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## **Athlete Workload Evaluation Platform Using Wearable Sensor Network**

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### **Abstract**

To achieve success in their sport, athletes must maintain a high level of physical fitness and avoid injuries during competition. This requires a balanced and effective training program. If the training is not managed effectively, it can lead to health problems that can compromise an athlete's performance. To overcome this problem, the project aimed to create a wireless wearable system that was more versatile and can be used in a wider range of sports. A sensor network consists of a number of sensory devices which collect data from attached sensors and transfer them to a master device where they are stored until transferred to a central server through a mobile network or any other form of network connection once the training session is over. This system helps coaches to monitor the intensity and volume of training to create a customized plan for each athlete. In this project, we used a wearable sensor network based on Gyroscope (MPU 6050) and a heart rate sensor (MAX30100). The communication is based on WiFi and radio frequency. Human Activity Recognition (HAR) from gathered data is done by Convolutional Neural Network (CNN) in the web application. CNN model achieved 92% accuracy for the collected dataset. This system gives the daily workload summary as activity times as external workload and the average heart rate and TRIMP score as internal workload. And the system provides preferable activity times for the next training session for each activity through the application. The workload for the next day is calculated according to the acceptable range of "Acute to Chronic Workload Ratio". Our athlete workload management system collects data from a wireless body area network and finally gives the workload information of the day and the preferable workload for the next day to help the coaches and athletes for healthier and more efficient training.

*Keywords: Machine Learning, Motion Detection, Wearable Sensors, Wireless Network, Workload Management System.*

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