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Movement Analysis of Athletes using Network Simulation 2

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Abstract

The increase in technology has allowed anyone with knowledge of programming the ability to run simulations of their models. The simulations are built from a series of mathematical algorithms or models and can vary with accuracy. These include everything from performance enhancing efficiency ethically reengineering the athletes themselves. We describe a training-support environment for runners with wearable support equipments of the awareness and mobile sensor network. The proposed system provides feedback to runners by providing information using kinetic feature and ambient change from sensors in the real-time. To investigate the characteristic wave form generated by repeats of arm swing during running. The proposed Hybrid location-based protocol, HLAR, combines a modified AODV protocol with a greedy-forwarding geographic routing protocol. Having gear that stimulates speed, distance, improves field awareness and provide most accurate solution for the most difficult decisions by using NS 2 we simulate the performances of the runners and analyze the runner parameter with trace graph.

Keywords: NS2, athlete, Performance, Network.

Introduction

Sports Technologies are man-made means developed to reach human interests or goals in or relating to a particular sport. Technology in sports is a technical means by which athletes attempt to improve their training and competitive surroundings in order to enhance their overall athletic performance[1]. Athletes and coaches are always looking for an extra edge to help them perform in their sport. Professional athletes and coaches know that visual skills play such key roles in sport performance. The aim of this work is analysis the athletic people's performance and safety while in the competition.

Network Simulator 2

NS (Version 2) is an open source network simulation tool. The use of NS is in network researches to simulate various types of wired/wireless local and wide area networks. NS 2 is written in C++ and Otcl to separate the control and data path implementations [5].

For example, simulation of protocols requires efficient manipulation of bytes and packet headers making the run-time speed very important. On the other hand, in network studies where the aim is to vary some parameters and to quickly examine a number of scenarios the time to change the model and run it again is more important.

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Methodology

In this paper a training-support environment for runners with wearable support equipments of the awareness and mobile sensor network is considered[4]. The proposed system provides feedback to runners by providing information using kinetic feature and ambient change from sensors in the real-time. This paper differs from its previous studies in the following points of view. First one is that the number of synchronous supporting target as human is plural. In the group, devices among targets are communicated mutually[2]. The other is that the supporting system has the immediacy as advices among demonstrational training. The system provides awareness information and feedback to runners using kinetic feature and ambient change from sensors in the real-time[3]. To investigate the form characteristic wave is generated by repeats of arm swing during running and conducted some trial with the use of prototype system, as preliminary step for the group training.

1. A hybrid location-based ad hoc routing protocol, which was particularly designed with optimal scalability performance is proposed. It combines a modified AODV protocol with a greedy-forwarding geographic routing protocol.
2. Our proposed protocol is to efficiently make use of all the location information available, to minimize the routing overhead,

Analyzing Athlete Performance

HLAR initiates the route discovery in an on-demand fashion. Runner includes the location coordinates of both itself and neighbor in a route request

(RREQ) packet and then looks up its own neighbor table to find if it has any closer neighbor.

1. Hybrid location-based protocol, HLAR, combines a modified AODV protocol with a greedy-forwarding geographic routing protocol.
2. Locally broadcast small beacon packets periodically. These periodic beacon packets include the runner's ID and the current location coordinates. These beacon packets send among runners to get runners current position and speed of the runners.
3. All runners' details are monitored by coach. In that system distance between each runners and current position of runners also updated[6].

A video camera can be a useful tool to 'capture' the movement. The skill performance can be replayed in slow motion, enabling the coach to identify exactly where faults occur. Using a video can help the coach develop their own observation and analytical abilities by directing them where to focus their live observations. Ideally, have a video monitor close by to observe the performance while the movement pattern is fresh in the minds of both the coach and the athlete.

Goals of Maximal Velocity Sprinting

There are three primary goals of effective maximal velocity sprinting such as preservation of stability, minimization of braking forces, and maximization of vertical propulsive forces.

Preservation of Stability

The first objective of sprinting mechanics is stability preservation. Stability is crucial to any athletic movement because it ensures that the body is able to move with maximal efficiency. To enhance stability, the muscles surrounding the spine should be strong enough to provide a stable origin for movement of the limbs[7]. It is important to note that this stabilization is dynamic in nature rather than static. This means that while the body does act to control movement, small movements will still be present and are actually beneficial to performance.

Minimizing braking forces

The second objective of efficient sprinting is minimizing braking forces that the athlete encounters at ground contact. Braking forces refer to those forces which act in the opposite direction of the desired movement. Braking forces experienced in sprinting tend to result in horizontal deceleration. Two scenarios are often the root of excessive braking forces. In many cases, the cause is a willful attempt to artificially increase step length by 'reaching out' with each step. This inevitably makes ground contact occur further away from the bottom dead center position[8]. A second scenario associated with excessive braking forces is instability. When the body experiences instability, it often attempts to regain stability by premature grounding of the swing leg. This often occurs as a result an overemphasis on 'kicking the butt.' Premature grounding of the swing leg typically means that the foot will still be moving forward with respect to the body when ground contact is made[9].

