

(19) 日本国特許庁(JP)

(12) 公表特許公報(A)

(11) 特許出願公表番号

特表2004-538053

(P2004-538053A)

(43) 公表日 平成16年12月24日(2004.12.24)

| | | |
|----------------------------|----------------------|-------------|
| (51) Int. Cl. ⁷ | F I | テーマコード (参考) |
| A 6 1 B 5/00 | A 6 1 B 5/00 1 O 2 C | 4 C O 2 7 |
| A 6 1 B 5/04 | A 6 1 B 5/00 D | 4 C O 3 8 |
| A 6 1 B 5/0408 | A 6 1 B 5/04 R | 4 C 1 1 7 |
| A 6 1 B 5/0452 | A 6 1 B 5/08 | |
| A 6 1 B 5/0478 | A 6 3 B 24/00 | |

審査請求 有 予備審査請求 有 (全 40 頁) 最終頁に続く

(21) 出願番号 特願2003-504831 (P2003-504831)
 (86) (22) 出願日 平成14年6月19日 (2002.6.19)
 (85) 翻訳文提出日 平成15年12月18日 (2003.12.18)
 (86) 国際出願番号 PCT/US2002/019713
 (87) 国際公開番号 W02002/102240
 (87) 国際公開日 平成14年12月27日 (2002.12.27)
 (31) 優先権主張番号 60/299, 602
 (32) 優先日 平成13年6月19日 (2001.6.19)
 (33) 優先権主張国 米国 (US)

(71) 出願人 503465959
 デジタル スポーツ メディア
 アメリカ合衆国 カリフォルニア 904
 01, サンタ モニカ, アパートメン
 ト 9, 12ティーエイチ ストリート
 1317
 (71) 出願人 503465960
 ハリス, ショウン
 アメリカ合衆国 カリフォルニア 904
 01, サンタ モニカ, アパートメン
 ト 9, 12ティーエイチ ストリート
 1317

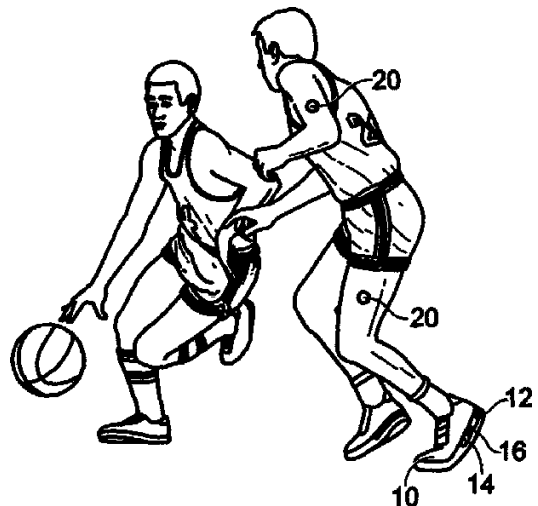
最終頁に続く

(54) 【発明の名称】 生理学的モニタリングおよびシステム

(57) 【要約】

本発明により提供されるのは、リアルタイム生理学的データを1人以上のユーザから収集し、データを遠隔データベースに無線で送信する生理学的モニタリングシステムである。遠隔データベースはアクセス可能であり、運動選手のパフォーマンスを評価するために、格納されたデータが利用される。システムはまた、競技場またはコート上での運動選手の正確な位置を判定し、送信するために、位置センサ(12)を含み得る。ある実施形態において、システムは、力、歩幅、一步の瞬発力、歩みの回転数、および速度を測定するセンサが埋め込まれた靴を含む。運動選手はまた、脈拍、心拍数、血中酸素飽和度、体表温度、および選択された筋肉活動の時間的なパターンなどの生理学的機能の測定のために、電極、例えば、無線表面筋電計測法ボタン電極を装着する。

【選択図】 図3



【特許請求の範囲】

【請求項 1】

ユーザと通信する少なくとも 1 つの生理学的センサであって、該ユーザの生理学的機能を検出し、該生理学的機能に応答する生理学的データ信号を生成するように適合された、少なくとも 1 つの生理学的センサと、
該少なくとも 1 つのセンサと通信するモニタであって、該センサから該生理学的データ信号を受信し、該生理学的データ信号を送信するように適合されたモニタと、
該モニタと通信する、データ受信器 / 送信器と、
該データ受信器 / 送信器と通信する、データベースと
を備える、生理学的モニタリングシステム。

10

【請求項 2】

前記データ受信器 / 送信器と無線通信する前記モニタをさらに備える、請求項 1 に記載の生理学的モニタリングシステム。

【請求項 3】

前記モニタと無線通信する前記少なくとも 1 つのセンサをさらに備える、請求項 1 に記載の生理学的モニタリングシステム。

【請求項 4】

遠隔データベースと通信する前記データ受信器 / 送信器をさらに備える、請求項 1 に記載の生理学的モニタリングシステム。

【請求項 5】

インターネットを介して、前記データベースと無線通信する前記データ受信器 / 送信器をさらに備える、請求項 4 に記載の生理学的モニタリングシステム。

20

【請求項 6】

アナログ生理学的信号をデジタル信号に変換するように適合されたアナログ / デジタル変換器をさらに備える、請求項 1 に記載の生理学的モニタリングシステム。

【請求項 7】

前記データベースは複数のユーザについてのファイルを含む、請求項 1 に記載の生理学的モニタリングシステム。

【請求項 8】

前記少なくとも 1 つのセンサは、心拍数、呼吸数、血中酸素濃度、筋肉活動、体表温度、体温および体表温度からなる群から選択される、少なくとも 1 つの生理学的機能を検出する、請求項 1 に記載の生理学的モニタリングシステム。

30

【請求項 9】

前記モニタは、前記少なくとも 1 つのセンサから受信した前記少なくとも 1 つの生理学的データ信号を格納するメモリを含む、請求項 1 に記載の生理学的モニタリングシステム。

【請求項 10】

前記モニタは、ユーザの靴に配置される、請求項 1 に記載の生理学的モニタリングシステム。

【請求項 11】

前記モニタは、前記ユーザが装着する、請求項 1 に記載の生理学的モニタリングシステム。

40

【請求項 12】

前記データベース内のデータは、リアルタイムでアクセスされ得る、請求項 1 に記載の生理学的モニタリングシステム。

【請求項 13】

前記データベースは、前記ユーザおよび前記データ受信器 / 送信器から遠隔の位置からアクセスされ得る、請求項 1 に記載の生理学的モニタリングシステム。

【請求項 14】

第 1 のユーザに近接する第 1 の受信器と、
該第 1 の受信器と通信する少なくとも 1 つの送信器と、

50

該第 1 の受信器と通信する信号プロセッサであって、該第 1 のユーザの該少なくとも 1 つの送信器との相対的な位置を特定する第 1 の位置判定信号を生成するように適合された信号プロセッサと、

