International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 04 | Apr 2020 www.irjet.net p-ISSN: 2395-0072

AN ARTIFICIAL INTELLIGENCE APPROACH FOR PREDICTING DIFFERENT TYPES OF STROKE

Shreyas S[1], R Shashank[2], Chinnaswamy C N[3]

[1]*Dept. of ISE, The National Institute of Engineering, Mysore*
[2]*Dept. of ISE, The National Institute of Engineering, Mysore*
[3]*Associate Professor, Dept. of ISE, The National Institute of Engineering, Mysore*

Abstract - Today there are numerous data in cases of various diseases in medical sciences. Physicians can access new findings about diseases and procedures in dealing with them by probing these data. This study was to analyse the prediction of stroke illness. Stroke is a second leading cause of death and they have been seriously debated health attack. A stroke is a condition where the brain tissue is injured and some brain tissue dies. The disturbance in brain circulation affects the oxygen supply to the brain leading to tissue injury and tissue death. For this reason there have been many studies have been carried out on detecting stroke related diseases Many predictive techniques have been widely applied in clinical decision making on stroke prediction. This includes artificial intelligence and predicting subtypes of stroke using deep learning method. There are three different types of stroke, these include are Ischemic stroke, Hemorrhagic Stroke, Transient Ischemic attack. Our study includes various information set from health institutions. Fundamental component of the prediction algorithm includes proper computation for accurate estimation and deep learning methods for predicting whether the patient will encounter stroke attack or not. So this way we can forecast the occurrence of stroke illness on the desired patients. Forecasting mainly depends on the patients details and this data is checked with the training model and predicts the type of stroke.

Key Words: artificial intelligence, **artificial neural network, back propagation algorithm**, **deep learning**

1. INTRODUCTION

Stroke is the third most crucial cause of death and leads to long term mental/physical inability. Stroke is a potentially life changing event that can have lasting physical and emotional effects. Stroke is a kind of assault on the mind which can happen at any time. A stroke occurs when a blockage or bleed of the blood vessels either interrupts or reduces the supply of blood to the brain. When this happens, the brain does not receive enough oxygen or nutrients, and brain cells start to die.

Stroke is a cerebrovascular disease. This means that it affects the blood vessels that feed the brain oxygen. If the brain does not receive enough oxygen, damage may start to occur. This is a medical emergency. As indicated by the world health organization stroke will keep on increasing death rates in the coming years, so earnest condition treatment must be very quick than expected under the circumstances. Consistently over a million people suffer from a stroke. Inability includes confront deformity, loss of vision, loss of motion, and discourse. Everyone overcomes with some stroke threat. The stroke in some cases causes loss of movement, sudden torture or suffering in the chest, talk inability, loss of memory and thinking limit. Stroke can affect the person of all ages. It can be brought to control and modifiable risk factors are essential. According to the report, mostly understood remedial error happens when there is expiry of meds, off kilter medicines, misguided estimations and treatment given to the wrong patient.

3 types of stroke:

- Ischemic stroke
- Hemorrhagic stroke
- Transcient ischemic stroke

1.1 Ischemic stroke

Ischemic stroke occurs when an artery to the brain is blocked. If an artery is blocked, the brain cells (neurons) cannot make enough energy and will eventually stop working. If the artery remains blocked for more than a few minutes, the brain cells may die. This is why immediate medical treatment is critical. Ischemic stroke is by far the most common kind of stroke, accounting for about 88 percent of all

strokes. Stroke can affect people of all ages, including children. Many people with ischemic strokes are older (60 or more years old), and the risk of stroke increases with age.

1.2 Hemorrhagic stroke

Hemorrhagic strokes make up about 13 percent of stroke cases. It's caused by a weakened vessel that ruptures and bleeds into the surrounding brain. The blood accumulates and compresses the surrounding brain tissue. The two types of hemorrhagic strokes are intracerebral (within the brain) hemorrhage or subarachnoid hemorrhage. A hemorrhagic stroke occurs when a weakened blood vessel ruptures. Two types of weakened blood vessels usually cause hemorrhagic stroke: aneurysms and arteriovenous malformations (AVMs).

