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Comparative Analysis of Soft Computing Hybrid Intellectual System Implications for Salvation of Machine Learning based Complex Problems

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Abstract— Soft Computing is attractive, best and innovative field for solving complex problems in human's life and it well suited for develop the tolerance for imprecision, uncertainty, prejudiced truth, and estimate to attain tractability, strength and decrease resolution cost. Soft Computing derives with various advanced levels of intellectual computing architectures like as artificial neural networks including, fuzzy logic control system, genetic algorithms and the combinational features of individual technological approaches are built the hybridization of powerful intellectual systems like as neural fuzzy based hybrid system, fuzzy based genetic algorithm and genetic neural approach. Soft computing hybridization is a gifted research invention of contemporary computational intelligence concerned with the expansion of future invention of intellectual systems. This paper describes the comparative study and analysis of intellectual hybrid systems, their inventions, approaches, implications, followed methodologies and how it can applicable and to solve the complex problems in engineering, medical, financial transactions, legal, aero-nautical, so on for future inventions and also how it varied aspects of soft computing primary and hybrid intellectual computing systems. This research paper more helpful for new researchers whose are in initial stage of research in various technologies under soft computing with different objectives and describes new methodologies and implications of hybrid intellectual systems by using soft computing techniques are described.

Index Terms—Machine Learning(ML), Fuzzy Logic Control System (FLC), Soft Computing (SC), Artificial Neural Networks(ANN), Genetic Algorithms(GA), Neural Fuzzy based Hybrid System(NFbHS), Fuzzy based Genetic Algorithm(FbGA), Genetic Neural Approach(GNA), result-based-statistical-significance-task (RbSST), Artificial Intelligence (AI), Ant Colony Optimization based System(ACObS).

I. INTRODUCTION

Soft Computing derives with various advanced levels of intellectual computing architectures like as artificial neural networks including, fuzzy logic control system, genetic algorithms and the combinational features of individual technological approaches are built the hybridization of powerful intellectual systems like as neural fuzzy based hybrid system, fuzzy based genetic algorithm and genetic neural approach. In present and past years lot of innovations are discovered by using the hybrid soft computing approaches by replacing the usage of traditional computing system approaches. Soft computing can derive the supplementary qualities and techniques that come from the hybrid approaches stimulate their application in each system [1]. Machine learning (ML) is the continuous process to analyze the data based the problem objectives, which automates diagnostic model construction [10]. In machine learning environment problems based objectives can be figure out by using learning based algorithms are progressively more supporting, making the decisions and personally interacting with us in our day-to-day activities like as machine based maintenance of power plants, highways and numerous of other engineered and eco based socio-technical systems with consideration of machine learning based safety systems. Machine learning innovations can rise to revolutionize financial based markets and it reveals mysteries inherent in human based learning [3]. Machine learning systems are derives the tools with intelligence ability that surpasses human capabilities or something in between, but from all perspectives, they are technological components of larger eco based socio-technical based systems to be engineered with safety concern in their mind [4].

In machine learning, by using the algorithmic sequences which iteratively be trained from basic data, it allows the systems to discover secreted insights without being explicitly programmed where-to-look and how-to-look. By deriving the innovative-computing-technologies, the approach of present-machine-learning is not like as past- machine-learning approach. It was natural from pattern-recognition along with the theory that systems can learn-train-tune without being processed by programmed to execute particular objective based activities. Many

researchers paying attention in artificial intelligence (AI) required training the systems through the learned data. Through the machine learning the systems are able to autonomously become accustomed by the iterative mechanism models to retrieve the new data. Systems can learn and train from previous computations, tune itself and to generate dependable, repeatable decisions and best result outcomes, it is common for traditional cum modern discovery but it is the great impetus level for the discovery. Some of the machine learning applications described as self-practice-driving Google car: the spirit of machine learning approach, Twitter: machine learning approach collective efforts with linguistic base rule creation, Fraud detection: more noticeable, significant uses in the present scenario of world and on-line trading cum business-Amazon and Netflix: Applications belong to present life machine learning approaches [10]. Now are day machine learning is important to build the future based system. Researchers are showing more interest and active role in machine learning approaches because of the similar issues that are made big data, data mining, cloud computing virtualization and Bayesian analysis more famous than always [10]. In data storage prospective, the computational processing become cheaper and more active, influential and reasonable data storage based the data availability variations along with the fast mounting database volumes. These data storage issues can show direct and indirect impacts on machine based learning [10]. Preparation of mindset swing is needed to be efficient at machine based learning approach, from base-technology to active-process, from accuracy to sufficient high-quality, but the identical could be supposed for other complex techniques that the programmers are paying attention in adopting the machine based rules [11].

