

Survey on Smart Health Monitoring Device

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Abstract- *Pertussis is a contagious respiratory disease which mainly affects young children and can be fatal if untreated. The world wellbeing association gauges 16 million pertussis cases every year overall coming about in more than 200000 passings. It is pervasive for the most part in creating nations where it is hard to analyze because of the absence of social insurance offices and clinical experts. Thus a minimal effort fast and effectively open is expected to give pertussis in such zones to contain a flare-up. So we use Cough monitoring system for people suffering from, pertussis, chronic obstructive pulmonary disease (COPD) since cough is associated with an increased risk of frequent exacerbations and hospitalizations*

Keywords- Internet of Things, Thing speak Cloud, Microcontroller, Heart rate sensor, flow Sensor, Sound sensor ,GSM.

I. INTRODUCTION

A common cause of coughing in young children is asthma. Typically, asthmatic coughing involves wheezing, easy to identify. Asthma intensifications ought to get treatment utilizing an inhaler . It is possible for children to grow out of asthma has they get older. Most cough will clear up, or at least significantly improve, within 2 weeks. If a cough that has not improved right now time see a specialist has it might be a manifestation of more serious problem. Coughing up blood or having difficulty in breathing requires immediate emergencies in medical attention. A rise in technological advancement has made it possible for a variety of wearable accessories that can monitor human activity. An ascent in mechanical headway has made it feasible for an assortment of wearable extras that can screen human movement this ascent has likewise made enthusiasm for the advancement of innovation for human use. There are numerous open doors for wearable advances to be utilized in the clinical business since regularly it is hard for specialists to precisely follow a patient's recuperation. For example, For instance diagnosing the seriousness of coughing has been dependent on emotional strategies which comprise of the patient's view of the manifestations utilizing cough visual simple scores patient's journals and surveys. Numerous experts have embraced non pharmacological mediations to help patients experiencing headstrong incessant cough. This is additionally somewhat in light of the fact that numerous

meddling cough prescriptions in the market are not viable and they contain dynamic anti-toxins and fixings which have no impact on cough manifestations. This is also partly because many intrusive cough medications in the market are not effective, and they contain active antibiotics and ingredients which have no effect on cough symptoms. Non-pharmacological treatments consist of therapy, education, counseling and cough suppression techniques. Numerous articles point to the way that non pharmacological intercessions can help in improving the patient's personal satisfaction just as essentially diminishing hack reflex affectability.

Anyway there is no solid proof investigation or survey on the viability of these medications people are the main patients who endure with troubles treating coughing side effects. The medication business has enthusiasm for using mechanical headways to advance their remedial strategies the usage of a cough checking gadget is popular. The implementation of a cough monitoring device is in high demand. There are currently no methods for veterinarians to accurately analyse the effectiveness. The motivation behind this venture was to make a gadget that naturally identifies coughing in patients and decides how much of the time the patient is coughing in a given timeframe. The device needed to be portable, durable, and small enough in size to comfortably. After receiving medical or pharmaceutical treatment for coughing symptoms, it is intended that the harness for a form. Because coughing is a common symptom among many ailments, this device has many applications. There are different types of coughing which are caused by a variety of medical reasons, including sore throat, foreign body object, pulmonary problems, heart disease, and tracheal collapse. Another medical condition which causes coughing is a sore throat. A sore throat may indicate a mouth infection, sinus infection, or foreign body stuck in the throat. Pulmonary problems may also induce coughing. These symptoms originate from the lower airway or lungs and are often caused by pneumonia. The cough is caused by fluid buildup in lungs, which induces a cough described as wet and phlegmy. Illnesses with this symptomatic cough needs immediate medical attention. Coughing may also signify heart disease. This particular cough occurs when the patients is lying down or asleep because it is caused by fluids building up around the lungs since the heart is not pumping properly.

Coughing may also be an indicator of Tracheal Collapse. This chronic, progressive, and irreversible disease is most common among patients, who are obese. The disease occurs in the trachea which keeps airways open allowing patients to breathe, move, and cough. When the C-shaped cartilage rings become flat, it causes the upper roof of the trachea to stretch and eventually collapse. The symptoms include a dry cough described as a “goose honking” cough, coughing when being picked up, difficulty breathing, wheezing sound when inhaling, intolerance to exercise, and fainting. Diagnosing this disease may include chest x-rays to help rule out other diseases. However, since the collapse may not always be visible, often other methods of diagnosing collapse are required. Such methods include fluoroscopy to help determine the trachea condition and size during the patients’ breathing cycle. Furthermore, endoscopy can be used to view the inside of the trachea using a fiber optic camera. This fiber optic camera gives a detailed view of the inside of the airway, and enables samples of the fluid to be taken. An echocardiogram may also be used to ultrasound of the heart. This provides insight on the cardiac function. Once a tracheal collapse is diagnosed, there are a variety of treatment options. This chronic, progressive, and irreversible disease is most common among patients, who are obese. The disease occurs in the trachea which keeps airways open allowing patients to breathe, move, and cough.

