International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Special Issue Apr 2021 www.irjet.net p-ISSN: 2395-0072

DESIGN AND IMPLEMENTATION OF GAIT MONITORING SYSTEM FOR THE ELDERLY PERSON

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Abstract**:** Gait Data Monitoring system through Internet of Things which provide a vital role in our day to day activities. The Elderly People face a physical problem when they are alone at home. The main objective of this research work is to monitor the elderly people about their gait gesture and send an alert automatically through internet of things to their children/caregivers when their parents faces physical difficulties. The Process works when the device is attached to the legs of the elderly people. The device consist of four GY-80 accelerometer sensors placed on the leg. The Arduino sensor used to determine the gait monitoring data and information passed via GSM Module to the alerts system will be passed to appropriate authority of the elderly people through smart mobile application. This Research Work mainly focused with sensor, module and mobile application using android.

Keywords**:** Arduino ATMega328p, SIM300 GSM Module, GPS sensor, Accelerometer sensor, Buzzer.

I. INTRODUCTION

Gait analysis is the systematic study of animal locomotion, more specifically the investigation of human movement, utilizing the eye and the cerebrum of eyewitnesses, expanded by instrumentation for estimating body developments, body mechanics, and the action of muscles. Step investigation is utilized to evaluate and treat people with conditions influencing their capacity to walk. It is likewise regularly utilized in sports biomechanics to help competitors run all the more proficiently and to distinguish act related or development related issues in individuals with wounds. Step investigation is the precise investigation of human strolling. Numerous individuals can move about with strange walk designs for quite a long time with no side effects. In any case, when somebody encounters a physical issue or agony, typical stride can be changed, bringing about unusual strolling that can prompt greater medical problems. In this method to find the abnormal walking pattern of the persons. Gait recognition is a type of behavioral biometric confirmation that perceives and checks individuals by their strolling style and speed. Advances in gait recognition has prompted the improvement of methods for legal sciences use since every individual can have a step characterized by exceptional estimations like the areas of lower leg, knee and hip.

II. LITERATURE SURVEY

Assessment and validation of a simple automated method for the detection of gait events and intervals by Ghoussayni, S.; Stevens, C.; Durham, S.; Ewins, D[1]. Gait recognition: Achallenging signal Processing technology for biometric identification by Boulgouris, N.K.; Hatzinakos, D.; Plataniotis, K.N.[2]. Kinematical analysis and measurement of sports form by Watanabe, K.; Hokari[3]. Gait analysis measurement for sport application based on ultrasonic system by Wahab, Y.; Bakar, N.A.[4]. Heel to toe motion characteristics in parkinson patients during free walking byKimmeskamp, S.; Hennig, E.M.[5]. New accelerometric method to discriminate between asymptomatic subjects and patients with medial knee osteoarthritis during 3-D gait by Turcot, K.; Aissaoui, R.; Boivin, K.; Pelletier, M.; Hagemeister, N.; de Guise, J.A.[6].

III. EXISTING SYSTEM

Current outcomes in neuromuscular disorder clinical trials include motor function scales, timed tests, and strength measures performed by trained clinical evaluators.

Measures are slightly subjective and are performed during a visit to a centre or medical clinic and comprise hence a point evaluation. Point evaluations can be affected by every day patient condition or factors like weakness, inspiration, and bury current sickness. To empower locally situated observing of walk and movement, a wearable magneto-inertial sensor (WMIS) has been created. This gadget is a development screen made out of two exceptionally light watch-like sensors and a docking station. Each sensor contains a tri-axial accelerometer, gyroscope, magnetometer, and a barometer that record linear acceleration, angular velocity, the magnetic field of the movement in all directions, and barometric altitude, respectively. The sensors can be worn on the wrist, lower leg, or wheelchair to record the subject's developments during the day. The empower information transferring for docking station and re-energizing of sensor batteries during the evening. Restrictive calculations used to dissected information to figure boundaries illustrative of the kind and force of the performed development. This WMIS can record a set of digital biomarkers, including cumulative variables, such as total number of meters walked, and descriptive gait variables, such as the level of the most fast or longest step that addresses the top exhibition of patient throughout a predefined timeframe.

