

## Analysis and Solutions of Silent Heart Attack Using Python

Bhuvan Sharma<sup>1\*</sup>, Spinder Kaur<sup>2</sup>

<sup>1</sup>BTech, CSE, Chandigarh University, Punjab, India

<sup>2</sup>Assistant professor, Chandigarh University, Punjab, India

\*Corresponding Author: bhuvansharma0908@gmail.com

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**Abstract** - We live in the twenty-first century, which is full of computers and electrical technologies that make human existence simpler. Artificial intelligence and machine learning are crucial in making life simpler for humans. In contrast, several ailments have evolved as a result of making life simpler, one of which is silent heart attack. Although there are medical treatments for this condition, there are only a few approaches that can forecast the silent heart. We can create models that can predict and detect heart attacks using artificial intelligence and machine learning. Some analysis has been done in this research while working on the road of predicting and detecting heart disease. Artificial neural network techniques are applied. Age, sex, cholesterol are some of the parameters that are set to predict silent heart attack.

**Keyword**- predict, silent heart attack, analyze.

### I. INTRODUCTION

A silent heart attack is defined as a heart attack with few, if any, symptoms or indicators that aren't recognised as heart attack symptoms. You may not feel any chest pain or shortness of breath, which are frequent heart attack signs [1]. It's similar to any other heart attack in that blood supply to a region of the heart is briefly restricted, resulting in scarring and damage to the heart muscle[2]. Your heart need oxygen-rich blood to operate properly. If plaque (a compound made up of fat, cholesterol, and other chemicals) forms in the arteries that deliver blood to the heart, blood flow can be reduced or stopped entirely[3]. The majority of people who have a silent heart attack have no noticeable symptoms. If there are symptoms, they may be overlooked or mistaken for something else, such as heartburn.

This is especially true among younger people who do not believe they are at risk of having a heart attack[4]. Diabetes, age, high cholesterol, and increased blood pressure are just a few of the factors that contribute to a silent heart attack[5]. There are also other issues .

In figure 1 there are the top most countries which are having the highest death rate among other countries. we can clearly visualize that the death rate of Turkmenistan is highest.

It is estimated that 18million people had died from Cardiovascular disease in 2019, that is 32% of all global deaths out of which 84.9% were due to heart attack and stroke. Centres of disease control and prevention has stated that, approximately every 40 seconds an American will have a heart attack. Every year, 80500 Americans will have a heart attack.

Aside from the introduction we categorize our paper into subsections such as : Section 2 represents the literature survey . Section 3 will discuss the problems and major results in the field of the heart attack using python . After analyzing the dataset we find some solutions which mention in the literature survey Section 4 Section 5 will be the conclusion.

### II. LITERATURE SURVEY

In this section we found so much literature on heart diseases but there are very few researchers who work on silent heart attack using machine learning and artificial intelligence G. Aditi , in this paper they are using machine learning techniques using different parameters [6]. S.Rachana R, in this paper analyzes Machine learning methods based on the proportion of different performance metrics (such as, Accuracy, Precision and Recall)[7]. R Paul M. ,In this article, promising markers of cardiovascular risk are evaluated using the following criteria: Total plasma homocysteine, fibrinolytic ability, fibrinogen, and high-sensitivity lipoprotein(a) C-reactive protein is a type of anti-inflammatory protein[8]. A.

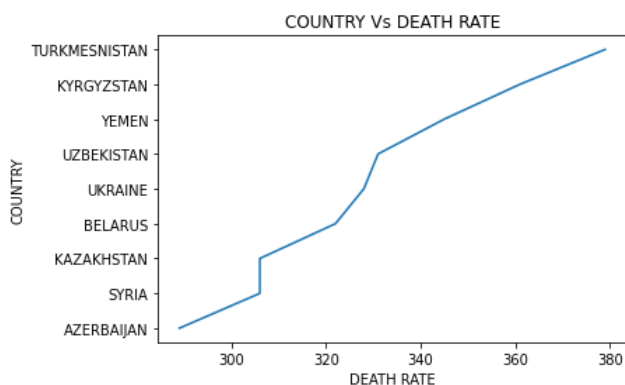


Figure 1 . Growth of heart attack in countries

Mehrdad , in this paper predicted Heart Attack Through explainable artificial Intelligence[9]. T. Chandrasegar , in this article information gathering is used to predict the likelihood of a patient having a heart attack[10]. K. Srinivas , in this paper the study analyzes after controlling for other risks, the Behavioral Risk Factor Surveillance System survey was conducted to see if self-reported cardiovascular disease rates are greater in Singareni coal mining regions in Andhra Pradesh state, India, than in other locations[11] . O. Thankgod , In this paper implement a machine learning based system that can detect and predict heart diseases in patients using the medical records of patients[12] . T. Bach Xuan , in this paper intends to present a comprehensive picture of global trends and developments in AI applications relevant to stroke and heart disease, as well as identify research gaps and advise future research and policy-making approaches[13] . A . Nimai Chand Das , In this paper we examined the various prescribed data of patients from various locations of India. We constructed a model using this data that is trained on this data and tries to predict if a fresh out-of-sample data has a chance of having a heart attack or not[14] . Milos Hauskrecht In this paper, we illustrate how the POMDP framework can be used to model and solve the problem of managing patients with ischemic heart disease (IHD), as well as the modelling benefits of the framework over traditional decision formalisms [15].

