

Search history

Search PN=(WO2015175414) (Results 1)

1:

Search [SP]: 1. a computer implemented method of determining a calculated position, comprising: receiving a request to determine a position of a mobile processing device; selecting a location calculation method from available methods based on availability of at least venue fingerprint data comprising previously observed beacons, wherein a first method is selected if the venue fingerprint data include previously observed venue and floor data for observed beacons in a request and venue detection and floor detection are successful, wherein a venue is determined based on a threshold number of at least two detected and venue-identified beacons, and a second method is selected if insufficient data to determine a venue is available for a venue, wherein insufficient data is available if less than the threshold number of beacons are present and calculating the position of the mobile processing device using the method selected. 2. the computer implemented method of claim 1 further including creating a data model including observed beacon characteristics and associated position data, the position data including a venue identifier and a floor identifier. 3. the computer implemented method of claim 2 further including refining previously observed position data to include at least refined position data. 4. the computer implemented method of claim 1 wherein selecting includes determining a venue from the observed beacons, followed by determining a floor from the observed beacons. 5. the computer implemented method of claim 1 wherein said calculating includes initiating a calculation using the first method, determining that observed beacons or previously observed data is insufficient to complete the calculating, and selecting the second method. 6. the computer implemented method of claim 1 further including selecting a third method if no venue fingerprint data for observed beacons in the request is available. 7. the computer implemented method of claim 1 further including selecting a third method if said calculating using the first or the second methods fails. 8. a mobile processing device including a wireless communication channel, comprising: a processor; a memory including code instructing the processor to perform the steps of observing a plurality of wireless beacons via the wireless communication channel, each beacon having observed characteristics; selecting a position calculation method stored in the memory based on availability of at least venue fingerprint data comprising previously observed beacons, wherein selecting comprises: selecting a first method if a threshold number of at least two observed beacons are included in the venue fingerprint data along with venue and floor data and venue detection and floor detection are successful, and selecting a second method if less than the threshold number of beacons is not available for observed beacons in the venue fingerprint data and calculating a position of the mobile processing device using the method selected. 9. the mobile processing device of claim 8 further including code: selecting a third method if venue fingerprint data for observed beacons is available or if said calculating using the first or the second methods fails. 10. the mobile processing device of claim 9 further including calculating using a data model including observed beacon characteristics and associated position data, the position data including a venue identifier and a floor identifier. 11. the mobile processing device of claim 9 wherein said calculating includes initiating a calculation using the first method, determining that observed beacons or previously observed data is insufficient to complete the calculating, and selecting the second method. 12. the mobile processing device of claim 9 wherein said first method is an ez algorithm method, the second method is a kalman algorithm, the first and second method using data including floor and venue data. 13. a method comprising: receiving a request to determine a position, the request including an observation of a plurality of wireless beacons from a mobile processing device, each beacon having observed characteristics; determining whether venue fingerprint data based on previous observations of beacons exists for one or more of the plurality of wireless beacons in the observation; selecting a position calculation method based on the venue fingerprint data, wherein a first method is selected if the venue fingerprint data includes previously observed venue and floor data for observed beacons and venue detection and floor detection are successful, wherein a venue is determined based on a threshold number of at least two detected and venue-identified beacons, and a second method is selected if venue and floor data is not available for a venue for at least the threshold number of beacons and calculating the position of the mobile processing device using the selected method. 14. the method of claim 13 further including selecting a third method if venue fingerprint data for observed beacons in the request is available or if said calculating using the first or the second methods fails. 15. the method of claim 14 wherein said calculating includes initiating a calculation using the first method, determining that observed beacons or previously observed data is insufficient to complete the calculating, and thereafter selecting the second method. 16. the method of claim 15 further including creating a data model including observed beacon characteristics and associated position data, the position data including a venue identifier and a floor identifier, and including refining previously observed position data to include at least refined position data. 17. the method of claim 16 wherein selecting includes determining a venue from the observed beacons, followed by determining a floor from the observed beacons. 18. the method of claim 13 wherein the receiving includes receiving the request from a mobile device via a network and further including outputting the position of the mobile processing device to the mobile processing device via the network in response to the request. (Results 0)

Search [SP]: background location estimation is used by mobile processing devices to establish the device position and is a feature which is useful to a number of applications on the device. location estimation techniques may use any of a number of different methods to calculate a position. while satellite systems such as global navigation satellite system (gnss) may aid in determining positions, use of wi-fi beacons in calculation techniques may provide a more accurate position fix and/or provide position fixes in areas where satellite systems are not accessible. the position of a mobile computing device can be estimated by using the strength of the radio signal from a beacon. however, the unpredictability of signal propagation through indoor environments is a challenge in determining a position fix. it can be difficult to provide an adequate statistical model of signal strength measurements. some efforts have focused on techniques that can generate an accurate empirical model from training data collected in a test area and real-time estimation for mobile processing devices. the accuracy of such approaches is at least in part dependent on the number of positions that are known to the positioning algorithm. the possible signal fluctuations that may occur, however, can increase errors and inaccuracies in the path of the user. depending on the position of a device, one calculation method may be superior to others in providing position accuracy. summary technology is provided for calculating a position in response to a position request. the position request can include observed beacon data associated with the request and upon which the calculation should in part be based. in response to the position calculation request, a selection is made between positioning algorithms and potentially differing data sources and models. choice of the data models and algorithms depends on a number of factors, including the capabilities of the device performing the processing, the number of observed beacons and the availability of data to resolve a position at a venue. this summary is provided to introduce a selection of concepts in a simplified form that are further described below in the detailed description. this summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter. brief description of the drawings fig. 1 is a block diagram depicting mobile computing devices relative to wireless beacons utilized for position calculations. fig. 2 is a perspective exploded view of an indoor position with a plurality of wireless beacons. fig. 3 is a flowchart representing a method in accordance with the present technology to determine a position using a selected method. fig. 4 is a flowchart illustrating a step of selecting a most accurate calculation method. fig. 5 is a flowchart illustrating creation of data models for the method of fig. 3. fig. 6 is a flowchart illustrating selection of a floor based on a voting features interval. fig. 7 is a block diagram illustrating scenarios calculating position using an ez algorithm. fig. 8 is a table illustrating a first ap model. fig. 9 is a table illustrating a hybrid ap model. fig. 10 is a table illustrating voting features interval data. fig. 12 block diagram of a functional representation of a first processing device and a computing device. fig. 13 is a block diagram of a functional representation of a second processing device and a computing device. fig. 14 is a block diagram of a processing system. detailed description technology is provided for determining or calculating a position in response to a position request. the position request can include observed beacon data associated with the request and upon which the calculation should in part be based. in response to the position calculation request, a selection is made between alternative positioning algorithms and potentially differing data sources and models. by providing a number of different algorithms, an optimal method of calculating a position based on observed data in the position request occurs. in accordance with the technology, a position calculation system uses one of at least two algorithms and two data models to calculate a position based on which algorithm provides a more accurate position calculation. choice of the data models and algorithms depends on a number of factors, including the capabilities of the device performing the processing, the number of observed beacons and the availability of data to resolve a position at a venue. in the disclosure herein, the beacons used may be wireless fidelity (wi-fi) access points having one or more basic service set identifiers (bssids). (it should be noted that one physical access point may be configured to support multiple bssids.) a first type of algorithm uses data consisting of wi-fi access point fingerprints and gps position fixes based on a two dimensional (2d) access point model. the two dimensional model includes a longitude and latitude of various access points having known positions. a 2d data store of the access point positions is maintained with positions of all wi-fi access points in the model provided at the approximate center of all observed locations. thus, the position associated with an access point comprises a most statistically likely position of a detected access point, rather than where the access point may

be actually located. using beacon detections, multiple measurements are combined during a position calculation in response to a position request to compute position and error radius. this method is alternatively referred to herein as creating an "inferred" position. this first method is less sensitive to characteristics of the rf environment, as the rf environment affects only whether a beacon can be observed, and is effective when beacon density is low. the first method works well in higher density environments with predictable rf characteristics, however a second positioning algorithm described below provides statistically better positioning results in such higher density environments. a second positioning algorithm uses three dimensional wi-fi fingerprints based on beacon observations consisting of wi-fi fingerprints, venue, floor, and user supplied ground truth relative to a known position. a 3d data store is provided in which an access point model having latitude, longitude, venue, and venue floor characteristics may be provided. the model positions wi-fi access points where the access points are believed to be located, using signal strength to range the position. to calculate a position, the positioning algorithm positions device using trilateration, using signal strength to determine distance from published access points in the 3d store. a device's receiver gain is automatically determined, and four observed wi-fi access points are used to calculate a position. a signal strength distribution based floor detection model is used to determine a floor from the wi-fi fingerprint. this calculation system is advantageous when the rf environment is more predictable (i.e., follows propagation path loss curve approximately) and when beacon density is high. in the context of this disclosure, a calculated position may include a latitude, longitude and other logical location information such as a venue identifier and a floor identifier within the venue. fig. 1 illustrates an exemplary context in which the technology described herein may be utilized. fig. 1 illustrates a block diagram of a plurality of mobile computing devices 102, 104 which utilize one or more beacons 110a-110d or other cell sites 120a, 120b to calculate a position for the mobile device. the mobile computing devices 102, 104 observe or otherwise detect one or more of the beacons 110, 120 and utilize the signals from these beacons to compute a position. exemplary beacons include cellular towers, base stations, base transceiver stations, base station sites, and/or any other network elements supporting any quantity and type of vacation mode. typically, beacons 110a-110d represent wi-fi beacons which have known propagation properties and signals which provide information to allow, for example, the mobile devices to calculate positions in areas where other types of signals may not be present, such as the interior of buildings and the like. each of the mobile computing devices 102, 104, may store properties for each beacon 110, 120. in some embodiments, exemplary properties include a latitude and longitude of the observing mobile computing device and an observation time. in internal positions such as a venue, the observations may include more granular information, such as a floor position. each mobile computing device may itself perform a position calculation, or may provide information to a location service 125 via a network 50 with the location service 125 returning a calculated position of the device to the device. each position calculation may utilize a kalman filter (or other methods) to a beacon fingerprint (e.g., set of beacons observed by the computing device) to produce an inferred device position. an error radius may also be calculated. the error radius may be reflected as a circle having the estimated device error radius as its radius. as a result, if a particular beacon is detected with a given confidence level, an inferred device position may be produced that is within a circle centered at the estimated beacon position with the estimated beacon radius (Results 24)