II. MACHINE LEARNING BASED DEVELOPMENT METHODS AND COMPLEX PROBLEMS

In machine learning derive the basic principle is that by combining the all human based decisions of various different levels of predictors, all together to bunch the methods to provide attractive solutions to challenging complex problems in various fields. It derives the principles for dealing with learning under uncertainty parameter situation like as huge volumes of data is accessible for induction [6] and sensor based character recognition and many open issues and there remain challenges which may necessitate interdisciplinary approaches. Machine based learning development methods

- Multi-Label based Classification
- Feature selection and retrieval
- Self tuning classification
- Large-scale based Learning
- Multi-modal based Learning
- Data-stream based classification and concept drift adaptation
- Multi-Dimensional based classification
- Active-mode Learning
- Mining based social networks
  - Applications of ensemble approaches
  - Clustering ensemble approaches

III. PAPER OBJECTIVES

The main aims of this congregate research work is in the field of soft computing hybrid intellectual system implications, methods to analyze, present the latest approaches with their implications for future based upcoming challenges in machine learning issues and the efforts of the community to address difficult machine learning complex problems [6]. And also it describes the comparative study and analysis of intellectual hybrid systems, their inventions, approaches, implications, followed methodologies and how it can applicable and to solve the complex problems in engineering, medical, financial transactions, legal, aero-nautical, so on for future inventions and also how it varied aspects of soft computing primary and hybrid intellectual computing systems.

IV. COMPLEX PROBLEMS SALVATION STAGES IN MACHINE LEARNING APPROACH

To develop a prototype and progression for rapidly accomplish the good effective vigorous results for solving the complex problems in machine learning approach. If once the prototype has designed, this same prototype used for many times for solving the series of complex problems with their internal modifications. To get faster and reliable effective results with this supplementary robust and developed process [8]. The following salvation stages are applicable and reusable in machine learning problems for solving the complex problems.

- Describe the complex problem
- Build the required data along with their data sets
- Choose the algorithm implications based the problem
- Build the computational calculus
- Progress results based the input data sets
- Express the outcome based results

A. Describe the complex problem

It is the primary and important stage to get the clear objectives of the particular problem. The structure of describe the complex problem is derived by the some assumptions; what is the problem and what type of the problem: explain the trouble casually and properly, to roll all assumptions and similar problems; describe whether taken problem has solvable or not: roll your inspiration for solving the problem, the advantage a solution provides and how the solution will be used for further purpose, **problem salvation strategy:** describe how the problem would be solved: manually to flush domain knowledge [8].

B. Build the required data along with their data sets

This stage derives and brief the attributes and visualizing them using disperse plots and histograms with a data analysis procedure. This process is consists the three basic stages like as: **selection of required data**: categories the available data and un-available data, gather wanted and removable of unwanted data; **pre-processing of gathered data**: systematize gathered data by cleaning, modifying and sampling from it; **alteration**: to alter the pre-processed data which could be ready for machine learning by engineering features using scaling, attribute decomposition and attribute aggregation [8].

C. Choose the algorithm implications based the problem

This is the important stage to solve the problems through the machine learning motto. Selection of right algorithm generated effective sequence of operational implications to retrieve the computational results. The loading up a cluster of paradigm machine learning algorithms into test bind to perform the formal experiment. The main intension of this is to derive all types of algorithmic statement implications and their dataset arrangement is excellent at choosing the concern configuration of the problem [8].

D. Build the computational calculus

After the selection of concern algorithm for the machine learning based problem, the derivation and implementation of the algorithmic sequences can be computed by the mathematical derivations and proofs. These derivations must have to satisfy the assumed assumptions to build the corresponding outcomes.

E. Progress results based the input data sets

This method is based on the considered parameters of the derived algorithm and it could be done by execution of mechanical tuning based investigation on the parameter set of the performing algorithm sequences. This result-based-statistical-significance-task (RbSST) is complicated and act as major role to satisfy the problem objectives. RbSST is gives best output based the designed configuration of the algorithm [8]. The process of progress results based the input data sets engage with three basic level concerns: **fine-tuning of algorithm**: it determine the finest methods, concerns with the search problem through model parameter-space, **techniques**: the objective based estimations build by various combinational representations. **Tremendous characteristic engineering**: the characteristic based decomposition and aggregation implemented in data preparation with their limitations of database [8].