II. LITERATURE REVIEW

In literature survey, We learned a mechanism of defense for human body which protects airways from foreign substance. We analyze several literature surveys where the information was detected and the drawbacks which are occurred during the survey are totally changed and the accomplished into a new technology based idea. We surveyed many ideas which were previously pre alarmed technology that were only based on cough detection algorithm. We produce an high efficient and high accuracy gadget which are in high technology generation..

1. A Cough based calculation for programmed, analysis of pertussis [8] :

Pertussis is a contagious respiratory disease which mainly affects young children and can be fatal if left untreated. The World Health Organization gauges 16 million pertussis cases every year overall coming about in more than 200,000 passings . It is common essentially in creating nations where it is hard to analyze because of the absence of human services offices and clinical experts. It is pervasive for the most part in creating nations where it is hard to analyze because of the absence of social insurance offices and clinical experts. Thus a

minimal effort fast and effectively open is expected to give pertussis in such zones to contain a flare-up. So we use Cough monitoring system for people suffering from, pertussis, chronic obstructive pulmonary disease (COPD) since cough is associated with an increased risk of frequent exacerbations and hospitalizations. The algorithm consists of three main blocks to perform automatic cough detection, cough classification and whooping sound detection. Every one of these concentrate applicable highlights from the sound flag and therefore order them utilizing a calculated relapse model the yield from these squares is gathered to give a pertussis probability finding regression model. The output from these blocks is collated to provide a pertussis likelihood diagnosis. The exhibition of the proposed calculation is assessed utilizing sound accounts from 38 patients the calculation can analyze all pertussis effectively from all sound chronicles with no bogus conclusion. It can likewise consequently recognize singular hack sounds with 92% precision and ppv of 97%. The low multifaceted nature of the proposed calculation combined with its high precision shows that it very well may be promptly conveyed utilizing cell phones and can be amazingly helpful for speedy ID or early screening of pertussis and for contamination flare-ups .Pertussis, also called whooping cough, is a contagious respiratory disease caused by *Bordetella pertussis* bacteria in lungs and airways. Its early symptoms include persistent dry coughs that progress into intense spells of coughing. This is generally yet not generally followed by a challenging sound because of the patient panting for air it primarily influences newborn children and little youngsters and can be deadly whenever left untreated. It mainly affects infants and young children and can be fatal if left untreated. The latest World Health Organization official report on the disease (2008) estimated 16million cases of pertussis annually worldwide resulting in approximately 200,000 deaths. Estimations from Public Health Agency of Canada report an even higher prevalence with up to 40million cases each year resulting in 400,000 deaths. Further about 95% of the pertussis cases have happened in creating nations where pertussis is viewed as significant reason for newborn child passings. A prepared specialist can affirm pertussis conclusion in for the most part unvaccinated cases by tuning in to the hack sounds and getting some information about different indications the highest quality level anyway is a culture test performed by gathering nasopharyngeal examples. Option in contrast to this are the polymerase chain response pcr test and blood investigation with serology anyway all these research facility tests are costly tedious and may not be accessible especially in rustic territories and creating nation. This can hinder effective and timely treatment of patients and risks worsening their condition as well as further spreading of the infection to others. An ease speedy and effectively open arrangement is

expected to give pertussis determination to individuals in creating countries where its predominance and death rate because of pertussis is most noteworthy. Such a framework should be completely robotized easy to understand and exceptionally precise so that there are no obstructions to its reception and sending with the cell phone utilization consistently ascending in creating nations.

