

# Evolutionary Computational Approach for Health Care Intelligence Systems

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**Abstract** - Artificial intelligence (AI) plans to copy human intellectual capacities. It is bringing a change in perspective to medical care, fueled by expanding accessibility of medical services information and quick advancement of examination strategies. In this paper, a new proposed Artificial Intelligence based Optimization algorithm is implemented in the Health care applications, and a Back Propagation Neural Network Algorithm for forecasting is used to identify the disease. In this study, a methodical assessment of existing strategies for health care intelligence in optimization techniques is given, and previous papers are discussed in detail, along with their shortcomings. Using GA, ACO, and ABC algorithms, track the optimum value from a large set of healthcare database. For GA and PACO algorithms, ROC analysis is used to determine the identification of disease.

**Key Words** Artificial Bear Optimization, Back Propagation Algorithm, Health Care Intelligence, ROC analysis, data mining.

## 1.INTRODUCTION

Health Care Intelligence (HCI) is a term that states to a group of software tools that are used to investigated through raw data in order to create informed decisions in a health care industry. HCI offers powerful, predictive analytic solutions for health care executives who need dependable information for strategic decision making and operational monitoring. Multidimensional investigation, mathematical representation and business modelling are among the techniques used to apply HCI system. This topic encompasses a number of related functions such as online and offline app based information analytical processing, query analysis, information warehousing and mining, and reporting. The fundamental idea behind HCI is to make decisions based on facts, with a unique version of the reality facts as the final expectation. The important goal of HCI modelling is to give decision-makers the tools and procedures they need to make effective and timely decisions.

Dynamic decision making and Stagnant decision making are two types of decision making strategies. It is truly possible to assess a vast number of alternative actions, arrive at more precise results, and make efficient and timely decisions using mathematical models and algorithms. We may conclude that the most significant benefit derived from the adoption of a business intelligence system is increased decision-making efficiency. [1-5].

Hans Peter Luhn, an IBM researcher, coined the term "business intelligence" in a 1958 article. "The ability to comprehend the interrelationships of supplied data in such a way as to steer behaviour toward a desired goal," he defines intelligence. Business intelligence, in its current form, is thought to have evolved from decision support systems, which began in the 1960s and continued to improve until the mid-80s.

Current HCI approaches, as well as their constraints and expectations, were investigated in this survey. Because the new approach, the old methodology constraints and its expectation must be solved. There are no enterprise-wide BI Methodologies in any of the available papers. Excel and spreadsheet functionalities are still used by business analysts. The analysis and visualisation capabilities of existing BI tools are lacking. Managing a massive data set with daily increasing data volumes is the most difficult task. Only 10% of BI users are capable of using an HCI tool. Multiple advanced uses result in inconsistencies in the response.

The main motivation for this research was to analyse popular metaheuristic algorithms and compare them to existing and new algorithms, validating with the Receiver Operating Characteristics (ROC) curve, and implementing the intelligence concept with the Back Propagation algorithm for forecasting customer performance.

The purpose of this project is to create and develop a novel algorithm for identifying the best client from a large pool of potential customers in the health-care industry. To address the difficulty in HCI, one must obtain an actuality -based and unique version of the genuineness in decision-making. To avoid putting human health at danger, the ideal customer must be appreciated and trustworthy. In this work, there are five stages to achieving the ideal customer: In the first stage, prepare the database and normalise the data. Individually applying the existing metaheuristics algorithms is unavoidable[1-2].

In this work, the point is to make promptly available, simple to-utilize programming apparatuses for prescient investigation and convenient detailing of exact and vigorous quality markers, effectiveness records and doctor revealing outcomes. HCI has combined large number of clinically-rich State-by-State patient records for examination and online access by our customers for this reason. Upheld by our top to bottom insight and key comprehension of clinic the

executives and the medical services industry, the authority of our customer can perceive, assess and benefit from promising circumstances for development, productivity and quality. By zeroing in on the patient and populace based requests, vital point of view can reach across all parts of medical clinic tasks, financial aspects and connections that drive the objectives and goals.

Regardless of whether the issues are growing new clinical projects, consolidations and unions, cost decrease, planning, or offices re-arrangement; coordinated effort, the cutthroat climate and an outside point of view are important to foresee and guarantee the accomplishment of the projects and activities. HCI gives the capacity to fundamentally foresee and assess assorted patient consideration exercises, doctor arrangement and assets designation; all prompting better financial execution.