F. Express the outcome based results

The results of a complex machine learning problem are worthless until they are applicable to concern questionnaires. The following points can be considered for Expressing the machine learning cum outcome based results. **Framework**: expressing the environment in which the problem exists and set up the inspiration for the research based question. **Questionnaire**: expressing the single point of question with the number of questionnaires to represent the concerns responses. **Responses**: expressing the clarifications as responses to the questionnaires. **Implications of Findings**: represent the lists of discoveries which are generated in the process prepared for user attentions. **Restrictions**: expressing the list of restrictions certainties and uncertainties **summary of conclusion**: it express the all major objectives of concern discoveries and work environment [8].

V. MAJOR ASPECTS TO GENERATE BEST OUTCOME OF MACHINE LEARNING SYSTEMS

In present life, there are various applications are available for ML approach like as data mining, big data and so on. Most of the people doing mistakes while the data-analyses when annoying to set up the associations between multiple characteristics. These minor mistakes put them into trouble to retrieve solutions to complex problems. The effective developments of successful ML applications require an extensive amount of self tuning mechanism of black art approach [7]. The ML approach is successfully applied to solve these minor problems for recovering the competence of systems and the designs of machines [5] based on ML.

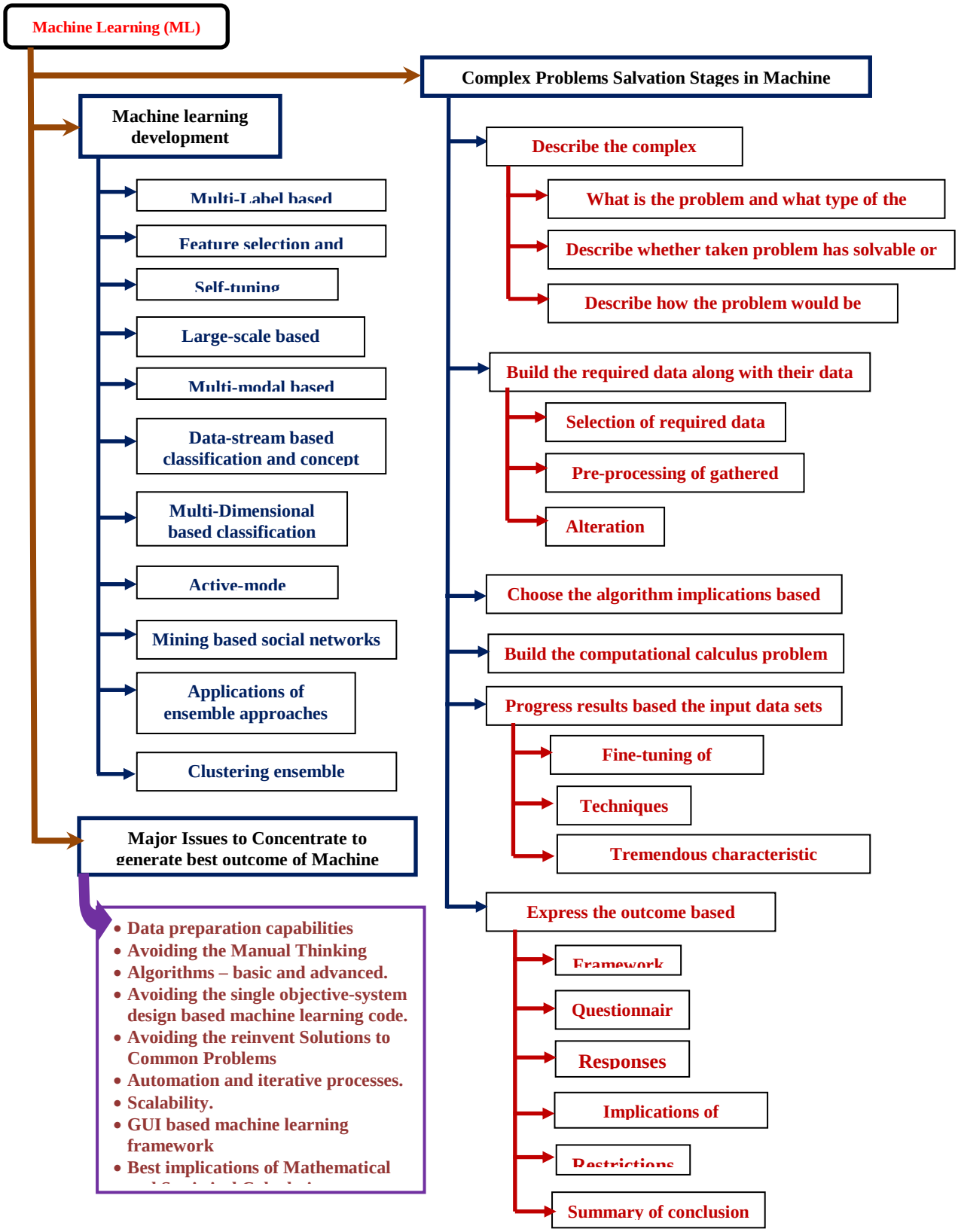

Figure 1: Machine learning development methods, Complex Problems Salvation Stages in Machine Learning and Major Issues to concentrate to generate best outcome of Machine Learning Systems

- Data preparation capabilities.
- Avoiding the Manual Thinking
- Algorithms – basic and advanced.
- Avoiding the single objective-system design based machine learning code.
- Avoiding the reinvent Solutions to Common Problems
- Automation and iterative processes.
- Scalability.
- GUI based machine learning framework
- Best implications of Mathematical and Statistical Calculations
- Ensemble modelin

A. Machine learning in today's world

In present scenario of ML inventions, various levels of algorithms are used to construct the model based approaches that uncover connections and the various organizations can formulate better decisions without involvement of human interference like as occasions and challenges for ML in business, combinational approach of ML with advanced medical based devices: technologies work together to help patients and also to find out how ML and advanced medical based devices can make a diagnosis the patients as soon as faster and to provide medical-care at a lower-price. Main beliefs and practices of ML and Implications of ML to IoT: ML can be used to attain superior levels of competence in the advanced fields like as Internet of Things [10].

VI. MAJOR ASPECTS TO GENERATE BEST OUTCOME OF MACHINE LEARNING SYSTEMS

