Design of a Sprinter Performance Improvement Training System

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Abstract: Small inefficiencies during a 100m sprint make the difference between winning and losing races. Coaches and athletes lack a means of identifying unique discrepancies that vary between athletes. Technology advances make data beyond final race times available. Interviews with twelve coaches and athletes were conducted to establish requirements for the system. The wearable sensor technology combines an Arduino, GPS, and IMU to provide graphs, maximum velocity, distance to maximum velocity, and decay. This enables coaches to make specific data driven recommendations for improvement based on sprinters' individual biomechanics. Verification tests for the IMU sensor exhibited a mean error of 0.18 m/s² and a standard deviation of 1.11 m/s². Verification tests for the GPS sensor indicated a 3 sigma of 38.9498° and 38.9497° for latitude and 77.1949° and 77.1947° for longitude. Comparison of velocity between video and sensor for a sprinter was 13.94% which passes the acceptance criteria. Validation testing with athletes over a period of time is underway.

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