INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact Factor: 6.078

(Volume 8, Issue 1 - V8I1-1410)
Available online at: https://www.ijariit.com

Smart Devices and Technologies for Athletes: A Survey

Sandeep N. Kugali
kugali.sandeep@gmail.com
Basaveshwar Engineering College (Autonomous) Bagalkot, Karnataka

Megha Navale
megha9731627593@gmail.com
Basaveshwar Engineering College (Autonomous) Bagalkot, Karnataka

Krutika Jigajinni
krutikajigajinni00@gmail.com
Basaveshwar Engineering College (Autonomous) Bagalkot, Karnataka

Srishti Bali
srishtibali182@gmail.com
Basaveshwar Engineering College (Autonomous) Bagalkot, Karnataka

Namrata Sonar
nmsonar99@gmail.com
Basaveshwar Engineering College (Autonomous) Bagalkot, Karnataka

ABSTRACT

The survey addresses how an IOT smart device helps the athletes to monitor their Physical activities. Athletes are the one who are skilled in sports and other exercises. They take part in many sports and competitive events. It is important that every athlete should stay fit and healthy. When it comes to the health of an athlete the parameters to be considered are speed, body temperature, angle movement, oxygen level and many more physical activities. Maintaining health status and progress in games is essential. The IOT smart device which is wearable reads all the physical activities related to athlete. The device as to support both Wi-Fi and Bluetooth mesh networks. The device need to collects all the data like acceleration, angle of movement and health status of athletes during training. The IOT device also collects the real time data of athlete. The real time data collected from devices will be sent to device cloud which can be stored and can be examine in future. This survey may help the coach to keep a track and monitor the athletes who are training.as the real-time data is being stored in the cloud that can be accessed anytime from anywhere through the internet. In this paper initially the introduction is given, next to it the elaboration of some papers related to the topic are explained and so on followed by the conclusion.

Keywords: *Athlete, IoT, Sensor, Bluetooth*

1. INTRODUCTION

Fitness and health are the essential factors that uses advance technology. To keep the body fit, blood circulation is the important physical activities which increases the fitness of body it also helps to tone the muscles increases strength and flexibility of body. Physical activities also include cardiovascular system which helps to strengthen the heart and lungs. Strengthen heart and lungs reduces the risk of heart attack and helps to decrease blood pressure and blood glucose levels. Physical activities become most important, while determining the fitness of athletes. To enhance physical activities of a sports person are very important. Now days diabetics, obesity, asthma and other health related issues developed at earliest stage. Participating in sports and other games will decreases the risk of the diseases like diabetics, asthma, obesity etc. Athletes should be more fit and healthy compare to others. People who compete in athletics during school or college days should not dropout from the school and score much well in tests and examinations. Participation in sports helps to improve character value such as honesty, equality, team spirit and respect for teammates and competitors. It also teaches people to be humble and self-confident. From this, people can also improve their leadership capabilities. Sports has a stronger influence on personal characters like consciences assertiveness and communication abilities.

Athletes are person who joins pride for our country by winning for our country. He recognizes our country worldwide. Many people from various backgrounds work hard to improve their skills so that they can be a part to represent our state or Nation. Every player needs a coach or trainee to guide them through the right path and guide to improving their skills. But not all players have coach and, in some cases, what happens if the trainee is out of reach. Sports has important role in promoting youths.

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The Physical activities helps to develop the performance of athletes. The most positive effect of sports is because of physical activities. If any athlete wants to participate or compete in sports then he should have good physical activities, which helps to determine the betterment of results. Muscles will get strengthened and excess fat will be reduced because of physical activities. The physical activities help to keep a person physical fit and mentally steady which will help to increase energy level and boosts the mood.

Fitness is the key factor for athletes to get succeed. Athlete should be prepared for game in order to gain fitness and increase their performance. There are two types of training models are used: general training and sports specific training. General training helps to athletes to be prepared in short term training, that is with 2-4 training session per week. In this model Athletes will learn how to use techniques and strategies related to their respective sports. Sport specific training is a long-term training where an athlete will be trained with 5-6 workout sessions. In this training model athlete will learn how to use skills and tactics that are specific to their sport. Training and preparation of activities will help the athlete to develop their skills so that they should get a better enhancement in their performance. For better performance daily monitoring of physical activities of an athlete is important.

