**Title of the Invention:**

**Abstract Title:**

**Abstract**

A system is described for automated sports data collection and analytics. Different types of data, for example but not limited , movement data, punch count, punch classification are collected via video analysis in real time during a sports activity and transmitted to a cloud based platform together with other sports data including but not limited to timing, scoring, statistics, and events with a time code. The cloud based platform is optimised to compile correlate and organize various data related to the sports activity; store query and retrieve various live data and historical data and provide analytics and intelligence to different parties involved in a sports activity such as, but not limited to, Coaches, TV, Radio and Online Broadcasters, displays, viewers, social media and fans. These different parties may subscribe to licensed access to the cloud-based platform for customised real time data feeds for their event\broadcast.

A user interface is described

SYSTEMS and METHODS for AUTOMATED SPORTS DATA COLLECTION AND ANALYTICS PLATFORM

CROSS-REFERENCES TO RELATED APPLICATIONS

**BACKGROUND OF THE INVENTION**

1. **TECHNICAL FIELD**

The present invention is directed to systems and methods for sports data collection, analytics and applications available as a service over a distributed network and remote users having access to a data and analytics platform.

1. **Description of the Prior Art**

Many currently available data capture methods are either (i) intrusive to the athletes performance or Collected manually by watching the event or event footage and entered into a database. Nearly all statistics are generated via human annotation where specialists use video play and pause function to manually collect raw statistics.

Traditional video recording techniques have certain limitations, such as insufficient viewing angles, moving camera

angles and zooms, non-calibrated images, and absence of tagged objects.

Recent advances in object tracking tools and various wearable monitoring devices have spawned the need for novel quantitative and timely data analysis tools that are customizable and equipped to provide easy to understand results and intelligent information.

By way of example the following are relevant prior art documents relating to sports data inputs, collection, analytics and application:

[0011] U.S. Publication No. 2015/0149837 for "METHOD, APPARATUS, AND   
  
COMPUTER PROGRAM PRODUCT FOR COLLECTING AND DISPLAYING SPORTING EVENT DATA BASED ON REAL TIME DATA FOR PROXIMITY AND MOVEMENT OF OBJECTS" by inventor Rodrigo Alonso et al, filed October 24, 2014, describes a method, apparatus and computer program product for collecting sporting event data based on real time data for proximity and movement of objects. In the context of a method, the method includes calculating a tag data filter parameter for a plurality of tag events based on received tag blink data and tag location data, wherein the tag data filter parameter comprises a blink period, distance span, or velocity, calculating a participant location data adjustment factor based on the tag data filter parameter, and calculating multidimensional player location information per unit time based on the plurality of tag events and the participant location adjustment factor.

In competitive combat sporting environments like boxing, the statistics on a boxer's performance, including the amount and type of punches thrown, provide a valuable source of data and feedback which is routinely used for coaching and performance improvement purposes. This paper presents a robust framework for the automatic Classification of a boxer's punches. Overhead depth imagery is employed to alleviate challenges associated with occlusions, and robust body-part tracking is developed for the noisy time-of-flight sensors. Punch recognition is addressed through both a multi-class SVM and Random Forest classifiers. coarse-to-fine hierarchical SVM classifier is presented based on prior knowledge of boxing punches. This framework has been applied to shadow boxing image sequences taken at the Australian Institute of Sport with 8 elite boxers. Results demonstrate the effectiveness of the proposed approach, with the hierarchical SVM classifier yielding a 96% accuracy, signifying its suitability for analysing athletes punches in boxing bouts.

**DRAWINGS**

**CLAIMS**

**Claim 1:**

What is claimed is:  
1. A system for data collection and analytics for a sports activity, comprising:  
a cloud based server platform  
wherein the multiplicity of sensors and the multiplicity of user devices are operable for network communication with the server platform;  
wherein the multiplicity of sensors are operable to collect and communicate in real time or near real time sports data related to the sports activity and players in the sports activity to the server platform;  
wherein the sports data comprises a multiplicity of data inputs from the multiplicity of sensors;  
wherein each of the multiplicity of data inputs has a corresponding time code;  
wherein the server platform is operable to aggregate, correlate, integrate, synchronize, and analyze the sports data, thereby creating analyzed data;  
wherein the multiplicity of user devices are operable to access the analyzed data.

Punch Classification

This section describes a punch sequence and the classification strategy. In order to reduce dimensionality of the recognition problem and consistency of the scale and a boxers speed, punch sequences. Each punch sequence is sampled to extract key frames which characterize the type of each punch.

In most recent research on activity recognition

Punch Classification Accuracy

1) Jab – The most important punch in boxing is the jab. It’s a punch that is throw with the lead hand from a stance positive. It’s the weakest punch but the most effective as it allows you to set up power punches and also to keep your opponent at bay. Some fighters have very strong jabs which stuns their opponents while others have a pawing jab, which does nothing more than gauging distance.

2) Cross – A cross is a straight punch thrown from the back hand from a stance position. Of all the power punches, this is the most effective from a distance because it travels in a straight line which means that it’ll hit the target quicker. The ‘one two’ is a classic combination of a jab followed by a cross.

3) Hook – The hook is a semi-circular punch that is aimed to land at your opponents side. It’s a punch that can generate a lot of power and increases the chance of a knock down or knock out because sometimes your opponent cannot see the punch coming (often referred to as their blindside).

4) Uppercut – An uppercut punch rises from the bottom and is usually used when your opponent puts their head too low or in front of their lead foot. It’s also a risky punch because if you miss, you’ll be off balance and leave yourself open to counter punches.

5) Overhand – The overhand is a punch thrown with your back hand and travels over your head in a looping fashion. It’s a wide and dangerous punch that requires good timing to land because it’s easier to see this punch coming from a distance.

**Documents considered to be relevant:**

[0016] U.S. Patent No. 8,079,247 for "Impact detection system" by inventor Brian Keith Russell et al., filed June 12, 2008, describes an impact detection system providing a means of sensing, monitoring and recording impact events on an impact surface using at least one sensor that is incorporated into the impact surface. The sensor(s) can be integral with, attached to or located behind various types of impact surface including various types of garments that can be worn by an individual or on composite materials such as an aircraft fuselage for example. The impact detection system includes a portable impact detection device electrically connected to the sensor(s) and is used to detect ballistic or non-ballistic type impacts on the impact surface. The portable impact detection device processes the impact data detected by the sensor(s) and stores the data for analysis at a later time or outputs the data to a third party system for review and/or analysis.

[0007] U.S. Patent No. 8,989,880 for "Performance analytics based on real-time data for proximity and movement of objects" by inventor Michael A. Wohl et al., filed July 15, 2013, describes Systems, methods, apparatuses, and computer readable media are disclosed for providing performance analytics using dynamics/kinetics models based on role data or weather data and real time data on movement and proximity of tagged objects. In one embodiment, a method is provided for monitoring a participant that at least includes correlating at least one tag to the participant; receiving blink data transmitted by the at least one tag; and determining tag location data based on the blink data. The method further includes receiving participant role data; comparing the tag location data to participant dynamics/kinetics models based at least in part on the participant role data; and determining participant location data based on the comparing the tag location data to the participant dynamics/kinetics models.

Punches

Total Punches Landed\Thrown

Boxer 1

Boxer 2