2. An Automated And Unobtrusive System For Cough Detection[1]:

Cough monitoring is useful for people suffering from chronic obstructive pulmonary disease (COPD) since cough is associated with an increased risk of frequent exacerbations and hospitalizations. Differently from what exists in the literature, this paper presents an automated cough detector that can be used for long term and remote monitoring. A dataset of sound traces collected in COPD patients' home was used to test the performance of different machine learning approaches. Sounds were recorded for 90 days and they contain cough events or environmental noises with the last being the larger proportion. This suggests us to consider supervised methods that can deal with class imbalance learning. The data allow also to investigate the possibility to distinguish between patient coughs and coughs coming from other people in the same environment. The results, presented using a stratified leave one-subject out cross validation, are promising since the area under the Receiver Operating Characteristic Chronic obstructive pulmonary disease (COPD) is a progressive respiratory disease characterized by chronic inflammation of the lung airways which results in airflow limitation. COPD is ranked within the top three causes of mortality and is a global health problem because of its increasing incidence and associated socio-economic costs. Patients with COPD as often as possible gripe of hack that in turns is related with an expanded danger of incessant intensifications and hospitalizations. Because frequent COPD exacerbations are associated with a high mortality and heavy use of healthcare resources, COPD patients with chronic cough may represent a target population for whom specific cough monitoring strategies should be developed. Cough examination is regularly performed by means of survey or manual hack tallying however the requirement for long haul and the expanding number of COPD patients have inspired the ongoing endeavors coordinated towards new methodologies for programmed cough investigation. Existing approaches usually use wearable devices such as inertial sensors or contact microphones in conjunction with audio snippet processing. Mechanized cough location is as yet an open issues increment institutionalized technique ready to screen the cough in an exact inconspicuous programmed and constant.

Indeed, the previous works either rely on manual intervention or have been developed for short term monitoring. This manuscript investigates the use of a remote microphone in conjunction with machine learning algorithms to automatically detect cough events for long term monitoring in the patient's home, also when the COPD patient shares the house with a partner

3. Effect Of Importance Sampling On Robust Segmentation Of Audio Cough Events In Noisy Environment [9]:

This paper proposes a new cough detection system based on audio signals acquired from conventional smartphones. The framework depends on nearby hu minutes to describe hack occasions and a k nn classifier to recognize hack occasions from non hackones discourse snicker wheeze and so forth and loud sounds. To manage the unbalance between classes we utilize particular borderline2 engineered minority oversampling strategy and a bespoke cost lattice. The framework moreover includes a post preparing module to keep away from segregated bogus negatives and along these lines builds affectability. Assessment has been completed utilizing a database containing an assortment of cough and non cough occasions and various sorts of foundation clamor. In this study, we specifically focused on noise likely to appear when the user is carrying the smartphone in daily activities. Different Signal to Noise Ratio values were tested ranging between -15 and 0 dB. Our experiments confirm that local Hu moments are suitable not only for characterizing cough events but also for coping with noisy environments. Results show a sensitivity of 94.17% and a specificity of 92.16% at -15 dB. In this manner our framework shows potential as a solid and spot universal checking gadget that enables patients self to deal with their own respiratory maladies and maintains a strategic distance from unreported or created side effects.

Cough is a mechanism of defense of the human body which protects airways from debris, especially mucus, and foreign material Cough can be considered as "a constrained expulsive move or moves against a shut glottis that are related with a trademark sound or sounds". This symptom is connected to many respiratory illnesses such as pneumonia, asthma or laryngitis, and some other generic pathologies (cold, flu, allergies, etc.). In addition, cough can be associated to the patients' lifestyle (smokers, sedentary people, etc.). Treatment of conditions related to cough constitutes an important burden for national health systems and economies (e.g. \$40 billion per annum in the USA from direct and indirect costs of the common cold). Until recently, the lack of golden- methods to objectively assess cough has limited its study to the use of subjective measurement tools like cough diaries or questionnaires. On the basis on the above, international

institutions and governments have promoted the potential of telemedicine in the management of respiratory conditions. Current cough screens depend on design acknowledgment motors dependent on highlights removed from cough sounds and other biomedical signs chest development electrocardiogram and so on. Previous proposals have achieved fair performance figures both in terms of sensitivity and specificity. For instance, the Life shirt system offered a sensitivity of 78.2% in laboratory conditions whereas the Leicester Cough Monitor reported a sensitivity of 85.7% in a study with 26 subjects. The Hull Automated Count Counter achieved a sensitivity of 80% in a group of 33 patients. Specificity results in these studies were generally around 90%. Despite these systems are expensive (ad-hoc design and manufacturing) and uncomfortable (non-wearable during daily activity). To overcome these limitations, tele-health is currently moving towards more generic readily available sensors. The ongoing advances in cell phone and watch innovation moreover permit utilizing these day by day use gadgets as astute hack checking frameworks since they highlight various inserted sensors ready to gauge hack sounds and related development. Moreover, the computational capability of these devices is growing while, at the same time, they feature real-time connectivity to offload complex operations to higher performance computing systems. In this paper, we propose an automatic cough detection system based on audio signals acquired from conventional smartphones. The system is able to detect cough events with high sensitivity and specificity in a noisy environment, i.e. the signals are recorded while the smartphone is inside the pocket of trousers, shirts or coats. To evaluate our proposal, we have synthesized a database comprising a variety of cough and non-cough (speech, laugh, sneeze, etc.) events and different types of background noise. In this study, we specifically focused on noise likely to appear when the user is carrying the smartphone in daily activities. Signal to Noise Ratio (SNR) values ranging between -15 and 0 dB were tested. The final system relies on local Hu moments as a feature feeding a k-NN classifier. Hu moments were recently imported from the field of image processing to speech emotion recognition. Our results confirm that local Hu moments allow the segmentation of cough events even in very noisy environments.