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4: 53658699 or 51511173 or 55406831 or 55473548 or 55479504 or 52816436 or 51530330 or 51967739 or 52444128 or 56882704 or 49012590
or 43590065 or 52410758 or 32883140 or 53736866) (Results 23)

Title: Enhanced inertial measurement unit/global positioning system mapping and navigation process

Abstract: Source: US2002062193A [EN] The present invention relates generally to a geospatial database access and query method, and more particularly to a map and Inertial Measurement Unit/Global Positioning System (IMU/GPS) navigation process. With the location information provided by an IMU/GPS integrated system, the geospatial database operations, such as database access and query, are sped up. With the map data from a geospatial database, the navigation performance and accuracy are enhanced. The present invention also supports real time mapping by using IMU/GPS integrated system as the positioning sensor.

Classifications:

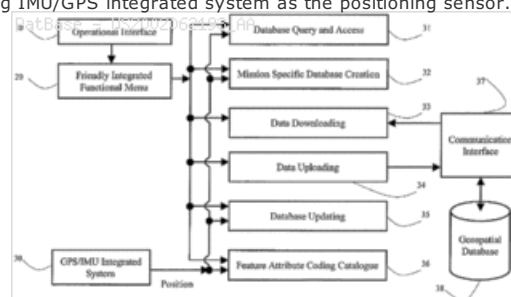
International (IPC 8-9): G01C21/16 (Advanced/Invention)

International (IPC 1-7): G01C21/00 G01C21/26 G01C21/30 H04B7/185

CPC: G01C21/165 G01S19/49

European: G01C21/16A G01S19/49

US: 340/995.1 340/995.100S 342/357.06 342/357.13 342/357.14
342/357.66 342/357.660S 701/208 701/208P 701/210 701/210S 701/213
701/213P 701/214 701/216 701/217 701/220 701/220S 701/454 701/472
701/472P



Family:

Publication number	Publication date	Application number	Application date
US2002062193 AA	20020523	US20010968410	20010926
US2003144795 AA	20030731	US20030359851	20030207
US6622090 BB	20030916	US20010968410	20010926
US6792353 BB	20040914	US20030359851	20030207

Priority:

US20000236794P 20000926 US20010968410 20010926 US20030359851 20030207

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Inventor(s): (std):

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Title: PROCEDURE TO INCREASE POSITION LOCATION AVAILABILITY

Abstract: Source: US2006052115A [EN] A device, method and system are provide which permits the methodology used to make the position determination to change dynamically in connection with achieving a position fix of a desired accuracy.

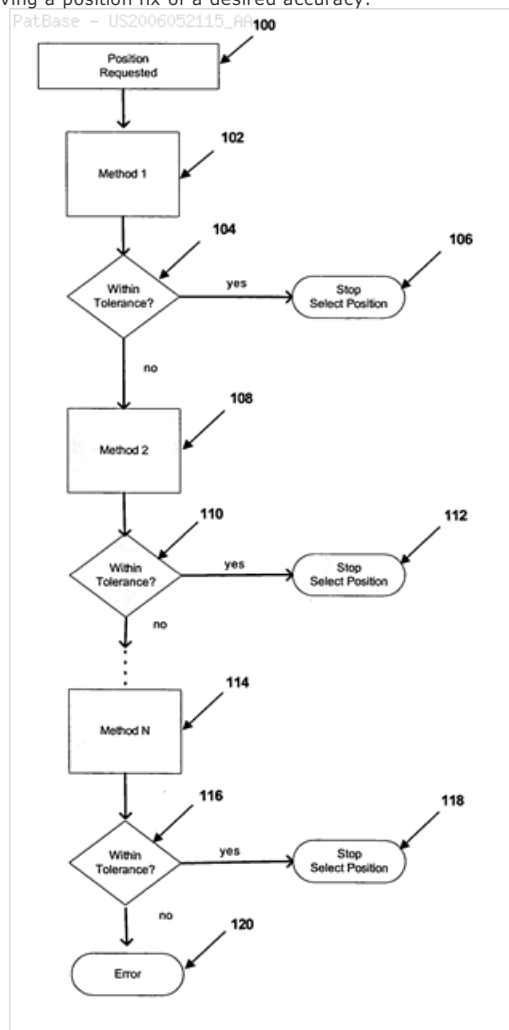
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International (IPC 8-9): G01C21/00 G01C21/28 G01S19/01 G01S19/12 G01S19/25 G01S19/48 G01S3/14 G01S5/02 G01S5/10 G01S5/14 H04Q7/20 H04Q7/38 H04W24/00 H04W64/00 (Advanced/Invention); G01C21/00 G01S19/00 G01S5/02 H04Q7/38 H04W64/00 (Core/Invention); H04W (Subclass/Invention)

CPC: G01S3/14 G01S19/01 G01S5/10 G01S5/0263 H04W64/00

European: G01S5/02H1 H04Q7/38L H04W264/00 H04W32/00 H04W64/00

US: 342/357.39 342/417 342/450 455/456.1 455/456.100 455/456.100P 455/456.100S 455/456.3 455/456.300 455/456.300P 455/456.6



Family:

Publication number	Publication date	Application number	Application date
AT423980 E	20090315	AT20050857941T	20050907
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DK2051556 T3	20111017	DK20050152560T	20050907
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JP2013036985 A2	20130221	JP20120153565	20120709
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JP5745739 B2	20150708	JP20070531332T	20050907
JP5797607 B2	20151021	JP20120153565	20120709
PL2051556 T3	20120131	PL20090152560T	20050907
PT2051556 T	20111206	PT20090152560T	20050907
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RU2009115243 A	20101027	RU20090115243	20090421

RU2366110 C2	20090827	RU20070112946	20050907
RU2495543 C2	20131010	RU20090115243	20090421
US2006052115 AA	20060309	US20040935785	20040907
US2012064911 AA	20120315	US20110223193	20110831
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Priority:

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Title: SERVER FOR UPDATING LOCATION BEACON DATABASE

Abstract: Source: US2006095348A [EN] A location beacon database and server, method of building location beacon database, and location based service using same. Wi-Fi access points are located in a target geographical area to build a reference database of locations of Wi-Fi access points. At least one vehicle is deployed including at least one scanning device having a GPS device and a Wi-Fi radio device and including a Wi-Fi antenna system. The target area is traversed in a programmatic route to avoid arterial bias. The programmatic route includes substantially all drivable streets in the target geographical area and solves an Eulerian cycle problem of a graph represented by said drivable streets. While traversing the target area, periodically receive the GPS coordinates of the GPS device. While traversing the target area, detecting Wi-Fi signals from Wi-Fi access points in range of the Wi-Fi device and recording identity information of the detected Wi-Fi access point in conjunction with GPS location information of the vehicle when the detection of the Wi-Fi access point was made. The location information is used to reverse triangulate the position of the detected Wi-Fi access point; and the position of the detected access point is recorded in a reference database. A user-device having a Wi-Fi radio may be located. A reference database of calculated locations of Wi-Fi access points in a target area is provided. In response to a user application request to determine a location of a user-device having a Wi-Fi radio, the Wi-Fi device is triggered to transmit a request to all Wi-Fi access points within range of the Wi-Fi device. Messages are received from the Wi-Fi access points within range of the Wi-Fi device, each message identifying the Wi-Fi access point sending the message. The signal strength of the messages received by the Wi-Fi access points is calculated. The reference database is accessed to obtain the calculated locations for the identified Wi-Fi access points. Based on the number of Wi-Fi access points identified via received messages, choosing a corresponding location-determination algorithm from a plurality of location-determination algorithms, said chosen algorithm being suited for the number of identified Wi-Fi access points. The calculated locations for the identified Wi-Fi access points and the signal strengths of said received messages and the chosen location-determination algorithm are used to determine the location of the user-device. The database may be modified with newly added position information to improve quality of previously determined positions, and error prone information is avoided.