Soft Computing is attractive, best and innovative field for solving complex problems in human's life and it well suited for develop the tolerance for imprecision, uncertainty, prejudiced truth, and estimate to attain tractability, strength and decrease resolution cost. Soft Computing derives with various advanced levels of intellectual computing architectures like as artificial neural networks including, fuzzy logic control system, and genetic algorithms. According to the author Fortuna [9], the basic opinion of soft computing is its collective use of new computation techniques that consent to it to accomplish a superior tolerance-level in the direction of vagueness and estimate mode. The hybrid systems derived from this combinational approach of soft computing based techniques which are measured to be the new front line of AI. The author Zadeh defined soft computing as an approach for building the systems which are computationally intelligent and possess human like thinking, proficiency in meticulous field, it can become accustomed to the changing environment and can learn to do improved and can make clear their decisions [13]. The applications of soft computing have advantages including solution to non-linear problems, in which mathematical models are not available, and introducing human knowledge such as cognition, recognition, understanding, learning, and others into the fields of computing.

The main focal point of this research article is to study and analyze the actions, applications and implications of fuzzy logic inference systems, genetic algorithms, AI based neural networks along with their derived combinational features of hybrid systems like as neural fuzzy based hybrid system, fuzzy based genetic algorithm and genetic neural approach. With the initiation of technology, it has been realized that if fuzzy things are made accurate intentionally, it costs in terms of complexity in methods along with its implication value. There are more continuing living methodologies which are more suitable for such type of trouble based problems. A combination of fuzzy sets and neural network techniques are considered as one among the list of techniques [6]. Considering the two approaches separately, each of neural network system and fuzzy inference system has their own characteristics. Neural Networks are suitable structures for function approximation having learning ability. Fuzzy systems are used for enhancing the neural network's explanation capability. The combinational hybridization of soft computing technique consist the neural networks and fuzzy logic to get best of the two worlds and to overcome their individual limitations. Handling uncertainty in such systems is necessary because humans are having low thinking nature in precise terms. The idea behind neuro-fuzzy systems is to mimic human thought and action. In another approach, the authors Bellman and Zadeh [7] stated that a great deal of the decision making in the practical real-world takes place in an environment in which the goals, the constraints and the consequences of possible actions are not known precisely [14]. In conventional based models, they are represented using crisp-models with their precisions. In an attempt to simplify the complications of the real-world, these models tend to fail to notice their actual natural behaviour, which make them incompetent to use and sometimes it does not give the desired results. In the context of estimation and approximation, a lot of significant work has been carried out in past [14

