Personalized Workload Management System With Injury Prevention For Long-Distance Runners

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Long-distance running requires effective workload management to achieve optimal performance while minimizing the risk of injuries. This study presents a Personalized Workload Management System which includes a wearable device, a web application and a machine learning model (ML). The wearable continuously monitors heart rate(HR) and calculates running distance while the web application manages training and tracks performance and the ML model predicts long-distance performance using athlete-specific data. The system utilizes Firebase for real-time data synchronization, secure storage and seamless accessibility. Tested on national athletes, the system demonstrated enhanced training efficiency, reduced injuries and improved performance metrics, addressing critical gaps in Sri Lankan sports science.

Keywords: *Athlete Wearables, Heart Rate Monitoring, Injury Prevention, Machine Learning, Personalized Training*