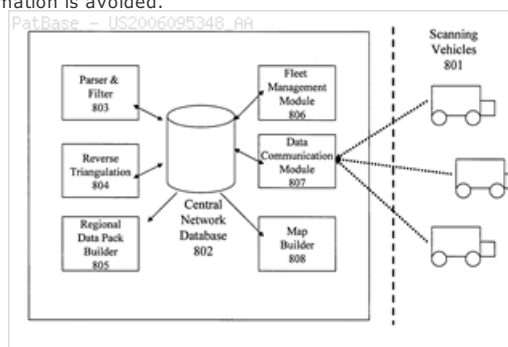
Classifications:

International (IPC 8-9): A01K5/02 G01S19/11 G01S19/13 G01S19/14 G01S19/46 G01S19/48 G01S5/02 G01S5/14 G06F15/16 G06F17/00 G06F17/30 G06F17/50 G06F7/00 G06Q10/08 G08G1/00 H04B7/00 H04B7/212 H04B7/26 H04L12/28 H04L29/08 H04M11/04 H04N7/18 H04Q7/20 H04Q7/38 H04W16/18 H04W24/00 H04W4/00 H04W4/02 H04W4/20 H04W48/08 H04W48/16 H04W48/20 H04W64/00 H04W8/00 H04W84/10 H04W84/12 (Advanced/Invention); G01C21/00 G01S19/14 G08G1/00 H04W16/18 H04W4/02 H04W4/20 H04W48/08 H04W48/14 H04W48/16 H04W64/00 H04W84/10 H04W84/12 H04W88/06 H04W88/08 H04W88/18 (Advanced/Non-invention); G06F17/00 G06F17/50 H04B7/212 H04Q7/20 H04W16/00 H04W24/00 H04W4/02 H04W48/00 (Core/Invention); H04Q7/38 H04W16/00 H04W48/00 H04W64/00 H04W84/02 (Core/Non-invention); H04W (Subclass/Invention)

International (IPC 1-7): H04W84/00

CPC: H04L69/04 H04W8/26 H04L29/12009 H04L29/12839 H04L61/6022 H04W48/20 H04W88/06 G01S5/021 G01S5/0226 G01S5/0252 G01S5/0284 G01S19/14 G01S19/46 G06Q10/0875 G08G1/20 Y10S707/99936 G01S5/0236 G01S5/0242 H04W16/18 H04W48/08 H04W48/14 H04W84/12 G01S5/02 G01S5/0205 H04W4/20 H04W84/10 H04W88/08 H04W4/021 H04W24/00 H04L67/2857 H04W4/027 H04W8/005 G01S19/13 H04W64/003 H04W4/02 H04W64/00 H04W48/16 H04W4/028 H04W4/029 **European:** G01S19/46 G01S5/02 G01S5/02A G01S5/02A1 G01S5/02A4 G01S5/02A5 G01S5/02A6 G01S5/02D G01S5/02R G06Q10/0875 H04L29/06C5 H04L29/12A H04L29/12A9D11 H04L61/00 H04L61/60D11 H04W2/02 H04W204/02 H04W208/26 H04W24/06 H04W248/16 H04W264/00 H04W32/00 H04W4/02 H04W4/187 H04W4/20 H04W64/00 H04W64/00B H04W8/26 S01S19/14 S08G1/20 T04W16/18 T04W2/02 T04W204/02 T04W216/18 T04W22/00 T04W24/04 T04W248/08 T04W264/00 T04W284/10 T04W288/08 T04W32/00 T04W4/02 T04W48/08 T04W48/14 T04W48/16 T04W50/06 T04W52/04 T04W64/00 T04W8/04 T04W84/10 T04W84/12 T04W88/08

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Family:

Publication number	Publication date	Application number	Application date
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Probable Assignee: SKYHOOK WIRELESS INC

Assignee(s): (std): ALIZADEH SHABDIZ FARSHID ; ALIZADEH SHADIZ FARSHID ; JONES RUSSEL KIPP ; JONES RUSSEL K ; BRACHET NICOLAS ; MORGAN EDWARD J ; MORGAN EDWARD JAMES ; PAYNE ANDREW C ; SHEAN MICHAEL GEORGE ; SHYHOOK WIRELESS INC ; NELSON JOEL N ; SHEAN MICHAEL G ; SKYBOOK WIRELESS INC ; SKYHOOK WIRELESS INC

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Inventor(s): PAYNE ANDREW ; SHEAN MICHAEL GEORGEUS ; SHEAN MICHAEL GEORGE BOSTON ; RUSSEL K JONES ; MORGAN EDWARD JAMESUS ; JONES RUSSEL KIPPUS ; MORGAN EDWARD JAMES NEEDHAM ; JONES RUSSEL KIPP ROSWELL ; JOEL N NELSON ; ALIZADEH-SHABDIZ, Farshid ; BRACHET, Nicolas ; ALIZADEH SHADIZ FARSHIDUS ; ALIZADEH SHABDIZ FARSHID WAYLAND

Agent(s): DAVIES COLLISON CAVE PTY LTD; DAVIES COLLISON CAVE; MBM INTELLECTUAL PROPERTY LAW LLP; PATENTANWALTSSKANZLEI MEYER; HUTCHINSON GLENN STANLEY; JENNINGS VINCENT LOUIS; WILMER CUTLER PICKERING HALE AND DORR LLP; WILMERHALE/BOSTON; WILMERHALE BOSTON; OCCHIUTI ROHLCEK AND TSAO LLP; WILMER CUTLER PICKERING HALE AND DORR; CESARI AND MCKENNA LLP; CESARI AND MCJENNA LLP; JAMES A; DICHIAIRA PETER M ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US VZ VN YU ZA ZM ZW

Title: WEIGHTED AIDING FOR POSITIONING SYSTEMS

Abstract: Source: US2009189810A [EN] Location information provided by multiple positioning systems is combined to provide an estimated user location. In performing the combination, location information provided by the positioning system that is currently deemed more reliable is provided greater weight than the location information provided from the other positioning system(s). Alternatively, one of multiple positioning systems is selected to calculate an estimated user location. The selected system is the one that is currently deemed more reliable based on some indicia of reliability. Using either approach, an accurate estimate of a user's location can be provided both in rural areas or other sparsely-populated areas as well as in urban areas or other areas prone to high multipath effects.

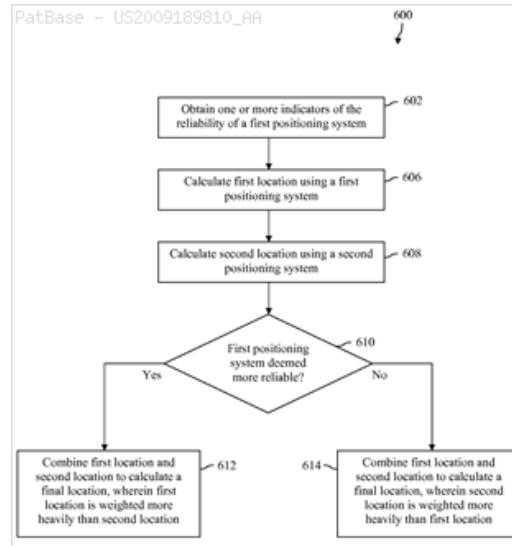
Classifications:

International (IPC 8-9): G01S19/48 G01S5/00 (Advanced/Invention);
G01S19/00 G01S5/00 (Core/Invention)

CPC: G01S19/48 G01S19/22 G01S19/23

European: G01S19/48 S01S19/22 S01S19/23

US: 342/357.06 342/357.14 342/357.31 342/357.310P 342/450 342/450S



Family:

Publication number	Publication date	Application number	Application date
US2009189810 AA	20090730	US20090354127	20090115

Priority:

US20080023278P 20080124 US20090354127 20090115

Probable Assignee: AVAGO TECHNOLOGIES LTD

Assignee(s): (std): BROADCOM CORP

Assignee(s): AVAGO TECHNOLOGIES GENERAL IP SINGAPORE PTE LTD ; AVAGO TECHNOLOGIES LTD ; BANK OF AMERICA NA COLLATERAL AGENT AS

Inventor(s): (std): MURRAY DAVID

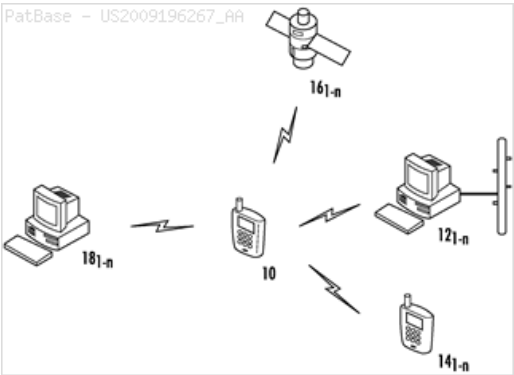
Agent(s): FIALA AND WEAVER PLLC C O CPA GLOBAL

Title: SYSTEMS AND METHODS FOR PROVIDING LOCATION BASED SERVICES (LBS) UTILIZING WLAN AND/OR GPS SIGNALS FOR SEAMLESS INDOOR AND OUTDOOR TRACKING

Abstract: Source: US2009196267A [EN] Systems and methods for tracking a wireless device are disclosed. According to one aspect, the wireless device includes a hybrid global positioning system (GPS) and wireless local area network (WLAN) circuit board for seamless indoor and outdoor tracking. In embodiments, GPS and WLAN data are combined to obtain a position estimate of the device. In other embodiments, the circuit board automatically switches between WLAN and GPS data for indoor and outdoor environments. A Location Based Services (LBS) algorithm for determining the position of a wireless device using WLAN and/or GPS signals is also disclosed. The LBS algorithm is implemented by way of method steps including: sensing GPS and/or WLAN signals, measuring and/or converting the sensed signals to obtain distance data, fusing the distance data, and applying one or more approximation algorithms to the distance data to obtain a position estimate of the wireless device. A method for rendering position data using a Marching Cubes algorithm is further disclosed.

Classifications:

International (IPC 8-9): H04W4/00 H04W64/00 H04W84/06
H04W84/12 (Advanced/Invention);
H04W24/00 (Advanced/Non-invention);
H04W4/00 (Core/Invention);
H04W24/00 (Core/Non-invention)
CPC: G01S19/46 G01S19/48
European: G01S19/46 G01S19/48
US: 370/338 370/338P 455/426.2 455/456.3 455/456.300S



Family:

Publication number	Publication date	Application number	Application date
US2009196267 AA	20090806	US20090358315	20090123
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WO09099773 A2	20090813	WO2009US31759	20090123
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Priority:

US20080025421P 20080201 US20090358315 20090123

Probable Assignee: WALKER SR JONATHAN B

Assignee(s): (std): WALKER JONATHAN B ; WALKER SR JONATHAN B

Inventor(s): (std): WALKER JONATHAN B ; WALKER SR JONATHAN B

Agent(s): LATIMER MAYBERRY AND MATTHEWS IP LAW LLP; LATIMER IP LAW LLC; LATIMER MATTHEW T

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: METHOD AND SYSTEM FOR POSITIONING OBJECT WITH ADAPTIVE RESOLUTION

Abstract: Source: US2010090899A [EN] The present invention provides a method and system for positioning an object with adaptive resolution. The method comprises: dividing a space to be detected into Hot Area and General Area; arranging, according to the positions of Hot Area and General Area, high-resolution positioning signal (US) transceivers and low-resolution positioning signal (RF) transceivers, wherein the detection scope of the low-resolution positioning signal transceivers covers the space and the detection scope of the high-resolution positioning signal transceivers covers the Hot Area; and when the object moving in the space, fusing the detection results from the high-resolution positioning signal transceivers and the low-resolution positioning signal transceivers to determine the position of the object with adaptive resolution. With the system of the present invention, for different areas, the object can be positioned with different positioning resolutions (precisions or granularities). Also, since it is not necessary to use a great deal of high-precision positioning devices, the system cost can be reduced considerably.

