IOSR Journal of Electronics and Communication Engineering (IOSR-JECE)
e-ISSN: 2278-2834,p- ISSN: 2278-8735.Volume 13, Issue 3, Ver.III (May. - June. 2018), PP 40-42
www.iosrjournals.org

Home Monitoring of Parkinson's disease Patients Using Raspberry Pi

Miss. Pawar Shubhangi B.[1], Prof.Mr. Yerigeri Vaijanatha.V.[2]
[1](*Department Of Pg, Mbes College Of Enggineering, Ambajogai/ Dr.Bamu Aurangabad, India)*
[2](*Department Of Pg, Mbes College Of Enggineering, Ambajogai / Dr.Bamu Aurangabad, India)*
Corresponding Author: Miss. Pawar Shubhangi B.

***Abstract*:** *Objective long-term health monitoring can improve the clinical management of several medical conditions ranging from cardiopulmonary diseases to motor disorders. In this paper, we present our work toward the development of a home-monitoring system. The system is currently used to monitor patients with Parkinson's disease who experience severe motor fluctuations. Monitoring is achieved using wearable sensors whose data are relayed to a remote clinical site via a web-based application. The work herein presented shows that wearable sensors combined with a web based application provide reliable quantitative information that can be used for clinical decision making.*

Keywords*: Parkinson, Sensor Node.*

Date of Submission: 26-06-2018 Date of acceptance: 12-07-2018

I. Introduction

Parkinson's is a neurological disorder that is mainly characterized by problems with body movements, although other symptoms can also occur. Our brain controls all our body functions and movements. It does this by sending messages through nerves to

different parts of the body. These messages are in the form of chemicals called neurotransmitters. This transmission of messages gets affected in Parkinson's. One important neurotransmitter that is involved in controlling body movements is called

dopamine. A small area in the brain stem called the substantianigra produces dopamine, a chemical that is responsible for controlling speed and planning of movements. With increasing life expectancy, the number of people affected with Parkinson's is thought to rise in the future. Parkinson's is globally distributed, affecting all cultures and races, with an estimated worldwide prevalence of 6.3 million people. Parkinson's tends to affect more men than women. The prevalence of the condition is considerably higher in the over-60 age group, even though there is an alarming increase of patients of younger age developing Parkinson's. It has been estimated that approximately 1% of the population over the age of 60 and 4% over the age of 80 are expected to develop Parkinson's. The most common form of Parkinson's is adult onset which normally sets in after 50 years, followed by young onset Parkinson's (between the age group 21-40) and juvenile onset Parkinsons's (relatively rare; <21 years)[1]. To date Parkinson`s Disease (PD) has remained incurable. Few treatment types have been introduced with the expectation of curing the disease, yet none of them has been permanently effective on the symptoms. Conversely, some medical treatments have even led to adverse side effects. Only subjective and qualitative methods have been utilized in order to scale the degree of the disease which is very unstable as a response to the drug therapy and surgical procedures.. This paper is organized as follows: I. Introduction, II. Scope, III. Related Work, IV. System Model. V.Contributions, VI. Conclusions, VII. Future Work.

II. Scope

To manage the disease at the particular stage and to look for different complication's in patient health: Treatment, as always, should be tailored to the needs of the individual. Patients should be helped to make informed decisions about their care, and try to involve the carers as much as the patient will allow. Aims are to communicate information about the disease, help the patient accept the diagnosis, reduce distress and minimise symptoms and, ultimately, improve prognosis. Arrange nursing assessment. Consider carer support - health and social care assessment. Driving - patient should inform DVLA and insurers. Aims to establish a care package and lines of communication build support for the patient and look out for any complications. Ongoing patient and carer support, diagnosis and treatment of complications, juggling medications. Aim to optimise quality of life, whilst providing information and support. The choice of drug depends on the impact of improving motor disability (better with levodopa) compared with the risk of motor complications (more common in younger

patients) and neuropsychiatric complications (more common in older and cognitively impaired patients; greater with agonists). Initial dug management can be done in effective way.