該信号プロセッサと通信するデータ受信器 / 送信器であって、該信号プロセッサから該第 1 の位置判定信号を受信するように適合されたデータ受信器 / 送信器と、

該データ受信器 / 送信器と通信するデータベースと

を備える、少なくとも 1 人のユーザの位置を判定するシステム。

【発明の詳細な説明】

【技術分野】

【0001】

10

(関連出願との相互参照)

本願は、2001年6月19日に出願された米国仮特許出願第60/299,602号の一部継続出願である。先願の優先権は明示的に主張され、その全文が本明細書中で参考として援用される。

【背景技術】

【0002】

近年、プロスポーツおよびアマチュアスポーツは、運動選手のパフォーマンスを向上させ、その実体を改善するために、進化した技術の力を利用し始めてきた。今日までの進歩の大部分は、進化したサプリメントおよび食事療法を運動選手に提供することに焦点が当てられてきた。行われてきた改善は非常に有益であったが、リアルタイム生理学的データを 20
利用する、進化したトレーニングツールを運動選手に提供することによってトレーニング構造をさらに充実させられる見込みが大幅に残っている。

20

【発明の開示】

【発明が解決しようとする課題】

【0003】

運動選手の生理学的データをモニタリングする現在の方法は、運動選手の体温および呼吸などの機能の周期的なテストまたはモニタリングを必要とする。このようなデータは、有用ではあるが、運動選手の調整またはパフォーマンスの評価において最も有用となり得る、正確な時間的情報を提供しない。

【課題を解決するための手段】

30

【0004】

(発明の要旨)

本発明は、1人または複数の運動選手から生理学的および/または位置情報を収集し、その運動選手に固有の情報データベースを維持するシステムを含む。

【0005】

ある実施形態において、システムは、力、歩幅、一步の瞬発力、歩みの回転数、および速度を測定するセンサが埋め込まれた靴を含む。運動選手はまた、脈拍、心拍数、血中酸素飽和度、体表温度、および選択された筋肉活動の時間的なパターンなどの生理学的機能の測定のために、電極、例えば、無線表面筋電計測法ボタン電極を装着する。センサが入手したデータは、ある好ましい実施形態において、同様に靴の中に配置されるか、または、 40
ユーザが他の位置に装着する、マイクロプロセッサに送信される。マイクロプロセッサは送信器を含み、データ受信器と、あるいは、競技場またはコートの上に位置する1つ以上のアンテナと無線通信する。収集されたデータは、Bluetooth(登録商標)などの標準的なプロトコルを用いて、アンテナに送信され、アンテナからホストサーバへと送信される。生理学的データを受信することに加えて、アンテナは、送信器の各プレーヤーに対する相対的な角度位置を判定するように適合される。ホストサーバは、この位置情報を受信し、各プレーヤーの位置を判定する。ホストサーバは、各プレーヤーについて受信したデータを処理し、データを各運動選手についてのファイルを含むデータベースに送信するようにプログラムされる。

40

【0006】

50

データベースは、自動的に、ホストサーバから受信した各運動選手の生理学的データおよび位置データで占められる。好適な実施形態において、データは、セキュリティおよびプライバシーのため、暗号化される。好適な実施形態において、データベースは、インターネット接続を介してアクセス可能であり、運動選手の身体的能力および複数の運動選手のパフォーマンスの評価において用いられるようにリアルタイムで利用可能である。例えば、試合または練習の間に、コーチは、ある特定のプレーの直後にデータベースにアクセスして、プレーヤーのパフォーマンスおよびプレー中のフィールドまたはコートでのポジショニングを評価することができる。

【0007】

ホストサーバはまた、リアルタイム無線機能の代わりに用いられる取り外し可能な格納装置を含み得る。これによって、無線アクセスポイントの領域外の運動選手が、システムを用いることが可能になる。これは、ランナー、バイク選手、およびアクセスポイントの領域外でトレーニングを行い得るその他の選手にとって、有用であり得る。このシナリオにおいて、1回のトレーニングが終了すると、その後、ユーザは、データをPCにダウンロードし、インターネットを介してデータベースにダウンロードする。

10

【発明を実施するための最良の形態】

【0008】

本発明のこれらの局面および他の局面が、以下で、図面を参照しながら説明される。

【0009】

次に、図1~3を参照すると、本発明のある好適な実施形態は、1人または複数の運動選手から、生理学的な情報を収集し、その運動選手に固有の情報のデータベースを維持するシステムを含む。データベース内の情報はリアルタイムでアクセスされ得、無線ネットワークが用いられて、生理学的センサ、モニタ、データベース、および、ユーザインターフェースを含む構成要素が接続される。これらの構成要素は、運動選手およびトレーナーによって用いられるように、リアルタイム位置データおよび/または生理学的データを、データベースに無線で送達する。このシステムは、目標と、目標に対して見積もられたパフォーマンスとに基づき、運動選手およびトレーナーに分析および指導を提供するために用いられ得る。

20

【0010】

図1に模式的に示すある実施形態において、システムは、力、歩幅、一步の瞬発力、歩みの回転数、および/または速度を測定するセンサ12が埋め込まれた靴10を含む。センサは、好ましくは、靴のフットベッド(f o o t e d)の下にある剛性のプレートまたは半剛性のプレート14に、搭載されるか、または埋め込まれる。センサは、データを受信し、アナログ信号をデジタル信号に変換し、デジタル信号を1つ以上の受信器またはアンテナ18に送信するマイクロプロセッサ/コントローラ16と通信する。他の好適な実施形態において、データは、マイクロプロセッサ/コントローラによって、または、ユーザが携帯するか、もしくは装着する他のメモリデバイスに、または、受信器18によって一時的に格納され得る。この実施形態は、低電力送信器またはアンテナの領域を超えたところまで活動し得る長距離ランナーまたはスキーヤーのような運動選手にとって、特に有用である。ある実施形態において、受信器は、競技場またはコートの周りに位置する複数のアンテナを含む。他の実施形態において、受信器は、ラップトップコンピュータ、PDA、または3G携帯電話であってもよい。データの送信は、好ましくは、Bluetooth(登録商標)プロトコルを用いて達成される。

30

40

【0011】

靴に埋め込まれたセンサに加えて、または靴に埋め込まれたセンサの代わりに、運動選手は、テープで皮膚に留められた無線表面筋電計測法ボタン電極のような電極20(図2)を装着し得、脈拍、心拍数、血中酸素飽和度、体表温度、および選択された筋肉活動の時間的なパターンなどの生理学的機能が測定される。このようなセンサは、手足の動きおよび一連の運動を測定し、モニタリングするために用いられ得る。センサが入手したデータは、同様に靴に配置されるか、または、ユーザが他の位置に装着する、マイクロプロセッ

50

サ 1 6 に無線で送信される。これらのセンサから受信した生理学的データは、靴に搭載されたセンサについて上述したように処理される。

【 0 0 1 2 】

団体競技に特に適するある好適な実施形態において、マイクロプロセッサ/コントローラ 1 6 は、競技場またはコートの上に位置する 1 つ以上の指向性アンテナ 1 8 (図 1) と無線で通信する。指向性アンテナとは、送信器のアンテナとの相対的な角度位置を判定し得るアンテナを意味する。収集されたデータは、Bluetooth (登録商標) などの標準的なプロトコルを用いて、マイクロプロセッサによってアンテナに送信される。しかし、本発明は、これらに限定されない。アンテナが受信したデータは、ホストサーバに送信される。上述したように、ある好適な実施形態において、アンテナは、アンテナの各プレーヤーに対する相対的な角度位置を判定するように、適合される。ホストサーバは、この位置情報を受信し、グローバルポジショニングシステムにおいて利用されている原理と類似の方法で、フィールドまたはコート上の各プレーヤーの位置を判定する。この時間的な位置情報はまた、リアルタイムで、または後で視るために、データベースに送信され得る。

10

【 0 0 1 3 】

ホストサーバ 2 2 は、各プレーヤーについて受信したデータを処理し、各運動選手についてのファイルを含むデータベースにデータを送信するようにプログラムされる。位置情報の場合、ファイルはまた、特定のシナリオにおいて、予め選択された対象となるプレーヤーのグループ、例えば、フットボールチームの攻撃ラインまたは守備ラインについて作成され得る。データベースは、自動的に、ホストサーバから受信したときに、各運動選手、または運動選手のグループの生理学的データおよび位置データで占められる。好適な実施形態において、データは、セキュリティおよびプライバシーのために、暗号化される。

20

【 0 0 1 4 】

好適な実施形態において、データベースは、遠隔の場所で維持され、インターネット接続を介してアクセス可能であり、運動選手または所望の運動選手のグループの身体的能力の評価において用いられるようにリアルタイムで利用可能である。例えば、試合または練習の間に、コーチは、ある特定のプレーの直後にデータベースにアクセスして、プレーヤーのパフォーマンスおよびプレー中のフィールドまたはコートでのポジショニングを評価することができる。他の例として、各プレーヤーの生理学的機能は、試合の経過、または活動を通じてモニタリングされ、疲労がモニタリングされ得る。

30

【 0 0 1 5 】

マイクロプロセッサ/コントローラまたはホストサーバはまた、運動選手のパフォーマンスの間のデータ格納用のメモリを含み得る。この機能は、アンテナまたは受信装置の領域外の運動選手が、データを収集し、その後、データをデータベースに送信することを可能にする。これは、ランナー、バイク選手、および、アクセスポイントの領域外でトレーニングを行い得るその他の選手にとって、有用であり得る。このシナリオにおいて、1 回のトレーニングが終了すると、その後、ユーザは、データを PC、3 G 携帯電話または PDA にダウンロードし、インターネットを介してデータベースにダウンロードする。

【 0 0 1 6 】

データベースに入った後、各運動選手についてのデータは、活動の性質に従って、アクセスおよび利用され得る。個人競技の運動選手は、トレーニングの間の進歩をたどるか、または心拍数またはスプリットタイムなどの個々の能力パラメータを評価するためにデータベースを利用し得る。チームは、チームのプレーぶりにおける弱点を突き止めるか、プレー中に、もしくはオフシーズンの中に遠隔地から、チームの選手の身体的調整を追跡するために情報を用い得る。本発明の興味深い他の局面として、プレーヤー位置情報は、試合の放送中にプレーを再構築し、試合中のチームまたは個人の運動選手のいずれかによる重要なプレーを強調するために、放送メディアによって用いられ得る。本発明はまた、特定の時刻におけるプレーヤーのフィールド上での位置を判定する、プレーの調整にも適用され得る。

40

50

【 0 0 1 7 】

本発明のこれらの特徴および他の特徴が、上記の好適な実施形態を参照しながら説明されてきたが、当業者であれば、添付の特許請求の範囲から逸脱することなく、本発明の細部および構成に対して多くの変更が可能であることを理解する。

【 図面の簡単な説明 】

【 0 0 1 8 】

【 図 1 】 図 1 は、本発明によるシステムの模式図である。

【 図 2 】 図 2 は、センサプレートおよびマイクロプロセッサ/コントローラを模式的に示す、本発明による、靴の模式的断面図である。

【 図 3 】 図 3 は、本発明の好適な実施形態による、コート上のセンサを装着したプレーヤーの斜視図である。 10

【国際公開パンフレット】

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
27 December 2002 (27.12.2002)

PCT

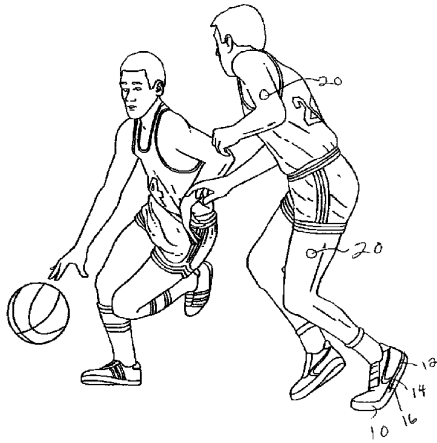
(10) International Publication Number
WO 02/102240 A2

- (51) International Patent Classification⁷: **A61B** Apartment 9, Santa Monica, CA 90401 (US), **JOYNER, Seth** [US/US]; 7755 N. 71st Street, Paradise Valley, AZ 85253 (US).
- (21) International Application Number: PCT/US02/19713
- (22) International Filing Date: 19 June 2002 (19.06.2002) (74) Agent: **GLENN C. BROWN, P.C.**; 777 N.W. Wall Street, Suite 308, Bend, OR 97701 (US).
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 60/299,602 19 June 2001 (19.06.2001) US (81) Designated States (*national*): AF, AG, AI, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GI, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SF, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.
- (71) Applicant (*for all designated States except US*): **DIGITAL SPORTS MEDIA** [US/US]; 1317 12th Street, Apartment 9, Santa Monica, CA 90401 (US). (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, [Continued on next page]
- (71) Applicants and (72) Inventors: **HARRIS, Shawn** [US/US]; 1317 12th Street,



WO 02/102240 A2

(54) Title: PHYSIOLOGICAL MONITORING AND SYSTEM



(57) Abstract: A physiological monitoring system that collects real time physiological data from one or more users and wirelessly transmits the data to a remote data base. The remote data base is accessible to utilize the stored data to assess the athlete's performance. The system can also include position sensors to determine and transmit an athlete's precise location on an playing field or court.

WO 02/102240 A2 

GB, GR, IL, IT, LU, MC, NL, PT, SI, TR), OAPI patent
(BI, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NT, SN, TD, TG).

Published:
— without international search report and to be republished
upon receipt of that report

Declaration under Rule 4.17:
of inventorship (Rule 4.17(iv)) for US only

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 02/102240

PCT/US02/19713

PHYSIOLOGICAL MONITORING AND SYSTEM

CROSS REFERENCE TO RELATED APPLICATION

The present application is a continuation in part of U.S. provisional patent application Serial No. 60/299,602, filed on June 19, 2001. The priority of the prior application is expressly claimed and its disclosure is hereby incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

In recent years professional and amateur sports have begun to exploit the power of technological advancements to enhance athlete's performance and better their entities. The majority of progress made, to date, has been focused on providing athletes with advanced supplements and diet regimens. While the improvements made are incredibly beneficial, there remains greater opportunity to further enrich the training structure by providing athletes with advanced training tools based on real-time physiological data.

Current methods of physiological data monitoring of athletes require periodic testing or monitoring of the athlete's functions such as temperature and respiration. While useful, such data do not provide the precise temporal information that would most useful in assessing an athlete's conditioning or performance.

SUMMARY OF THE INVENTION

This invention includes a system that collects physiological and/or location information from one or multiple athletes, and maintains a data base of information specific to that athlete.

PAGE 2 OF DESCRIPTION WAS NOT FURNISHED UPON FILING

WO 02/102240

PCT/US02/19713

3

In one embodiment the system includes a shoe with embedded sensors that measure force, stride length, foot strike, stride frequency, and speed. The athlete also wears electrodes, such as wireless Surface Electromyography button electrodes, to measure physiological functions such as pulse, heart rate, blood oxygen saturation, skin temperature, and the temporal patterns of selected muscle activity. The data acquired by the sensors are transmitted to a microprocessor that in one preferred embodiment is also located in the shoe, or which is worn in another location by the user. The microprocessor includes a transmitter, and is in wireless communication with a data receiver or alternatively, one or more antennae that are located around the playing field or court. The collected data is transmitted to the antennae, and from the antennae to a host server using a standard protocol such as Bluetooth®. In addition to receiving the physiological data, the antennae are adapted to determine the relative angular location of the transmitter with respect to each player. The host server receives this location information and determines the location of each player. The host server is programmed to process the data received for each player, and transmits the data to a data base that includes files for each athlete.

The data base is automatically populated with each athlete's physiological and location data received from the host server. In preferred embodiments the data is encrypted for security and privacy. In a preferred embodiment the data base is accessible via an internet connection, and is available real time for use in assessing the physical performance of the athlete, and the performance of multiple athletes. For example, during a game or a practice a coach could access the data base

immediately after a particular play, and evaluate players' performance and positioning on the field or court during the play.

The host server can also include removable storage to be used instead of the real time wireless capability. This permits athletes out of range of a wireless access point to use the system. This will be useful for runners, bikers, and others who may be training out of range of an access point. In this scenario when the training session is done the user then downloads the data to a PC and then thru the Internet to the database.

These and other aspects of the invention will now be described by reference to the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic diagram of a system according to the invention.

Fig. 2 is a schematic cross-sectional view of a shoe according to the invention, and showing schematically the sensor plate and microprocessor/controller.

Fig. 3 is a perspective view of players on a court and wearing sensors according to a preferred embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to Fig.'s 1-3, one preferred embodiment of the invention includes a system that collects physiological information from one or multiple athletes, and maintains a data base of information specific to that athlete. The information in the data base can be accessed real time, uses a wireless network to connect components including physiological sensors, a monitor, a database and user interfaces. These components wirelessly deliver real time location and/or

physiological data to the database for the use of athletes and trainers. The system can be used to provide analysis and guidance to the athlete and trainer based on goals and performance measured against goals.

In one embodiment shown schematically in Fig. 1, the system includes a shoe 10 with embedded sensors 12 that measure force, stride length, foot strike, stride frequency, and/or speed. The sensors are preferably mounted or embedded in a rigid or semi rigid plate 14 that underlies the footbed of the shoe. The sensors are in communication with a microprocessor/controller 16 that receives the data, converts analog signals to digital signals, and transmits the digital signals to one or more receivers or antennae 18. In other preferred embodiments, the data can be temporarily stored by the microprocessor/controller, or on another memory device carried or worn by the user, or by the receiver 18. This embodiment is particularly useful for athletes such as long distance runners or skiers whose activities would take them beyond the range of low power transmitters or antennae. In one embodiment the receiver includes a plurality of antennae located around the playing field or court. In an alternate embodiment, the receiver can be laptop computer, PDA, or 3G cell phone. The transmission of data is preferably accomplished using Bluetooth® protocol.

In addition to or instead of the shoe embedded sensors, the athlete can wear electrodes 20 (Fig. 2), such as wireless Surface Electromyography button electrodes, taped to their skin to measure physiological functions such as pulse, heart rate, blood oxygen saturation, skin temperature, and the temporal patterns of selected muscle activity. Such sensors can be used to measure and monitor limb movements and

motion sequences. The data acquired by the sensors are wirelessly transmitted to the microprocessor 16, which is also located in the shoe, or which is worn in another location by the user. The physiological data received from these sensors is processed as described above with respect to the shoe-mounted sensors.

In one preferred embodiment that is particularly suited to team sports, the microprocessor/controller 16 is in wireless communication with one or more directional antennae 18 (Fig. 1) that are located around the playing field or court. By directional antennae we mean antennae that can determine the angular position of the transmitter relative to the antenna. The collected data is transmitted by the microprocessor to the antennae using a standard protocol such as Bluetooth®, although the invention is not intended to be so limited. The data received by the antennae are transmitted to a host server. As mentioned above, in one preferred embodiment the antennae are adapted to determine the relative angular location of the antennae with respect to each player. The host server receives this location information and by methods similar to those principles utilized in global positioning systems, determines the location of each player on the field or court. This temporal location information can also be transmitted to the data base for real time or delayed viewing.

The host server 22 is programmed to process the data received for each player, and transmits the data to a data base that includes files for each athlete. In the instance of location information, a file can also be created for a pre-selected group of players of interest in a particular scenario, e.g. the offensive or defensive line of a football team. The data base is automatically populated with each athlete's

WO 02/102240

PCT/US02/19713

7

or group's physiological and location data when received from the host server. In preferred embodiments the data is encrypted for security and privacy.

In a preferred embodiment the data base is maintained on a remote site and is accessible via an internet connection, and is available real time for use in assessing the physical performance of the athlete or a desired group of athletes. For example, during a game or a practice a coach could access the data base immediately after a particular play, and evaluate players' performance and positioning on the field or court during the play. As another example, each player's physiological functions can be monitored through the course of the game or activity to monitor fatigue.

The microprocessor/controller or host server can also include memory for data storage during the athlete's performance. This feature permits athletes out of range of an antennae or receiving device to collect the data and later transmit the data to the data base. This will be useful for runners, bikers, and others who may be training out of range of an access point. In this scenario when the training session is done the user then downloads the data to a PC, 3G cellular telephone, or PDA, and then through the internet to the database.

Once in the data base, the data for each athlete can be accessed and utilized according to the nature of the activity. An individual athlete can utilize the data base to track progress during training, or to evaluate individual performance parameters such as heart rate or split times. Teams can use the information to identify flaws in the team's execution of plays, track the physical conditioning of its athletes during play or during the off-season from remote locations. In another interesting aspect of the invention, the player location information can be utilized by broadcast media to

WO 02/102240

PCT/US02/19713

8

reconstruct plays during broadcast of a game, and to highlight key plays by either team or individual athletes during the game. The invention might also have applications in the regulation of play to determine a player's location on the field at a specific time.

While these and other features of the invention have been described with respect to the preferred embodiments described above, those of skill in the art will recognize that numerous modifications in detail and arrangement of the invention are possible without departing from the scope of the following claims.

What is Claimed is:

1. A physiological monitoring system comprising:
at least one physiological sensor in communication with a user and adapted to detect a physiological function of the user and to generate a physiological data signal responsive thereto;
a monitor in communication with the at least one sensor and adapted to receive the physiological data signal therefrom and to transmit the physiological data signal;
a data receiver/transmitter in communication with the monitor; and,
a data base in communication with the data receiver/transmitter.
2. A physiological monitoring system according to claim 1 further comprising the monitor in wireless communication with the data receiver/transmitter.
3. A physiological monitoring system according to claim 1 further comprising the at least one sensor in wireless communication with the monitor.
4. A physiological monitoring system according to claim 1 further comprising the data receiver/transmitter in communication with a remote data base.
5. A physiological monitoring system according to claim 4 further comprising the data receiver/transmitter in wireless communication with the database via the internet.

6. A physiological monitoring system according to claim 1 further comprising an analog to digital converter adapted to convert an analog physiological signal to a digital signal.
7. A physiological monitoring system according to claim 1 wherein the database includes files for a plurality of users.
8. A physiological monitoring system according to claim 1 wherein the at least one sensor detects at least one physiological function selected from the group consisting of heart rate, respiration rate, blood oxygen level, muscle activity, skin temperature, body temperature, and skin temperature.
9. A physiological monitoring system according to claim 1 wherein the monitor includes a memory for storing the at least one physiological data signal received from the at least one sensor.
10. A physiological monitoring system according to claim 1 wherein the monitor is located in the shoe of a user.
11. A physiological monitoring system according to claim 1 wherein the monitor is worn by the user.

WO 02/102240

PCT/US02/19713

11

12. A physiological monitoring system according to claim 1 wherein the data in the database can be accessed real-time.

13. A physiological monitoring system according to claim 1 wherein the database can be accessed from a location remote from the user and the data receiver/transmitter.

14. A system for determining the position of at least one user comprising:
a first receiver proximate to a first user;
at least one transmitter in communication with the first receiver;
a signal processor in communication with the first receiver and adapted to generate a first position defining signal specifying the location of the first user relative to the at least one transmitter;
a data receiver/transmitter in communication with the signal processor and adapted to receive the first position defining signal from the signal processor;
a data base in communication with the data receiver/transmitter.

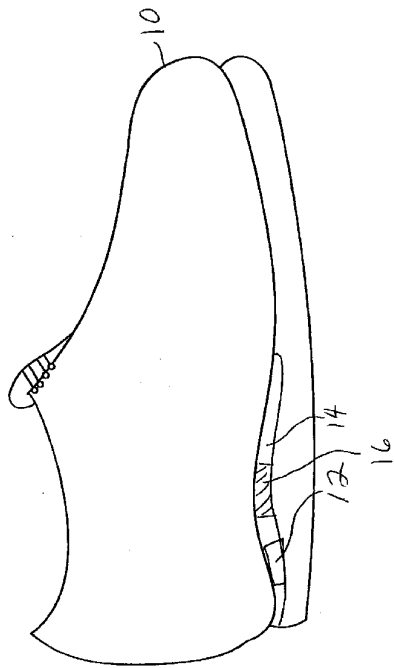


Fig. 2

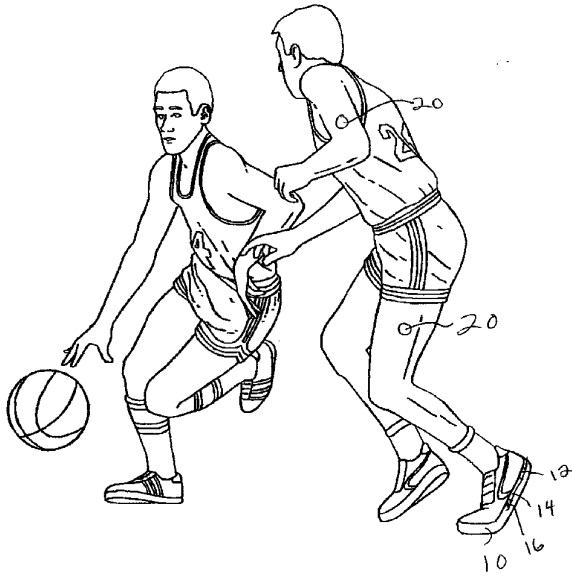


Fig. 3

【国際公開パンフレット(コレクトバージョン)】

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



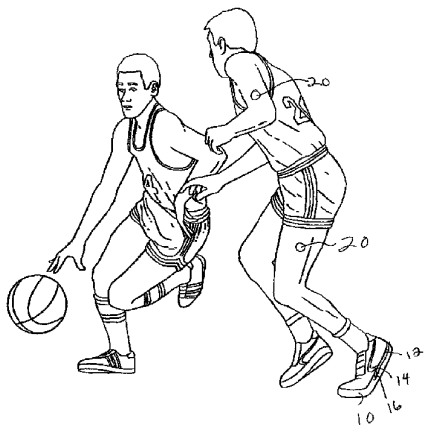
(43) International Publication Date
27 December 2002 (27.12.2002)

PCT

(10) International Publication Number
WO 02/102240 A3

- (51) International Patent Classification: **A61B 5/00** Apartment 9, Santa Monica, CA 90401 (US). **JOYNER, Seth** [US/US]; 7755 N. 71st Street, Paradise Valley, AZ 85253 (US).
- (21) International Application Number: PCT/US02/19713
- (22) International Filing Date: 19 June 2002 (19.06.2002) (74) **Agent: GLENN C. BROWN, P.C.**; 777 N.W. Wall Street, Suite 308, Bend, OR 97701 (US).
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 60/299,602 19 June 2001 (19.06.2001) US (81) **Designated States (national):** AF, AG, AI, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GI, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.
- (71) Applicant (for all designated States except US): **DIGITAL SPORTS MEDIA** [US/US]; 1317 12th Street, Apartment 9, Santa Monica, CA 90401 (US). (84) **Designated States (regional):** ARIPO patent (GH, GM, KR, LS, MW, MZ, SD, SI, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM).
- (71) Applicants and (72) Inventors: **HARRIS, Shawn** [US/US]; 1317 12th Street, [Continued on next page]

(54) Title: PHYSIOLOGICAL MONITORING AND SYSTEM



(57) Abstract: A physiological monitoring system that collects real time physiological data from one or more users and wirelessly transmits the data to a remote data base. The remote data base is accessible to utilize the stored data to assess the athlete's performance. The system can also include position sensors (12) to determine and transmit an athlete's precise location on an playing field or court.



WO 02/102240 A3

WO 02/102240 A3 

European patent (AT, BL, CH, CY, DE, DK, ES, FI, FR, GB, GR, IL, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:
27 February 2003

Declaration under Rule 4.17:
of inventorship (Rule 4.17(iv)) for US only

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:
— *with international search report*

【国際公開パンフレット(コレクトバージョン)】

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

CORRECTED VERSION

(19) World Intellectual Property Organization
International Bureau



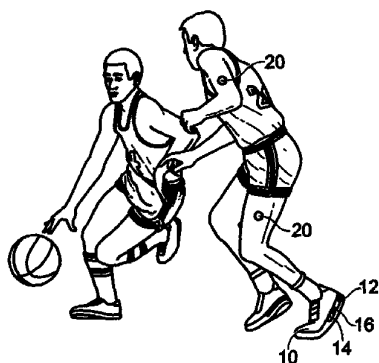
(43) International Publication Date
27 December 2002 (27.12.2002)

PCT

(10) International Publication Number
WO 02/102240 A3

- (51) International Patent Classification: **A61B 5/00**
 - (21) International Application Number: PCT/US02/19713
 - (22) International Filing Date: 19 June 2002 (19.06.2002)
 - (25) Filing Language: English
 - (26) Publication Language: English
 - (30) Priority Data: 60/299,602 19 June 2001 (19.06.2001) US
 - (71) Applicant (for all designated States except US): **DIGITAL SPORTS MEDIA** [US/US]; 1317 12th Street, Apartment 9, Santa Monica, CA 90401 (US).
 - (72) Inventors: **HARRIS, Shawn** [US/US]; 1317 12th Street, Apartment 9, Santa Monica, CA 90401 (US). **JOYNER, Seth** [US/US]; 7755 N. 71st Street, Paradise Valley, AZ 85253 (US).
 - (74) Agent: **GLENN C. BROWN, P.C.**; 777 N.W. Wall Street, Suite 308, Bend, OR 97701 (US).
 - (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.
 - (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SI, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, EG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Declaration under Rule 4.17:**
of inventorship (Rule 4.17(c)) for US only
- [Continued on next page]*

(54) Title: PHYSIOLOGICAL MONITORING AND SYSTEM



(57) Abstract: A physiological monitoring system that collects real time physiological data from one or more users and wirelessly transmits the data to a remote data base. The remote data base is accessible to utilize the stored data to assess the athlete's performance. The system can also include position sensors (12) to determine and transmit an athlete's precise location on an playing field or court.

WO 02/102240 A3

WO 02/102240 A3 

Published:
— with international search report

(15) Information about Correction:
see PCT Gazette No. 15/2003 of 10 April 2003, Section II

(88) Date of publication of the international search report:
27 February 2003

(48) Date of publication of this corrected version:
10 April 2003

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 02/102240

PCT/US02/19713

PHYSIOLOGICAL MONITORING AND SYSTEM

CROSS REFERENCE TO RELATED APPLICATION

The present application is a continuation in part of U.S. provisional patent application Serial No. 60/299,602, filed on June 19, 2001. The priority of the prior application is expressly claimed and its disclosure is hereby incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

In recent years professional and amateur sports have begun to exploit the power of technological advancements to enhance athlete's performance and better their entities. The majority of progress made, to date, has been focused on providing athletes with advanced supplements and diet regimens. While the improvements made are incredibly beneficial, there remains greater opportunity to further enrich the training structure by providing athletes with advanced training tools based on real-time physiological data.

Current methods of physiological data monitoring of athletes require periodic testing or monitoring of the athlete's functions such as temperature and respiration. While useful, such data do not provide the precise temporal information that would most useful in assessing an athlete's conditioning or performance.

SUMMARY OF THE INVENTION

This invention includes a system that collects physiological and/or location information from one or multiple athletes, and maintains a data base of information specific to that athlete.

WO 02/102240

2

PCT/US02/19713

NOT FURNISHED UPON FILING

WO 02/102240

PCT/US02/19713

3

In one embodiment the system includes a shoe with embedded sensors that measure force, stride length, foot strike, stride frequency, and speed. The athlete also wears electrodes, such as wireless Surface Electromyography button electrodes, to measure physiological functions such as pulse, heart rate, blood oxygen saturation, skin temperature, and the temporal patterns of selected muscle activity. The data acquired by the sensors are transmitted to a microprocessor that in one preferred embodiment is also located in the shoe, or which is worn in another location by the user. The microprocessor includes a transmitter, and is in wireless communication with a data receiver or alternatively, one or more antennae that are located around the playing field or court. The collected data is transmitted to the antennae, and from the antennae to a host server using a standard protocol such as Bluetooth®. In addition to receiving the physiological data, the antennae are adapted to determine the relative angular location of the transmitter with respect to each player. The host server receives this location information and determines the location of each player. The host server is programmed to process the data received for each player, and transmits the data to a data base that includes files for each athlete.

The data base is automatically populated with each athlete's physiological and location data received from the host server. In preferred embodiments the data is encrypted for security and privacy. In a preferred embodiment the data base is accessible via an internet connection, and is available real time for use in assessing the physical performance of the athlete, and the performance of multiple athletes. For example, during a game or a practice a coach could access the data base

WO 02/102240

PCT/US02/19713

4

immediately after a particular play, and evaluate players' performance and positioning on the field or court during the play.

The host server can also include removable storage to be used instead of the real time wireless capability. This permits athletes out of range of a wireless access point to use the system. This will be useful for runners, bikers, and others who may be training out of range of an access point. In this scenario when the training session is done the user then downloads the data to a PC and then thru the Internet to the database.

These and other aspects of the invention will now be described by reference to the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic diagram of a system according to the invention.

Fig. 2 is a schematic cross-sectional view of a shoe according to the invention, and showing schematically the sensor plate and microprocessor/controller.

Fig. 3 is a perspective view of players on a court and wearing sensors according to a preferred embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to Fig.'s 1-3, one preferred embodiment of the invention includes a system that collects physiological information from one or multiple athletes, and maintains a data base of information specific to that athlete. The information in the data base can be accessed real time, uses a wireless network to connect components including physiological sensors, a monitor, a database and user interfaces. These components wirelessly deliver real time location and/or

WO 02/102240

PCT/US02/19713

5

physiological data to the database for the use of athletes and trainers. The system can be used to provide analysis and guidance to the athlete and trainer based on goals and performance measured against goals.

In one embodiment shown schematically in Fig. 1, the system includes a shoe 10 with embedded sensors 12 that measure force, stride length, foot strike, stride frequency, and/or speed. The sensors are preferably mounted or embedded in a rigid or semi rigid plate 14 that underlies the footbed of the shoe. The sensors are in communication with a microprocessor/controller 16 that receives the data, converts analog signals to digital signals, and transmits the digital signals to one or more receivers or antennae 18. In other preferred embodiments, the data can be temporarily stored by the microprocessor/controller, or on another memory device carried or worn by the user, or by the receiver 18. This embodiment is particularly useful for athletes such as long distance runners or skiers whose activities would take them beyond the range of low power transmitters or antennae. In one embodiment the receiver includes a plurality of antennae located around the playing field or court. In an alternate embodiment, the receiver can be laptop computer, PDA, or 3G cell phone. The transmission of data is preferably accomplished using Bluetooth® protocol.

In addition to or instead of the shoe embedded sensors, the athlete can wear electrodes 20 (Fig. 2), such as wireless Surface Electromyography button electrodes, taped to their skin to measure physiological functions such as pulse, heart rate, blood oxygen saturation, skin temperature, and the temporal patterns of selected muscle activity. Such sensors can be used to measure and monitor limb movements and

WO 02/102240

PCT/US02/19713

6

motion sequences. The data acquired by the sensors are wirelessly transmitted to the microprocessor 16, which is also located in the shoe, or which is worn in another location by the user. The physiological data received from these sensors is processed as described above with respect to the shoe-mounted sensors.

In one preferred embodiment that is particularly suited to team sports, the microprocessor/controller 16 is in wireless communication with one or more directional antennae 18 (Fig. 1) that are located around the playing field or court. By directional antennae we mean antennae that can determine the angular position of the transmitter relative to the antenna. The collected data is transmitted by the microprocessor to the antennae using a standard protocol such as Bluetooth®, although the invention is not intended to be so limited. The data received by the antennae are transmitted to a host server. As mentioned above, in one preferred embodiment the antennae are adapted to determine the relative angular location of the antennae with respect to each player. The host server receives this location information and by methods similar to those principles utilized in global positioning systems, determines the location of each player on the field or court. This temporal location information can also be transmitted to the data base for real time or delayed viewing.

The host server 22 is programmed to process the data received for each player, and transmits the data to a data base that includes files for each athlete. In the instance of location information, a file can also be created for a pre-selected group of players of interest in a particular scenario, e.g. the offensive or defensive line of a football team. The data base is automatically populated with each athlete's

WO 02/102240

PCT/US02/19713

7

or group's physiological and location data when received from the host server. In preferred embodiments the data is encrypted for security and privacy.

In a preferred embodiment the data base is maintained on a remote site and is accessible via an internet connection, and is available real time for use in assessing the physical performance of the athlete or a desired group of athletes. For example, during a game or a practice a coach could access the data base immediately after a particular play, and evaluate players' performance and positioning on the field or court during the play. As another example, each player's physiological functions can be monitored through the course of the game or activity to monitor fatigue.

The microprocessor/controller or host server can also include memory for data storage during the athlete's performance. This feature permits athletes out of range of an antennae or receiving device to collect the data and later transmit the data to the data base. This will be useful for runners, bikers, and others who may be training out of range of an access point. In this scenario when the training session is done the user then downloads the data to a PC, 3G cellular telephone, or PDA, and then through the internet to the database.

Once in the data base, the data for each athlete can be accessed and utilized according to the nature of the activity. An individual athlete can utilize the data base to track progress during training, or to evaluate individual performance parameters such as heart rate or split times. Teams can use the information to identify flaws in the team's execution of plays, track the physical conditioning of its athletes during play or during the off-season from remote locations. In another interesting aspect of the invention, the player location information can be utilized by broadcast media to

WO 02/102240

PCT/US02/19713

8

reconstruct plays during broadcast of a game, and to highlight key plays by either team or individual athletes during the game. The invention might also have applications in the regulation of play to determine a player's location on the field at a specific time.

While these and other features of the invention have been described with respect to the preferred embodiments described above, those of skill in the art will recognize that numerous modifications in detail and arrangement of the invention are possible without departing from the scope of the following claims.

WO 02/102240

PCT/US02/19713

9

What is Claimed is:

1. A physiological monitoring system comprising:
at least one physiological sensor in communication with a user and adapted to detect a physiological function of the user and to generate a physiological data signal responsive thereto;
a monitor in communication with the at least one sensor and adapted to receive the physiological data signal therefrom and to transmit the physiological data signal;
a data receiver/transmitter in communication with the monitor; and,
a data base in communication with the data receiver/transmitter.
2. A physiological monitoring system according to claim 1 further comprising the monitor in wireless communication with the data receiver/transmitter.
3. A physiological monitoring system according to claim 1 further comprising the at least one sensor in wireless communication with the monitor.
4. A physiological monitoring system according to claim 1 further comprising the data receiver/transmitter in communication with a remote data base.
5. A physiological monitoring system according to claim 4 further comprising the data receiver/transmitter in wireless communication with the database via the internet.

WO 02/102240

PCT/US02/19713

10

6. A physiological monitoring system according to claim 1 further comprising an analog to digital converter adapted to convert an analog physiological signal to a digital signal.

7. A physiological monitoring system according to claim 1 wherein the database includes files for a plurality of users.

8. A physiological monitoring system according to claim 1 wherein the at least one sensor detects at least one physiological function selected from the group consisting of heart rate, respiration rate, blood oxygen level, muscle activity, skin temperature, body temperature, and skin temperature.

9. A physiological monitoring system according to claim 1 wherein the monitor includes a memory for storing the at least one physiological data signal received from the at least one sensor.

10. A physiological monitoring system according to claim 1 wherein the monitor is located in the shoe of a user.

11. A physiological monitoring system according to claim 1 wherein the monitor is worn by the user.

WO 02/102240

PCT/US02/19713

11

12. A physiological monitoring system according to claim 1 wherein the data in the database can be accessed real-time.

13. A physiological monitoring system according to claim 1 wherein the database can be accessed from a location remote from the user and the data receiver/transmitter.

14. A system for determining the position of at least one user comprising:
a first receiver proximate to a first user;
at least one transmitter in communication with the first receiver;
a signal processor in communication with the first receiver and adapted to generate a first position defining signal specifying the location of the first user relative to the at least one transmitter;
a data receiver/transmitter in communication with the signal processor and adapted to receive the first position defining signal from the signal processor;
a data base in communication with the data receiver/transmitter.

WO 02/102240

PCT/US02/19713

1/1

Fig. 1

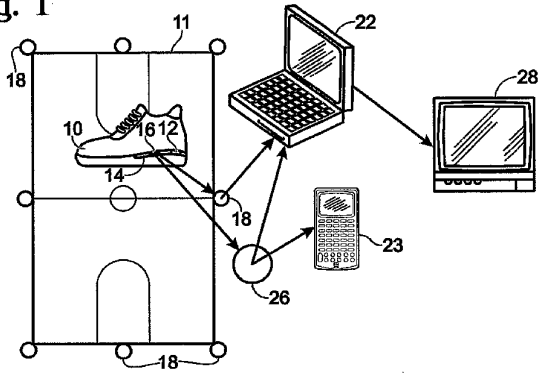


Fig. 2

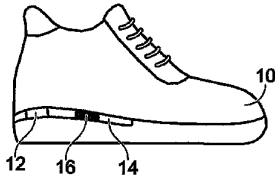
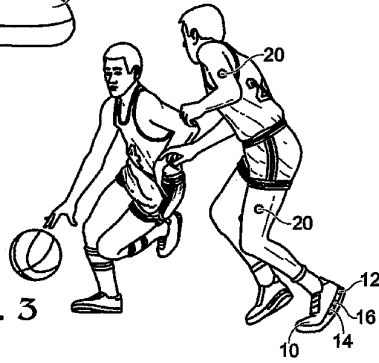


Fig. 3



【 国際調査報告 】

| INTERNATIONAL SEARCH REPORT | | International application No. PCT/US02/19713 | | |
|--|--|--|--|--|
| A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : A 61 B 5/00 US CL : 600/300 According to International Patent Classification (IPC) or to both national classification and IPC | | | | |
| B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 600/300,301,481-486,500-538,544-545,587-595; 128/903,904; 340/all classes Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched None Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) BAST | | | | |
| C. DOCUMENTS CONSIDERED TO BE RELEVANT | | | | |
| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. | | |
| X | US 4,784,162 A (RICKS et al.) 15 November 1988, See Fig. 1, lns. Cols. 2, lns. 13-42, Col. 3, lns. 12-66, Col. 7, lns. 48-60. | 1, 2, 3, 4, 6, 8, 9, 12, 14 | | |
| X | US 5,379,775 A (DEMPSEY et al.) 3 December 1996, See ABST. , Col. 3, lns. 35-65, Col. 4, lns. 1-27, Col. 5, lns. 33-67, Col. 6, lns. 1-29) | 1, 2, 3, 4, 5, 6, 7, 9, 12 | | |
| <input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex. | | | | |
| * Special categories of cited documents: <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> *A* document defining the general state of the art which is not considered to be of particular relevance *B* earlier application or patent published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 50%; vertical-align: top;"> *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art *Z* document member of the same patent family </td> </tr> </table> | | | *A* document defining the general state of the art which is not considered to be of particular relevance *B* earlier application or patent published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed | *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art *Z* document member of the same patent family |
| *A* document defining the general state of the art which is not considered to be of particular relevance *B* earlier application or patent published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed | *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art *Z* document member of the same patent family | | | |
| Date of the actual completion of the international search 22 September 2002 (22.09.2002) | | Date of mailing of the international search report 11 DEC 2002 | | |
| Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230 | | Authorized officer Pamela Whitford Telephone No. (703)308-0858 | | |

フロントページの続き

| (51) Int.Cl. ⁷ | F I | テーマコード(参考) |
|---------------------------|--------------|------------|
| A 6 1 B 5/0488 | A 6 1 B 5/04 | 3 0 0 J |
| A 6 1 B 5/0492 | A 6 1 B 5/10 | 3 1 0 A |
| A 6 1 B 5/08 | A 6 1 B 5/14 | 3 1 0 |
| A 6 1 B 5/11 | A 6 1 B 5/04 | 3 3 0 |
| A 6 1 B 5/145 | A 6 1 B 5/04 | 3 1 2 U |
| A 6 3 B 24/00 | | |

(81) 指定国 AP(GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), EA(AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), EP(AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OA(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG), AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW

(71) 出願人 503465971
 ジョイナー, セス
 アメリカ合衆国 アリゾナ 8 5 2 5 3, パラダイス ヴァレイ, エヌ. 7 1 エスティー
 ストリート 7 7 5 5

(74) 代理人 100078282
 弁理士 山本 秀策

(74) 代理人 100062409
 弁理士 安村 高明

(74) 代理人 100113413
 弁理士 森下 夏樹

(72) 発明者 ハリス, ショウン
 アメリカ合衆国 カリフォルニア 9 0 4 0 1, サンタ モニカ, アpartment 9, 1
 2 ティーエイチ ストリート 1 3 1 7

(72) 発明者 ジョイナー, セス
 アメリカ合衆国 アリゾナ 8 5 2 5 3, パラダイス ヴァレイ, エヌ. 7 1 エスティー
 ストリート 7 7 5 5

F ターム(参考) 4C027 AA02 AA04 EE01 GG18 JJ03
 4C038 KK01 SS08 VA16 VB31 VB34 VC20
 4C117 XA07 XB06 XB15 XC11 XC19 XE13 XE19 XE23 XE37 XE56
 XE62 XE76 XF13 XH02 XH04 XH16 XJ38 XL01 XL13 XL21
 XR05

| | | | |
|----------------|---|---------|------------|
| 专利名称(译) | 生理监测和系统 | | |
| 公开(公告)号 | JP2004538053A | 公开(公告)日 | 2004-12-24 |
| 申请号 | JP2003504831 | 申请日 | 2002-06-19 |
| [标]申请(专利权)人(译) | 数字体育传媒 哈里斯显示下行 赛斯·乔伊纳 | | |
| 申请(专利权)人(译) | 数字体育传媒 哈里斯, 照耀 乔伊纳, 赛斯 | | |
| [标]发明人 | ハリスショウン ジョイナーセス | | |
| 发明人 | ハリス, ショウン ジョイナー, セス | | |
| IPC分类号 | A63B24/00 A61B5/00 A61B5/02 A61B5/024 A61B5/04 A61B5/0408 A61B5/0452 A61B5/0478 A61B5/0488 A61B5/0492 A61B5/08 A61B5/103 A61B5/11 A61B5/145 A63B69/00 G06F19/00 | | |
| CPC分类号 | A61B5/0002 A61B5/02 A61B5/024 A61B5/1036 A61B5/1038 A61B5/145 A61B5/6807 A63B24/0021 A63B69/00 A63B2024/0025 A63B2220/836 A63B2225/20 A63B2225/50 A63B2230/00 A63B2230/06 A63B2230/207 A63B2230/50 A63B2230/60 A63B2243/007 G06F19/3418 G16H40/67 | | |
| FI分类号 | A61B5/00.102.C A61B5/00.D A61B5/04.R A61B5/08 A63B24/00 A61B5/04.300.J A61B5/10.310.A A61B5/14.310 A61B5/04.330 A61B5/04.312.U | | |
| F-TERM分类号 | 4C027/AA02 4C027/AA04 4C027/EE01 4C027/GG18 4C027/JJ03 4C038/KK01 4C038/SS08 4C038/VA16 4C038/VB31 4C038/VB34 4C038/VC20 4C117/XA07 4C117/XB06 4C117/XB15 4C117/XC11 4C117/XC19 4C117/XE13 4C117/XE19 4C117/XE23 4C117/XE37 4C117/XE56 4C117/XE62 4C117/XE76 4C117/XF13 4C117/XH02 4C117/XH04 4C117/XH16 4C117/XJ38 4C117/XL01 4C117/XL13 4C117/XL21 4C117/XR05 | | |
| 代理人(译) | 夏木森下 | | |
| 优先权 | 60/299602 2001-06-19 US | | |
| 外部链接 | Espacenet | | |

摘要(译)

本发明提供了一种生理监测系统，其从一个或多个用户收集实时生理数据并将数据无线传输到远程数据库。可以访问远程数据库，并使用存储的数据来评估运动员的表现。该系统还可以包括位置传感器（12），用于确定和传输运动员在体育场或球场上的确切位置。在一个实施例中，该系统包括具有嵌入式传感器的鞋，以测量力，步幅，步进的瞬时力，行走速度和速度。运动员也，脉搏，心脏率，血氧饱和度，为的生理功能，如身体表面温度的时间模式，并且选择的肌肉活动，电极，例如，一个无线表面肌电测量测量方法安装纽扣电极。