Classifications:

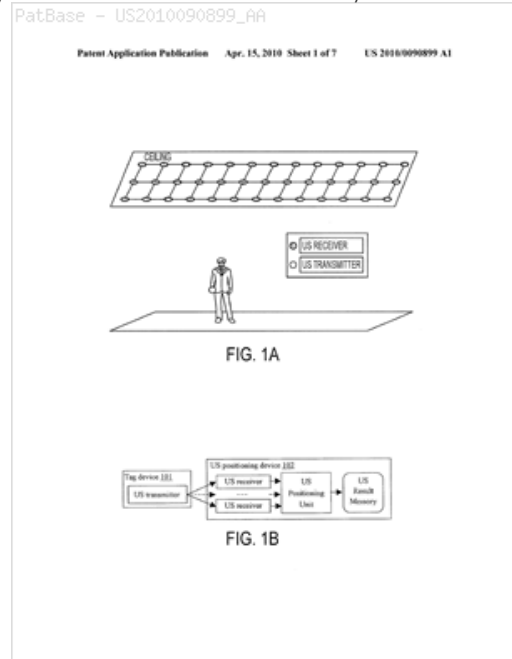
International (IPC 8-9): G01S1/24 G01S3/80 G01S5/00 G01S5/02
G01S5/12 G01S5/28 (Advanced/Invention);

G01S1/00 G01S3/00 G01S5/00 G01S5/02 G01S5/12 (Core/Invention)

CPC: G01S5/0252 G01S5/0263 G01S5/14 G01S5/18

European: G01S5/02D G01S5/02H1 G01S5/18 S01S5/14

US: 342/387 342/387P 342/463 342/463S 367/118 367/118S

**Family:**

Publication number	Publication date	Application number	Application date
■ CN101718859 A	20100602	CN200810161869	20081009
■ JP2010107501 A2	20100513	JP20090220184	20090925
■ JP5225242 B2	20130703	JP20090220184	20090925
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Priority:

CN200810161869 20081009

Probable Assignee: NEC CHINA CO LTD

Assignee(s): (std): NEC CHINA CO LTD ; NEC ELECTRONICS CHINA LTD

Assignee(s): NEC ELECTRONICS CHINA LIMITED ; NEC (CHINA) CO LTD ; NEC CHINA CO

Inventor(s): (std): JUNHUI ZHAO ; WANG YONGCAI ; YONGCAI WANG ; ZHAO JUNHUI

Agent(s): SUGHRUE MION PLLC

Title: COGNITIVE POSITIONING SYSTEM

Abstract: Source: US7956807B [EN] This invention provides arbitrary positioning accuracy for cognitive radio communications in both indoor and outdoor environments adaptively. It enables the user or wireless device itself to adjust positioning accuracy adaptively. Hence, this invention can be used for developing numerous personal, commercial, governmental and military cognitive location-based services and applications. Furthermore, the invented H-DSM technique can be used by cognitive wireless networks and devices to improve spectrum efficiency.

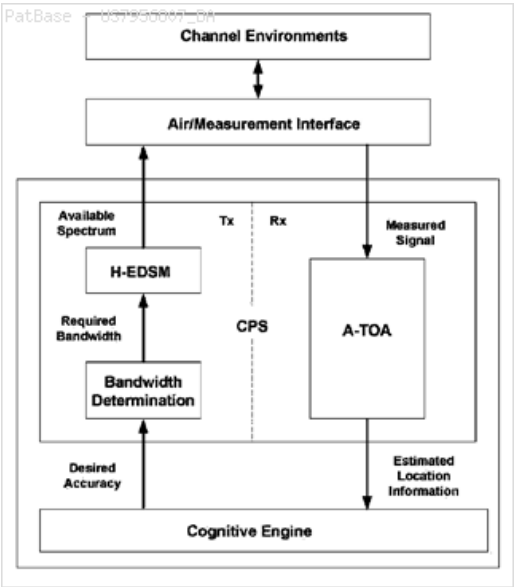
Classifications:

International (IPC 8-9): G01S3/02 (Advanced/Invention)

CPC: G01S5/0205 G01S5/14 G01S11/08

European: G01S11/08 G01S5/02A G01S5/14

US: 342/450



Family:

Publication number	Publication date	Application number	Application date
US7956807 BA	20110607	US20080018509	20080123

Priority:

US20070881945P 20070123 US20080018509 20080123

Probable Assignee: OF SOUTH FLORIDA UNIV

Assignee(s): (std): UNIV SOUTH FLORIDA

Assignee(s): UNIVERSITY OF SOUTH FLORIDA ; OF SOUTH FLORIDA UNIV

Inventor(s): (std): ARSLAN HUSEYIN ; CELEBI HASARI

Agent(s): COURTNEY M; SMITH AND HOPEN PA

Title: SELECTING BEACONS FOR LOCATION INFERENCE

Abstract: Source: US2011227791A [EN] Location inference using selected beacons. Data is received representing a set of beacons observed by a computing device. The beacons are located within a first geographic area. A subset (e.g., a clique) of the beacons is selected based on a coverage area of each of the beacons, where each of the beacons in the selected subset has a coverage area that overlaps with the coverage area of each of the other beacons in the selected subset. Using known or estimated positions of the beacons, a second geographic area is defined based on the selected subset of beacons and the beacon reference data and the coverage areas associated therewith. The second geographic area, smaller than the first geographic area, represents an approximate location of the computing device. In some embodiments, the computing device is calculated to be within the second geographic area with 95 percent probability.

Classifications:

International (IPC 8-9): G01S1/08 G01S3/02 G01S5/02

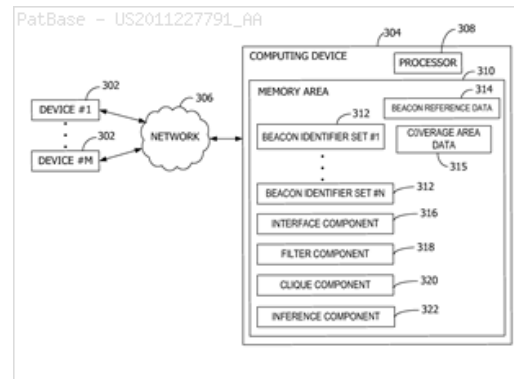
H04W64/00 (Advanced/Invention)

CPC: G01S5/0252 G01S5/0278 G01S5/02 H04W8/26 H04W48/08

H04W48/16 H04W64/00

European: G01S5/02 H04W48/08 T04W48/16 T04W64/00 T04W8/26

US: 342/386 342/386P 342/451 342/451S 342/464



Family:

Publication number	Publication date	Application number	Application date
■ CN102196557 A	20110921	CN201110071764	20110318
■ CN102196557 B	20160803	CN201110071764	20110318
■ US2011227791 AA	20110922	US20100727901	20100319
■ US8618984 BB	20131231	US20100727901	20100319

Priority:

US20100727901 20100319

Probable Assignee: MICROSOFT TECHNOLOGY LICENSING LLC

Assignee(s): (std): CHU LON CHAN ; GHOSAL PRASANTA ; LIN JYH HAN ; MICROSOFT CORP ; RICE CHRISTOPHER RUSSELL ; SESHADRI ARAVIND KRISHNAMACHARI ; PACHLAG ANUP KASHINATH

Assignee(s): MICROSOFT TECHNOLOGY LICENSING LLC

Inventor(s): (std): CHU LON CHAN ; GHOSAL PRASANTA ; JYH HAN LIN ; KASHINATH PACHLAG ANUP ; KRISHNAMACHARI SESHADRI ARAVIND ; LIN JYH HAN ; LON CHAN CHU ; PACHLAG ANUP KASHINATH ; PRASANTA GHOSAL ; RICE CHRISTOPHER RUSSELL ; RUSSELL RICE CHRISTOPHER ; SESHADRI ARAVIND KRISHNAMACHARI

Title: METHOD FOR DETERMINATION OF WIRELESS TERMINALS POSITIONS AND ASSOCIATED SYSTEM AND APPARATUS THEREOF

Abstract: Source: US2013273938A [EN] Conventional position estimation methods require the deployment of more fixed anchors in order to increase the accuracy in a crowded indoor environment, or they suffer from inaccuracies due to multipath fading. The present invention overcomes the problems associated with the prior arts by selecting one or more mobile nodes as virtual anchors when estimating the position of a target mobile node. This takes advantage of the fact that mobile nodes are closer to the target mobile node than the access points in most typical deployments, thus eliminating the need to deploy more access points or fixed anchors for the purpose of position determination. After obtaining an initial estimate of the position of the target mobile node, the target mobile node can serve as virtual anchors to estimate the positions of other mobile nodes, which can then be used to further refine the position estimate of the target mobile node.

