

# AN ANDROID BASED HEALTH MONITORING SYSTEM USING MACHINE LEARNING

Avinash Palve<sup>1</sup>, Snehal More<sup>2</sup>, Shivani Chaudhari<sup>3</sup>, Akshay Katke<sup>4</sup>, Kartike Kampassi<sup>5</sup>

<sup>1</sup>Professor, Avinash Palve, Dept. of Computer Engineering, TCOER Pune, Maharashtra, India.

<sup>2</sup>Snehal More, Department of Computer Engineering, TCOER, Pune, Maharashtra, India

<sup>3</sup>Shivani Chaudhari, Department of Computer Engineering, TCOER, Pune, Maharashtra, India

<sup>4</sup>Akshay Katke, Department of Computer Engineering, TCOER, Pune, Maharashtra, India

<sup>5</sup>Kartike Kampassi, Department of Computer Engineering, TCOER, Pune, Maharashtra, India

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**Abstract** - Among the many threats to human health Nutrition-related diseases is now emerging as dangerous threat to human health. To maintain healthy lifestyle balancing energy intake and expenditure is crucial step. To monitor the daily food intake of an individual accurately we present the system Android Based Healthcare System Using Machine Learning. To record the acoustic signals during eating high fidelity microphone is used which is to be worn on the person's neck by the help of which an embedded hardware prototype will collect food intake data. Signal collected will preprocessed by the hardware through blue tooth signal will dispatched to Smartphone where food types are recognized. We use hidden Markov models to identify chewing or swallowing events. Developed application on the Smartphone, which aggregates the food intake recognition results and gives suggestions on healthier eating, such as better eating habits or nutrition balance. It will generate notification to the user.

**Key Words:** health, signal, food, Smartphone, acoustic, Bluetooth etc...

## 1. INTRODUCTION

To maintain healthful existence is very important in our day by day life. Daily food intake must be right because abnormalities due to calorie imbalance lead to diseases, such as obesity, anorexia, and other eating disorders. If proper care isn't taken then severe disorders may additionally take vicinity. Currently present solutions to measure calorie expenditure, such as Fit-bit, Philips Direct Life, etc. However, continuously and non-invasive monitoring calorie intake remains a big challenge. Currently present solutions rely on self-reports which is given by user, which are neither convenient nor precise because the food intakes are changing in nature they are versatile and energy amount contained in different food is vary in proportion.. To develop

accurate and easy-to-use solution to monitor the daily food intake and its expenditure endorse Android Based Healthcare System Using Machine Learning.

## 2. LITERATURE SURVEY

In [1] Author has described about Advances in wearable sensor technology continues and plays major role to improve human healthcare provides opportunities and advances that help to balance food intake and energy consumption technology has become part and parcel for human beings. Technology accessibility has now reduced barriers for low power computing and networking. Recent advances in wearable sensor technology helps to monitor environment and movement to detect neck and head injuries. Integration of sensors is done in the system to collect the health related data of user. Integration and interpretation of data plays the major role. Physical and technical flexibility of wearable sensors helps to monitor the behaviour of subject in its environment. The goal is to use advances in wearable sensors, processors and display to study the behaviour of animal and human beings in their neutral environment.

In[2] Author has described about real-world degradation of speech signals taking place due to noise which lowers the system performance in speech recognition systems. Hidden Markov Model is used for reconstruction of speech components which are spectral whose performance is degraded by unwanted acoustic noise. Discrete time random processes form the Markov chain using Markov property. At each step there is discrete state among the number of possible states which are finite in nature. in the frequency domain encoding of speech parameters is done by number of speech analysis technique. Characterization of signal is done precisely. The technique is built on speech recognition system which is distributed in nature. Unreliable

spectrograph data is reconstructed for noise robust speech recognition by Hidden Markov Model.

