ANALYSIS ON SLEEP APNEA DURING THEIR TEENAGE

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ABSTRACT

The fitness tracker data for human activity recognition are playing an important role in improving health and monitoring the daily movements of human such as health care and fitness. This detects human activities such as step count, sleeps rate, calories burned, mood for the data collected by the activity tracker device and mainly helps in identifying the Apnea-Hypopnea Index (AHI) which is caused due to Obstructive Sleep Apnea. To overcome these problems, Homomorphic Encryption techniques are proposed, which is used for privacy preserving out-sourced storage and computation. The encrypted technique helps in protecting sensitive data from outsourced. Decryption of the medical data and analysis performed on the encrypted data.

Key words: Sleep Apnea, Homomorphic Techniques, Encryption, Decryption

I.   INTRODUCTION

The major intention of this document is to known about the teenage peoples are having sleep apnea or not by using the daily movements of human such as health care & fitness and find out the level of Apnea Hypopnea Index by applying the Encrypted Homomorphic Techniques: They are Gorti's Enhanced Encryption Scheme and Carmichael's Encryption Scheme. The both Encryption Schemes are called Algorithm. And it also applies for the encrypt the given dataset because, it is a medical dataset. These records are very sensitive for many external threats that affect its security and privacy. The privacy and security of the data shared across the medical field is very difficult to maintain so these encrypted algorithms are helps in protecting sensitive data from outsourced. The analysis is made on the encrypted data by computing the AHI to predict the disease for teenage peoples based on the range given in AHI. The performance of encrypted algorithms is measured based on the time taken for encryption decryption of the medical data.

II.   OBJECTIVE

Sleep Apnea is a usual disease characterized by cessation of breathing during sleep that can last seconds or minutes. Data for human activity recognition are playing an important role in improving health and monitoring the daily movements of human such as health care. The objective is to foreknow and estimate the value of AHI level for teenage peoples, as it is medical data the security of the data is carry on. Gorti's Enhanced Encryption Scheme and Carmichael's Encryption Scheme. The both Encryption Schemes are called Algorithm. And it also applies for the encrypty the given dataset because, the given data's are medical dataset it contains five thousand records and nine attributes such as I'D, Hours of sleep, Age, Weight(kg), Height(feet), Gender, Total hypopnea events, Total apnea events & Calories. The analysis is made on the encrypted data by computing the AHI to predict the disease for teenage peoples based on the range given in AHI. The performance of encrypted algorithms is measured based on the time taken for encryption decryption of the medical data. Finally, the data wrapper web tool is using for visualization

process. The AHI stages are survey by comparing the age, gender and level of AHI, where the results and effects are judged.

III. RELATED WORKS

Sleep apnea is a serious public health problem. The National Heart, Lung, and Blood Institute (NHLBI, Bethesda, MD) estimates the prevalence rate of sleep apnea at approximately 6.62% or 18 million Americans at any given time. In the US and Europe, approximately 75% of individuals seen in disorder clinics have OSA [3]. The apnea syndrome (SAS) may be a respiratory disease suffered by people that stop breathing during their sleep. The number of apneic events per hour so as to diagnose the syndrome is age dependent [9].

Sleep Apnea is a sleep disease characterized by cessation of breathing during sleep that can last seconds or minutes. In addition, sleep apnea is considered an important factor for morbidity and mortality due to its direct effect on the cardiovascular system. These effects are related to physiological functions like systemic hypertension and increased sympathetic activity that compromise the guts [1].

Sleep apnea is classified into two types. The first type is Obstructive Sleep Apnea (OSA), which is generally caused by a collapse of the upper respiratory airway. The other is Central apnea (CSA), which is caused by inhibited respiratory drive, since the brain fails to appropriately control breathing during sleep. Out of the two sleep apnea types, OSA is more common than CSA [8]. The symptoms associated to apnea are fatigue, daytime sleepiness, low reaction and visual problems. Entire population regardless of gender, age or race can be affected by sleep apnea [5].

The apnea hypopnea index (AHI), a count of the amount of apneas and hypopneas per hour of sleep, is that the key measure used for case identification, for quantifying disease severity, and for outlining disease prevalence in normal and clinical populations [2]. The Apnea Hypopnea Index (AHI) is taken into account to be the foremost relevant metric to diagnose the existence and severity of the disorder, indicating the amount of apnea events per hour of sleep. This disorder is significantly prevalent with a worldwide estimation of 200 million people [10].

The homomorphic encryption may be a special quite encryption mechanism which will resolve the safety and privacy issues. Unlike the general public key encryption, which has three security procedures, i.e., key generation, encryption and decryption. In homomorphic encryption, if the user wants to question some information on the cloud server, he first encrypts the info and stores the encrypted data within the cloud [6].