III. Related work

Filippo Casamassima, Alberto Ferrari, Bojan Milosevic, Pieter Ginis, Elisabetta Farella and Laura Rocchi, "A Wearable System for Gait Training in Subjects with Parkinson's Disease" In this paper, a system for gait training and rehabilitation for Parkinson's disease (PD) patients in a daily life setting is presented. It is based on a wearable architecture aimed at the provision of real-time auditory feedback. The system enables real-time extraction of gait spatio-temporal features and their comparison with a patient's reference walking parameters captured in the lab under clinical operator supervision. R. Jagannathan, Kukku Thomas and Merlin Lopus, "Ambulatory Wireless Monitoring of Tremors in Patients with Parkinson's Disease", they have designed an ambulatory system to diagnose whether a patient is suffering from Parkinson's disease. Shyamal Patel, Borrong Chen, Thomas Buckley, Ramona Rednic, Doug McClure, Daniel Tarsy, Ludy Shih, Jennifer Dy, Matt Welsh, Paolo Bonato, " Home Monitoring of Patients with Parkinson's Disease via Wearable Technology and a Web-based Application", this system is currently used to monitor patients with Parkinson's disease who experience severe motor fluctuations. Monitoring is achieved using wireless wearable sensors whose data are relayed to a remote clinical site via a web-based application. The work herein presented shows that wearable sensors combined with a web-based application provide reliable quantitative information that can be used for clinical decision making.

IV. System Model

The system is an integrated platform that includes: 1) wearable sensors used to gather accelerometer data, gyroscope data; and 2) a web-based application that allows for two-way communication between patient and clinician. Via the proposed platform, clinicians can access sensor data. 3) an application that allows patient to see its directly. By using the arduino board and sensor nodes we able to stream the data directly when the matlab program is run on windows or it can be seen directly on ubuntu . Due to these patients are able to see the stream data directly. The sensor data is being collected and streamed directly at the movement. i.e. we able to see live streaming . Another method to stream the sensor data of patient on the patient host or the server can be done by using an additional raspberry module to the existing system. We can see the data on raspberry module window. In these case the data is being streamed till the program is running. One of the extra feature of using raspberry pi module is that the sensor data can be seen at any place in the world where there is internet connectivity. We are using the vnc server to stream the data at any place in the world.

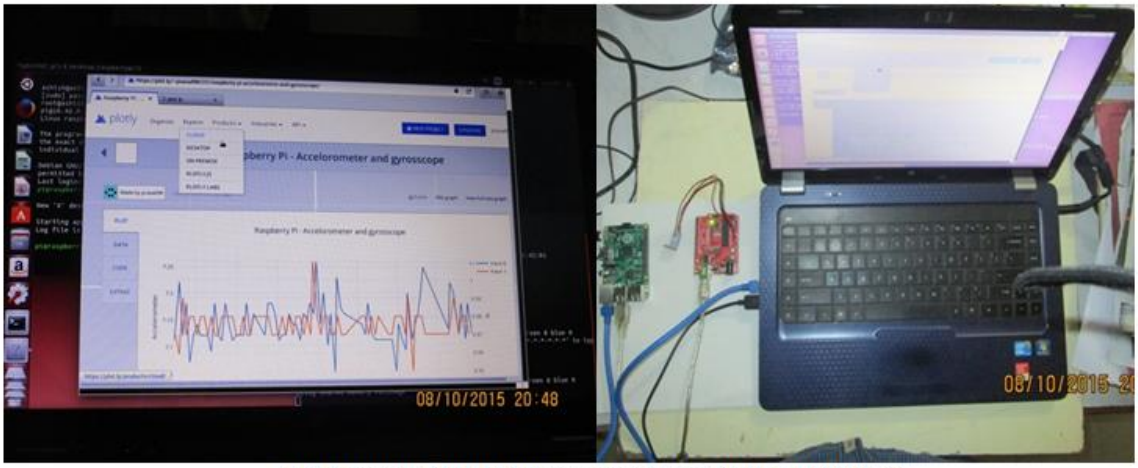

Fig.1 System Model of Sensor System for Motion Analysis of Parkinson's disease Patients

V. Contributions

In a sensor system for motion analysis of Parkinson's disease patients, this paper focuses on the data transmission of the patients health details or the sensor data. In this we directly focused on directly streaming the sensor data. We propose this by using Arduino board and Raspberry pi module. The data can be seen on the patients system directly and the clinician system can be seen using server. The system model is formally designed. The data security is maintained so that the data originality is maintained and we get the accurate results. By using this we are able to see the patient data anywhere in the world where there is web connectivity.

VI. Conclusion

The work herein presented shows that a home-monitoring system that uses wearable sensor technology and a web-based application can be relied upon to gather clinically relevant information for the management of patients with PD. Our results measure the severity of symptoms and motor complications can be reliably estimated. In this paper, a smart multi-level tool for real-time remote patient monitoring (SMTRPM) was presented. To support activities, the SMTRPM generates digital reports on patients' health. The SMTRPM offers the multiple ways to be informed when a patient presents an anomaly; updated patient vital signs can be obtained. During this research, a patient's health before and after medical treatment, surgery, or examinations it was observed. In countries where the government provides public health institutions (PHIs), there is an overpopulation of patients who require hospitalization. A decrease in the time needed to monitor patients, through characterizing a patient's health in real time. However, the project evolved until it produced an important application for medical services. The primary aim was to understand the fundamental basis of an ultimate application. The use of technological innovation in medicine has become extremely important for the scientific advances. This innovation brings the ability to consultations in a way never done before and we will all benefit from it.

