

## SYSTEMS AND METHODS FOR SIGNAL STRENGTH DISPLAY

### Technical Field

5 The present disclosure relates, in general terms, to systems providing information to an end user. More specifically, the present disclosure relates to a personal GPS navigation system on a mobile device, the mobile device providing information on the current GPS location of the mobile device, as well as the accuracy of the information, based on the strength of the GPS signal.

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### Background

This background description is provided for the purpose of generally presenting the context of this disclosure. Contents of this background section are neither expressly  
15 nor impliedly admitted as prior art against the present disclosure.

Personal global positioning system (GPS) navigation systems on mobile devices are becoming increasingly common. Using radio waves between satellites and a receiver within mobile devices, the latter receives a signal from the satellites that  
20 contains information such as the time the signal was sent and the orbital information of the satellite. From the information received, the receiver inside the mobile device calculates the location of the mobile device, supplying information such as the location of the mobile device in latitude and longitude, the speed of the mobile device, and any other movement.

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One useful application of the easily obtainable information of the location of a mobile device is in e-commerce, in which companies and individuals buy and sell goods and services over the internet. In particular, platforms providing ride hailing services and product delivery services regularly use the readily obtainable real-time  
30 information of a mobile device. Platforms for ride hailing services, for instance, typically make use of the location of a passenger and the location of a driver to

match a passenger to a driver, among other factors. Similarly, platforms for product delivery services typically make use of the locations of the recipient, the product and the delivery personnel to complete a delivery assignment.

- 5 Another useful application of the location of a mobile device is in personal navigation, in which individuals provide an input of a desired destination, while the mobile device makes use of the current GPS location of the individual to calculate an optimal route of travel to guide the individual towards the destination.
- 10 It is therefore necessary for an end user to be confident that the location information is accurate. Inaccurate location information might lead to the user selecting an incorrect location during booking of ride hailing services or product delivery services, or it might lead to the end user being supplied with an inaccurate route of travel.

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### Summary

Disclosed herein is a system comprising:

- 20 a non-transitory memory;  
a display interface; and  
a processing system comprising one or more processors coupled to the non-transitory memory, configured to read instructions from the memory that, when executed by the processing system, causes the system to perform a locating method by:
- 25 obtaining a current global positioning system (GPS) position of a mobile device;  
determining a GPS signal strength of the mobile device at the current GPS position;  
performing a comparison of the GPS position and GPS signal
- 30 strength against historical data of prior location attempts;  
classifying the GPS signal strength based the comparison; and  
displaying, on the display interface:

a map;  
an indication of the current GPS position of the system  
on the map; and  
a navigation button, programmed to:  
5 zoom or pan the map such that the current  
position of the mobile device is located at a centre of  
the map, when the button is activated; and  
an indicator, corresponding to the GPS signal  
strength.

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In some embodiments, the historical data of prior locating attempts comprises a plurality of data pairs, each data pair comprising:

a service requester's location data; and  
a service provider's location data.

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In some embodiments, a local correction vector is produced based on the service requester's location data and the service provider's location data, and wherein a proximity score is assigned to each of the plurality of prior locating attempts, based on a lowest magnitude of the local correction vector over each of the plurality of  
20 prior locating attempts.

In some embodiments, the service provider's location data may be a fixed geographic location.

25 In some embodiments, the historical data comprises a plurality of proximity scores, each proximity score corresponding to a magnitude of a corresponding said local correction vector, is subsequently evaluated for:

a minimum proximity score; and  
a maximum proximity score.

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In some embodiments, the processing system further interpolates the plurality of proximity scores between the minimum proximity score and the maximum proximity score, to determine a plurality of predefined thresholds, each threshold

corresponding to a respective limit between non-overlapping GPS signal strength ranges.

In some embodiments, the plurality of predefined thresholds define an upper limit  
5 for each respective GPS signal strength range, the GPS signal strength ranges comprising:

- a non-existent signal;
- a weak signal; and
- a strong signal.

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In some embodiments, the indicator corresponding to each of the plurality of predefined thresholds is:

- for the non-existent signal, a red navigation button with a diagonal line across;

15 for the weak signal, a black navigation button with an exclamation mark;  
and  
for the strong signal, a black navigation button.