1.3 Transcient Ischemic Attack

From head to toe, your blood delivers oxygen to every part of your body. Your cells need it to survive. If your blood flow gets blocked anywhere, it can bring big trouble. One serious effect is a problem called a transient ischemic attack, or TIA for short. When you have a TIA, the flow of blood to part of your brain gets cut off for a short time. It's also called a ministroke. A TIA can be a sign that a full-blown stroke is on the way. About 1 in 3 people who have a TIA go on to have a stroke, often within a year. TIAs are short and won't cause lasting damage, but it's still important to treat them like an emergency and get care right away. The main difference is that a TIA only lasts a few minutes. The clot then gets pushed along, like a temporary clog in a pipe, or chemicals in your body quickly break it down. Normal blood flow returns to your brain before any lasting problems set in. Symptoms can last for up to 24 hours, but they're usually gone in an hour. Strokes, on the other hand, don't go away so quickly. That means some part of your brain goes without oxygen, and the longer that lasts, the more damage happens. While a TIA comes on, goes away, and leaves no symptoms, a stroke can have long-lasting effects and can be life-threatening.

2. Related Work

Nowadays, health care industries are providing several benefits like fraud detection in health insurance, availability of medical facilities to patients at inexpensive prices, identification of smarter treatment methodologies, construction of effective health-care policies, effective hospital resource management, better customer relation, improved patient care and hospital infection control. Stroke type detection is also one of the significant areas of research in medical. There is no automation for Stroke disease prediction.

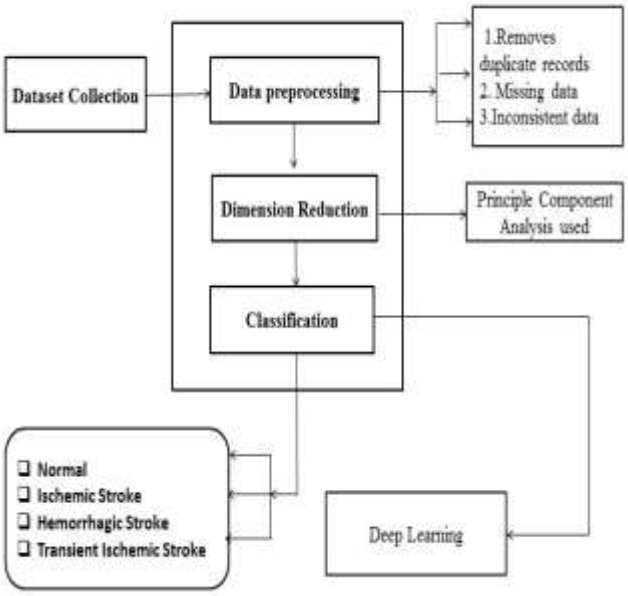
Limitations of Existing System

- Manual Approach, requires more experience
- Requires Medical Equipments
- More Expensive
- Lack of user satisfaction
- Less Efficient
- Less Accurate

3. Proposed System

Most investigations performed on the robotized analysis of stroke and its subtypes were on the picture preparing methods and CT scan and MRI. An artificial neural system gives a general method for moving toward issues. To predict the stroke infection, it receives order calculation neural system. An Artificial neural system based expectation of stroke illness enhances the analytic exactness with higher consistency. Proposed system is an automation for stoke prediction using machine learning or AI techniques.

Fig 1: Architecture



A. Data Collection

The data collected from the medical college institute. The dataset consist of 1500 samples of which 1000 are male and 500 are females.it also includes 30 features which contain, it includes patient history, hospital details, risk factors and symptoms.

Risk factors include Age, Gender, Blood Pressure, Chest Pain, Alcohol, Diabetes, Headache Cigarettes, Family History, Hypertension, Cholesterols, Heart Rate, Face Deficit, Arm/Hand Deficit, Leg/Foot Deficit, Visuospatial Disorder and blood vessels, etc. Every one of the side effects and hazard factors is examined painstakingly for the expectation of stroke.

B. Data Preprocessing

Data preprocessing is the process of removing the unwanted data and extraction of relevant data for processing. Truly speaking stroke data set is already preprocessed and any ways we applied the following methods to extract the better data-sets.