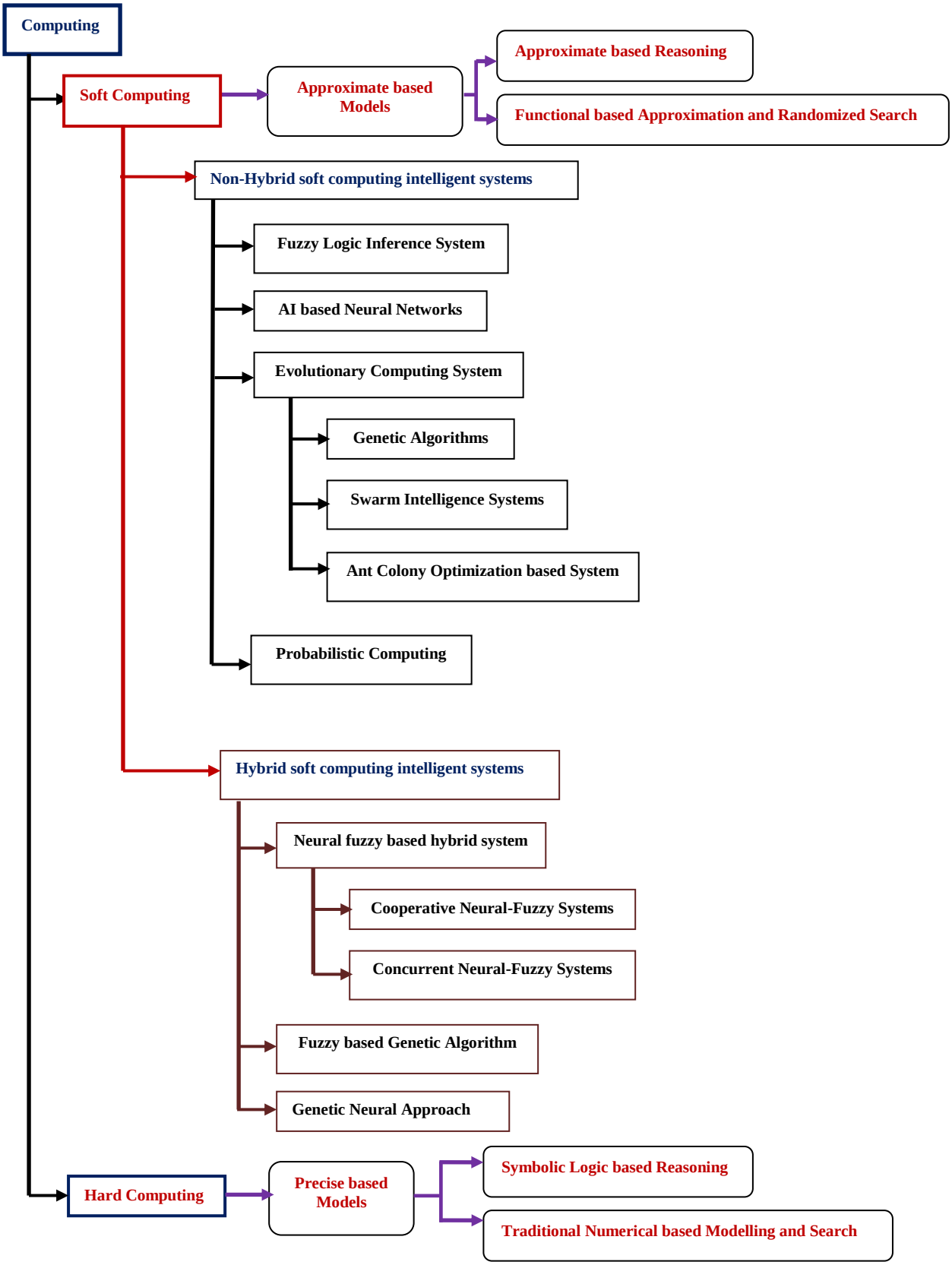

Figure 2: Computing based sequences: Soft computing types and their implications

VII. COMPUTATIONAL INTELLIGENCE SOFT COMPUTING HYBRID SYSTEMS

The computational intelligence based systems derives many application areas in complex domains for decision-making-process, diagnosis-retrieval, supervision-unsupervision, computing-modelling and data-analysis [15]. The computational intelligence techniques are mainly applying in most of fields like as, type1: control based engineering, data analysis and function approximation, type2: monitoring and diagnosis of complex dynamic systems, chaotic domains and time-series data, with a special emphasis on economic or financial problems and electromechanical based devices and systems, type3: numerous medical diagnosis problems and, type4: managerial decisions and strategic decision-making. The need for the design of a generalized hybrid architecture combining both, theoretical intelligent components and suitable areas of application is currently under construction by the researcher. Soft computing is the fusion of methodologies that were designed to model and enable solutions to real world problems, which are not modelled or it can be very complicated to make the model as mathematically. The principle constituents of soft computing are NN, FLC, Evolutionary based Computing (EbC) and Probabilistic based Computing (PbC) and also further divided into other methodologies [14]. Soft computing is an aggregation of rising methodologies intend at utilizing the tolerance-ability for vagueness, uncertainty and partial truth towards achieving robustness, flexibility and low cost [5]. As opposed to conventional methods, soft computing methodologies mimic consciousness and cognition in several ways like learning from experience, performing input-output mapping etc. by simulating biological process through parallelization. Neural networks and fuzzy logic is maybe proved to be the most successful combination of intelligent techniques in modern literature around AI, also called as neuro-fuzzy systems and techniques [16]. Neuro-fuzzy systems have shown a high rate of success when applied in complex domains of application, either when fuzzy set theory is the heart of such a system, or when the neural mechanism is the dominant component in the architecture. These combinational approaches of hybrid systems can be less obvious and expressive, relating to dissimilar NN or FLC structures like as self-organizing maps or radial basis functions [15].

