mellon University developed their Information Processing Language (IPL), a <u>computer language</u> tailored for AI programming.

XI. ARTIFICIAL LIFE

Artificial life (commonly Alife or alife) is a field of study and an associated art form which examine systems related

to life, its processes, and its evolution through simulations using computer models, robotics, and biochemistry.[1] There are three main kinds of alife[3], named for their approaches: *soft*[4], from software; *hard*[5], from hardware; and *wet*, from biochemistry.Artificial life studies the logic of living systems in artificial environments. The goal is to study the phenomena of living systems in order to come to an understanding of the complex information processing that defines such systems.Also sometimes included in the umbrella term Artificial Life are agent based systems which are used to study the emergent properties of societies of agents.

Robots Serve Humans on Land, In Sea and Air

NASA and General Motors are working together to accelerate development of the next generation of robots and related technologies for use in the automotive and aerospace industries.

The idea of using dexterous, human-like robots capable of using their hands to do elaborate work is not new to the aerospace industry. The software, robotics and simulation division at Johnson built the original Robonaut, a humanoid robot designed for space travel, in a collaborative effort with the Defense Advanced Research Project Agency 10 years ago.

"Our challenge today is to build machines that can help humans work and explore in space,".
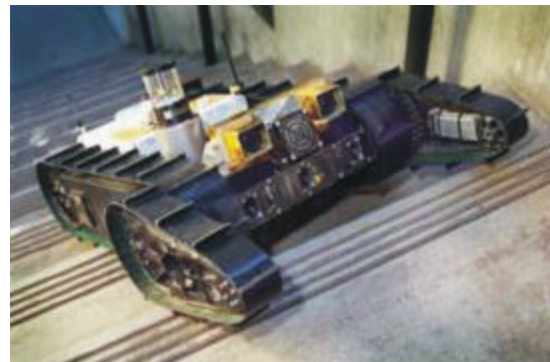
XII. ROLE OF AI IN OUR LIFE

Robot can sense you:

An assistive robot has to be able to sense when a human is touching it. Domo has springs in its arms, hands and neck that can sense force and respond to it.

Robotic Army

Robots are increasingly taking over more soldier duties in Iraq and Afghanistan, with predictions that as much as 30 percent of the U.S. Army will be robotic by 2020. WUSTL computer scientists who work on robots say the machines still need the human touch.

Surgery by Satellite: New Possibilities at Medicine's Cutting Edge

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Science Daily (June 7, 2007) — Robotic surgery may be coming to your town. Surgeons who no longer stand by the patient, but direct the operation from a computer console can drive robots that perform surgery.

Game artificial intelligence refers to techniques used in computer and video games to produce the illusion of intelligence in the behavior of non-player characters (NPCs).

XIII. ARTIFICIAL INTELLIGENCE MEETS NATURAL STUPIDITY

Jocelyn Paine presented three mistakes made by AI researchers. (It also, very briefly, warns on the final page about a few others.) To keep AI credible, he says, we must stop repeating mistakes caused by sloppy thinking. The paper ridicules three of these mistakes, which McDermott admits he suffers from himself.

(*i*) One mistake is "wishful mnemonics": identifiers named after grand concepts such as "theorem", "understand", or "is a". In other words, identifiers named after what you would like the program to do, rather than what it actually does. Often, what you would like it to do is to imitate some human ability such as understanding natural language. It will never so, certainly not in the way a human does, and you shouldn't let your identifiers lull you into believing that it does.

(*ii*) Another mistake is to assume that if only modules could communicate in natural language, all our problems would be solved. But there is a part of this section that discusses: "the"; reference; data structures that represent parts of things such as "the finger of the hand" or "the left arm of the chair"; and data structures that represent things that have been destroyed and recreated, such as "the barn that burned down and was rebuilt". That is well worth reading, especially if you believe you can

solve your problem by using the data structures AI people call "frames", or any equivalent that has "part-of" links.

(*ii*) And the third section is headed "** Only a Preliminary Version of the Program was Actually Implemented". Find it, and enjoy.

XIV. CONCLUSION

Applications of AI components in the security sector are not only focused on the development of on-line innovative and thinking systems, but also gadgets with imbedded human common sense with capabilities of human-like security decision making interventions. There is definitely scope for use of artificial intelligence within the social environment. In this research paper we have discussed the new technology like REVERB project. The REVERB project, which involves BAE Systems and a number of other leading UK Universities, is aimed at developing new technologies, which will enable robots to respond to events and multi-task in similar ways to humans and animals. Perhaps the only two concepts, which have been shared between researchers, are Baar's Global Workspace Theory and the agent-based model, advanced independently by Brooks and Minsky.

Applications of AI components in the security sector are not only focused on the development of on-line innovative and thinking systems, but also gadgets with imbedded human common sense with capabilities of human-like security decision making interventions, also the role of AI in different fields as defense, medical science, games and the importance of robots for multiple purposes.

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