In some embodiments, the indicator corresponding to each of the plurality of  
20 predefined thresholds additionally comprises text:

- for the non-existent signal, "No Signal";
- for the weak signal, "Weak"; and
- for the strong signal, "Strong".

25 In some embodiments, the indicator corresponding to the GPS signal strength of the mobile device is transitory.

In some embodiments, the processing system is additionally configured to supply a prompt for a user to use the system with caution if the GPS signal strength falls  
30 within the predefined thresholds of a non-existent signal or a weak signal.

In some embodiments, the processing system is additionally configured to supply a prompt for a user to confirm the location of said mobile device, if the GPS signal strength falls within the predefined thresholds of a non-existent signal or a weak signal.

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In some embodiments, the prompt displays a last known location of the user concurrently with a request for the user to confirm the location of said mobile device.

- 10 In some embodiments, the display interface additionally comprises an indicator of confidence displaying the current GPS location of the mobile device.

In some embodiments, the indicator of confidence is a circle with the current GPS location of the mobile device located at a centre of the circle, and wherein a radius of the indicator of confidence is a predetermined value based on the historical data of prior locating attempts, corresponding to the GPS signal strength.

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In some embodiments, the mobile device may be a mobile phone.

## 20 **Brief description of the drawings**

Some embodiments of the systems for this invention, in accordance with the present disclosure, will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

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Figure 1 illustrates a flowchart of a locating attempt as described in the present disclosure.

Figure 2 illustrates two screenshots of a display, comprising an interface (e.g. touchscreen) by which a user interacts with the system.

Figure 3 illustrates two screenshots of a display, comprising an interface (e.g. touchscreen) by which a user interacts with the system.

### Detailed description

Embodiments of the present disclosure relate to a personal GPS navigation system on a mobile device, the device providing information on the current GPS location of the mobile device, as well as the accuracy of the information, based on the strength of the GPS signal.

In one or more embodiments, the system comprises a non-transitory memory, a display interface, and a processing system. The processing system comprises one or more processors coupled to the non-transitory memory, and is configured to read instructions from the memory that, when executed by the processing system, causes the system to perform a locating method.

Figure 1 illustrates the locating method (100) of the present disclosure. The locating method comprises first obtaining a current global positioning system (GPS) position of a mobile device (102), determining a GPS signal strength of the mobile device at the current GPS position (104), performing a comparison to a database comprising historical data of prior locating attempts (106), classifying the GPS signal strength based on the comparison (108), then displaying these information on a display interface (110). The information displayed on the display interface comprises a map, an indication of the current GPS position of the system on the map, and a navigation button. The navigation button is further programmed to zoom or pan the map such that the current position of the mobile device is located at a centre of the map when the button is activated, and to display an indicator corresponding to the GPS signal strength.

Step 102 can be performed in a conventional way, namely by obtaining a signal from a satellite, communication tower or fixed network distribution location, or triangulating signals from multiple such sources. All such embodiments and others are intended to fall within the scope of the present disclosure.

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Step 104 can similarly be performed in a conventional way, or otherwise be calculated by, and received from, pre-existing GPS software on the mobile device. For example, a signal-to-noise ratio (SNR) may be supplied along with each GPS signal from each source, the SNR corresponding to a GPS signal strength (also referred to as accuracy or error, as dictated by context) specifying the potential amount of error in the GPS signal. In other embodiments, the GPS signal strength is determined based on fluctuations in the current GPS position that are not determined by movements of the device the location of which is being determined – e.g., fluctuations in a GPS signal for location a person holding a mobile device that is stationary.

Step 106 involves performing a comparison with historical data that may, for example, be stored in a database. The historical data reflects errors in locations specified by GPS and actual locations – e.g., the difference between the locations of a mobile device of a passenger when compared with that of a vehicle, for a ride hailing request. This can be determined through various mechanisms such as by checking or obtaining the GPS coordinates from the mobile device of both the passenger and driver when a driver indicates a passenger has been picked up – this informs the system that the location of the passenger and vehicle/driver is the same and that the vehicle is located at the pickup point or origin. In some embodiments, historical data of prior locating attempts comprises a series of data sets, each data set comprising a first GPS position (e.g. of a first mobile device), a second GPS position of a second mobile device, wherein the second GPS position is obtained from when the second mobile device shares the same geographic location as the first mobile device (e.g. a driver with the second mobile device picks up a passenger carrying the first mobile device, or picks up a meal from a restaurant with known GPS location corresponding to the first GPS position – this "correspondence" may comprise the known GPS location being the location of the restaurant or comprise a the known GPS location being related to a pickup point at

which a vehicle would typically wait while a person brings the food from the restaurant to the vehicle), and a local correction vector produced from the first GPS position and the second GPS position. The location correction vector corresponds to a degree of error (or distance between) the first GPS position and the second GPS position. The local correction vector from each of the data points within historical data is then evaluated to give a proximity score corresponding to a magnitude of the local correction vector. The proximity score may then be classified into one of a plurality of GPS signal strength ranges.