GPS tracker, IOT devices and other similar devices will help to track athletes while they are performing. Athletes and coach will be in pressure to improve their performance. Because of pressure, many opportunities are opened up for analysing the sports to get real-time and reliable data. An Athletes essential physical activity can be measured using wearable IOT devices. Now a days wireless communication technologies are used to connect the two or more objects. The IOT includes communication systems, which will allow humans to communicate with million, billions of devices. For this communication sensors, actuators and other services are helpful.

IOT is a technology transition in which the devices will allow us to sense and control the physical world by making objects smarter and connecting them through on intelligent network. IOT is stared in 2008 and 2009 in these years more “things” connected to the internet then people in the world. In the year 2003 world population was 6.3 billion and 500 million devices are connected, in the year 2020 world population was 7.6 billion and the connected devices were 50 billion, this shows how IOT is spreading worldwide. IOT focusses on connecting “things” such as machines, to a computer network such as internet. Nowadays IOT related wireless technologies are developed in terms of protocols performance reliability, latency, cost effectiveness and coverage and also the IOT technologies are designed for shortrange radio communication like Bluetooth, ZigBee and etc. IOT networks has many topologies but the general one is start- or tree-based. The data collected by group of sensors will be sent to central controller in order to guarantee centralized processing. Mesh topology is another topology which is generally used in the development of hardware devices. Network nodes in the mesh topology are directly and dynamically connected, therefore they allow many-to-many communications. IOT system can be used to track when monitor athletes progress and performance.

Wearable devices which are made up of IOT technology will generate large amount of data. This should be stored for future analyses. For storing the data generated from the wearable devices can be given to device cloud which helps the coach and the athlete to keep and monitor athlete performance. By doing this the data can be accessed anywhere anytime through the Internet.

2. SURVEY CARRIED OUT

The description about how the mobile network can monitor the player/athlete to keep checking the health status of player. Networks driven by wireless technologies are expected to support chronic diseases, early diagnosis, real-time monitoring, and medical emergencies. Gateways, medical servers, and health databases plays vital role in creating health records and delivering health services to authorized coach of the athlete medical care on-demand and health care represent one of the most attractive application areas for the IoT. Compliance with treatment and medication at home and by healthcare providers is another important potential application. Therefore, various medical devices, sensors, and diagnostic and imaging devices can be viewed as smart devices or objects constituting a core part of the IoT. IoT-based healthcare services are expected to reduce costs, increase the quality of life, and enrich the user’s experience. From the perspective of healthcare providers, the IoT has the potential to reduce device downtime through remote provision. In addition, the IoT can correctly identify optimum times for replenishing supplies for various devices for their smooth and continuous operation. Further, the IoT provides for the efficient scheduling of limited resources by ensuring their best use and service of more patients. Ease of cost-effective interactions through seamless and secure connectivity across individual patients, clinics, and healthcare organizations is an important trend according to [1].

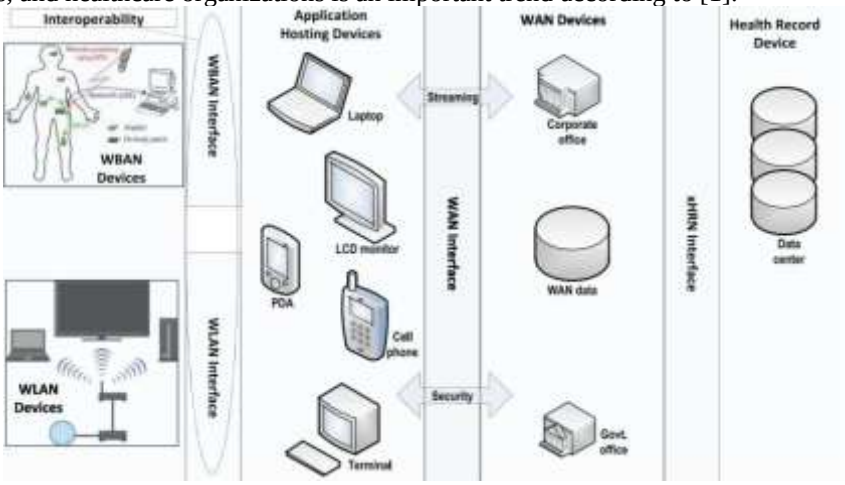

Fig.1: System architecture[1]

