

## MEDICAL RESOURCE ALLOCATION USING MACHINE LEARNING

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### ABSTRACT

In the Medical Sector, huge number of people needs and comes to healthcare center for their treatment. Most of the patients may not get valuable treatment in the healthcare sector, for instance, resources like medicine, operation theatre, prepared medicinal products, blood samples to all kinds of people. Previous model utilized in healthcare sector is Support Vector Machines; It uses a supervised learning model for classification, regression, and detection of outlines. Previous model fails to satisfy the desired condition. So we propose a neural network model, which is a series of algorithms that endeavors to recognize underlying relationships in a set of data through a process that mimics the way the human brain operates eventually our proposed algorithm helps to resource allocate our healthcare process.

**Keywords:** Medical resources, machine learning, single hashing algorithm, Mathematical models, Biological function.

### PROBLEM SPECIFICATION

In medical resource allocation already used by SVM, its algorithm is not suitable for large data sets. SVM does not perform very well when the data set has overlapping. Algorithmic complexity and memory requirements of SVM are very high (Zhao and Li, 2020).

### PROBLEM DEFINITION

In our case where the number of features for each data point exceeds the number of training data samples, the SVM will underperform. It may be difficult to interpret and understand because of a problem caused by personal factors and the weights of the variable (Tian and Collins 2005).

## **PROBLEM DESCRIPTION**

As hospitals are dealing with large data sets SVM is not suitable algorithm in our case. It takes too much of time to fetch the synchronize data.

### **Existing System**

Initially, Support Vector Machines are the most standard machine learning algorithm that is being used by the healthcare industry. It uses a supervised learning model for classification, regression, and detection of outlines. It is also being used for protein classification, image segregation, and text categorization. This Support vector machine does not perform very well when the data set has overlapping (Kasthurirathne *et al.*, 2015).

### **Technical Feasibility**

It is a browser based user interface for construction workflow. Thus, it provides an easy access to the users. It provides the technical guarantee of accuracy, reliability and security (Kharrazi *et al.*, 2017). Band width exists for providing a fast feedback to the users irrespective of the number of users using the system.

### **Behavioural Feasibility**

The analyst considers the extent that the proposed system will fulfill his departments (Lane *et al.*, 2017). That is, whether the proposed system covers all aspects of the working system and whether it has considerable improvements. We have found that the proposed “single hashing algorithm” will certainly have considerable improvements over the existing system.

### **Economic Feasibility**

The proposed system is economically feasible because the cost Involved in purchasing the hardware and the software in a within approachable. Working with this system need not require a highly qualified professional. The operating-environment costs are marginal. The less time involved also helps in its economic feasibility (Jin *et al.*,2020).

## **PROPOSED SYSTEM**

We proposed neural networks are mathematical models, originally inspired by biological processes in the human brain. Neural Network model which can be flexible to allocate resources for the patient in the nearest hospital. These services should be provided in an efficient, cost-effective manner to reduce the time and resources currently required for such a process.

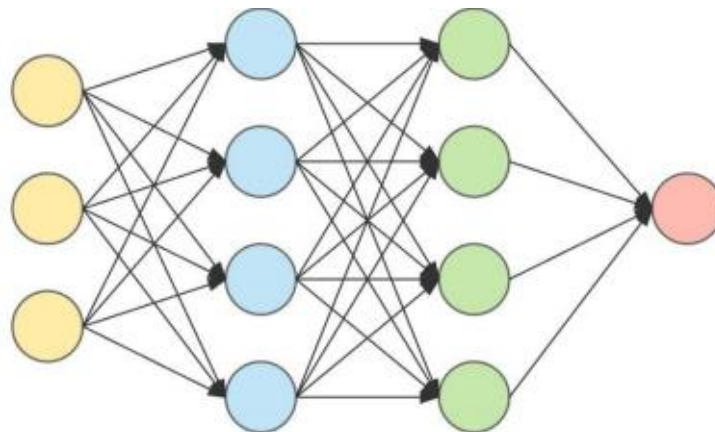
## Domain Description

### Machine Learning

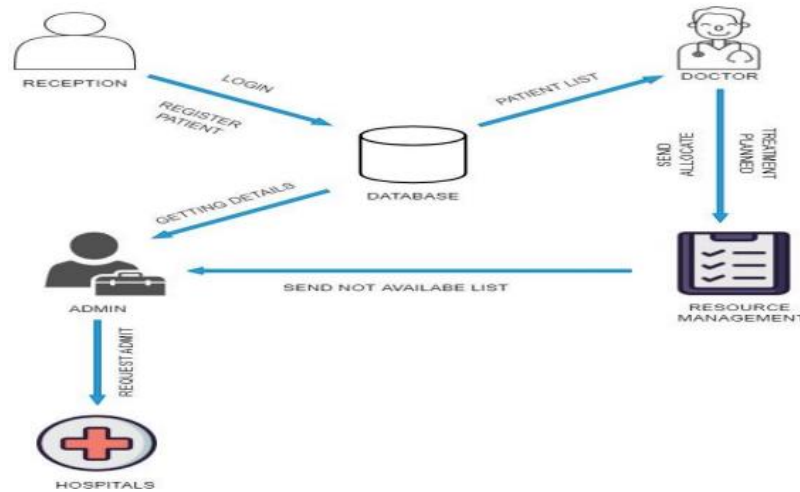
Machine learning is an application of artificial intelligence that involves algorithms and data that automatically analyse and make decision by itself without human intervention. It describes how computer perform tasks on their own by previous experiences. Therefore we can say in machine language artificial intelligence is generated on the basis of experience. One of the machine learning algorithm is Neural Network.