Neural Fuzzy based Hybrid System(NFbHS), the both of neural networks and fuzzy system work independently from each other. The co-operative NFbHS use the mechanism to learn all the parameters from fuzzy system. The NFbHS system can perform the inference operations based on the system of fuzzy rules with help of prior predefined available knowledge. The human-like reasoning style of fuzzy system is in incorporated by five layers of NFHS with the use of a linguistic model and fuzzy sets contains a hug set of If-Then constructed fuzzy based rules. NFbHS can represent the training data formed from the n-dimensions of functions. The NFbHS consists the error computing module to improve the learning instructions when the errors has been measured, initially the membership functions are defined and the parameters of membership functions are activated and learnt through when it needed for a operation [30]. The if-then fuzzy rules are implied by a domain based expert for consultation when it is under training. If a poor training data is fed to the network, the expert knowledge can bring the neural network to a solution. Sometimes, the rules used in a NFbHS system may be false or redundant. ANN were first introduced by McCulloch and Pitt [9], in 1940s based on the observation that human brain consist of numerous interconnected neurons encapsulating the most rare thing in this world - human intelligence. The author Zadeh argued that humans do not reason precise numerical values, instead using categories which are not based on numerical values. The advantage of ANNs over conventional computers lies is in its high parallelism [8]. A conventional computer is a sequential machine in which if one of the components fails, then the whole machine goes down. ANN based on human brain is robust than the existing methods based on traditional procedures. The author, Graupe described the brain function is totally unaffected even if some of the neurons die or misbehave. It is becoming widely accepted that the advent of ANN will open new understanding into how to simplify programming and algorithm design for a given end and for a wide range of ends [10]. Although there are some limitations of ANN too, like designing neural networks, long training periods, and possibility of over-fitting, but taking a little care, performing these tasks patiently and in right manner may generate fantastic results.

VIII. COMPARATIVE ANALYSIS OF SOFT COMPUTING HYBRID INTELLECTUAL SYSTEM IMPLICATIONS

Table 1. Comparative analysis of Soft Computing Hybrid Intellectual System Implications

