

Research Domain & technologies generalization of A.I.

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Abstract:

The Technology has enhanced & captured every aspect of life, Artificial Intelligence has proven its magic in every field, it may be in security systems, home appliances, Intelligence system for automation processes, Simulation systems for predictive purposes, Biological observations & symptoms for recognitions, Knowledge base systems for data classification & signature verification purposes etc. Technology does not based on isolated observation or functions, it is a integrated design approach generated from different algorithms ,procedures,behaviours ,features etc,as per design approach different domains are created ,which has their own pattern or performance with specific application.

Here in the proposed paper different research domain & their applications has been presented to evaluate their need & purpose to generate result based on their performance measures.

Introduction:

Artificial Intelligence:

It is a technology in computer application use to solve problems using knowledge understanding, defined rules, perception, reasoning and common sense.

It is a field at which human like intelligence is provided to machine using well defined rules and algorithms.

- Researchers studied human mind and developed artificial neural network.
- Researchers studied human Genes and generated genetic algorithm
- Several categorizations are there at which A.I. Are used. It has broad classification in various fields.

Related Work:

Static analysis method for finding SQL-injection flaws based on Vulnerability pattern approach is used by Livshits and Lam [2], Defensive Programming [1] has given a approach for Programmers by which they can implement their own input filters or use existing safe API s that prevent malicious input or that convert malicious input in to safer input..The main issues of this method, is that it cannot detect the SQL injection attacks patterns that are not known beforehand. Vulnerability patterns are described here in this approach.

The basic idea is to adapt the traversal order to suit the input patterns used in "Adaptive Pattern Matching" [3] is proposed.. Simply put, instead of browsing the information from the

input one by one, we can improve the system performance by skipping over those fields that are irrelevant for matching any pattern. Here, a packet filtering system is through a DFA (Deterministic Finite Automaton) like automaton, which can rapidly select the matching-patterns in a single scan of input. A typical scenario in fulfilling this approach is to preprocess all the patterns into a DFA-like automaton, then scan the packet fields in a left to right manner.

The technique builds models of the typical queries and then at runtime, queries that do not match the model would be identified as attack, is presented in IDS [4], use an Intrusion Detection System (IDS) to detect SQLIAs, based on a machine learning technique. This tool detects attacks successfully but it depends on training seriously. Else, many false positives and false negatives would be generated.

Research areas:

Artificial Intelligence (A.I.) [5] is basically based on the comparison of Human Intelligence and Artificial or Machine Intelligence.

In simple words, it is a machine, which takes decision like human for solving problems and performing given task.

Artificial Intelligence areas:

- Expert system or Intelligent System: It is designed using computer programs that answer with knowledge and common sense in a specialized subject with explanation of recommended guidelines and advice.

Embedded system: Programming codes are logical structure. It states some condition, inputs and output, but it could not do anything until it is used by any hardware or system. Codes need some platform to run.

Machine, a mechanical or electrical body could not predict or perform anything by itself. It also requires some logic to work. Embedded system is a design where a logical code is embedded into chip or hardware component to perform logical operation. Example of embedded system: Robots, ATM card, mobile SIM or chip etc

- **Fuzzy Logic:** It is used to solve [6] problems and generate result, when ambiguous data, incomplete data & unclear logic is provided.

This technique is used to solve the problem which does not have exact answers or results. Means

- No exact 'YES' or 'NO'.
- No exact 'True' or 'false'.
- No exact statement for justification or for explanation.

They work on Approximation type problems and generate final solution.

Example: White paper is white. And Black paper is black.

But, when question arises how much paper is white and how much paper is black, such type of problems are solved by Fuzzy Logic techniques.

Certain time incomplete data is available that might be generated from survey, research or by

any analysis. In such cases several logic, rules, predicates, relation, semantics, past data analysis, history patterns has been taken to generate the result and justification.

Robotics, satellite communication, web and network attack, human behavior prediction, human effort tendency prediction which are far from judgment and does not have exact method to solve the problem, which works on may be, may not be, near about, approximately type domain requires Fuzzy logic techniques.

- **Neural Network:** It is inspired by human brain, which contains interconnected neurons that share data using patterns and relationships existing between neurons.

Brain works by transmitting message in the form of signals [6,7]. Information or data are stored in neurons connected by each other through transmitting edges. With every memory or information new neuron or cells are created millions of neurons are presented in human mind.