10 In this disclosure, unless the context states otherwise, prior locating attempts refer to historical data as collected from prior ride hailing service requests or delivery pick-up requests, both by the system described in the present disclosure or by any other methods of detecting a user's location.

15 *Evaluating historical data of prior locating attempts*

The evaluation of historical data of prior locating attempts to classify the GPS signal strength via a comparison against predefined thresholds is described here. While the discussion below has been made with reference to adapting the system in a ride hailing service platform or in a product delivery service platform, it will be appreciated that the same methods may be used for other on-demand services which require a device GPS location to be supplied with known accuracy.

*Example 1*

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In a first example, the system described herein is adapted in a ride hailing service platform. A series of data sets may arise from rides hailed via the platform in the last six months. One data set may comprise the following:

- 30 (i) Geographical coordinates of a service requester's (i.e., a passenger's) mobile device belonging to a passenger requesting the service, as detected by the locating method described in this disclosure or otherwise,

- expressed as a two-dimensional coordinate, such as its longitude and latitude:  $(a_1^\circ, b_1^\circ)$ , and its corresponding GPS signal strength, which may be expressed as a SNR.
- 5 (ii) Geographical coordinates of a service provider's (i.e., an assigned driver's) mobile device belonging to an assigned driver, as detected by the same locating method (as in (i)), expressed as a two-dimensional coordinate:  $(a_2^\circ, b_2^\circ)$ , and its corresponding GPS signal strength, which may be expressed as a SNR.
- 10 (iii) A local correction vector calculated from the discrepancy between the first geographical coordinate (as in (i)) and the second geographical coordinate (as in (ii)), at the point the service is rendered (i.e., when the assigned driver picks the passenger up).

15 In the above, it is imperative that the service requester of the said ride hailing service is the passenger at the pick-up location (i.e. the passenger is booking the ride for himself).

*Example 2*

- 20 In a second example, the system described herein is adapted in a product delivery service platform. This may be an on-demand food delivery service platform, or it may be a courier service platform. A series of data sets may arise from deliveries facilitated via the platform in the last six months. One data set may comprise the following:
- 25 (i) Geographical coordinates of a service provider's (i.e., an assigned driver's) mobile device belonging to a driver assigned to carry out the delivery service, as detected by the locating method described in this disclosure or otherwise, expressed as a two-dimensional coordinate, such as its longitude and latitude:  $(a_1^\circ, b_1^\circ)$ , and its corresponding GPS signal strength, which may be expressed as a SNR.
- 30 (ii) Geographical coordinates of a service requester's (i.e., pick-up point of a food item or product being delivered) mobile device, as supplied by a

- database comprising the geolocation of the pick-up point, expressed as a two-dimensional coordinate:  $(a_2^\circ, b_2^\circ)$ .
- (iii) A local correction vector calculated from the discrepancy between the first geographical coordinate (as in (i)) and the second geographical coordinate (as in (ii)), at the point the service is rendered (i.e., when the assigned driver picks the food item or product up).

In the above, it is assumed that the assigned driver takes the mobile device (from which his geographical coordinate data is collected) to the pick-up point.

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In both Example 1 and Example 2, a local correction vector was calculated from the discrepancy between a first geographical coordinate (e.g. specified pick up location) and a second geographical coordinate (e.g. actual GPS coordinate determined, for example, from the mobile device GPS circuitry). The available historical data may be analysed to determine the spread of the data points, wherein each data point comprises a magnitude of the local correction vector, i.e. the distance between a first geographical coordinate and a second geographical coordinate. In the description and Example which follow, the term "discrepancy magnitude" has been used to refer to the magnitude of the said local correction vector.