Soft computing technique variation	**Description**	**Advantages**	**Lagging issues**	**Applications**
Fuzzy Logic Inference System	Fuzzy logic [18] is a language, which uses syntax and local semantics where we can imprint any qualitative knowledge about the problem to be solved. The main attribute of fuzzy logic is the robustness of its interpolative reasoning mechanism.	Does not need lots of data to train. The interpretability and simplicity, and it allow modelling near natural language rules. When new data or rules are added to the system, there is no need to re-train the system, mainly just adding new rules. The ease to model your reasoning and the ability to deal with uncertainty and nonlinearity. The ease of implementation and the use of linguistic variables. Capacity to represent inherent uncertainties of the human knowledge with linguistic variables; It simple interaction of the expert of the domain with the engineer designer of the system and it easy interpretation of the results, because of the natural rules representation and also easy extension of the base of knowledge through the addition of new rules and the robustness in relation of the possible disturbances in the system [24].	The minmax rule for conjunctive-AND and disjunctive-OR reasoning are not robust at all and also incapable to generalize, or either, it only answers to what is written in its rule base. Not robust in relation the topological changes of the system, such changes would demand alterations in the rule base. Depends on the existence of a expert to determine the inference logical rules	Image processing, character recognition, industrial automation, control applications, data mining, automotive applications and so on.
AI based Neural Networks	Neural networks were introduced by [19] and [20]. They are computational structures that can be trained to learn by examples. Using a supervised learning algorithm, such as the back-propagation [21], and a training set that samples the relation between input and output, we can perform fine local	Neural Networks (NN) in short, ANNs are powerful tools in the medical data processing field, and have been used widely [17].	NNs are prone to over-fitting, and are hard to understand.	Pattern recognition, identification, classification, speech, vision and control systems, data mining, forecasting,

	optimization. Neural Networks are suitable structures for function approximation having learning ability			fault diagnosis and so on.
Evolutionary Computing System **Genetic Algorithms**	Genetic algorithms [22] give us a method to perform randomized global search in a solution space. Usually a population of candidate solutions, encoded internally as chromosomes, is evaluated by a fitness function in terms of its accuracy. The best chromosomes are combined and reproduced in subsequent generations. Genetic programming, proposed by [23] is an extension to the original concept of genetic algorithms. The population in genetic programming is composed by variable length tree-like candidate solutions. Each of these individual candidates, called program, may have functional nodes, enabling the solution to perform arbitrarily large actions.	GAs has proven their robustness and usefulness over other search techniques because of their unique procedures that differ from other normal search and optimization techniques.		Medical Diagnosis, Data Mining, Image Processing, Signal Processing, Pattern Recognition, Fault Tolerance, Process Control, Biomedical application and so on.
Evolutionary Computing System **Swarm Intelligence Systems**	Swarm Intelligence(SI) can therefore be defined as a relatively new branch of Artificial Intelligence that is used to model the collective behaviour of social swarms in nature, such as ant colonies, honey bees, and bird flocks. Swarm-based algorithms have recently emerged as a family of nature-inspired, population -based algorithms that are capable of producing low cost, fast, and robust solutions to several complex problems [26].	Adaptable, Evolvable, Resilient, Boundless and Novelty [27].	Nonoptimal, Noncontrollable, Nonpredictable, Nonunderstandable and Nonimmediate [27].	Data Mining, Image Processing, Signal Processing, Pattern Recognition, Fault Tolerance, Process Control, Biomedical application and so on.
Evolutionary Computing System **Ant Colony Optimization based System(ACObS)**	It is a Probabilistic technique. Searching for optimal path in the graph based on behaviour of ants seeking a path between their colony and source of food. Meta-heuristic optimization. Virtual trail accumulated on	Inherent parallelism, Positive Feedback accounts for rapid discovery of good solutions, Efficient for Travelling Salesman Problem and similar type of problems	Theoretical analysis is difficult, Sequences of random decisions with not independent, Probability distribution changes by iteration, Research is experimental rather	Traveling Salesman, Scheduling, Graph-Coloring, Constraint Satisfaction and