Classifications:

International (IPC 8-9): G01S5/02 G01S5/06 H04W24/00 H04W64/00

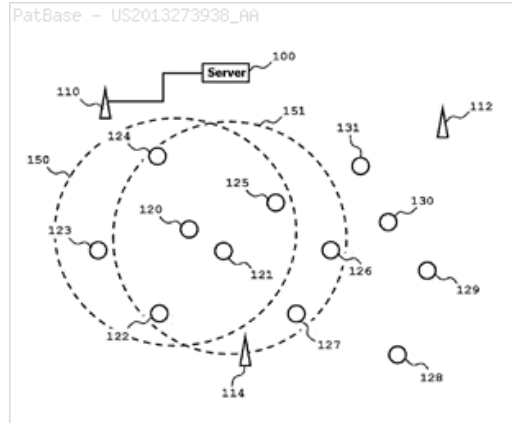
H04W84/10 (Advanced/Invention);

H04W84/12 H04W84/18 (Advanced/Non-invention)

CPC: G01S5/06 H04W64/00 H04W84/12 H04W84/18

European: H04W64/00 T04W84/12 T04W84/18

US: 1/1 455/456.1



Family:

Publication number	Publication date	Application number	Application date
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US2013273938 AA	20131017	US20110995295	20111206
US9121924 BB	20150901	US20110995295	20111206
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Priority:

JP20110004669 20110113 JP20110096935 20110425 WO2011JP06808 20111206
JP20130526230 20111206

Probable Assignee: PANASONIC CORP

Assignee(s): (std): CHENG KIAN SOON ; NG CHAN WAH ; PANASONIC CORP ; PANASONIC IP CORP AMERICA ; TAN PEK YEW

Assignee(s): SUN PATENT TRUST ; PANASONIC INTELLECTUAL PROPERTY OF AMERICA CORP

Inventor(s): (std): CHENG KIAN SOON ; NG CHAN WAH ; TAN PEK YEW

Agent(s): GRUENECKER KINKELDEY STOCKMAIR AND SCHWANHAUESSER; PEARNE AND GORDON LLP; NIHEI MASAYUKI

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: CLUSTERING CROWD-SOURCED DATA FOR DETERMINING BEACON POSITIONS

Abstract: Source: US2012182933A [EN] Embodiments analyze crowd-sourced data to identify a moved or moving beacon. The crowd-sourced data for the beacon is grouped into a plurality of clusters based on spatial distance. Timestamps associated with the crowd-sourced data in the clusters are compared to select one of the clusters. The crowd-sourced data associated with the selected cluster is used to determine position information for the beacon.

Classifications:

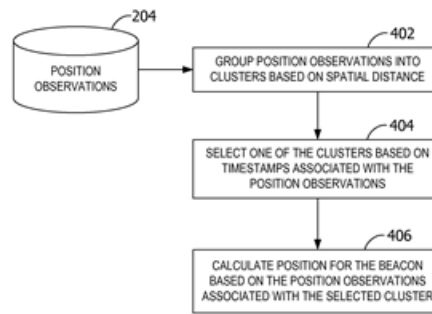
International (IPC 8-9): H04W24/00 H04W24/10 H04W4/00 H04W64/00 H04W68/00 (Advanced/Invention)

CPC: H04W64/003 H04W48/08 G01S5/0242 H04W64/00 H04W24/10

European: G01S5/02A6 H04W48/08 T04W28/04 T04W64/00

US: 1/1 370/328 370/328P 370/400 455/456.1 455/456.100P

PatBase - US2012182933_AA



Family:

Publication number	Publication date	Application number	Application date
■ US2012182933 AA	20120719	US20110008034	20110118
■ US2012184292 AA	20120719	US20110185520	20110719
■ US2014057651 AA	20140227	US20130061560	20131023
■ US8542637 BB	20130924	US20110008034	20110118
■ US8577389 BB	20131105	US20110185520	20110719
■ US9179435 BB	20151103	US20130061560	20131023

Priority:

US20110008034 20110118 US20110185520 20110719 US20130061560 20131023

Probable Assignee: MICROSOFT TECHNOLOGY LICENSING LLC

Assignee(s): (std): BANDHAKAVI SINDHURA ; BASU PRADIPTA KUMAR ; LIN JYH HAN ; LIU WEILI ; MICROSOFT CORP ; MICROSOFT TECHNOLOGY LICENSING LLC

Inventor(s): (std): BANDHAKAVI SINDHURA ; BASU PRADIPTA KUMAR ; LIN JYH HAN ; LIU WEILI

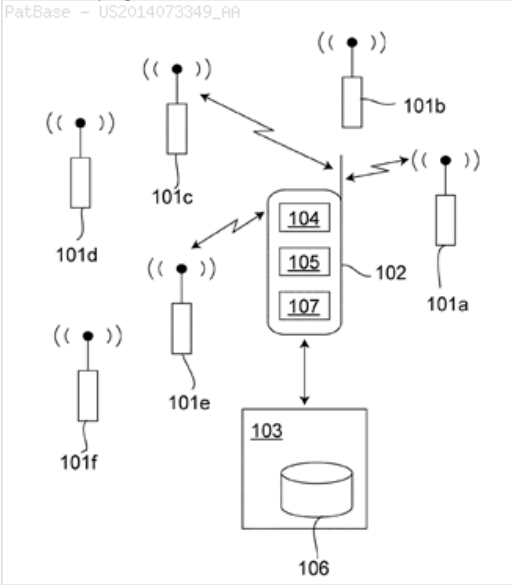
Agent(s): ANEESH; KATE; MICKY

Title: LOCATION-DEPENDENT SELECTION OF A RADIO-BASED LOCALIZATION METHOD FOR A MOBILE TERMINAL

Abstract: Source: US2014073349A [EN] The techniques described herein relate to a method for the localization of a terminal device by a localization unit that is configured to locate the terminal device on the basis of radio signals received in the terminal device from radio access points. In the method, the activation of the localization is controlled on the basis of the radio signals as a function of an evaluation of radio signals from at least one radio access point that have been detected in the vicinity of the terminal device by at least one receiving unit, and/or as a function of information about installation sites of radio access points. Moreover, the techniques described herein relate to a system that is suitable for carrying out the method.

Classifications:

International (IPC 8-9): G01S5/02 H04W64/00 (Advanced/Invention)
CPC: H04W64/003 G01S5/0252 G01S5/0263 H04M1/72572 H04W64/00 H04W84/12
European: G01S5/02D G01S5/02H1 T04M1/725F2G T04W64/00 T04W84/12
US: 455/456.1



Family:

Publication number	Publication date	Application number	Application date
DE102011006180 A1	20120927	DE201110006180	20110325
EP2689616 A1	20140129	EP20120712248	20120326
US2014073349 AA	20140313	US20120007372	20120326
WO12130811 A1	20121004	WO2012EP55347	20120326

Priority:

DE201110006180 20110325 WO2012EP55347 20120326

Probable Assignee: VODAFONE HOLDING GMBH

Assignee(s): (std): SCHUNK THORSTEN ; VODAFONE HOLDING GMBH

Inventor(s): (std): SCHUNK THORSTEN

Agent(s): JOSTARNDT HANS DIETER

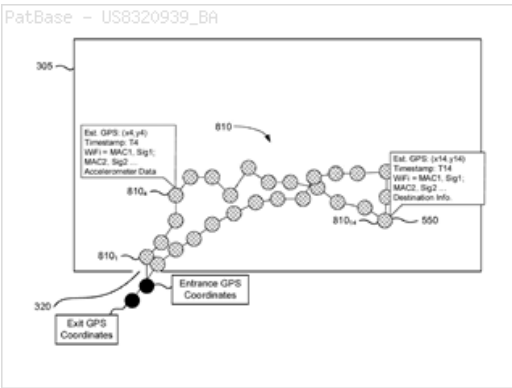
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Title: CROWD-SOURCED INFORMATION FOR INTERIOR LOCALIZATION AND NAVIGATION

Abstract: Source: US8320939B [EN] Aspects of the disclosure relate generally to using crowd sourced information to generate walkable paths through indoor spaces. More specifically, aspects relate to recording data such as accelerometer readings, wireless network or other beacon signal information, and timestamps while a client device moves within an indoor space. If the user reaches a destination within the indoor space, the client device may prompt the user for information about the destination. The information received and recorded by the client device may be sent to a server computer for further processing. The server may use the information to identify walkable paths within the indoor space. This information in turn may be used in various ways, such as to provide navigation assistance to users though the indoor space.

Classifications:

International (IPC 8-9): H04W24/00 (Advanced/Invention)
CPC: G01C21/206 G01S5/0027 G01S19/48 H04W4/027 H04W4/043
US: 370/338 455/415 455/456.1 709/224



Family:

Publication number	Publication date	Application number	Application date
US8320939 BA	20121127	US20110091504	20110421

Priority:

US20110091504 20110421

Probable Assignee: GOOGLE LLC
Assignee(s): (std): GOOGLE INC ; VINCENT LUC
Assignee(s): GOOGLE LLC
Inventor(s): (std): VINCENT LUC
Agent(s): LERNER DAVID LITTENBERG KRUMHOLZ AND MENTLIK LLP

Title: POSITIONING SYSTEMS AND METHODS AND LOCATION BASED MODIFICATION OF COMPUTING DEVICE APPLICATIONS

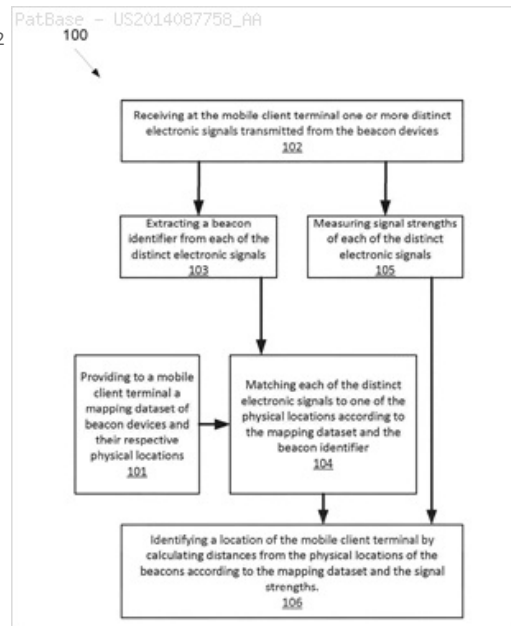
Abstract: Source: US2014087758A [EN] A computerized method of identifying a location of mobile client terminals. The method comprises providing to a mobile client terminal a mapping dataset which defines a plurality of physical locations of a plurality of beacon devices, receiving at the mobile client terminal at least one distinct signal transmitted from at least one of the plurality of beacon devices, extracting from each of the at least one distinct signal an identifier of a beacon device of the plurality of beacon devices, matching between the identifier and one of the plurality of physical locations using the mapping dataset, and identifying a location of the mobile client according to the matching.