IV. PROPOSED SYSTEM

The Process works when the device is attached to the legs of the elderly people. The device consist of four GY-80 accelerometer sensors placed on the leg. The Elderly People face a physical problem when they are alone at home. The main objective of this research work is to monitor the elderly people about their gait gesture and send an alert automatically through internet of things to their children/caregivers when their parents faces physical difficulties. The Arduino sensor used to determine the gait monitoring data. If patient facing physical difficulties or walk abnormally the sensor will detects then alert message pass using global system for mobile communication (GSM) with exact location using global positioning system (GPS) through their children/caregiver's mobile application.

V. BLOCK DIAGRAM

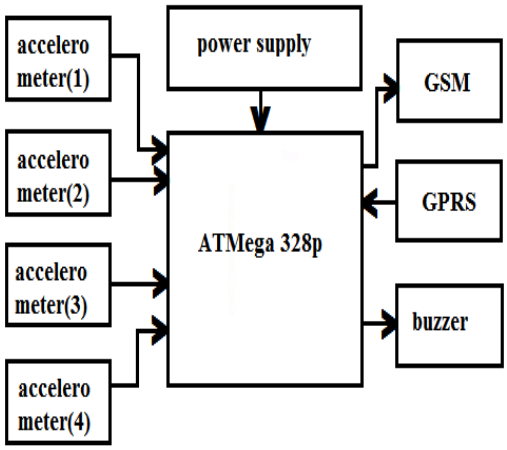
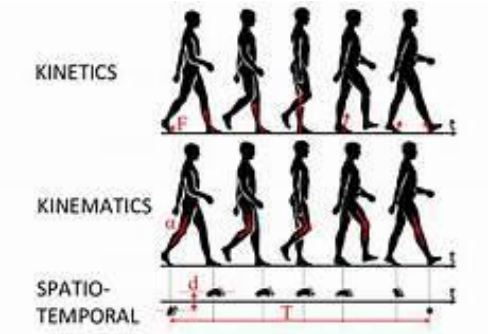


Fig 4.1. Block diagram

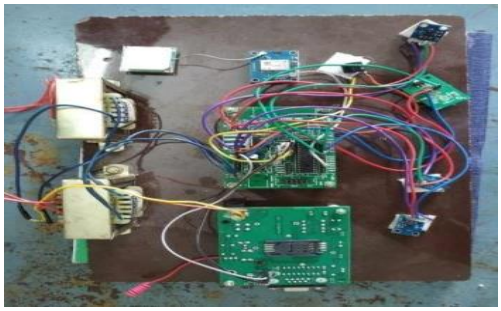
VI. EXPERIMENTAL RESULTS

The device is attached to the legs of the elderly people. The device consist of four GY-80 accelerometer sensors placed on the leg. The Arduino sensor used to monitoring the gait data of the elderly people. if the elderly people faces physical difficulties information passed via GSM Module to the alerts system will be passed to appropriate authority of the elderly people through smart mobile application with their exact location.

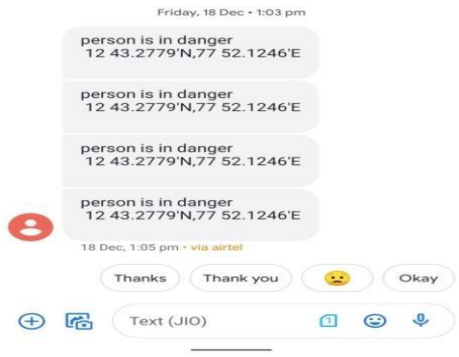


(a)

(b)



(c)



(d)

(e)

Fig 4.2. (a) gait analysis (b) sensors placed on legs (c) gait monitoring system project image (d) output image of sending sms to mobile application (e) output image of location.

VII. CONCLUSION

In this study a comprehensive review of accelerometry based gait analysis has been performed. Extensive review of single and multiple based sensor platforms including accelerometers has been performed. It is very important impact on health-care monitoring system. Using gait monitoring system to avoid human's physical disaster then we can find their exact location. Recent applications are shifting towards the use of smaller number of sensors such as using a single GPS, accelerometers and mobile phones. Developed algorithms based on accelerometer and mobile phones.

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