## 2. Literature Survey

In this recent scenario, Artificial Intelligence techniques are enormous impacts in the healthcare industry It is a starting a warmed discussion on whether AI specialists would some time or another supplant human specialists. Human doctors, we accept, won't be supplanted by PCs soon, however AI can positively assist doctors with improving clinical decisions or even supplant human judgment in specific spaces of medical care (eg, radiology). The new compelling employments of AI in medical services have been made conceivable by the rising accessibility of medical services information and the fast improvement of huge information examination systems. Astonishing AI innovations can open clinically fundamental realities concealed in an enormous measure of information when coordinated by pertinent clinical inquiries, which can help restorative course. In this work, we look at the current scenario of Artificial Intelligence in medical services as well as the future impacts of the health data. First, we'll take a look at four important viewpoints from the perspective of clinical experts:

1. Insights into the use of AI in medical services
2. Information kinds that AI frameworks have to look at
3. Tools that enable AI frameworks to produce clinically meaningful outcomes
4. The types of illnesses that the AI team is now dealing with.

Author	Remarks
Somashekhar et al.[3]	It is shown that the oncology based AI framework for helping the analysis of malignant growth in the human body through a twofold validation study.
Tahmassebi et al. [4]	In this paper, the Multiparametric Magnetic Resonance Imaging information

	is used to identify the breast cancer or malignant growth in the patients. They proposed Machine Learning methods are used to identify the early stage and give the proper treatment accordingly.
Farina et.al. [5]	In this work, upper-limb prostheses and its targeted muscle reinnervation are carried out. The man/machine interface system tried to improve the tmr procedures and control upper-appendage prostheses.
Dilsizian and Siegel[6]	This work discussed about the heart disease and its related issues based on the cardiovascular images with the possible utilization of the Artificial Intelligence framework.
Dagli et al. [7]	It is characterized staggered discernment model for long term endurance expectation of non-little cell cellular breakdown in the lungs patients. In this research, 559 samples are taken for testing and find out the related attributes for feature selection. Multilayer Neural Network is used to find out the better prediction analysis.
Kayal et al. [8]	This work proposed to find the Hepatocellular Carcinoma with new further developed classification approach is implemented. They tested with 165 patients and find out 49 danger factors, 15 are high risk and remaining is normal. They are used methods are support vector machine, Deep Neural Network and unsupervised K-Nearest Neighbor model is used for better prediction.
Zhang et. al. [9]	It is proposed a model ischaemic stroke prediction using machine learning techniques. This research mainly focus on regression based prediction algorithm is used to analyze the ischaemic heart disease.
Asadi et. al. [10]	This work deals with the ischaemic stroke analysis using machine learning algorithm. In this work, 107 patients data is applied in the machine learning algorithm like Logistic regression models, ANN and SVM are used to analyze the stroke data.

## 3. Health Care Intelligence System

Artificial Intelligence technique is applied to several kinds of unstructured healthcare information and structured healthcare information. Typically Artificial Intelligence techniques contains various types of machine learning methods such as the Artificial neural network, natural language processing modernized deep learning methods and

support vector machine. Majority of health care diagnostic disease areas include cardiology, neurology and cancer.

To keep away from the genuine human issues with the complicated medical care data or unstructured usefulness of current AI implementation and to stay away from manual decision making in the medical services industry. It is to apply the original artificial intelligence algorithm with the impression of parallel ant colony optimization algorithm [11-12].

