DETECTING SLEEP HYPNEA ON PEOPLE ABOVE AGE 50 WITH SECURED HOMOMORPHIC TECHNIQUES

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ABSTRACT

The sleep apnea is a disorder which occurs when breathing is interrupted during sleep. Untreating sleep apnea maylead to hypertension,stroke or heart failure.Hospital medical database security is an important issue when dealing with medical information systems.Homomorphic encryption is a form of cryptographic method that performs on encrypted data without decryption.The scheme compares and detects the time taken for encryption and decryption of the medical records and analysis performance of the data,computing the AHI to predict the people who are above 50 for the identification of sleep apnea.

Key words - Homomorphic techniques,Gorti's,Carmichael's,Analysis time,AHI stages.

I.INTRODUCTION

To detect the sleep apnea, which occurs when breathing is interrupted during sleep.Sleep apnea test, called a polysomnogram (PSG).This is done in a sleep disorder center or even at home or hospital,component tests that electronically sends and records specific physical activities while sleeping,there are stages like very high, high, medium, low and initial stage.The risk factor for sleep apnea are being overweight,over age 40,nasal obstruction or sinus problems, having a family history of sleep apnea.Treatments can includes lifestyle changes,such as losing weight or changing sleep positions,medical devices like CPAP(continuous positive airway pressure)machines or surgery.Several security policy are proposed to maintain the data.Homomorphic encryption is a form of cryptographic method allows to perform on encrypted data without decryption,It is used for privacy preserving outsourced storage.The two homomorphic techniques are Gorti's enhanced scheme and carmichael's enhanced scheme that are used for encryption of medical data,the performance of the algorithm are compared .Sleep apnea syndrome (SAS) is diagnosed by monitoring full night recording which is done even in home, the AHI stages are recorded.The nasal airflow sensor and snore microphone is used to record the human breathe activities and analyzed the results of the people are predicted.

II.OBJECTIVE

The sleep apnea is a common disorder ,where there will be difficulty of breathing during sleep.The objective is to prevision and analyze the AHI level in people who are above age 50,as it is hospital data the security of the data is maintained.Monitoring devices detects human activities such as sleep rate, sleep count, heart rate, airflow, blood oxygen level, breathing patterns that helps in identifying the AHI (apnea hypopnea index).In database, general attributes such as patient ID, gender, age, weight(kg),height(feet),and main attributes like hours of sleep, total hypopnea events, calories.Using secured homomorphic techniques to perform on encrypted data without decryption,the comparision of the scheme acquires the speed and the power performance of two different security scheme.The results of AHI level in person are detected according to the age category and visualized in data wrapper tool.The AHI stages are predicted by comparing the age and level, where the results and effects are analyzed.

` III.RELATED WORK

Sleep apnea, which is a common disorder characterized by the repetitive cessation of breathing during sleep, may result in various diseases, including headaches, hypertension, stroke and asystole.[10]Sleep is a non-uniform

biological state that has been divided into several states based on polysomnographic measurements that include electroencephalogram,electromyogram,electro-oculogram and other signal types.[8]

A traditional diagnosis method of sleep apnea is polysomnography, which can only be conducted in sleep center with specialized personals, expensive and inconvenient. Some other methods or devices have been developed to alleviate sleep apnea, such as continuous positive airway pressure (CPAP) and intra-oral advancement device and surgery.[1]Obstructive apnea or hypopnea causes an interruption or reduction in airflow with continuous breathing effort.[4]

Neural network(NN) as a classifier to identify the diagnostic performance using features. A neural network performs a pattern classification task. NNs classifiers have been proven to be extremely helpful in assisting medical specialties in clinical diagnosis.[2]The results show that the NN is useful as a predictive tool for OSA with a high performance and improved accuracy, which is better than reported techniques in the literature.[5]

The device comprises flow sensors (oral and nasal), real-time analysis hardware and software, and a miniature display unit. A complete cessation of respiration is identified and counted throughout the night. After at least 5 hours of recording, the SleepStripTM score (S-score), which represents the number of respiratory events per hour of recording is computed and displayed.[9]