- **Data cleaning** – to remove noise and irrelevant data.
- **Data integration** – where multiple data sources are combined. Where we used data from kaagle.com, dataworld.com etc.
- **Data selection** – for retrieve from the database only the relevant data to analyze.
- **Data transformation** – where data are transformed or consolidated into forms appropriate for processing. To work with KNN algorithm we need data in numerical formats.

C. Dimension Reduction

To predict stroke disease and types we use 18 parameters, all 18 parameters are relevant for stoke disease prediction. All parameters used for stroke disease prediction. Training data-sets applied to "naive bayes" and "KNN algorithm" and both algorithm compared to identify the most efficient algorithm.

D. Classification Algorithms

We have many algorithms to build model in Classification technique such as KNN, Naive bayes, Decision Tree, ID3, Random Forest, SVM , Regression techniques etc…. Depending of the requirement, labels, parameters and data-set we select the appropriate algorithm for predictions. Algorithm is used to build a model that makes predictions based on evidence in the presence of uncertainty. Since our analysis consist of a predictive model used for the tasks where it involves prediction of one value using other values in the data-set. Classification technique will have predefined labels. It classifies an object based on the parameters to one of the predefined set of labels. In our study we have made use of "naive bayes algorithm and KNN algorithm" which is an efficient and works fine for all different sets of parameters. It also generates accurate results.

KNN Algorithm:

K-nearest neighbors (KNN) algorithm uses 'feature similarity' to predict the values of new datapoints which further means that the new data point will be assigned a value based on how closely it matches the points in the training set.

Nave biase:

Naive Bayes Algorithm is one of the popular classification machine learning algorithms that helps to classify the data based upon the conditional probability values computation. It implements the Bayes theorem for the computation and used class levels represented as feature values or vectors of predictors for classification. This algorithm is a good fit for real-time prediction, multi-class prediction, recommendation system, text classification, and sentiment analysis use cases.

4. CONCLUSION

This survey is a medical sector application which helps the medical practitioners in predicting the stroke disease based on the stroke parameters. It is automation for stroke disease prediction and it identifies the disease, its types and complications from the clinical database in an efficient and an economically faster manner. It is successfully accomplished by applying the classification algorithms. This classification technique comes under data science technology. To enhance the correctness and the execution. We can prepare a larger dataset from medicinal school, which incorporates the history, clinic points of interest, most dangerous components and side effects. After the patient's subtle parameters are entered, it checks

with the model and predicts the kind of stroke and begins estimation on the stroke.

REFERENCES

[1]Duen-Yian Yeh a, Ching-Hsue Cheng b, Yen-Wen Chen b A predictive model for cerebrovascular disease using data mining„Science, Vol. 8970- 8977, 2011.

[2] Cheng-Ding Chang a, Chien-Chih Wang b, Bernard C. Jiang Using data mining techniques for multi-diseases prediction modeling of hypertension and hyperlipidemia by common risk factors Vol 38 ,5507–5513, 2011.

[3] Genetics and Genomics of Stroke Novel Approaches Alison E. Baird, MBBS, PHD Brooklyn, New York Vol. 56, No. 4, 2010.

[4] M. Anbarasi et. al. Enhanced Prediction of Heart Disease with Feature Subset Selection using Genetic Algorithm International Journal of Engineering Science and Technology Vol. 2(10), 5370-5376 ,2010.

[5] ShantakumarB.Patil,Y.S.Kumaraswamy. „Predictive data mining for medical diagnosis of heart disease prediction‟jyoti soni, ujma ansari, dipeshsharma IJCSE Vol .17, 2011 .

[6].https://www.researchgate.net/publication/5880405

[7]Lela Mirtskhulava , Gillian Pearce et alArtificial Neural Network Model in Stroke Diagnosis 2015 17th UKSIM-AMSS International Conference on Modelling and Simulation.

[8] Mirtskhulava Lela, Al-Majeed Salah, Gillian Pearce, Gogoladze Tamar, Ivane Javakhishvili. Blood clotting prediction model using Artificial Neural Networks and Sensor Networks. GESJ: Computer Science and Telecommunications 2014|No.3(43). ISSN 1512-1232. Proceedings of the 2nd International Conference on Inventive Communication and Computational Technologies (ICICCT 2018) IEEE Xplore Compliant - Part Number: CFP18BAC-ART; ISBN:978-1-5386-1974-2 978