**III. RESULTS AND DISCUSSION**

In this section we are analysing the different questions based on the dataset available on Kaggle. There are some common factors which we analyse from the literature and do the work (Lack of exercise, high BP, High cholesterol , family history of heart disease). Dataset is first refined. This section is divided into some categories: Researcher work from countries , year wise , contributing journal , Parameter silent heart attack.

**3.1 Contribution in Healthcare using Computing techniques**

In today’s world computers are playing a vital role in each and every sector . Similarly, computers has made tremendous growth in the field of medical . Nowadays computers are used from patient beds to operating rooms . With the help of computers some researchers from the different countries are researching silent heart attacks over the years some of the data is shown in figures given below. Figure 2 shows the research by years classification graph.

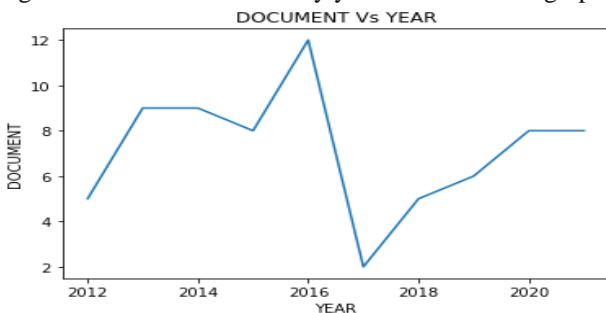


Figure 2 : Documents per year

Through the literature survey we analyze that the author of USA and UK are collaborating with many countries in figure 3

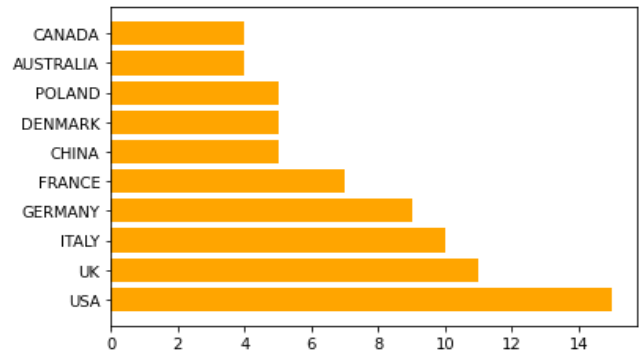


Figure 3. Country wise contribution

We also analyze which journal is publishing the most relevant and high quality of papers . Top quality journals are taken and their graph is shown below

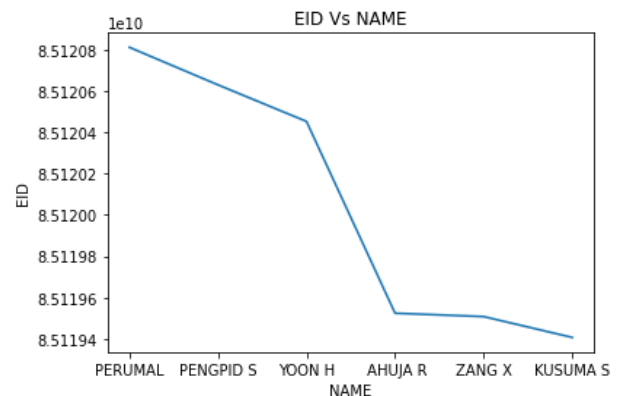


Figure 4 : Some Top most journals

Eid is the electronic identification. It is sorted to the quality of papers. More the value of Eid more the quality of paper. In the graph shown above we can clearly visualize Author Perumal has published the most relevant high quality journal.

**3.2 What are the major parameters that lead to Silent heart attack?**

If your cholesterol is high, fatty acid starts developing in your blood carrying arteries. At last, these deposits make it difficult for arteries to flow enough blood to the body through them. Sudden breakage of these deposits can be the reason of heart stroke and silent heart attack. By using matplotlib library of python we have visualised the death rate of peoples due to their high cholesterol with respect to their age. In Figure 2, You can see the age of 67 is at peak for being a high level cholesterol from our dataset .Womens are seen at higher risk of having a heart attack then in men.It is seen that , from men 50% of women dies in first year of first heart attack. . In the first 6 years after a heart attack, women are almost twice to have a second heart attack shown in Figure 3. By using matplotlib library of

python we have visualised the death rate of men and women with respect to their age