The "gold standard" for diagnosing SAS may be a full night recording, supported which the apnoea index (AI) or the apnoea/hypopnoea index (AHI) is computed. Normal healthy sleep is sequences of stages that typically cycle every 60–90 min. Depending on the standards, different stages are derived from four basic biological sleep states: Awake, Light Sleep, Deep Sleep, and Rapid-Eye Movement (REM) Sleep.[6]

An effective diagnosis of the sleep apnea syndrome (SAS) is based on a contextual analysis of the patient's polysomnograph, simultaneously recording electrophysiological.[3].SAMOA,a help tools, being an automatic SAS diagnostic system that incorporates both conventional programming and artificial intelligence techniques, the need is urgent for automatic methods based on computer systems to replace traditional manual data analysis procedures so that clinicians can carry out diagnostic and management tasks efficiently and effectively.[7]

IV.METHODOLOGY

FLOWCHART OF WORK PROCESS

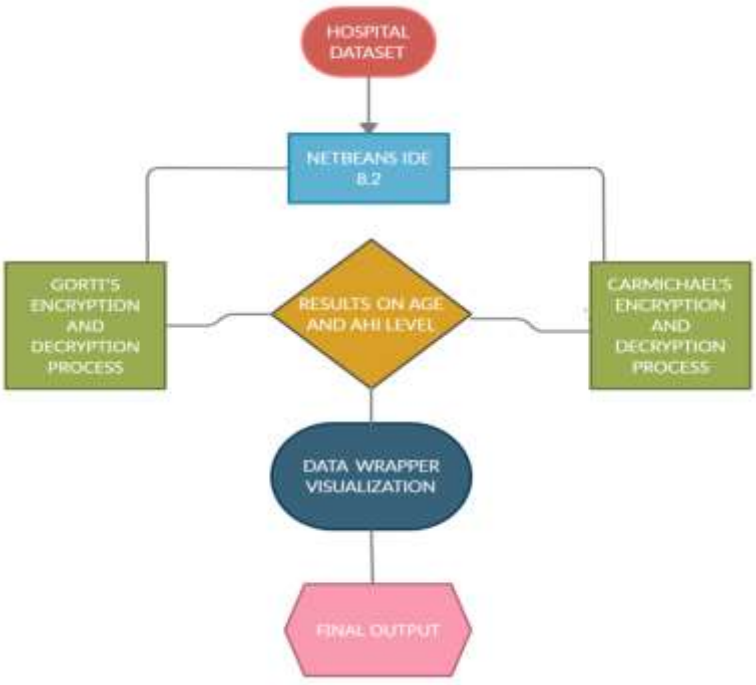

Fig 4.1

A. GORTI'S ENHANCED SCHEME

The Gorti's Enhanced Homomorphic Cryptosystem(ECH) is a encryption scheme that allows to perform on the encrypted data as the operations are performed on the plaintext format,and then the results are fetched that will be decrypted using the gorti's enhanced decryption algorithm. The scheme mainly focuses on addition ,multiplication and mixed operations.The scheme is strong as the secret keys are used which is difficult to find,this scheme is very faster and requires less memory.Gorti's scheme is more secure to perform,increased security due to medical data privacy concerns.

B. CARMICHAEL'S ENHANCED SCHEME

The carmichael's function is vital performing in cryptography system,it's a security performance algorithm,due to its use in the RSA encryption algorithm.The scheme is used for security of the data transmission.The encryption key is the public key and the decryption key is the secret key which is kept private.The key is secretly published by any two prime numbers along with the values.This can be regenerated only by someone who knowns the prime secret key.(fig 4.1)