Increased Vertical Propulsive Forces

The final objective of effective sprinting is enhancing vertical propulsive forces. Increasing vertical propulsive forces produces a host of benefits. It increases vertical displacement of the athlete which will in turn result in a more effective ground contact position and increased likelihood of negative foot speed on the subsequent ground contact. The final benefit of increased vertical propulsive forces is increased leg stiffness. Leg stiffness refers to the ability of the legs to act as a spring during contact. Leg stiffness is critically important to maximal velocity sprinting and the maintenance of the momentum developed during the acceleration period of a sprint. As an athlete accelerates from a resting position to top end speed the athlete develops momentum along the way.

Results and Discussion

Consider Athletes in the track as Nodes. There are Four Athletes 0, 1, 2 and 3. Participants: Node 0, Node 1, Node 2 and Node 3 consider as respectively are Punjab, Tamil Nadu, Karnataka and Haryana. Athletes from the above states are ready for 300 meter track and they are at initial position. All the athletes are at 'On your mark' position as shown in Figure 1. All the athletes started running. Everyone is crossing their 'set and go' position as shown in figure II.

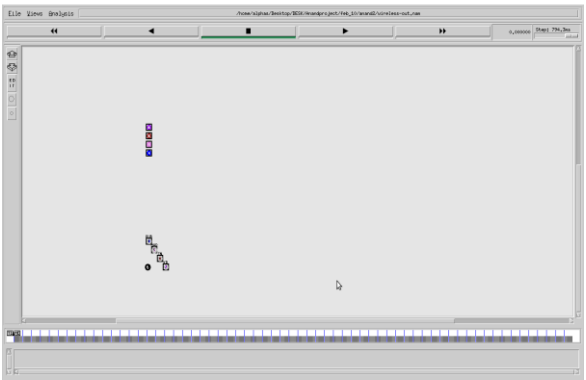

Figure I. Players are at initial position

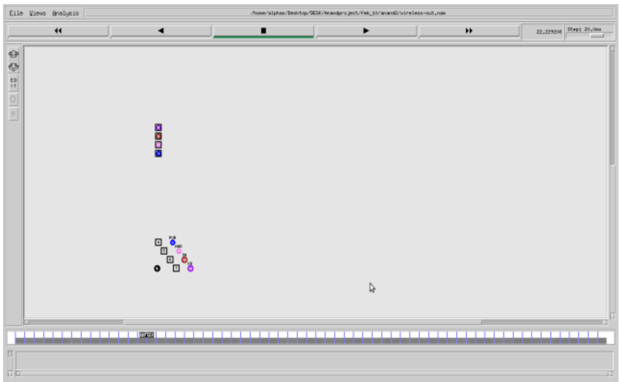

Figure II. Players are at running position

All the athletes started running. Athlete 3 runs at first position, athlete 2 runs at second position, athlete 1 runs at third position, and athlete 0 runs at fourth position. Approximately they cross 120 meter as shown in figure 3. In this track field of 200 meter, now Punjab state player runs first, Haryana state player runs second, Tamil Nadu state player runs third and Karnataka state player runs last as shown in Figure IV.

Figure III. Athletes cross 100 meter

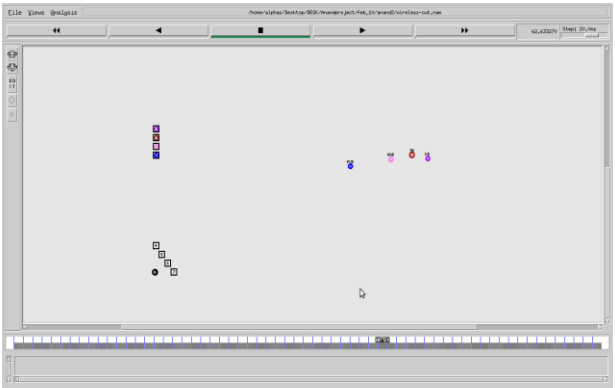

Figure IV. Athletes cross 200 meters

At any stage, the position of the athletes may change simultaneously and any one can complete first at the final. As of now Punjab athlete runs at first position and Haryana state athlete runs second, Tamil Nadu state athlete runs third and Karnataka state athlete runs last as shown in figure V. Punjab athlete reached the line and other three state athlete are running for their position as shown in figure VI.