4. Wireless Respiratory Monitoring System Using Wearable Patch Sensor Network [10]

Wireless body sensors are increasingly used by clinicians and researchers, in a wide range of applications such as sports, space engineering and medicine. Observing imperative signs continuously can significantly build analysis precision and empower programmed restoring methods e.g. identify and stop epilepsy or narcolepsy seizures. Breathing

parameters are basic in oxygen treatment medical clinic and walking observing while the appraisal of hack seriousness is basic when managing a few sicknesses, for example, interminable obstructive pneumonic. Right now low force remote respiratory observing framework with hack location is proposed to gauge the breathing rate and the recurrence of hacking this framework utilizes wearable remote multimodal fix sensors structured utilizing off the rack parts. It monitors the breathing flow by measuring the temperature and pressure variations. While these solutions can offer precise measurement results with stationary users, they fail with highly mobile users.

5. Robust Detection Of Audio-Cough Events Using Local Hu Moments [1] :

Telehealth has shown potential to improve access to health-care cost-effectively in respiratory illness. However, it has failed to live up to expectation, in part because of poor objective measures of symptoms such as cough events, which could lead to early diagnosis or prevention. Considering the weight that these conditions comprise for national wellbeing frameworks an exertion is expected to cultivate telehealth potential by growing ease innovation for effective observing and investigation of hack occasions. This paper proposes the utilization of nearby hu moments as a vigorous list of capabilities for programmed hack discovery in cell phone obtained sound signals the last framework takes care of a k closest neighbors classifier with the separated highlights. To appropriately assess the framework in an assorted variety of loud foundations we debased genuine cough sound information with an assortment of sounds including commotion from both indoor and open air situations and non cough occasions snuffle chuckle discourse and so on. The created database allows flexible settings of Signal to Noise Ratio (SNR) levels between background sounds and events (cough and non-cough). This evaluation was complemented using real patient data from an outpatient clinic. The system is able to detect cough events with high sensitivity (up to 88.51%) and specificity (up to 99.77%) in a variety of noisy environments, overcoming other state-of-the-art audio features. Our proposition makes ready for pervasive cough observing with negligible interruption in day by day exercises cough is one of the commonest side effects causing patients look for clinical counsel. Cough is one of the commonest symptoms causing patients seek medical advice. Cough can be comprehended as a characteristic reflex physiologically targeting freeing the lower aviation routes from flotsam and jetsam particularly bodily fluid it is in this manner a barrier instrument for launching outside material out of the respiratory framework. From the sign handling point of view a sound cough occasion is a non stationary sign without a

reasonable formant structure and made out of three stages explosive stage the moderate stage and the voice stage. explosive phase, the intermediate phase and the voice phase. The normal term is roughly 300 ms its range shows a high vitality top around 400 hz and an optional top somewhere in the range of 1000 and 1500 hz. Over one hundred pathological conditions are associated with cough. Many of them .Are respiratory sicknesses, for example, pneumonia asthma laryngitis or incessant obstructive aspiratory malady while others are progressively nonexclusive cold influenza sensitivities and so on likewise hack can be related to way of life smokers stationary individuals and so on . Cough medications establish a huge weight for national wellbeing frameworks – an estimation of £100 million/year cost for nhsscotland and \$40 billion for each annum in the usa from immediate and circuitous expenses of the basic cold – and economies with a normal. Yearly efficiency misfortune cost of £2176 per quiet in spite of the way that cough sounds pass on imperative data of the condition of the respiratory framework there are no best quality level strategies to impartially evaluate cough. This clarifies why until ongoing years the investigation of cough has been confined to emotional estimation devices the specialist as a rule requests that the patient give his/her own energy about the recurrence and seriousness of their coughs and how they influence Their personal satisfaction cough scores journals and indication polls are commonly utilized right now this methodology presents a few downsides that can prompt error of cough side effects. First, the actual limitations of the human hearing system and other tools.

III. CONCLUSION

Although Health monitoring has been a challenging issue in the field of Health Care but due to its application in various fields it has received immense attention over the years. The survey shows the various obstacles that occur during Health Monitoring processes. This survey deal with a discussion over real time based Health monitoring techniques along with factors affecting them in different aspects as such as accuracy, performance etcare discussed. different techniques can be employed independent of each other. Thus, to handle all the obstacles of Health Monitoring process an IOT Device can be developed that contains the combination of features of various Health Monitoring services.

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