VII. Future Work

Future work includes the change in the technique of the data extraction so that the data will not get corrupted and also can be stored for the future use. Complications related to the use of the web based application can be discussed. cost can be reduced to the particular amount so that it can be benefitted to all. only use of wireless related work can be done. Other future work areas include the development of algorithms for extracting and combining visual information that alleviate ambient visual sensing problems in case of cluttered scenes and reduce dependency of acquired data on blob sensors positions. Additional work is also required to develop improved data fusion techniques for more accurate activity detection and introduce robust autonomic behaviour profiling methods that minimise caretakers workload and enable long term elderly monitoring. The work related to the software application can be done so as to make it much flexible to use. Work related to maintain the accuracy can be done so that accurate results are present at the output.

References

[1]. FilippoCasamassima, Alberto Ferrari, Bojan Milosevic, Pieter Ginis, ElisabettaFarella and Laura Rocchi, "A Wearable System for Gait Training in Subjects with Parkinson's Disease", Sensors 2014, pg. 6229-6246.

[2]. R. Jagannathan, Kukku Thomas and Merlin Lopus, "Ambulatory Wireless Monitoring of Tremors in Patients with Parkinson's Disease", Middle-East Journal of Scientific Research 20 (12), 2014, pg.1894-1898.

[3]. SuryadipChakrabortya, Saibal K Ghosha, AnaghaJamthea, Dharma P Agrawala," Detecting mobility for monitoring patients with Parkinson's disease at home using RSSI in a Wireless Sensor Network", International Workshop on Body Area Sensor Networks (BASNet-2013), 2013, pg. 956 – 961.

[4]. Shyamal Patel, Bor-rong Chen, Thomas Buckley, Ramona Rednic, Doug McClure, Daniel Tarsy, Ludy Shih, Jennifer Dy, Matt Welsh, Paolo Bonato," Home Monitoring of Patients with Parkinson's Disease via Wearable Technology and a Web-based Application", 32nd Annual International Conference of the IEEE EMBS Buenos Aires, Argentina, 2010, pg. 4411-4414.

[5]. W. T. Latt, U-X. Tan, K. C. Veluvolu, C. Y. Shee, and W. T. Ang, "Physiological Tremor Sensing using only Accelerometers for Real-time Compensation",IEEE International Conference on Robotics and Biomimetics, 2009, pg. 474-479.

[6]. G.M. Lyonsa , K.M. Culhanea, D. Hiltonb, P.A. Gracec , D. Lyonsb, "A description of an accelerometer-based mobility monitoring technique", Medical Engineering & Physics, 2005, pg. 497–504.

[7]. Bonato P, Sherrill D, Standaert D, Salles S, Akay M. Data mining techniques to detect motor fluctuations in Parkinson's disease. Proceedings of the 26th AnnualInternational Conference of the IEEE EMBS 2004; pp 4766-4769; doi:10.1109/IEMBS. 2004.1404319 .

[8]. Deuschl G, Volkmann J, Raethjen J. Tremors: differential diagnosis, pathophysiology, and therapy. In: Jankovic J, Tolosa E, editors. Parkinson's disease and movement disorders (5). Philadelphia: Williams and Wilkins; 2007; pp 298-320 .

[9]. Fisman G, Herzog J, Fishman D, Tamma F, Lyons K, Pahwa R, Lang A, Deuschl G. Subthalamic nucleus deep brain stimulation: summary and meta- analysis of outcomes. Movement Disorders 2006;21(14):S290-S304; doi:10.1002/ mds.209

[10]. Obwegeser A, Uitti R, Witte R de, Lucas J, Turk M, Wharen R. Quantitative and qualitative outcome measures after thalamic deep brain stimulation to treat disabling tremors. Neurosurgery 2001;48(2):274-284; doi:10.1097/00006123-200102000-00004

IOSR Journal of Electronics and Communication Engineering (IOSR-JECE) is UGC approved Journal with Sl. No. 5016, Journal no. 49082.

Miss. Pawar Shubhangi B "Home Monitoring of Parkinson's disease Patients Using Raspberry Pi"IOSR Journal of Electronics and Communication Engineering (IOSR-JECE) 13.3 (2018): 40-42.