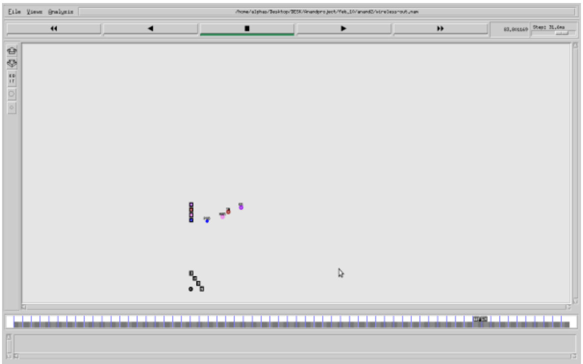

Figure V. Athletes are going to reach final stage

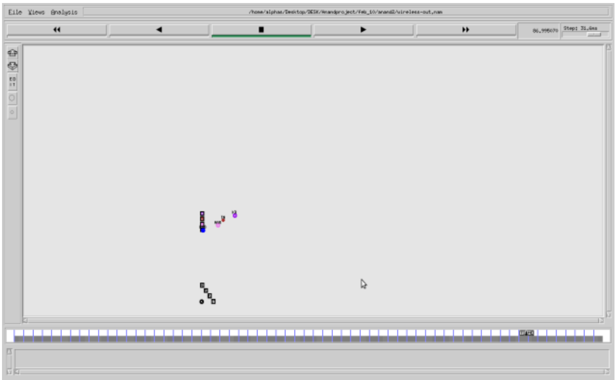

Figure VI. One athlete finished the line

Three state athletes from Punjab, Haryana, Tamil Nadu athletes finished the line and Karnataka athlete is in his final stage as shown in figure VII. All the athletes reached 300 meters track and finishing line as shown in figure VIII.

Figure VII. Three athletes finished the line

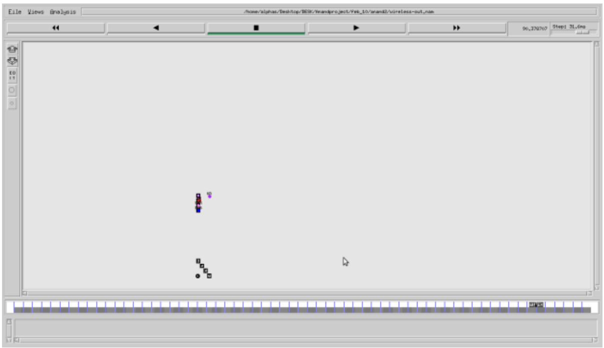

Figure VIII. All the athletes finished the line

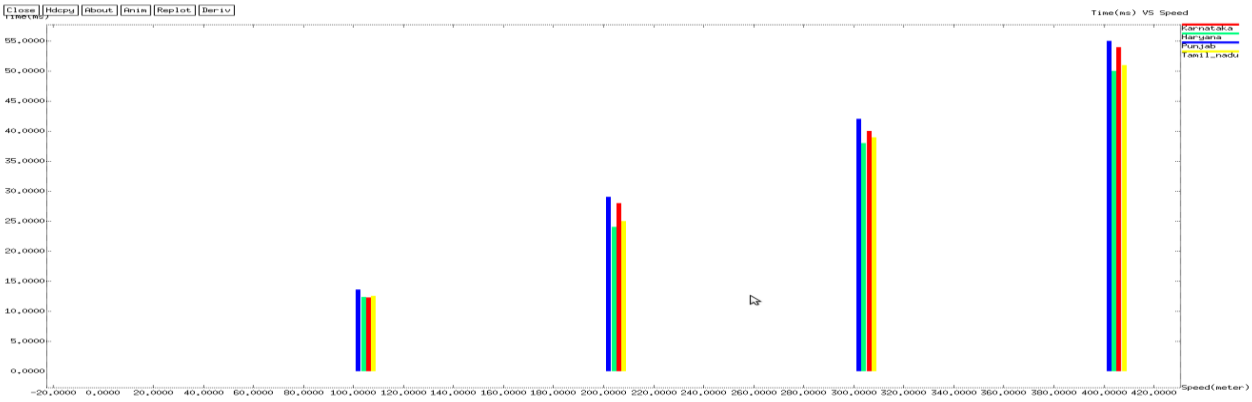

Figure IX. Graph **of** athlete's performance

Table I. Table reading of Government School-Ootteri (Chennai) for Ninth standard student

Athlete	100m	200m	300m
1	12:35sec	24 sec	38 sec
2	12:50 sec	25 sec	39 sec
3	12:30 sec	28 sec	40 sec
4	13:55 sec	29 sec	42 sec

Table II. Reading of II-M.P.Ed Students from Physical Education Department, Tamil Nadu Physical Education and Sports University, Chennai.

Athlete	100m	200m	300m
1	16 sec	34 sec	1:12 sec
2	16 sec	35 sec	1:16 sec
3	16:01 sec	33 sec	50:05 sec
4	20:05 sec	38 sec	56:01 sec

Conclusion

In this paper, the supporting environment of group pace-training for runners with wireless sensor network is taken into consideration. This sensor network was implemented by tiny sensor with ad-hoc radio communication. As to radio communication, we'll try to conduct the experiment under more realistic environment. A training-support environment for runners with wearable support equipments of the awareness and mobile sensor network was proposed. The system provides feedback to runners by providing information using kinetic feature and ambient change from sensors in the real-time.

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