Classifications:

International (IPC 8-9): G01S G01S11/06 G01S3/02 G01S5/00 G01S5/02 G01S5/14 G1S3/02 H04W4/02 H04W48/04 H04W64/00 H04W88/02 (Advanced/Invention); G01S (Subclass/Invention)

CPC: H04W64/00 G01S5/0252 G01S5/0236 G01S5/14 G01S11/06

US: 455/456.1



Family:

Publication number	Publication date	Application number	Application date
AU2012260462 AA	20121129	AU20120260462	20120523
AU2012260462 BB	20170223	AU20120260462	20120523
CA2836500 AA	20131118	CA20122836500	20120523
CN103688186 A	20140326	CN201280034155	20120523
CN103688186 B	20170926	CN201280034155	20120523
EP2715389 A1	20140409	EP20120789158	20120523
EP2715389 A4	20141126	EP20120789158	20120523
EP2715389 B1	20170712	EP20120789158	20120523
ES2645229 T3	20171204	ES20120789158T	20120523
IL229574 A0	20140130	IL20120229574	20120523
IL229574 A1	20171130	IL20120229574	20120523
IN02080MN2013 A	20141010	IN2013MN02080	20131108
JP2014519604 T2	20140814	JP20140512002T	20120523
KR20140068809 A	20140609	KR20137034195	20120523
NZ617495 A	20150529	NZ20120617495	20120523
RU2013152875 A	20150627	RU20130152875	20120223
RU2013152875 A	20150627	RU20130152875	20120523
RU2597885 C2	20160920	RU20130152875	20120523
SG194813 A1	20131230	SG20130082227	20120523
US2014087758 AA	20140327	US20120119196	20120523
WO12160560 A1	20121129	WO2012IL50182	20120523

Priority:

EP20120789158 20120523 IL20130229574 20131121 US20110489118P 20110523
 WO2012IL50182 20120523 US20120119196 20120523 WO2012IL50182 20120223

Probable Assignee: WISE SEC LTD

Assignee(s): (std): MAOR VADIM ; Uajs SEK LTD ; VADIM MAOR ; WISE SEC LTD

Inventor(s): (std): MAOR VADIM

Inventor(s): VADIM MAOR

Agent(s): CULLENS PATENT AND TRADE MARK ATTORNEYS; CULLENS PTY LTD; INTEGRAL IP; JANSEN CORNELIS MARINUS; VO; ISERN JORGE; GE EHRlich 1995 LTD; G E EHRlich 1995 LTD ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: LOCATION DETERMINATION USING GENERALIZED FINGERPRINTING

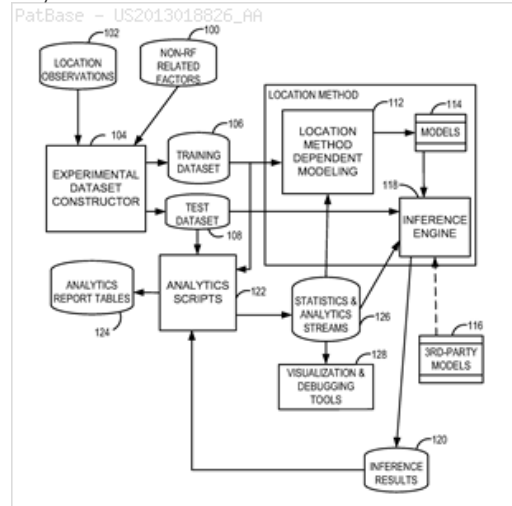
Abstract: Source: US2013018826A [EN] An RF fingerprinting methodology is generalized to include non-RF related factors. For each fingerprinted tile, there is an associated distance function between two fingerprints (the training fingerprint and the test fingerprint) from within that tile which may be a linear or non-linear combination of the deltas between multiple factors of the two fingerprints. The distance function for each tile is derived from a training dataset corresponding to that specific tile, and optimized to minimize the total difference between real distances and predicted distances. Upon receipt of an inference request, a result is derived from a combination of the fingerprints from the training dataset having the least distance per application of the distance function. Likely error for the tile is also determined to ascertain whether to rely on other location methods.

Classifications:

International (IPC 8-9): G06F15/18 G06F17/50 G06F19/00 G06F7/60
G06N3/02 G06N99/00 H04L12/64 (Advanced/Invention)

CPC: G06N99/005 G06F17/5018 H04L12/6418

US: 702/1 703/2 706/12 706/15

**Family:**

Publication number	Publication date	Application number	Application date
US2013018826 AA	20130117	US20110183464	20110715
US2014040175 AA	20140206	US20130053807	20131015
US8589318 BB	20131119	US20110183464	20110715
US9020869 BB	20150428	US20130053807	20131015

Priority:

US20110183464 20110715 US20130053807 20131015

Probable Assignee: MICROSOFT TECHNOLOGY LICENSING LLC

Assignee(s): (std): LIN JYH HAN ; MICROSOFT CORP ; MICROSOFT TECHNOLOGY LICENSING LLC ; SUNDARARAJAN ARJUN

Inventor(s): (std): LIN JYH HAN ; SUNDARARAJAN ARJUN

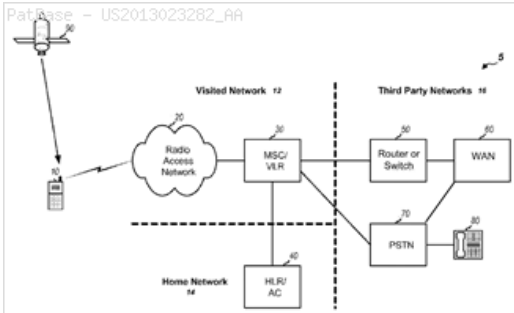
Agent(s): MICROSOFT CORP; BRYAN; KATE; MICKY

Title: LOCATION DETERMINATION BASED ON WEIGHTED RECEIVED SIGNAL STRENGTHS

Abstract: Source: US2013023282A [EN] Training datasets and test datasets consisting of observations (i.e., RSS measurements) partitioned per a mapping tile system are used to evaluate possible RSS weighting functions for each such tile. The observations from the training dataset are used to determine an optimal weighting function based on the training dataset that minimizes the error for the test data, wherein the error may be a function of the deltas between GPS positions of observations in the test dataset and predicted positions from the RSS weighted functions applied to test data. The accuracy of the optimal weighted function for each tile is characterized to determine whether to use the weighted function or an alternative (such as a non-weighted function) for subsequent inquiries.

Classifications:

International (IPC 8-9): H04W24/00 (Advanced/Invention)
CPC: G01S5/021 G01S5/0252
US: 455/456.1



Family:

Publication number	Publication date	Application number	Application date
■ US2013023282 AA	20130124	US20110252605	20111004
■ US8559975 BB	20131015	US20110252605	20111004

Priority:

US20110188464 20110722 US20110252605 20111004

Probable Assignee: MICROSOFT TECHNOLOGY LICENSING LLC
Assignee(s): (std): BASU PRADIPTA KUMAR ; LIN JYH HAN ; MICROSOFT CORP
Assignee(s): MICROSOFT TECHNOLOGY LICENSING LLC
Inventor(s): (std): BASU PRADIPTA KUMAR ; LIN JYH HAN
Agent(s): MICROSOFT CORP

Title: USING WIRED ENDPOINTS TO DETERMINE POSITION INFORMATION FOR WIRELESS ENDPOINTS IN A NETWORK

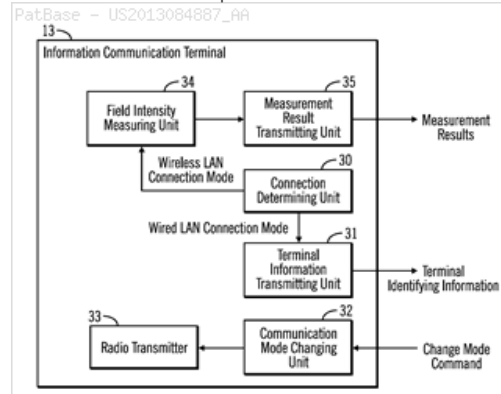
Abstract: Source: US2013084887A [EN] Provided are a computer readable recording media, system, and method for using wired endpoints to determine position information for wireless endpoints in a network. Identification information from a detected wired endpoint connected to the network is received and a command is issued to the detected wired endpoint to cause the detected wired endpoint to transmit signals identifying the wired endpoint. Information is received from a communicating wireless endpoint, comprising one of the wireless endpoints, using wireless communication, including wireless endpoint identification information and information identifying at least one of the wired endpoints transmitting signals received at the wireless endpoint. Position information is determined for the wired endpoint indicated in the information received from the communicating wireless endpoint. Information on the communicating wireless endpoint is updated to associate with the determined position information.

