

# Architecture of an IoT-based System for Cricket Supervision

Geethalakshmi V  
Bearys Institute of  
Technology Mangalore, India

Fathimath Kousar  
Bearys Institute of  
Technology Mangalore, India

Mohammed Sinan Marikattay  
Bearys Institute of  
Technology Mangalore, India

**Abstract:** Cricket is one of the most played game all over the world. However cricket players face many injuries during the match and training. Upper Limb injuries, Back Injuries, Lower Limb injuries are some of the common injuries which occurs during the match. These injuries may lead to serious health issues and sometimes it may even lead to death. Internet of Thing (IoT) is a new technology which can be used to diagnose the health issues and can prevent the adverse effects which may occur due to the injuries. This proposal includes sensing device (RFID), telecommunication devices (Zigbee) and Cloud Computing.

**Keywords:** IoT, RFID, Zigbee, Cloud Computing.

## I. Introduction

Cricket, with millions of fans all over the globe is one of the most popular game in the world. [1]ICC, is the organization which is responsible for developing and improving the quality of cricket. Many steps are taken to improve the architecture of IoT. The most common architecture which is used is M2M Architecture [2]. This M2M architecture has two main layers. The first layer is a default gateway and the second layer is the network layer. The default layer consist of the components while the network layer consist of the routing and storing information. One of the main technology which can be used in this proposal is Wireless Body Area Networks (WBANs). It is a sensor which is used to measure blood pressure, heart rate and body motion. Hence it is possible to monitor the health of the players while playing using this IoT technology. [3] Radio Frequency Identification (RFID) sensors are used to sense the activity of the players. In this the sensors is used to identify the nodes and then should have the ability to communicate with the human and other devices.

## II. Literature Review

Wearable monitoring devices has the capacity to collect all the required data. Data such as heart beat, Pulse rate etc. can be collected by this wearable devices. Sensors gather the required information such as pulse rate, oxygen level in the blood etc. and then forward the collected information to the gateway. Here the gateway can be anything such as mobile phone or any communication device. Communication can take place using wireless network technologies. Here WBANs communicate with wireless network technologies such as Zigbee, Wireless Personal Area Network (WPAN) and Wireless Local Area Network (WLAN). The main aim of this proposed system is due to the lack of IoT framework. Numerous other paradigms have been investigated and proposed in different articles. In Otto et a, a health care system consisting of WBANs and application software implemented on a Personal Digital Assistant(PDA) or a personal computer is proposed. This system supports ECG sensor types which can be used to monitor the heart activity.

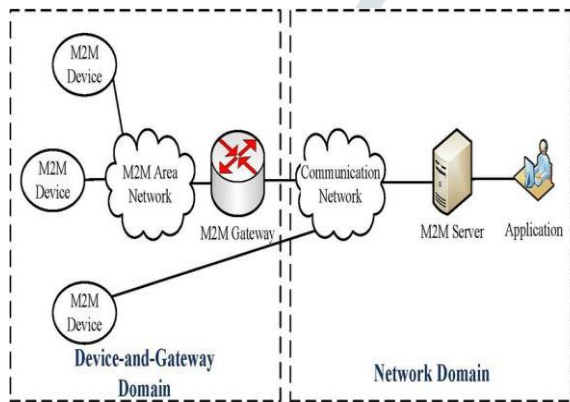
*A.Existing System:* At present this method of detecting the health problems and preventing them is used in the football game [4]. Where the player's accessories such as shoes and jerseys are equipped with IoT

devices such as sensors etc. Which helps in identifying the injuries which will occur during the match or training session.

**B Security Threats:** M2M architecture is used in the proposed system. It has many vulnerabilities.[5] Attacks in this M2M architecture can be classified as active and passive attacks. However the passive attack will not cause much damage to the system while the active attack will cause severe damage to the system. Device triggering attack, Denial of service attack, Access priority attack, External interface attack are some of the major threats to this M2M architecture.

**C. Ways to overcome the attacks:** Security threats can be overcome by implementing some basic security mechanisms in the physical and data link layers. Eavesdropping, Jamming, Exhaustion are some of the major threats in the physical layer all these threats can be prevented using Multiple Input Multiple Output(MIMO) Technology is proposed for the security purpose. Like this many methods are used for preventing the attacks in each and every layer of the architecture.

### III. Architecture



The above diagram is the common architecture which is used for IoT based cricket supervision. [6] According to the M2M general architecture it consist of the following elements.

**M2M Device:** This is used to connect the network domain either directly or via gateway.

**M2M Gateway:** Acts as a proxy to connect the network domain and the M2M devices.

**M2M Server:** This acts as a middleware between the gateway and the application.

**M2M Area Network:** It helps in the communication between the M2M devices and M2M gateway.

**M2M Communication Network:** This helps in the communication between M2M sever and M2M Gateway.

### IV. Proposed System

The same techniques and Architecture can be used in cricket game as it is also one of the world famous games in which many players have lost their lives due to injuries caused while playing. So the main objective of the proposed system is to protect the players by identifying the internal injuries at the beginning stage and giving them right treatment at the right time. Here we use the sensors for collecting the data and Cloud for data storage.

#### A. System Design

Proposed system uses many technologies.

Some of the main technologies used here are:

- RFID
- WBAN
- Zigbee
- WLAN
- WPAN

**RFID:** Radio Frequency Identification is used to identify objects wirelessly and it also contains a reader device. It consist of Active and Passive tags Active tags are used to detect collision while the passive tags are used to respond to the reader commands.

**WBAN:** Wireless Body Area Network is a network which helps in Continuous monitoring of the human body and observe the activities of the vital human organs. WBANs are mainly used in the medical fields for monitoring the health condition of the patients.

**Zigbee:** Zigbee is a wireless technology developed to be used in M2M communication in IoT between the wireless devices. This is mainly used because of its low cost and low power. Zigbee is used because they can be easily integrated into the systems across the IoT industries.

**WLAN:** Wireless Local Area Network used for the wireless distribution of the devices and it uses high frequency radio waves. It allows the user to move around a specified coverage area and still there will not be an interruption in the internet connection.

**WPAN:** WPAN stands for Wireless Personal Area Network. This is used for connecting personal device within a short range. The best example is Bluetooth. Plugging in is one of the key technology in WPAN, in this when two devices equipped with WPAN comes close to the central server then it acts as if those devices are connected together using a cable.

## V.Conclusion

IoT is one of the fastest growing technologies. This technology can be used for the development of the mankind in many ways.

In this proposed system, architecture for cricket supervision mainly involves the monitoring of the cricket players by keeping the sensing devices in their accessories. These sensing devices monitors the health of the players and then sends the data to the cloud. Cloud stores the data and then sends the data to the Coach who can access the information using the mobile app. Sometimes the data can also be sent to the nearby hospital if there is any serious injuries occurred to the player. This method can be used in any sport.

## VI .References

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