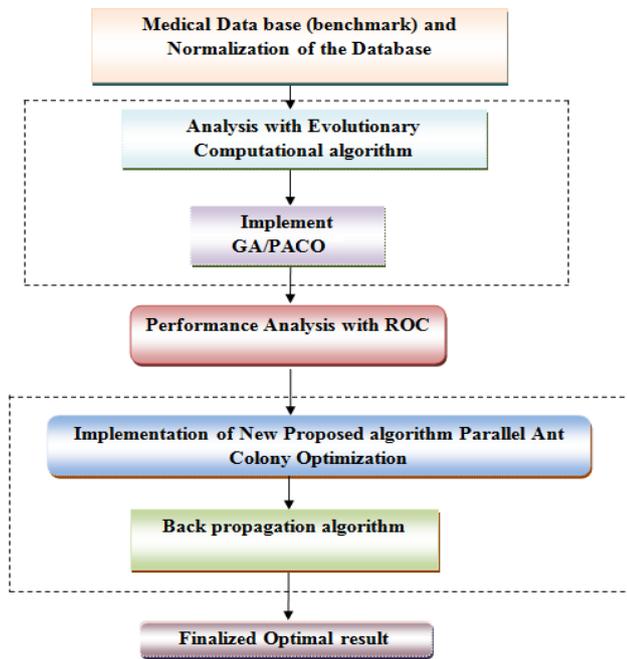


Fig:1 Overall application of Proposed HCI System.

Figure 1 shows the general execution of the proposed medical care knowledge framework. It is utilized to track down the ideal boundary of the information medical services information. Genetic Algorithm (GA) and Parallel Ant Colony Optimization (PACO) calculations are carried out and observe the outcome information base set and assess the presentation with Receiver Operating Characteristic (ROC) analysis. The new proposed calculation is executed. The flow chart diagram portrayal for proposed calculation, PACO is in Figure 2.

The application is created with the execution of calculations and results will be displayed as information base and ROC examination and among calculations near Study is happens and Intelligence idea is carried out that is estimating the client execution with Back Propagation calculation.