Interoperability means the devices that are internally connected to measure the physical activities of an athlete such as Bluetooth and the implanting devices specialized WBAN is used for providing user interface to view and manage BAN (Body Area Network) application.
WLAN is it acts as an access point (AP) that clients can use to connect the node i.e it uses for connecting the wireless devices for the user end nodes.
Application hosting devices are the viewing devices which shows the output of that implanted body devices output on the screen using WAN (wide area network) for the wide range of connection over very long distance.
WAN devices that are also used like cooperate data & government data in which they are preferred as a storage class for storing the data which are of very high manipulated cost.
Health recorded data that is used to store the data that are collected from the WAN devices to store and monitor for the athlete in future reference and these are the best mode for the data centre where the both athletes are used to check and fetch the data at any required time.

So, Fig.1 that describes about how the system is working on the implanted athlete's body to know his recorded data at the end.

Identifying the ECG signals and calculate ECG [2] which is still easy to keep continuous description about the health of athlete. The IoT Net topology refers to the arrangement of different elements of an IoT healthcare network and indicates representative scenarios of present healthcare environments, this describes how a heterogeneous computing grid collects enormous amounts of vital signs and sensor data such as blood pressure (BP), body temperature, electrocardiograms (ECG), oxygen saturation and forms a typical IoT Net topology. It transforms the heterogeneous computing storage capability of static and mobile electronic devices such as laptops, smartphones, and medical terminals into hybrid computing grids.

Visualizes a scenario in which athlete health profile and vitals are captured using portable medical devices and sensors get attached to his or her body. The captured data are then analysed, and stored from various sensors and machines become useful for aggregation. Based on analyses and aggregation, coach can monitor athletes from any location and keep monitoring him accordingly.

In [3] the data is only getting real-world information of athlete that is it is getting the live data of athlete to the coach and calculate the Blood pressure to avoid heart strokes. The traditional way of physical fitness test is that the coach records the athletes' physical fitness test results regularly, evaluates the athletes' physical fitness status through comprehensive results, and specifies the next training plan. Zejiag Huang studied the effect of intensive training on the stability and instability of surface physical fitness of preadolescent football players, and used model to define the results of physical fitness test. By testing the basic movements, the non-parametric correlation matrix of he established, and the correlation coefficient was visualized by using the correlation graph presented by the cycle, which provided help for the selection of athletes. With the development of computer technology and the Internet of Things technology, through the establishment of appropriate database, data storage, extraction, association and analysis can provide accurate information data for athletes' training programs to assist coaches in management.

Measuring Physical Activities only of high weight lifting athlete [4] such as boxing, karate and kick boxing etc. This measures their Physical activities like temperature, strong punches and also stroke using the sensors of temperature and pulse rate. The health burden is emerging from and unexpected death caused by cardiac issues. Sudden Cardiac Arrest (SCA) is frequently named "the silent killer" specially in the high-weight lifting person. The proposed system is for athlete health monitoring, which collects ECG signals from each person sends through Arduino UNO. For the transmission of data from the person wearing the device to the server, the wireless Radio Frequency Transmitter and Receiver is used. Under critical circumstances to generate warning messages to the coach the developed system is used. By continuous monitoring and immediate action on the person whose readings are abnormal have a high chance of saving a life of the person who is doing this high weight lifting athlete. The health of sportspeople in athletics has recently become a demanding concern. Several types of interesting sports including karate, heavyweight boxing, kickboxing, attract many people around the world. Some kinds of these sports like teaching Mixed Martial Arts (MMA) and Boxing can be very dangerous to the health of the people involved. Therefore, making these kinds of sports safe will positively impact athletes' health. Making these types of sports safe, could also be achieved by instantaneously monitoring the effect of the fight on the persons involved such as kick force or strong punch, athlete heartbeat rates, number of kicks or hits that an athlete received, and the athletes body temperature.