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Using two or more predetermined benchmarks for two or more categories of signal strength, an evaluation of the spread of the data points may yield the following:

- (i) 90% of all bookings have a discrepancy magnitude of  $d_1$  m, or less;
- (ii) 95% of all bookings have a discrepancy magnitude of  $d_2$  m, or less; and
- (iii) 99.9% of all bookings have a discrepancy magnitude of  $d_3$  m, or less,

where it shall be understood that  $d_1 < d_2 < d_3$ .

*Example 3*

An analysis of historical data over a time period of a six month period may yield the following:

- (i) P50 = 20 m;

- (ii) P80 = 37 m;
- (iii) P90 = 65 m;
- (iv) P95 = 104 m; and
- (v) P99 = 1414 m,

5 where P50 refers to 50% of all bookings in that historical data set.

The datasets may also be combined, or combined with other datasets, as needed. Moreover, local correction vectors may be calculated at the time of comparison step 106, or may be performed in advance to speed up performance of the method,

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Throughout this specification and unless the context states otherwise, it shall be understood that geographical coordinates of a mobile device, when collected and stored to comprise a part of a historical data set for use in the system as described in this disclosure, is collected and stored with a corresponding GPS signal strength  
15 of the data point being collected. The GPS signal strength may be expressed as a SNR.

Throughout this specification and unless the context states otherwise, the term "user" or "users" may be used to represent either one or both of the service  
20 requester or the service provider.

#### *Generating a proximity score*

In some embodiments, the local correction vector data, each data point being  
25 collected from a service (ride hailing or delivery service) being rendered, then provides the basis for a proximity score based on the service requester's location data, the service provider's location data and the corresponding SNRs. The proximity score may provide information on how one or both of the GPS signal strengths relate to the accuracy of the geographical locations of one or both of the  
30 service requester and/or service provider.

A collection of proximity scores over services rendered over a predefined time interval, for example six months, then may then be evaluated for their relation to the corresponding SNR. The processing system may also be configured to eliminate outliers from the collected data.

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Outliers may comprise, but are not limited to, the following situations:

- i) an assigned driver leaves the mobile device in a vehicle when walking to pick up the food items or products for delivery; or
- ii) an assigned driver picks up a passenger at a different pick-up point from the location where the respective mobile devices have obtained both users to be, as mutually agreed, for example, due to traffic congestions, road diversions or the prohibition of waiting at an agreed location.

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#### *Classifying the signal strength*

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Based on the historical data of prior locating attempts, the system may be further configured to classify the confidence radius of a user's location to one of a plurality of categories. These categories may be termed as "No Signal", "Weak" and "Strong", or these categories may be termed as "Low", "Medium" or "High".

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In reference to Example 3 above, a "Strong" signal may cover the discrepancy magnitude of 90% of all bookings, a "Weak" signal may cover the discrepancy magnitude of 95% of all bookings, and "No Signal" may cover the discrepancy magnitude of 99% of all bookings.

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#### *Displaying the GPS signal strength*

In one or more embodiments, the system comprises a display interface which is configured to display a map, an indicator of the current GPS position of the system on the map, a navigation button, programmed to zoom or pan the map to bring the

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current position of the mobile device to a centre of the map, when the button is activated, and an indicator corresponding to the real-time GPS signal strength.

The indication of the current GPS position of the system on the map may be displayed as a single point, and the navigation button may be displayed on the same map. The navigation button may serve two or more features. A first feature of the navigation button may be to zoom or pan the map such that the current position of the mobile device is located at the centre of the map. The display interface may allow a user to pan the map to a different location, such as for the purpose of viewing a different point-of-interest (POI). The said navigation button may then allow a user to re-centre the current location on the map with a single tap.

A second feature of the navigation button may be to inform the user the accuracy of the location data at the current location when viewing said information on the map, such as for the purpose of booking a ride hailing service or a delivery service. The navigation button may hence additionally include a text or a symbol indicating the GPS signal strength as classified in an earlier step of this claimed invention by the processor in the system. The indicator may read "Strong" with a black navigation button, or it may read "Weak" with a black navigation button with an exclamation mark to remind a user to use the information provided with caution. The indicator may also read "No Signal" with a red navigation button and a diagonal line across, to indicate that there is no GPS signal at that instant. In the absence of a signal, the location information displayed on the map may be information collected at an earlier instant, and which has not been updated since. The information may hence be inaccurate since the user may have moved since.