Human mind is an unbelievable, unpredictable, uncontrolled device or system have very high design and access complexity and almost difficult to predict or understand their architecture and exact working.

Scientist and researchers are continuously working to understand human mind design and their architecture, pattern of information transfer and accessing. The purpose of Human minds study is to develop logical model based on human mind and could resemble its features and principles.

Human Mind Features:

- Good learner
- Have history about prior knowledge with date and time.
- Generates link between two different information stored in neurons.
- Able to solve complex problems or could generate new approach.
- Unlimited storage.
- Unlimited speed, bandwidth of information transfer and never tires.
- Have past, present and future prediction as rule, conditions, knowledge, data exist in mind by supporting edges.
- Strongest capability of classification.
- Signal identification capability from different component or body parts.
- Ability to think beyond imagination, to think anything at any time, free to think.
- Does not require special input

Several features of brain exist, which can't be specified in words and even human does not knows about it. Brain provides inspiration to develop Artificial Brain (machine Design) to work like human mind principle.

If Researchers could completely succeed in generating such design almost any type of problem could be solved. It may be of science,

technology, Geography, history, future prediction etc.

Robot mind Design follows the principle of Artificial Neural Network (A.N.N)

- **Robotics:**

Robot design consist of mechanical and electrical components like motor, body frame, wiring connection, skeleton etc ,these forms the shape of robot .But the decision capability or problem solving approach is generated using Artificial Neural Network(A.N.N)

- **A.N.N(Artificial Neural Network):**

This concept is taken from human brain, where data or information is transmitted from one node to another node using processing elements (Neurons). It is a parallel system[5,6], connected in the form of mesh type network, and they shares information generated by previous memories and patterns.

Here, several rules, conditions, study of past historical data, problem solving approach, pattern ,logic, semantics are well designed and organized to generate efficient algorithm which provides intelligence to robot.

Intelligence: Well formatted approach which contains human mind features in the form of algorithm.

- **Data Mining:**

This technique is used for the analysis of complex or sophisticated data to find valid patterns, relationship from the large data repository. It is used to analysis data presented in the form of Textual content or multimedia

content. Mining[4] may be of any type Text Mining, Image mining, and web mining, content mining etc, Data means information and mining means digging to extract some useful item. It is a technique by which useful information is extracted from the large or huge amount of data repository, all the information is not used for the entire task. Human is a complete machine, which contains several schemas to transform and execute information.

Example:

- Eye: Image recognition system, data video, quality, intensity recognition system.
- Ear: Voice recognition system.
- Tongue: taste and type recognition system.
- Mind: result processing and analysis system.
- Nose: Smell and domain recognition system.

These all are controlled by centralized controlling system, Nerve system. Human Mind contains the repository and linking of information available, where the collection of data and analysis occurs for result or conclusion generation.

Millions of memories in the form for cells or nodes, their connection are available but research is required to extract logical data, which are dependent on certain conditions or logics. Here comes data mining to find out patterns for further study and analysis.

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Application of Data Mining: Recognition systems, network attack patterns, machine performance and behavior parameters and patterns, searching patterns etc.

Example: Search Engine-Extraction of useful patterns and signatures.

- **Natural Language Processing:**

It is used to understand machine language by human or vice versa, used in Robotics or machine learning, automation etc, to provide flexible communication.

Example: Speech recognition, image recognition, pattern recognition, faces recognition system, optical character recognition systems, human behavior recognition system etc.

- **Image Processing:** To process incomplete[3] data, unclear data to generate desired results,

Example: Image taken from satellite might be unclear but could be made visible and clear by using image processing techniques.

- **Classifier:** It is a function use to classify data or problem into respective classes using previous experience, observation, perception, common sense, rules, logics, semantics, analysis etc

Classifier is trained, using machine learning approaches (using artificial Intelligence). Various classifiers are:

- Decision tree
- Neural Network

- K-Nearest-Neighbor Algorithm
- Support Vector Machine
- Naïve-Bayes classifier
- Gaussian Model

Conclusion: Here in the proposed paper A.I techniques and their application has been presented, and explained at different perspective to enhance research motive and their bifurcation at required fields. A.I. has almost covered the entire field shown above and it is the most promising field for the implementation of techniques, the result generated using A.I. technique provides most accurate dimensions.

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