The perspective of [5] is that it calculates the cluster of Parameter like health, sports and daily activity, tracking and localization safety. This difference can be analysed by using algorithms on cluster in Machine Learning and Data Science too which need cellular to get the data of athlete. Due to mobility of the human and animals, smart wearable devices are becoming increasingly important since they can collect and send the data on the move and accordingly receive information from the Internet which helps in making smarter decisions. The use of smart wearables can bring efficiency and optimization to the applications, enhance the quality of life, and increase productivity or safety.

Fitness activity trackers were the first big wave of wearable devices in the market followed by Bluetooth headsets, smartwatches, and web-enabled glasses. The gaming industry added more wearables, with virtual reality and augmented reality headsets. However, the important life-altering applications in wearable technology is found mostly in health monitoring and medical use cases.

[6] gives a brief description about, sensor can help the swimmers. This article states the use of contemporary technology can enhance the performance of swimmer in competition. The reasons for shifting to wearable inertial sensor were the difficulties occurred during the traditional "video Analysis". Video analysis is a form of keeping a check on the swimmer, where the videoclip of performance of swimmer is captured under the water which will be examined later. This is an offline method, by this the coach was unable to

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correct the errors of swimmers on the spot, he was unable to provide real-time feedback and many more unfavourable conditions and difficulties made them to use "wearable inertial sensors". The difficulties that were faced by video analysis are, it is very difficult to shoot a moving body under the water, due to the continuous movement of water, water splashes will get generated due to this the video can't be captured correctly, which results in difficulty to catchup the error and accurate timing can't be found. As the winner can be declared in difference of 1 second, if accuracy is not found this results in difficulty to correct the swimmer from coach. These all limitations can be overcome by using the wearable sensors. The sensors that were used are an inertial and magnetic sensor, which includes accelerometers, gyroscopes and magnetometers. Using these sensors decreased the cost of wearable device. Now these sensors have to be used in water and these has to be made water proof, this was achieved by IMU application where sensors are sealed hermetically to make them unit waterproof and to resist the aquatic environment.

Now the sensor wearable device is made ready which monitors the swimmer continuously increases the amount of information available, by this the fatigue of swimmer can be evaluated. But then the problem was where to fix this device as the device should not increase the drag force of swimmer, should not bother the swimmer's action and should not bind the swimmer by any means, it should set swimmer free. The place to place the device or sensor on swimmer was decided on the swimming stroke of swimmer, as strokes are of four types front crawl, backstroke breaststroke and butterfly. And sensors placements were lower and upper back, head, wrist and ankle. Thus, this was mainly used to estimate for feature detection (stroke counts), biochemical event, displacement, velocity and energy of swimmer.

A novel ambulatory motion analysis framework using wearable inertial sensors. Here they used a system which automatically classify large amount of data generated from athlete's activities. It is done by using Discrete Wavelet Transform (DWT). The classifier classifies the data with 98% accuracy, and used one more method that is Gradient decent algorithm, it is used to estimate the relative orientation of wearable inertial sensors which will be located on thigh or shank, from which knee angle is calculated. And finally, they used curve shift registration technique to determine potential injury and generate normative data. Here are some challenges they faced [7]:

i) Athletes would be highly focused on how to complete the task
ii) Controlled laboratory does not reflect the condition of the training environment (e.g. uneven/wet ground)
iii) The use of only 1-5 trails as representative of how an athlete completes a movement technique is highly questionable
iv) Lack of normative data for many sports

Solution for the above challenges is using sensors. The aim of the project is to utilize wearable inertial sensor and develop a method to automatically and accurately categorize the activities which are related to ground that are walk, jog, jump, sprint, land. And to extract joint kinematics data and impact acceleration data for each foot contact cycle and to generate normative data using a functional data approach. The framework is as shown in Fig. 2.