Homomorphic encryption systems are capable of performing operations on encrypted data without knowing the secret key. The result obtained is that the same as if we performed these operations on the data [4]. Homomorphic encryption schemes that allow simple computations on encrypted data are known for an extended time [7]

IV. METHODOLOGY

The most used and important process are

A. Gorti's Algorithm

This algorithm is used for encrypt and decrypt the dataset and find the AHI level of the teenage peoples. Enhanced Homomorphic Cryptosystem (EHC) for Homomorphic Encryption / Decryption with IND-CCA secure. The computer will perform the computation on the encrypted data, hence without knowing anything of its real value. Decrypted result must be adequate to the intended computed value if performed on the important data. Gorti's is the faster and simple method for analysing the medical dataset. This algorithm is use to identify the AHI level of the teenage peoples in few minutes

B. Carmichael Algorithm

This algorithm is also used for encrypt and decrypt the dataset and find the AHI level of the teenage peoples. The algebraic Homomorphic encryption system over the integers, which is based on the Carmichael's theorem. The scheme is probabilistic scheme in which the encryption of the same message depends on some randomized integer and produces the different cipher texts each time encrypted. HE schemes based on the Carmichael's theorem and the cyclic property of the Carmichael's function. The scheme is probabilistic in nature and uses a randomized integer for the encryption function. Carmichael's theorem is shower than the Gorti's algorithm.
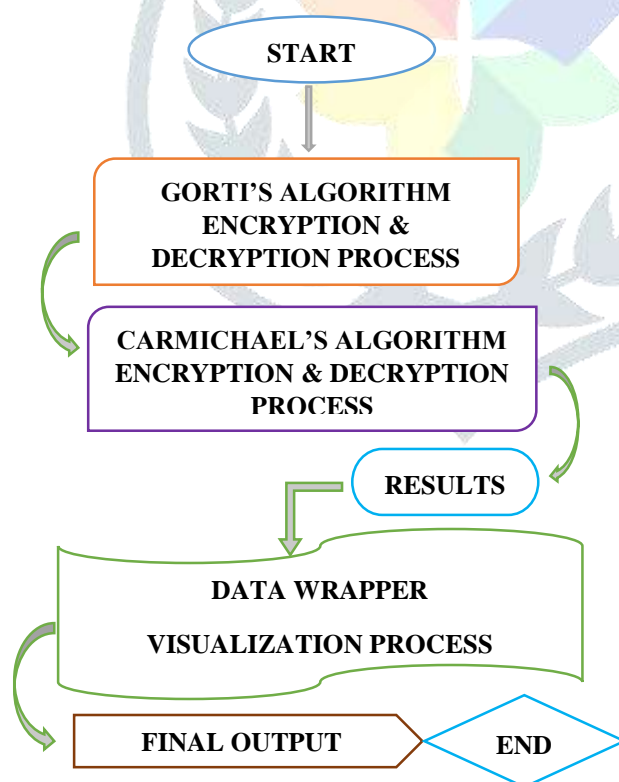
C. Visualisation using Data Wrapper

Visualization is any technique for creating images, diagrams, or animations to communicate a message. Visualization through visual imagery has been an effective way to communicate both abstract and concrete ideas since the dawn of humanity. Visual analytics focuses on human interaction with visualization systems as part of a larger process of data analysis.

There are four basic steps in implementing process:

1. Gorti's Algorithm is used to encryption decryption process and to analysis the AHI level of the sleep apnea patients.
2. Carmichael Algorithm is used to encryption decryption process and to analysis the AHI level of the sleep apnea patients.
3. Compared both algorithms and check the results like encryption and decryption time.
4. Visualization by intra-active graphs and charts in web tool

FLOW CHART OF THE PROCESS

V. RESULTS

Figure 1

In the figure 1, The Gorti's algorithm is performed for encrypt decrypt the medical dataset with the security and find the AHI level of the teenage peoples to calculate the results and effects in few minutes.
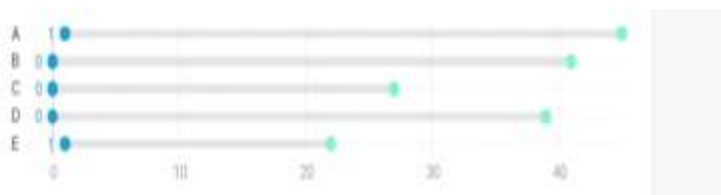

Figure 2

In this figure Gender, Age and Results these attributes are taken for the visualization process in data wrapper tool to display chart diagram and the type of chart used here to represent this is Range plot for Gorti's algorithm.

Figure 3

In this figure is the Carmichael algorithm result and it performed for encrypt decrypt the medical dataset for security propose and this algorithm is used to find the AHI level of the teenage peoples to calculate the results and effects.

Figure 4

In this figure Gender, Age and AHI these attributes are taken for the visualization process in data wrapper tool to display chart diagram and the type of chart used here to represent this is Arrow plot.

VI. CONCLUSION & FUTHER WORK

In this paper, Net Beans IDE 8.2 Java is a tool to analyse the AHI level, Results and Effects found out the effectiveness of the two algorithms. The algorithms have given the same result in both encrypted data and decrypted data. from the two algorithms the Gorti algorithm seems to be a faster one because the execution time taken for it is lesser than that of Carmichael algorithm. Comparing to all the age peoples, teenagers have less possibilities to affect by heart attack / failures. Finally, the data wrapper is a web tool to visualize the chart diagram.

This project can be further developed and we can save many person's life because teenager can be safeguarded by this disorder. Teenagers are affected at a low level and the disorder can be cured. Since the teenager have a good and high level of immunity level they can be treated and the disorder can be cured and the death rate due to sleep apnea can be reduced.

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