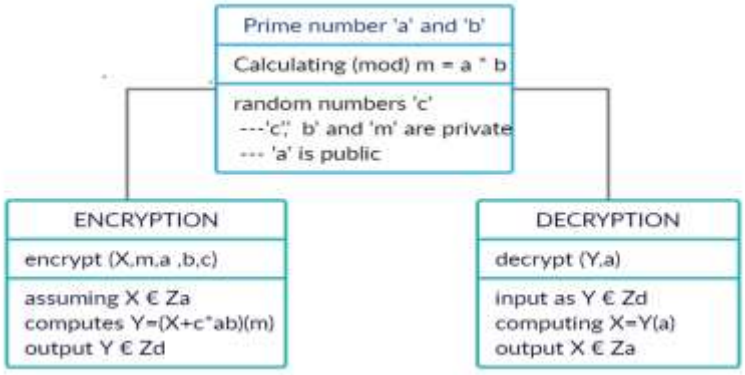

Fig 4.2

C. PERFORMANCE ANALYSIS

The comparison of Gorti's Enhanced Homomorphic Cryptosystem and carmichael's encryption algorithm scheme are performed.The analysis of total encryption and decryption time,the execution run time provides experimental results for the total run time analysis performance.The compared results is the consumption of power, memory and the performance speed of the two algorithm scheme.One of the effective scheme is Gorti's Enhanced Homomorphic Cryptosystem,which is secure and smart operation.

V.RESULT

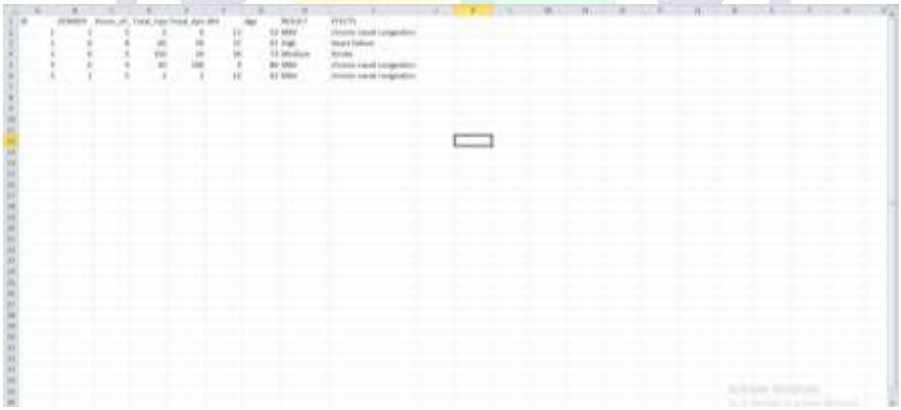

Fig 5.1

In fig 4.1,The Gorti's Enhanced Homomorphic Cryptosystem(ECH) is performed, the common attributes are gender,id and the results according to people age above 50 are assumed by analyzing total sleep rate,hypnea count and hours of sleep, slightly the age above 50 are resulted the AHI level at risk stage,there are people with symptoms like excess weight and snoring, and effects like stroke,chronic nasal congestion.

Fig 5.2

In fig 4.2,The Gorti's Enhanced scheme is visualized in a tool called data wrapper using chart type as grouped bars,the results and severity of the disorder is displayed.The common symptom for above age 50 people are snoring,sleeplessness,stress,often waking up,body position,limb movements.Once the respiratory organ discomforts the breathing process during sleep which results in sleep apnes.The nasal airflow sensor and snore microphone is used to record the human breathe activities.

Fig 5.3

In fig 4.3,The charmichael's Enhanced Homomorphic Cryptosystem is performed,there are stages like very high,high,medium,low and initial stage.Slightly the age above 50 are resulted the AHI at risk stage as their body condition and symptoms are already at high.They may acquire heart failure or mild attacks even death during sleep at anytime as there is a high level of chances.

Fig 5.4

In fig 4.4,The charmichael's Enhanced scheme is visualized in a tool called data wrapper using chart type as dot plot,the results and severity of the disorder is displayed.According to their life style the risk of disorder are ranged,comparing the age,AHI level the results and effects of the above age 50 people are predicted.

VI. CONCLUSION AND FURTHER WORK

In this paper,Netbeans IDE 8.2 Java is used to analyze the two different secured homomorphic techniques.The performance of the scheme are found as the gorti's enhanced scheme performs effectively and results are also predicted.In hospitals the patients are not deeply inspected,they do only normal data collection of the patients.If they analyze exhaustively, the base of heart failure,death while sleeping and stroke is "SLEEP APNEA".There is a 90% of chance for people above age 50 come to have such things like mild heart attack at anytime as there is high level of risk,if the people fail to scrutinize in depth.

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