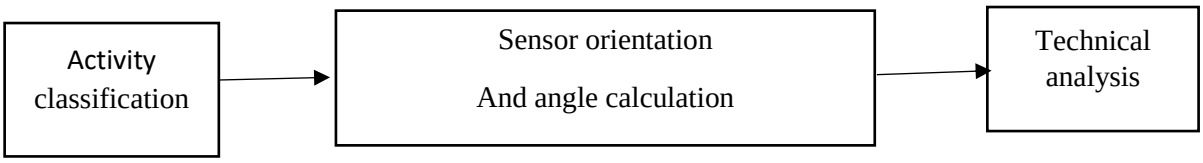

Fig. 2: Framework[7]

Activity classification: It is automatically classifying the training activities which will be evaluated by sporting and health professionals. It allows them to quickly split the athletes training session and can look after athletes' data. Here they are using accelerometer to classify athlete's activity like jumping, jogging. The Discrete Wavelet Transform (DWT) is used for extracting features from accelerometer data.
Sensor orientation and knee angle: These wearable inertial sensors are self-contained and independent of motion. Here Kalman filter is used for measuring the orientation and also used algorithm to show effectiveness performance at low expenses. The algorithm uses Gradient Decent optimization Technique. And to calculate or measure knee join angle, the sensors will be attached to thighs. The data will be calculated using described fusion algorithm.
Technical analysis: it is the method to generate and analyse the separate classification generated from previous steps.

Sensors will be attached to athlete and the data from each sensor will be stored in inertial SD card on board device this is already undergone experiment. The proposed framework is used to generate accurate and automatic to classify and uses movement technique.

[8] IoT has given a vast and different way to make this world look smart with abundant technologies. These technologies have been boon to this generation, the best thing that IoT has given is reduction in the size of equipment's or machines. The equipment's or machines that are being used in medical field have been reduced to a small sensor or the sensors are being used to measure the same things that the large machines do in medical field. And in this paper a new thing has been added to make it look even more Intelligent that is smart phones. The main concept of this paper is to build a IoT smart device for the football athletes to measure their ECG using biomedical sensors. The sensors which sense the human bio-signal are called as biomedical sensors. And the ECG measured by the biomedical sensors is even displayed in smart device with the help of cloud. This paper contributes mainly a distributed computational framework to use the capabilities of smart devices for sharing the processing of advanced health monitoring applications.

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The [8] gives even the description of different devices which are built to measure ECG of athletes, but these devices had difficulties to place it on the athlete body. All those devices were not that easy to place or fit them somewhere on the athlete's body as they may disturb the athletes to play. So, looking at those defaults this paper has built the device which can be worn by the athlete as a shield on their chest which will not make any discomfort for them while playing or practicing. In addition, an environmental sensor has been added to the system, which reads the environment conditions like ground temperature, wind speed, wind temperature and humidity which will be sent to medical staff to check the environment and suggest the athletes to play or not. And this environmental sensor has been placed in the device which is worn as a smart watch by the athlete. This system works as follows firstly, the chest shield and smart watch process work by sensing the thing. This is assessed by sport coaches and medical staff by the devices such as smartphones and feedback are given to athletes on time which is a real-time occurrence.

Fig.3: Application scheme [8]

The applications methodology is checked and formed into a Table 1 where it describes step-by-step system process completely.

Table 1: Framework methodology [8]

Design Stages	Inputs	Outputs
(i) Application analysis for tasks and dataflows break down	• Implementations • State_of_the_art techniques • Application requirements • Working environment constraints	• Application partitioning • Granularity unit • Data-flow diagrams
(ii) Resource planning	• Cloud market • Network architecture • IoT environment	• IoT environment configuration: sensors, wearables, mobile devices, etc.
(iii) Deployment and calibration of the system	• Configuration set up. • Test	• Distributed architecture for IoT environment

The Fig.4 explains, how the application would look in smartphones which will be observed by sport coaches and medical staff.