In [3] Author has described about Currently available systems are lack of and accuracy to monitor the ingestive behaviour in human beings which are very free living. That is the reason behind poor understanding of etiology of overweight as well as obesity. Researches are done which have been shown that the frequency of swallowing can be used to prediction of detecting the food intake. Liquids and solids differentiation can be done and ingested mass can be detected. System proposes two methods and comparison of this methods is done to detect acoustic swallowing from the sounds which are contaminated by speech and noise. Results shows the high efficiency of proposed methodology in separation of swallowing sounds from the artifacts. This artifacts are originate from head movements, noise, food ingestion. Accuracy of the system is not related to body mass index. Which shows this system is suitable to be used by obese individual.

In [4] Author described about obesity research which is a big problem now a days. While increasing the awareness about obesity related diseases in public the epidemics behind the causes is poorly understood. In the ongoing scientific debate etiology of obesity is subject with varying views and strong different opinions. Changes in our diet and lifestyle as well as changes in the physical activity causes the obesity. Strong worded summaries of research made by popular media publications like Time magazine. Controversy issues rise by these summaries of research. This paper concentrate on weight regulation in human beings and its relation with energy consumption equation. Insight of etiology can be understand by energetic of obesity. Techniques are developed to measure components in the energy equation accurately.

In [5] Author described about Vital food intake information of an individual gathered by using on body sensors. To help the weight loss professionals to develop personalize program for client and to inform nutrition information and research of eating behaviours this system is helpful. To maintain balance in food consumption and energy expended in daily life is very important for persons long term health. 700 million is the number of obese people predicted by World Health Organization. Manual methods and automated solutions are used to capture the eating behaviour of an individual. Proposed system have self reporting solutions broad i range using ubiquitous sensors. It simplify the current manual monitoring techniques which are infeasible with current manual reporting techniques. Manual logging is replaced. ADM system supply the self reports. Daily schedule is

maintained for consumption of food.

In [6] Author described about the ingestive behavior using non-invasive monitoring of chewing and swallowing, to study the behavioral patterns for estimation of weight and volumetric food and energy intake this methodology has been developed. By using the bone conduction microphone or sound sensor swallowing is detected in non invasive monitoring. Two fold methodology is used in this system first, sensor based system and second protocol is used to do manual scoring of swallowing and chewing. To maintain the healthy lifestyle maintaining the balance between energy intake and energy expenditure is the key factor. For non-invasive monitoring of mastication and swallowing goal is to develop the sensor hardware and hardware based system need to collect the reliable data from the sensors. For the automatic pattern recognition score of chews and swallows is used as a standard. In this system the high reliability and readability o data is obtained which result into high quality.

In [7] Author described about use of different discriminate qualities of speech feature component for acoustic event detection and speech recognition. Using AdaBoost approach from the large feature pool the discriminate feature can be extracted. Data driven methods use this extracted feature set. Non speech sounds can be detected this helps to improve speech recognition performance. In proposed system Ada Boost based algorithm used to select the feature set from large features. In acoustic event detection the research interest is growing rapidly. Though the speech is main source the other sounds may also carry the useful information. Acoustic events may occur in many variety. So the detection of acoustic events help to describe social and human activity in their environment.

In [8] Author described about automatically assign the predefined categories to the free text documents, text categorization is the main problem. Without indexing document retrieval from the number of documents which are online available is quite difficult. Solution to this problem is document categorization. Machine learning techniques which are new and improved in nature are applied to text categorization. Feature space contain the unique words and phrases in the documents. For reduction for text categorization purpose. Feature space selection may easy the text categorization in applications like neural networks

### 3. SYSTEM DESIGN

Android based health monitoring system is mainly composed of two components: An embedded unit section for acoustic data gathering, retrieval and per-processing, and

smart-phone section run the application to give notification to the user for healthier eating suggestions. These suggestions are based on the calorie consumption by the user. Embedded unit section interact with the smart-phone section via Bluetooth connectivity.

#### 4. CONCLUSION

Android based health monitoring system is mainly composed of two components: an embedded unit section for acoustic data gathering, retrieval and per-processing, and Smartphone section run the application to give notification to the user for healthier eating suggestions. These suggestions are based on the calorie consumption by the user. Embedded unit section interacts with the Smartphone section via Bluetooth connectivity.

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