#### 4. Result analysis

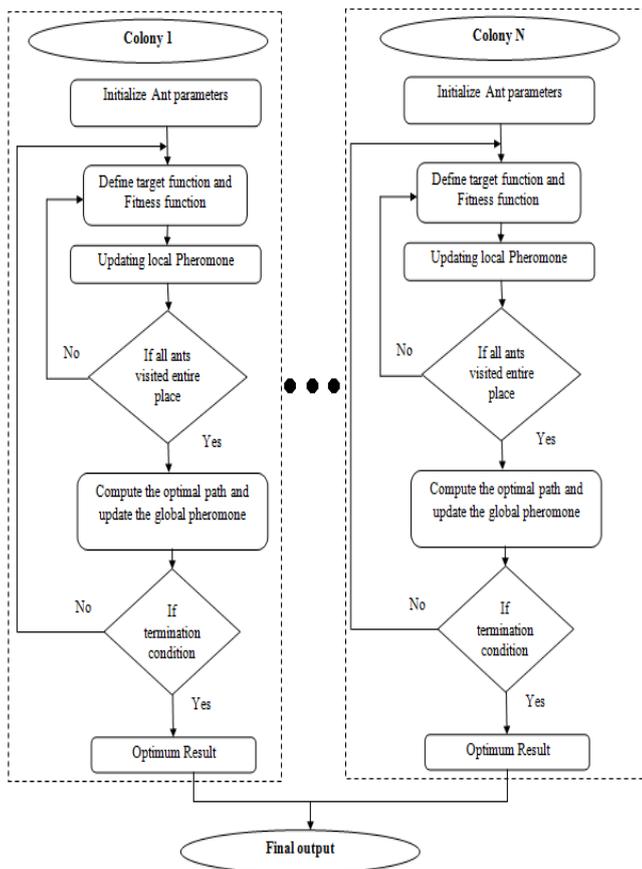


Fig 2. parallel Ant Colony Optimization algorithm

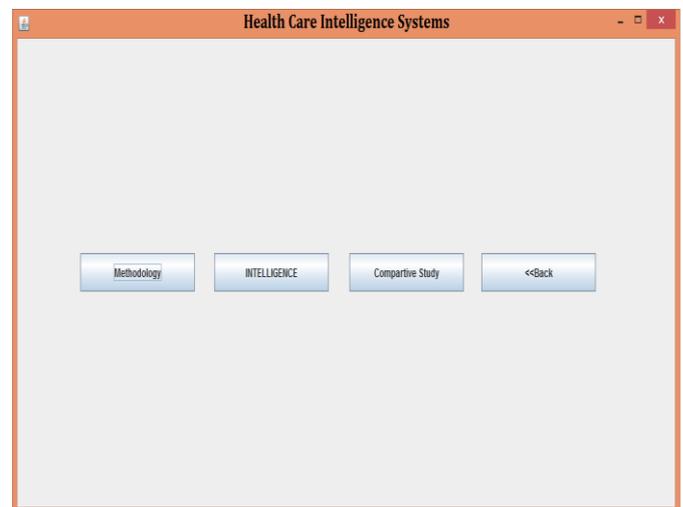


Fig 3: HCI system initial screen

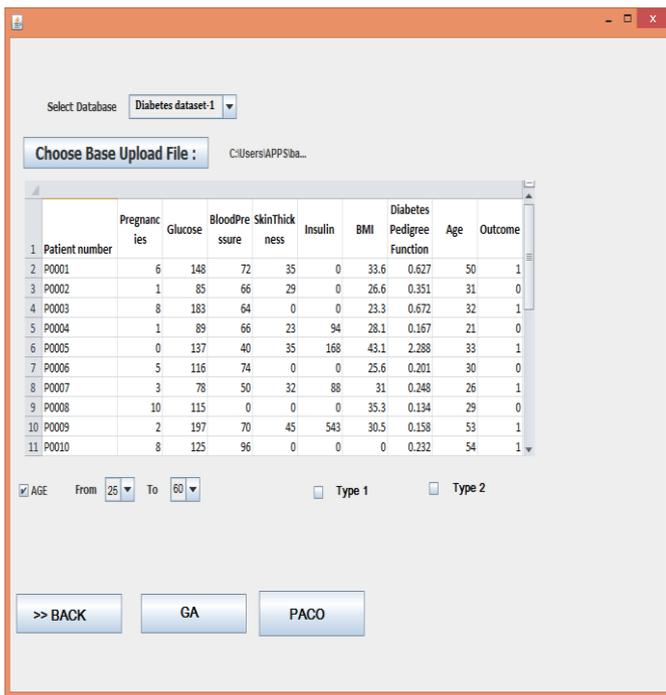
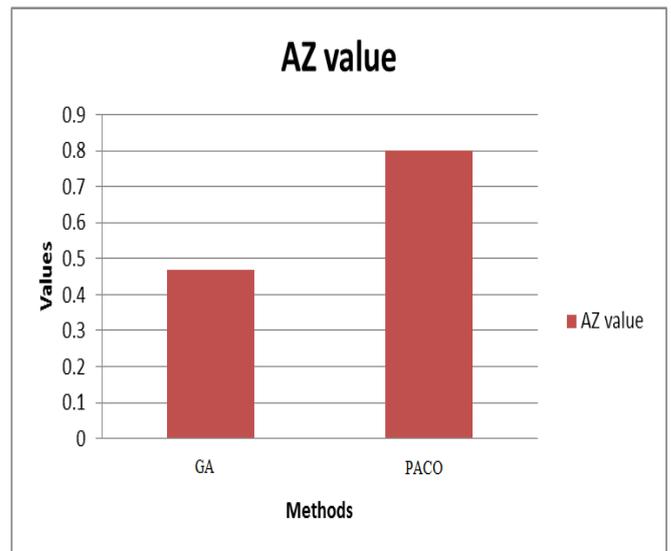


Fig 4: swarm intelligence algorithms (GA and PACO)

Table 2 : Comparison of GA and PACO

Analysis Variables/ Methods	GA	PACO
True positive	234	376
True Negative	255	423
False Positive	236	76
False Negative	273	126
True positive rate	0.481	0.732
False Positive rate	0.173	0.141
Positive Predicted Value	0.482	0.831
AZ value	0.481	0.801



Az Value Comparison of GA and PACO

### 5. Conclusions

In this work, Meta heuristic based Optimization algorithms such as GA and PACO are applied to the health care data set and to attain the near optimal results. To overwhelmed the disadvantages in the already implemented algorithm, proposed Parallel Ant Colony Optimization gives the better performance by using ROC analysis with the AZ computational value.

By carrying discipline to key medical care framework demonstrating, working with the methodologies of metaheuristic calculation and anticipating systems are executed. The Experimental outcome shows the justifiable perspective on the Genetic algorithm and the proposition of PACO analysis. For estimating the presentation of the client will be examined by the Back Propagation calculation with the weightage system of the each characteristic. The AZ worth of GA approach produces 0.48 and the proposed PACO approach produces 0.8. It was investigated that the proposed PACO calculation achieve well.

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