(a)

Fig. 4: Scheme of the monitoring application, Figure(a): Overall environment conditions

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(b)

Figure(b): Mockup ECG parameters of football players [8]

The description about how IOT based motion tracking system has been boon to the many athletes how use their legs in sports, for example sports like football. The study of this [9] mainly reveals a new AI+IOT (AIoT) paradigm for next generation foot related sports. This proposes a customized wireless wearable sensor device, which is worn by the player at his ankle, which tracks each and every motion done by that player. As the sensors used in this device are accelerometer and gyroscopes which measures the 3-axis acceleration and 3-axis angular velocities results in recording long-running and calculates the constant interaction which measures the reduction in energy-consumption and improvement of computational power.

This sensor maintains each and every movement of the player done during the practice which will be very easy for the coach to take the data and correct the player on time or even can take the details later and explain player what his errors are and what to be implemented to improve his quality in sports. Before this the bioanalysis technique was used by the coach to maintain information about the player, which is a off-line method, where the captured video has to be checked to known the errors or the mistake, this would take a lot time and video cannot capture the movement of player and even a single coach cannot be able to maintain the record of all the player that he has his under. So, this wireless wearable sensing device will sense the motion and maintain all the recorded data in the device as it is connected to the cloud and even can show on the application when accessed.

Fig. 5: System Architecture [9]

This Fig.5 shows the place where a player is wearing the sensor device, that device will senses the movement and generate the data, this data is attached to the cloud which stores the data and even shows the same data on the application.

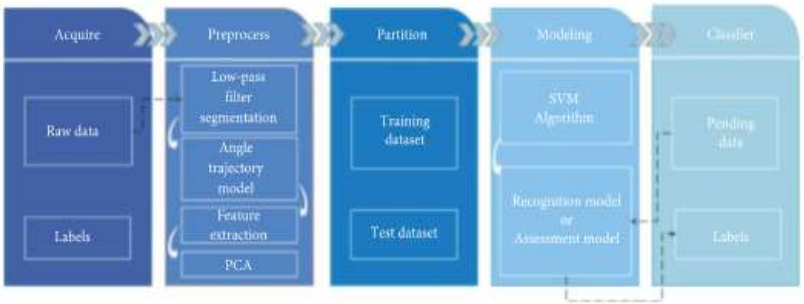

Fig. 6: Motion reorganization and assessment system [9]

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The Fig. 6 shows how the motion of the player can be recognised in the system. This is done in to the steps as follows: Data processing, Attitude angle modelling, Future extraction and selection Dimensionality reduction and classification. This is mainly done based on SVM classification algorithm

[10] Briefs about the application of IoT technology used in the smart wearable devices. This concept is unique and is used to monitor the health condition of the patients and athletes. We have seen that there is increase in the use of wireless technologies and miniaturization of electronic sensors in health monitoring. The active health condition of the patients or athletes could be monitored by the doctor, coaches, or even by the patients or athletes themself. The aim of carrying out this project is to develop low-cost, high quality multi-purpose smart wearable devices. There are various parameters that could be monitored by this work are, ECG, oxygen level and heart rate etc., could be monitored. The work is carried out in 3 phases:

i) The first phase is the use of Raspberry-Pi as an open-source micro-controller with the combination of HealthyPi hat serving as a conduct between Raspberry-Pi and Healthy-Pi connected biosensors.

ii) The second phase links the device to an open sources IoT dashboard to display the data via an interactive IoT dashboard so that it could be accessed by doctors or by coach or be patients / athletes themselves so that the message is sent to both.

iii) The third phase includes the development and testing of the Fuzzy logic system.

The advantages of the system purposed are, cost effective- individual can be tracked remotely from any place hence minimizing the travel and hospital bill, quick service- there could be immediate assistance for patients by physicians, real time management- complications can be avoided as it allows the necessary and immediate treatment and improving the quality of life- help old people as they are been monitored by doctors.