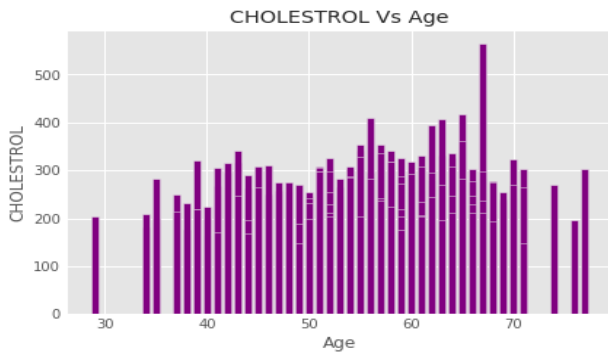


Figure 2. Silent Heart attack due to cholesterol

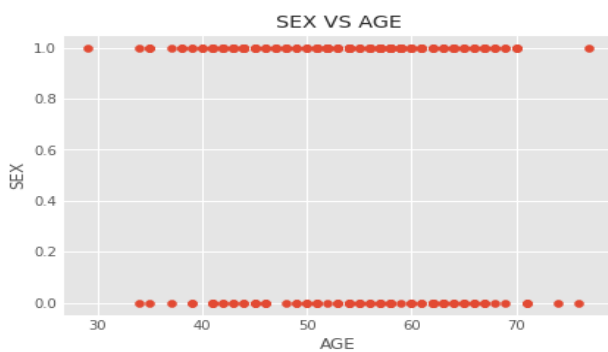


Figure 3. Gender wise Attacks

Due to high blood pressure it becomes more difficult for our heart to pump blood in all parts of our body . Due to this the left ventricle of our heart becomes thicker. Due to a thickened left ventricle risk of heart attack increases , heart failure and sudden cardiac death. Heart failure. By using matplotlib library of python we have visualised the death rate of peoples due to their high blood pressure with respect to their age. In Figure 4 you can clearly visualize at age of 55 the blood pressure is at its peak hence most of the people dies at age of 55 due to high blood pressure.

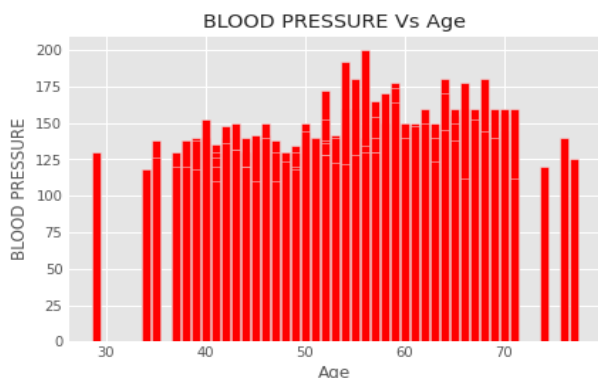


Figure 4. Silent heart attack due to Blood Pressure

#### IV. SOLUTIONS

There are so many solutions but as it is regarding health so we need to work on many parameters.

**4.1 Machine learning and Artificial Intelligence:** Some of the parameters are supervised machine learning classifier , neural network etc. As one of the parameters is used by G. Suraj Kumar, S. Aditya, S. P. Upadhyay, C. Pawan Kumar”[16]. This research have various Supervised ML classifiers like , decision tree and gradient boosting , random forest and logistic regression that are used to make a model for myocardial infarction prediction. In this way i am analyzing the datasets according to the various parameter like age, sex, blood pressure and high cholesterol . Matplotlib , Pandas , Numpy are the libraries used to analyze the dataset of silent heart attack.

Table 1.

TYPES OF NEURAL NETWORK	TECHNIQUES USED	BEST TO USE IN
ARTIFICIAL NEURAL NETWORK(ANN)	Linear function, non linear function , sigmoid curve , hyperbolic tangent.	1.Any table dataset which has rows and columns formatted in CSV. 2.Classification and Regression issues with the input of real values. 3. Any model with the highest flexibility, like that of ANNS.
CONVOLUTION NEURAL NETWORK(CNN)	Convolution , Max polling , flattening , full connection.	1.Image datasets containing OCR document analysis. 2.Any two-dimensional input data which can be further transformed to one-dimensional for quicker analysis. 3. The model needs to be involved in its architecture to yield output.
RECURRENT NEURAL NETWORK(RNN)	LSTM , Gated RNN	1.One to One: A single input connected to a single output, like Image classification. 2. One to many: A single input linked to output sequences, like Image captioning that includes several words from a single image. 3.Many to One: Series of inputs generating single output, like Sentiment Analysis. 4. Many to many: Series of inputs yielding series of outputs, like video classification. It is also widely used in language translation, conversation modeling, and more.

#### V. CONCLUSION

Silent heart attack is one of the major cause of world wide death of human beings and cases of humans deaths due to silent heart attack are increasing day by day . In silent heart attack there is lack of blood flow to the heart and this occurs without pain even if the heart is associated with arteries. The result of this is , the heart attack often goes unnoticed, and a person cannot have immediate help. In this paper , we are analyzing the different parameters . We will use matplotlib , pandas and numpy to analyze the provided datasets on silent heart attack. In the future we will make and train a model using artificial intelligence and machine learning which can detect the symptoms of heart attack and can save the lives of people.

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