The information showing the GPS signal strength may be programmed to be transitory. It may be displayed for two seconds, ten seconds, or it may be displayed for a predefined duration as determined by a user in a system setting. It may also be displayed until a user chooses to turn it off by tapping the same navigation button. This is illustrated in Figure 2, in which a navigation button 200 shows GPS

signal strength to be "Strong". After a predefined period of time, the signal strength indication of "Strong" disappears, as reflected by navigation button 202'.

- In some embodiments, the indicator may display "Weak" or "No Signal". In such cases, the processing system may be additionally configured to supply a prompt for a user to use the system with caution. Such a prompt may comprise a note that the information may not be accurate and hence the service rendered (e.g., ride hailing, food item or product delivery service) may take a longer time than usual (e.g. the assigned driver may not locate the passenger within an agreed time for delivery or service, or the food item or product being delivered may not arrive as quickly as indicated). The user may be required to perform an action to acknowledge the prompt, before the service request is allowed to proceed. The acknowledgement may be in the form of tapping a prompt that reads "OK, I understand".
- 15 In other embodiments, when the indicator may display "Weak" or "No Signal", the processing system may be additionally configured to supply a prompt with the location of the user. Such a prompt may read "The system detects that you are at Dawson Place. Please confirm if this is correct, or alternatively, please move to a location with a better GPS signal strength." The user may then be required to perform a selection to do one of three things, (1) confirm that the location detected is correct, (2) opt to input the information of a nearby POI (e.g. the actual pickup point), or (3) opt to move to a location with a better signal strength then run the location search again. Advantageously, this feature enhances the experience when the user is requesting a service from a location with a high density of tall buildings, which may thus compromise the GPS signal strength.
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- In yet another one or more embodiments, the processing system may be additionally configured to display a confidence radius with the current GPS location of the mobile device. The confidence radius may be displayed as a circle with the current GPS location of the mobile device at the centre of the circle. The radius of the circle may be one of a plurality of predetermined values, corresponding to the values determined based on a maximum proximity score and a minimum proximity score, after eliminating outliers. This is illustrated in Figure 3 which shows a
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navigation button 301 with "weak" signal strength. A proximity score (corresponding to radius of error 302) corresponds to the confidence radius, which is displayed as a circle 300 of radius equal to the confidence radius. Also shown is a mechanism using a notes field 304 for the user to input the information of a POI from which, for example, pickup should be made – the user may alternatively move a centre of the circle to the POI. Figure 3 also shows a navigation button 306 with no signal. The location 308 may therefore correspond to a last known location of the mobile device the location of which is being sought.

### 10 Example 3

Consider here a data set comprising ride hailing activities made via a platform in the last six months. Historical data may comprise rides wherein the assigned driver was able to locate the passenger with a high accuracy – i.e., the passenger's location data was collected when the GPS signal strength high and the data hence has a correspondingly high SNR. In this case, when the assigned driver arrives at the pick-up point as indicated by the assigned driver's mobile device, both users may be within 10 m or less than 10 m of each other and hence the service may proceed swiftly.

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In another ride recorded, the assigned driver may not have been able to locate the passenger with a high accuracy – i.e., the passenger's location data may have been collected when the GPS signal strength was low and the data hence has a correspondingly low SNR. When this request is sent to the database, the assigned driver receives the GPS location supplied by the passenger's mobile device and heads towards the pick-up point, and the passenger may not be at the location provided by the system, but instead, be 100 m away or more than 100 m away. The service in this case may be delayed or compromised.

30 The historical data may be analysed collectively to evaluate a maximum proximity score and a minimum proximity score. The rides being fulfilled with a discrepancy of 10 m or less than 10 m may be assigned a proximity score of 100, while the rides

being fulfilled with a discrepancy of 100 m or more than 100 m may be assigned a proximity score of 10. The system may hence be configured such that there exists five predefined threshold values of confidence radii (inversely proportionally related in the example given here), for e.g., for scores above 80, scores between 61 to 80, scores between 41 to 60, scores between 21 to 40, and scores below 20, wherein scores below 20 may be classified as "No Signal", scores between 21 to 40 may be classified as having "Weak" signal, and wherein scores above 41 are classified as having "Strong" signal.