### Adaptive Neural Network

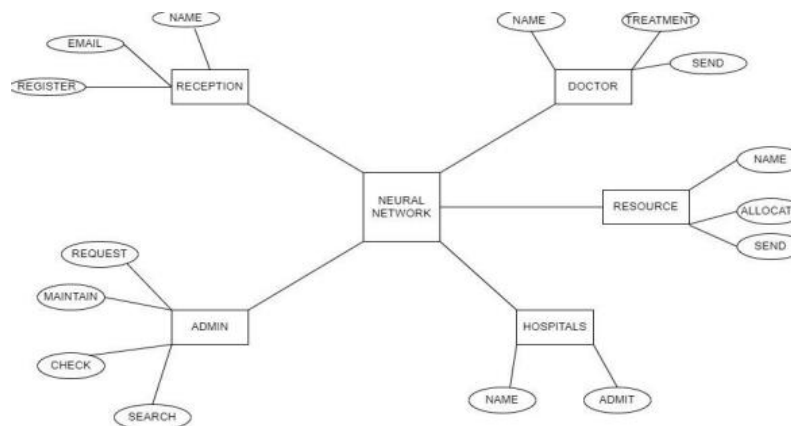
Adaptive neural networks can improve the accuracy of pattern recognition and prediction by adapting to the most optimal model structure and changing inputs while training. Neurons (Nerve Cells) are the fundamental units of our brain and nervous system. He neurons are responsible for receiving (input) from the external world, for sending (output) and for transforming the electrical signals in between (Fig. 1, 2 & 3)



**Fig 1: Process of Neural Network – Model**



**Fig 2: System Arch Functional Architecture**



**Fig 3: ER Diagram**

**Modules Description**

**Reception Module**

In the Reception Module reception member is going to login into the field, then the field the patient necessary details like name, address, mobile number and medications, if any are taken then the registration, is finished then the patient is sent to treatment, and the patient list is saved to the database

**Doctor Module**

In the Doctor module first, log in to the module then view the list of patientsis registered for the treatment and the doctorstarted the treatment planning and finds the prognosis the description for that.

Then the treatment or medication is prescribed to the patients. And resource for the patient is allocated by resource management if required treatment is available. Then the further process is executed.

### **Resource Management**

In this Module, resource management is logged in to the field then view the list of patients is waiting for the resource allocation. If the prognosis of the patient's treatment is available then the patient is allocated for the resource. If the resource is not available for the patients then need to transfer for the resource.

The Not available list is sent to the admin for further process.

### **Admin Resources**

Admin logged into the field after that the admin is checking all other modules and checked the list of patients who needed the resource allocation. Then the admin going to check the resource with the registered hospital's list and if a resource is available in the list of hospitals who have registered then, the admin request the hospitals to admit the patient for their treatment. If the request is accepted then the patient's is transferred to that hospital.

### **Hospitals Module**

In the Hospitals module, first, need to register and log in to the Module and the hospital's employee or manager or director going to register their hospitals in the application. The registration of the hospital's forms with the details, about the hospitals and address than, their specialization of prognosis. If registration is successful then the requested list of the admission of the patients is accepted by the hospitals.

### **Features of the Software**

**Portability:** As servlet are written in java and conform to a well defined and widely accepted API they are highly portable across operating system and across server implementation.

**Efficiency:** servlet invocation is highly efficient; once a servlet is loaded it generally remains in the server memory as a single object instance.

**Extensibility:** The servlet API is designed to be easily extensible. As it stands today the API include classes that are optimized for HTTP servlets.

**Flexibility:** Servlets are also quite flexible; it also introduce java server pages which offer a way to write snippets of servlet code directly within a static HTML page using similar to Microsoft ASP.

**Safety:** Servlets can handle errors safely, due to java exception handling machine. It throws an exception that can be safely caught and handled by the server.

**Advantages:** Neural Networks have the ability to learn by themselves and produce the output that is not limited to the input provided to them. The input is stored in its own networks instead of a database; hence the loss of data does not affect its working. Even if a neuron is not responding or a piece of information is missing, the network can detect the fault and still produce the output. They can perform multiple tasks in parallel without affecting the system performance.

## **CONCLUSION**

In our case, the resource allocation plays a vital role in highly sensitive environment like healthcare center. Huge number of patients are not given the most required treatment for the individual when the resources are not available in that particular location and there is no proper intimation were those patient can find the required resources for the treatment, as these centers are not integrated and effective model to resource allocation. So we use resource allocation in a neural network in the hospital sector which gives an efficient and cost-effective manner to reduce the time.

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