	path segments Path selected at random based on amount of "trail" present on possible paths from starting node Ant reaches next node, selects next path. Continues until reaches starting node. Finished tour is a solution and the tour is analyzed for optimality [28].	and also can be used in dynamic applications based adapts to changes such as new distances, etc [28].	than theoretical and Time to convergence uncertain.	Routing mechanism in tele-communicati on-networks,
Probabilistic Computing	Probabilistic Computing approaches like as the bayesian approach is more than rising in attractiveness and being optimistic; it is considered one of the big four approaches to cognitive-modelling, with the other 3 being: dynamic based systems connectionism and rule making-based.	Probabilistic computing based bayesian approach derives the following advantages: Language based association, Interpolation based derivations and Intuitions of Bayesian learning engage to specify a former and integration based derivations.	Probabilistic computing based bayesian approach derives the following disadvantages: Computationally infeasible, information theoretically nfeasible and un-automatic [29]	Signal Processing, Pattern Recognition, Fault Tolerance and so on.
Neural fuzzy based hybrid system	[14]A neuro-fuzzy system is essentially a multi-layer neural network and it applies standard learning algorithms developed for neural networks like back-propagation algorithm. In general, a neuro-fuzzy system has input and output layers, and hidden layers representing membership functions and fuzzy rules. When a training example consisting of input-output pair is presented to the network, the back-propagation algorithm computes the network's actual output and compares it with the target output. [14]During error propagation, the neuron activation functions are also modified. The if-then fuzzy rules are supplied by a domain expert for consultation during training. If a poor training data is fed to the network, the expert knowledge can bring the neural network to a solution. Sometimes, the rules used in a neuro-fuzzy system may be false or redundant.	A combination of fuzzy sets and neural network techniques are considered as one among the list of techniques [6]. Considering the two approaches separately, each of neural network system and fuzzy inference system has their own characteristics. Neural Networks are suitable structures for function approximation having learning ability. Fuzzy systems are used for enhancing the neural network's explanation capability. One of the best combinations for soft computing technique is hybridization of neural networks and fuzzy logic to get best of the two worlds and to overcome their individual limitations. It can handle any kind of data and it manages imprecise, partial and imperfect information. It derives self-learning, self organising and self tuning abilities. Not required prior knowledge of relationship of data and it makes computations very fast by using fuzzy	The idea behind neural fuzzy based hybrid systems is to mimic human thought and actions. Limited analysis is available and Multi-layers neural networks hard to combine with classical control [25].	Data Mining Image Processing, Signal Processing, Pattern Recognition, Fault Tolerance, Process Control, Biomedical Application, Character Recognition, Traffic Control , Process Control and Monitoring, Optimization and Scheduling, Data Security, Cooling and Heating and so on.

		number based operations. It can less human-decision making process.		
Neuron-based Genetic Algorithm	Topology optimization: GA is used to select a topology with number of hidden layers and nodes, inter connected patterns for an ANN. Genetic training algorithm: the learning of ANN is formulated as a weight optimization problem usually using the inverse mean squared error as fitness measure and control parameter optimization: learning rate, momentum rate, tolerance level and so on optimized by using GA	It creates new indicators based on existing once. GA helps to generate better population from good parents, these results close to global optimum and It is robust [25].	It remains a 'black box' which once fed with inputs produces an output. However, their excellent result record might compensate for that deficiency. A second drawback is that inputs have to be altered before being fed to the network. It is fail to depict followings[25]: a) Which network (architecture) to use? b) How many hidden layers? c)How many neurons? d) What activation functions should I use? e) What cost function is the most appropriate? f) Which training algorithm to apply?	In pattern matching Speech recognition, text-to-speech Machines that are able learn Optical character recognition (OCR) Fraudulent credit card detection and Image compression and so on.
Fuzzy based Genetic Hybrid approach system	A fuzzy GA hybrid system is a directed random search of overall fuzzy subsets of interval. By the use of fuzzy logic based techniques for improving genetic algorithm behavior and modeling GA components. This is called fuzzy genetic algorithms [25]. By the application of genetic algorithms in various optimization and search problems involving fuzzy systems.	It has features which make it applicable for solving the problems and capable of creating the classification rules for a fuzzy system, where the objects are classified by the linguistic terms. It is more efficient as it is consistent with numeric coding of fuzzy examples. User friendly and faster and Easy to understand and explicit representation knowledge.	Hard to combine and work out how best to represent a candidate as a bit string [25].	Medical Diagnosis Data Mining Image Processing Signal Processing Pattern Recognition Fault Tolerance Process Control and so on

IX. CONCLUSION

Soft computing hybridization is a gifted research invention of contemporary computational intelligence concerned with the expansion of future invention of intellectual systems. The main aims of this congregate research work is in the field of soft computing hybrid intellectual system implications, methods to analyze, present the latest approaches with their implications for future based upcoming challenges in machine learning issues and the efforts of the community to address difficult machine learning complex problems and also it describes the comparative study and analysis of intellectual hybrid systems, their inventions, approaches, implications, followed methodologies and how it can applicable and to solve the complex problems in

engineering, medical, financial transactions, legal, aero-nautical, so on for future inventions and also how it varied aspects of soft computing primary and hybrid intellectual computing systems. This research paper more helpful for new researchers whose are in initial stage of research in various technologies under soft computing with different objectives and describes new methodologies and implications of hybrid intellectual systems by using soft computing techniques are described.

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