10 The proximity scores and corresponding SNRs associated with the locating attempts which resulted in said proximity scores may then be used to provide a prediction on the GPS signal strength classification corresponding to not only the SNR but also a confidence radius, when a ride hailing service is requested at a particular SNR. Consequently, the confidence radius may be displayed on the display interface.

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It will be appreciated that many further modifications and permutations of various aspects of the described embodiments are possible. Accordingly, the described aspects are intended to embrace all such alterations, modifications, and variations that fall within the spirit and scope of the appended claims.

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Throughout this disclosure, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps, but not the exclusion of any other integer or step or group of integers or steps.

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The reference to any prior art in this disclosure is not, and should not be taken as, an acknowledgement or any form of suggestion that the prior art forms part of the common general knowledge.

What is claimed is:

1. A system comprising:
  - a non-transitory memory;
  - 5 a display interface; and
  - a processing system comprising one or more processors coupled to the non-transitory memory, configured to read instructions from the memory that, when executed by the processing system, causes the system to perform a locating method by:
    - 10 obtaining a current global positioning system (GPS) position of a mobile device;
    - determining a GPS signal strength of the mobile device at the current GPS position;
    - performing a comparison of the GPS position and GPS signal strength against historical data of prior location attempts;
    - 15 classifying the GPS signal strength based the comparison; and displaying, on the display interface:
      - a map;
      - an indication of the current GPS position of the system
      - 20 on the map; and
      - a navigation button, programmed to:
        - zoom or pan the map such that the current position of the mobile device is located at a centre of the map, when the button is activated; and
        - 25 an indicator, corresponding to the GPS signal strength.
2. The system of 1, wherein the historical data of prior locating attempts comprises a plurality of data pairs, each data pair comprising:
  - a service requester's location data; and
  - 30 a service provider's location data.
3. The system of 2, wherein a local correction vector is produced based on the service requester's location data and the service provider's location data, and wherein a proximity score is assigned to each of the plurality of prior locating attempts, based on a lowest magnitude of the local correction vector over each of the plurality of prior locating attempts.

4. The system of 2, wherein the service provider's location data may be a fixed geographic location.
5. The system of any one of 2 to 4, wherein the historical data comprises a plurality of proximity scores, each proximity score corresponding to a magnitude of a corresponding said local correction vector, is subsequently evaluated for:
  - a minimum proximity score; and
  - a maximum proximity score.
6. The system of 5, wherein the processing system further interpolates the plurality of proximity scores between the minimum proximity score and the maximum proximity score, to determine a plurality of predefined thresholds, each threshold corresponding to a respective limit between non-overlapping GPS signal strength ranges.
7. The system of 6, wherein the plurality of predefined thresholds define an upper limit for each respective GPS signal strength range, the GPS signal strength ranges comprising:
  - a non-existent signal;
  - a weak signal; and
  - a strong signal.
8. The system in 1, wherein the indicator corresponding to each of the plurality of predefined thresholds is:
  - for the non-existent signal, a red navigation button with a diagonal line across;
  - for the weak signal, a black navigation button with an exclamation mark; and
  - for the strong signal, a black navigation button.
9. The system in 1, wherein the indicator corresponding to each of the plurality of predefined thresholds additionally comprises text:
  - for the non-existent signal, "No Signal";
  - for the weak signal, "Weak"; and
  - for the strong signal, "Strong".
10. The system in 1, wherein the indicator corresponding to the GPS signal strength of the mobile device is transitory.
11. The system in 1, wherein the processing system is additionally configured to supply a prompt for a user to use the system with caution if the GPS signal

strength falls within the predefined thresholds of a non-existent signal or a weak signal.

- 5 12. The system in 1, wherein the processing system is additionally configured to supply a prompt for a user to confirm the location of said mobile device, if the GPS signal strength falls within the predefined thresholds of a non-existent signal or a weak signal.
13. The system of 12, wherein the prompt displays a last known location of the user concurrently with a request for the user to confirm the location of said mobile device.
- 10 14. The system in 1, wherein the display interface additionally comprises an indicator of confidence displaying the current GPS location of the mobile device.
- 15 15. The system in 14, wherein the indicator of confidence is a circle with the current GPS location of the mobile device located at a centre of the circle, and wherein a radius of the indicator of confidence is a predetermined value based on the historical data of prior locating attempts, corresponding to the GPS signal strength.
16. The system in 1, wherein the mobile device may be a mobile phone.