The methodology includes the 3 phases. The first phase is data collection of various health parameters by the ECG sensor so that the heart rate is recorded, the temperature sensor to record temperature readings and the SPO_2 sensor to record oxygen levels and rate of respiration. Data is then transmitted to the HealthyPi device. This device uses the programming code, the specified digital signals are generated by using the raw input data and this is done by controller. Later it provides a clear, comprehensible output which is transmitted to the Raspberry-Pi. The second phase includes Raspberry Pi where the output is transmitted via the MQTT protocol to the selected IoT dashboard. In the third phase, as the output data is generated and is evaluated or identified by patients / athletes or to doctor / coach. The input for Fuzzy logic system is the output of the third phase. This logic is a multi-valued logic, with the value of fuzzy variables ranging from 0 to 1. This system has five inputs; x-direction accelerometer, y-direction accelerometer, y-direction gyroscope, heart rate (HR) and oxygen saturation. The if-then rules are used to relate the inputs to outputs. The fuzzy logic system uses the MATLAB.

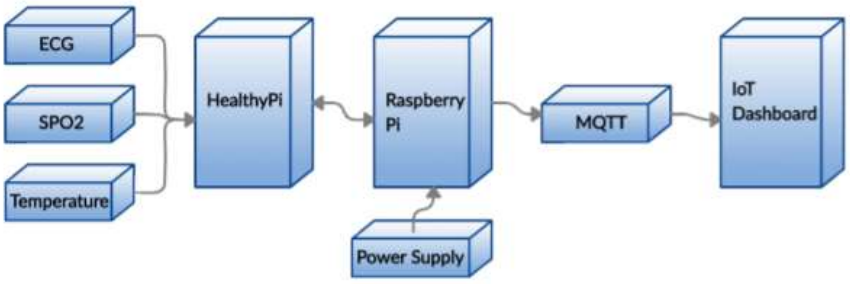

Fig. 7: Multipurpose IOT ready health monitoring [10]

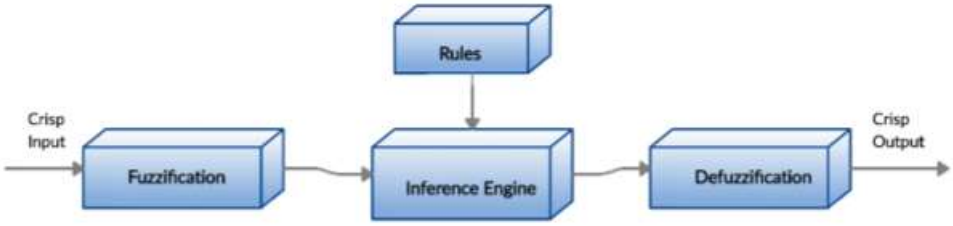

Fig. 8: Fuzzy logic based system [10]

Hardware Components Used in Proposed System are; Raspberry Pi 3 B+, HealthyPi 3 Hat, Electrocardiogram (ECG) Sensor ADS1292R, Pulse Oximeter Sensor AFE4400 and Body Temperature Sensor MAX30205. Software Components Used in the Proposed System are; IoT Dashboard io.adafruit.com, MQTT Protocol and Android Application IoT tool.

The readings are noted based on the resting, walking and running of an individual. After conducting 60 test cases the fuzzy logic system detected success and unsuccess rates in all the 3 modes of an individual and it is seen that the success rate is higher than that of the unsuccess rate. And the system accuracy was 91.6 %. Fig.7 and Fig. 8 gives the detailed block flow about IoT ready health monitoring and Fuzzy logic.

[11] presents how the wearable devices consist of sensor helps in healthcare specially in swimming exercises with real-time therapist feedback. [11] has three different feedback system architecture those are: Therapist, User, and Cloud System. The primary

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motivation was to develop a group of wearable devices. Specially attention was given to application which would be used in monitoring the physical activities. And designed a System/device which is wearable and waterproof consist of sensors with an Inertial Measurement Unit (IMU) and gives real-time therapist feedback. This device is designed because, it is difficult for therapist to monitor swimming activities by camera-based system, to overcome from this difficulty sensors are best alternatives to monitor the swimming activities. The new designed Device is sensor based Wearable device. Sensors have the potential to monitor physical activities even under water. The wearable sensor devices can be attached to anywhere over the body of swimmer. There are three different system architecture for monitoring in swimming rehabilitation.