Classifications:

International (IPC 8-9): G01S5/02 H04W24/00 H04W52/02 H04W64/00 H04W88/02 (Advanced/Invention)

CPC: H04W64/00 H04W84/12 G01S5/0289 H04W52/0245 G01S5/0236 Y02D70/00 Y02D70/142 Y02D70/144 Y02D70/164 Y02D70/22

US: 455/456.1



Family:

Publication number	Publication date	Application number	Application date
JP2013081023 A2	20130502	JP20110219205	20111003
JP5710438 B2	20150430	JP20110219205	20111003
US2013084887 AA	20130404	US20120629472	20120927
US8805409 BB	20140812	US20120629472	20120927

Priority:

JP20110219205 20111003

Probable Assignee: IBM

Assignee(s): (std): IBM

Assignee(s): INT BUSINESS MACHINES CORP ; INTERNATL BUSINESS MACH CORP ; INTERNATL BUSINESS MACH CORP
IBM

Inventor(s): (std): AKIYAMA KAZUTO ; KOGO MAKOTO ; NISHIMURA YASUTAKA ; KOGOH MAKOTO ; HAMADA SHINKICHI ;
AKIYAMA KAZUHITO

Agent(s): KONRAD RAYNES DAVDA AND VICTOR LLP; DAVID W

Title: FINGERPRINTING WITH RADIO CHANNEL RELATED INFORMATION

Abstract: Source: US2013109405A [EN] Example Embodiments presented herein are directed towards a radio node (101, 130, 102), and corresponding methods therein, for fingerprinting positioning measurements. The radio node may be configured to provide a fingerprinting measurement result comprising radio channel related information. Non-limiting examples of radio channel information may be Doppler, speed and/or delay spread information. Example embodiments presented herein may also be directed towards a positioning node (140), and corresponding methods therein, for fingerprinting positioning management. The positioning node may be configured to receive radio channel related information from the radio node and generate a radio fingerprint based on the received radio channel related information.

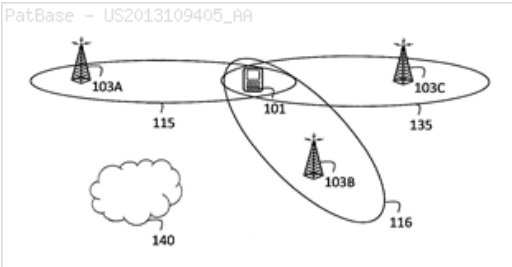
Classifications:

International (IPC 8-9): G01S5/02 H04W24/00

H04W64/00 (Advanced/Invention)

CPC: G01S5/0252 H04W64/00

US: 455/456.1



Family:

Publication number	Publication date	Application number	Application date
EP2772111 A1	20140903	EP20120720697	20120328
US2013109405 AA	20130502	US20120638949	20120328
US9594149 BB	20170314	US20120638949	20120328
WO13062462 A1	20130502	WO2012SE50340	20120328

Priority:

US20110552471P 20111028 US20120638949 20120328 WO2012SE50340 20120328

Probable Assignee: TELEFONAKTIEBOLAGET LM ERICSSON PUBL

Assignee(s): (std): TELEFONAKTIEBOLAGET L M ERICSSON PUBL ; WIGREN KARL TORBJOERN ; WIGREN TORBJOERN ; ERICSSON TELEFON AB L M ; SIOMINA IANA

Assignee(s): TELEFONAKTIEBOLAGET L M ERICSSON (PUBL) ; TELEFONAKTIEBOLAGET LM ERICSSON PUBL

Inventor(s): (std): SIOMINA IANA ; WIGREN KARL TORBJOERN ; WIGREN TORBJOERN

Agent(s): KUEHN FRIEDRICH HEINRICH; COATS AND BENNETT PLLC; HASSELGREN JOAKIM

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

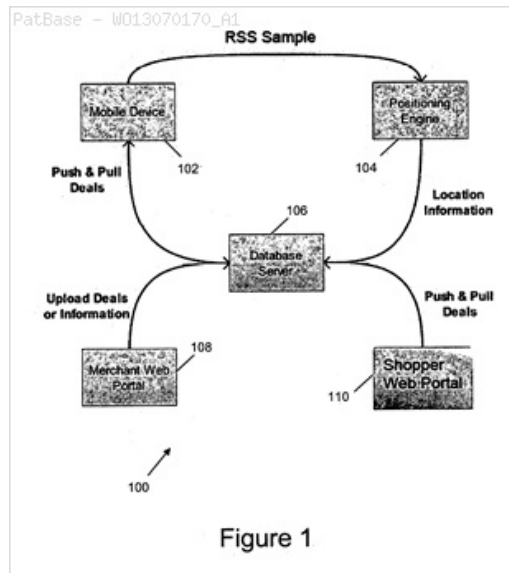
Title: A METHOD AND APPARATUS FOR DETERMINING LOCATION INFORMATION OF A POSITION IN A MULTI-STOREY BUILDING

Abstract: A method and apparatus for determining location information of a position in a multi-storey building, the method comprising: retrieving observation data comprising observed addresses and corresponding observed received signal strengths of wireless access points detected at the position from a memory; retrieving, for each storey of the building, a radio map comprising a plurality of location points in the respective storey of the building from a database; selecting one or more location points comprising the observed addresses from the radio map; determining a storey estimate of the position by calculating a sum probability for each storey of the building; and setting the storey estimate as the storey of the building having highest value of the calculated sum probability.

Classifications:

International (IPC 8-9): G01S5/02 H04W4/02 (Advanced/Invention)

CPC: H04W4/043 G01S5/0278 G01S5/0252



Family:

Publication number	Publication date	Application number	Application date
■ CN104054360 A	20140917	CN201180076211	20111108
■ DE602011033948 D1	20170216	DE201160033948T	20111108
■ EP2777304 A1	20140917	EP20110875431	20111108
■ EP2777304 A4	20151014	EP20110875431	20111108
■ EP2777304 B1	20161228	EP20110875431	20111108
■ SG189818 A1	20130628	SG20120023867	20111108
■ WO13070170 A1	20130516	WO2011SG00397	20111108

Priority:

EP20110875431 20111108 WO2011SG00397 20111108

Probable Assignee: RUCKUS WIRELESS INC

Assignee(s): (std): HAN YANG ; RUCKUS WIRELESS INC ; RUCKUS WIRELESS SINGAPORE PTE LTD ; YFIND TECHNOLOGIES PTE LTD ; TING SEE HO

Assignee(s): RUCKUS WIRELESS INC SUNNYVALE

Inventor(s): (std): CHEN SHIHAO ; HAN YANG ; TING SEE HO

Agent(s): KADOR AND PARTNER; LUCAS BRIAN RONALD; LEE AI MING

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: CORRECTING DEVICE ERROR RADIUS ESTIMATES IN POSITIONING SYSTEMS

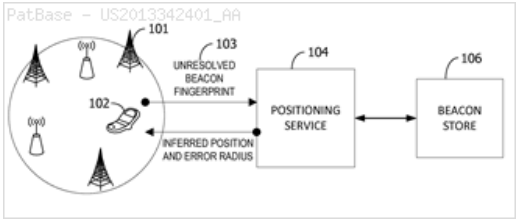
Abstract: Source: US2013342401A [EN] Embodiments adjust device error radiuses associated with inferred device positions produced by positioning systems. Inferred beacon positions and associated beacon radiuses are accessed for beacons in a beacon fingerprint from an observing computing device. The beacon radiuses are associated with a pre-defined confidence level (e.g., an in-circle percentage). A Kalman filter is applied to at least one of the beacons using the inferred beacon positions and the beacon radiuses associated therewith to infer a device position for the computing device and to compute a device error radius for the inferred device position. The computed device error radius is adjusted as a function of the quantity of beacons input to the Kalman filter to achieve the pre-defined confidence level.

Classifications:

International (IPC 8-9): G01S3/02 G01S5/02 (Advanced/Invention); G01S1/00 (Advanced/Non-invention)

CPC: G01S5/0252 G01S1/00 G01S5/021 G01S5/0242 G01S5/0278

US: 342/451



Family:

Publication number	Publication date	Application number	Application date
■ US2013342401 AA	20131226	US20120530648	20120622
■ US9651654 BB	20170516	US20120530648	20120622

Priority:

US20120530648 20120622

Probable Assignee: MICROSOFT TECHNOLOGY LICENSING LLC

Assignee(s): (std): DIACETIS STEPHEN P ; LETCHNER JULIA MAUREEN ; LIN JYH HAN ; MICROSOFT CORP ; SONG YONG ; MICROSOFT TECHNOLOGY LICENSING LLC

Inventor(s): (std): DIACETIS STEPHEN P ; LETCHNER JULIA MAUREEN ; LIN JYH HAN ; SONG YONG

Title: INDOOR/OUTDOOR DIFFERENTIATION USING RADIO FREQUENCY (RF) TRANSMITTERS

Abstract: Source: US2014004876A [EN] An apparatus and method is provided for indoor/outdoor transition detection of devices to improve selection of the navigation algorithms. A mobile device can scan resources such as radio frequency (RF) sources in its vicinity and compare the scanned resources with a set of indoor-only resources to determine whether the mobile device is located inside a structure (e.g., indoor) or outside the structure (e.g., outdoor). The techniques provide an apparatus and method to determine when a device transitions between indoor and outdoor to efficiently use appropriate algorithm for positioning and/or navigation.