A. Multi-User Therapist System

As name says multiple users can wear the devices. The sensors which are in the devices will send the signals from multiple devices to processing device. That is presented in Fig. 9. different wireless technologies are used to connect or process signal/data between User, Therapist and sensors. The application used by therapist consist user-by-used parameter, performance indicator and time dependent graph in real-time. Therapist can give feedback only when necessary, this can be done orally or through any other communication path. Example user can have earphones for receiving audio feedback, or can have actuators or similar. The advantages of this architecture is, it gives real-time data to therapist and therapist can give feedback to user immediately. It speed-up the rehabilitation theory also.

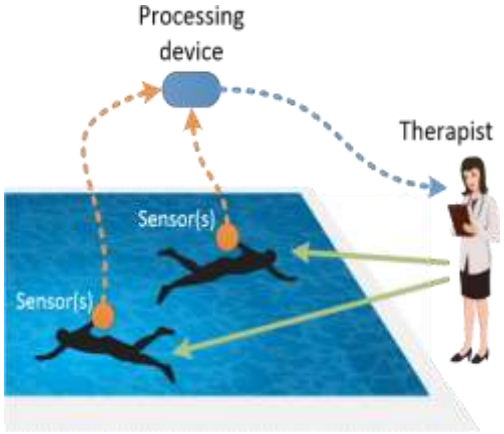

Fig.9: Multi-User therapist System [11]

B. Autonomous User System

This architecture is compact because all elements will be attached to user. That is shown in the Fig. 10. This system gives real-time data to processing devices from where therapist can give feedback but also this system gives real-time data to user so that user can monitor his swimming activities. Therefore, it requires educated user who knows about swimming activities and well trained how to monitor and how to use the device.

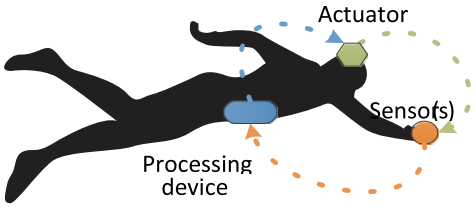

Fig. 10: Autonomous System [11]

C. Cloud System

The Multi-User Therapist System and Autonomous User System are combined together in cloud system. Cloud system offers several different types of feedback possibilities example:

i) Feedback from the cloud can be given directly to user, that is shown in the Fig. 11 with dotted green line.

ii) Feedback from the cloud can be given indirectly through the therapist, that is shown in the Fig.11 with solid blue line and solid green lines.

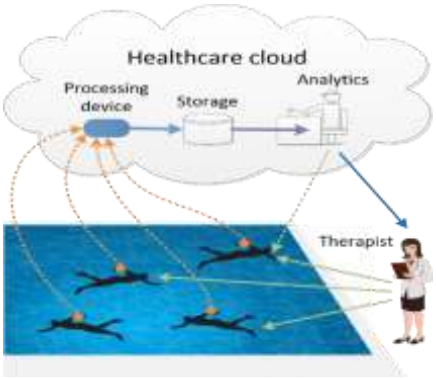

Fig. 11: Cloud System [11]

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The cloud system collects and process the large amount of data from multiple users. There are five properties of collected data, volume, veracity, velocity, and value.

3. CONCLUSION

The brief framework by this literature review we are going to conclude that the physical activities are very important factors for the athletes to maintain their fitness, success, health and body status. Fitness can be maintained differently for different type of athletes. The fitness varies according to the type of the sport that the athlete involves. The physical activities of athletes are mainly maintained by their coach, this maintenance leads the coach to learn about their strength, weakness, habits, confidence, leadership quality, game sprit, unity, behavior and etc. Thus, the data maintained by the coach is due to the "IOT smart wearable device" worn by athlete which will produce data or records through the help of the sensors attached to those. By the available data, the coach can easily maintain the health status of athlete and decide what can be done to improve his abilities and what best can be drawn from him.
These smart devices have led to a very different revolution in this world which have helped the athletes who cannot afford a coach for them and even for the coach who is far from his athlete. These devices have started acting like an agent to fulfill athlete or coach needs, when one is not their or not present for one another. Smart device is used to maintain events and gain more perception from them. These different technologies and devices may be used for further future research work for the benefit of Athlete.

4. REFERENCES

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