Classifications:

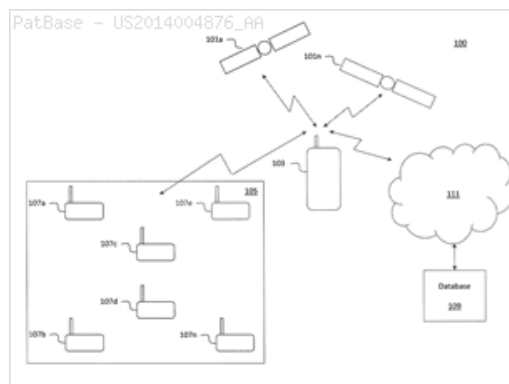
International (IPC 8-9): G01C21/20 G01S19/00 G01S19/48 G01S5/02

H04W24/00 H04W4/02 (Advanced/Invention);

G01S19/34 G01S5/02 (Advanced/Non-invention)

CPC: G01C21/206 G01S5/0236 G01S19/34 G01S19/48

US: 455/114.2 455/444 455/448 455/456.1 455/456.3 455/456.6 455/63.1

**Family:**

Publication number	Publication date	Application number	Application date
■ CN103513227 A	20140115	CN201210587238	20121228
■ CN103513227 B	20170412	CN201210587238	20121228
■ EP2680039 A1	20140101	EP20130003196	20130621
■ TW201400841 A	20140101	TW20120147546	20121214
■ TWI557420 B	20161111	TW20120147546	20121214
■ US2014004876 AA	20140102	US20120538296	20120629
■ US9008694 BB	20150414	US20120538296	20120629

Priority:

US20120538296 20120629

Probable Assignee: AVAGO TECHNOLOGIES LTD

Assignee(s): (std): BROADCOM CORP ; FULLER RICHARD ; MALKOS STEVEN

Assignee(s): AVAGO TECHNOLOGIES GENERAL IP SINGAPORE PTE LTD ; AVAGO TECHNOLOGIES LTD ; BANK OF AMERICA NA COLLATERAL AGENT AS

Inventor(s): (std): FULLER RICHARD ; MALKOS STEVEN

Agent(s): JEHL VOLKER ARMIN; STERNE KESSLER GOLDSTEIN AND FOX PLLC

Designated states: AL AT BA BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR

Title: SYSTEM, METHOD AND COMPUTER PROGRAM FOR DYNAMIC GENERATION OF A RADIO MAP

Abstract: Source: US2014011518A [EN] Embodiments described herein provide a system, method and computer program for dynamic radio map generation, which may be used for indoor positioning of one or more mobile devices based on received signal strength (RSS) in some examples. In an aspect, a dynamic scheme may be used to learn the RSS radio map from only a small number of fingerprint samples. Compressive sensing may be applied to build the graph structure and calculate the graph weight in some embodiments. Once the RSS radio map is learned, a mobile device may be located and location based services can be provided to the user in some example embodiments. An indoor learning and positioning system on a mobile device may be used to evaluate the performance. Embodiments described herein may not require a large amount of offline calibrations, which may reduce the labor cost of collecting fingerprints significantly while maintaining a satisfactory level of localization accuracy.

Classifications:

International (IPC 8-9): G01S5/02 G06F19/00 H04W16/18 H04W24/00

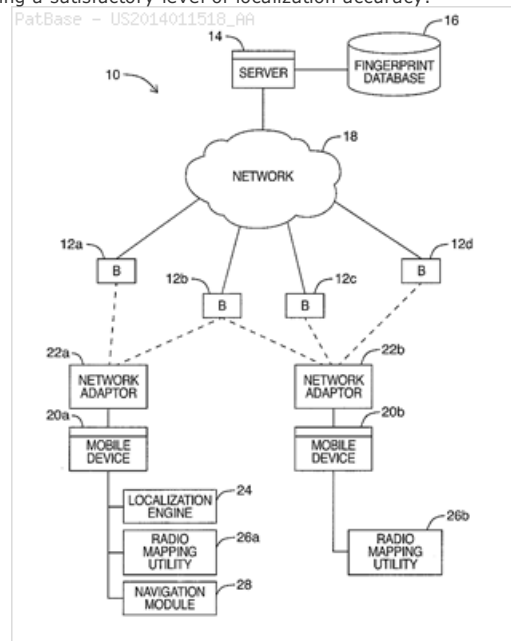
H04W24/10 H04W4/02 H04W4/04 H04W64/00

H04W84/12 (Advanced/Invention);

H04W4/04 (Advanced/Non-invention)

CPC: H04W4/025 G01S5/0252 H04W4/043 H04W64/00

US: 1/1 455/456.1



Family:

Publication number	Publication date	Application number	Application date
CA2877763 AA	20141223	CA20132877763	20130626
CN105143909 A	20151209	CN201380044486	20130626
EP2865205 A1	20150429	EP20130810535	20130626
EP2865205 A4	20160309	EP20130810535	20130626
IN00177MN2015 A	20160624	IN2015MN00177	20150124
JP2015531053 T2	20151029	JP20150518740T	20130626
KR20150035745 A	20150407	KR20147036226	20130626
US2014011518 AA	20140109	US20130927510	20130626
US9167386 BB	20151020	US20130927510	20130626
WO14000090 A1	20140103	WO2013CA00602	20130626

Priority:

US20120664459P 20120626 US20130927510 20130626 WO2013CA00602 20130626

Probable Assignee: GOVERNING COUNCIL OF UNIV OF TORONTO

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Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: DYNAMIC SELECTION OF POSITIONING SYSTEM AND DISPLAY MAP

Abstract: Source: US2014192658A [EN] Systems, apparatus and methods for determining whether to use an indoor map or an outdoor map based on local area network (LAN) signals from access points (APs) are disclosed. If only weak AP signals belonging to a location content identifier (LCI) are received, prior art systems display an indoor map associated with the LCI. An improvement herein further determines a quality of AP signals and/or wide area network (WAN) signals before determining whether to display the indoor map or an outdoor map.

Classifications:

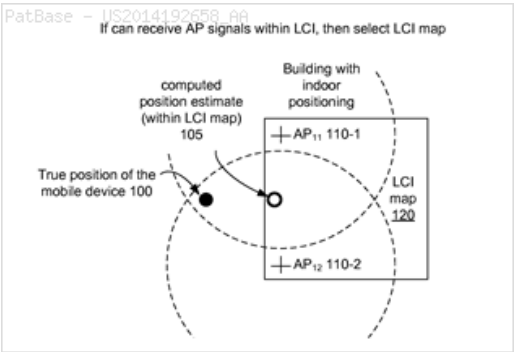
International (IPC 8-9): G01C21/20 H04W4/02

H04W4/04 (Advanced/Invention);

H04W64/00 (Advanced/Non-invention)

CPC: H04W4/025 G01C21/206 H04W4/043 G01S19/14 G01S19/48

US: 370/252 370/338



Family:

Publication number	Publication date	Application number	Application date
US2014192658 AA	20140710	US20130734733	20130104
WO14107283 A1	20140710	WO2013US74792	20131212

Priority:

US20130734733 20130104

Probable Assignee: QUALCOMM INC

Assignee(s): (std): QUALCOMM INC

Inventor(s): (std): GAO WEIHUA ; VENKATRAMAN SAI PRADEEP ; ZHANG GENSHENG

Agent(s): WYMAN BRYAN H

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

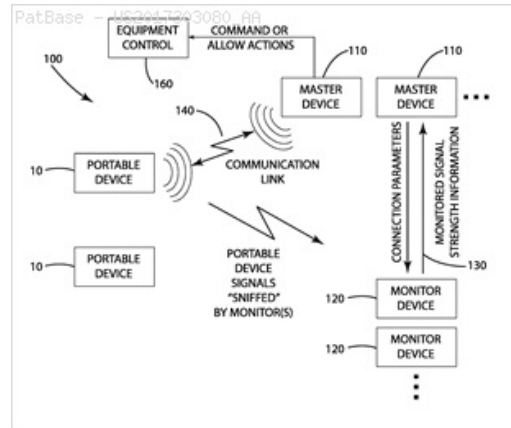
Title: SYSTEM AND METHOD FOR ESTABLISHING REAL-TIME LOCATION

Abstract: Source: US2017303080A [EN] A communication system with a master device configured to determine location information in real-time with respect to a portable device. The master device may direct one or more monitor devices to monitor communications that occur over a primary communication link. The monitor devices may sense characteristic information about the signal from the portable device, and communicate this characteristic information to the master device via an auxiliary communication link. The communication system may determine location of the portable device, authenticate the portable device, determine whether the portable device is authorized to allow or initiate an action, and command or enable an action with respect to equipment.

Classifications:

International (IPC 8-9): G01S5/00 G01S5/02 G01S5/14 G06F21/31
H04B17/318 H04L29/06 H04L9/32 H04M1/66 H04M1/68 H04M3/16
H04W12/06 H04W24/00 H04W24/08 H04W4/00 H04W4/02 H04W4/04
H04W76/02 (Advanced/Invention);
H04W84/18 (Advanced/Non-invention)

CPC: H04W4/025 H04B17/318 H04W4/008 H04W4/046 H04W12/06
H04W24/08 H04W76/025 H04W84/18 H04W4/02 H04L63/0823 G06F21/31
H04L9/3247 H04L2209/80 H04W4/80 H04W76/15



Family:

Publication number	Publication date	Application number	Application date
■ US2017303080 AA	20171019	US20170627496	20170620
■ US2017303090 AA	20171019	US20170488136	20170414
■ US9794753 BA	20171017	US20170488136	20170414
■ WO17181050 A1	20171019	WO2017US27686	20170414

Priority:

US20160323262P 20160415 US20170488136 20170414 US20170627496 20170620

Probable Assignee: INFINITEKEY INC

Assignee(s): (std): INFINITEKEY INC

Assignee(s): DENSO INT AMERICA INC

Inventor(s): (std): FOMINAYA IV ANTONIO ; HARTMAN ROBERT ; JAGER KARL ; SMITH ERIC ; STITT RAYMOND MICHAEL ; STROUD MICHAEL

Agent(s): WARNER NORCROSS AND JUDD LLP; DEVRIES NATHAN J ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KH KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW