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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:    ) Group Art Unit:

DUPRAY et al.       ) Examiner:

Serial No.: 09/194,367     ) **PRELIMINARY AMENDMENT**

Filed: November 24, 1998    )

Atty. File No.: 1003-PUS    )

For: "LOCATION OF A MOBILE )
   STATION"        )

Dear Sir:

Prior to initial examination of the above-captioned application, please enter the following Preliminary Amendment.

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IN THE CLAIMS:

1. (Once Amended) A method for locating a [wireless] mobile station using wireless signal measurements obtained from transmissions between said mobile station and a plurality of base stations capable of wirelessly detecting said mobile station, comprising:

providing first and second mobile station location estimators, wherein said location estimators provide location estimates of said mobile station when said location estimators are supplied with data obtained from wireless signal measurements obtained from transmissions between said mobile station and the base stations, wherein:

(A) said first location estimator performs one or more of the <u>following</u> techniques <u>(a)</u> through (c) when supplied with said wireless signal measurements:

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(a)     a triangulation technique to determine, for each of three or more of the base
stations, one of: a distance and a wireless signal angle of arrival between the mobile
station and the base station using the wireless signal measurements;

(b)     a learning technique, wherein said learning technique determines an
association for associating:

        (i)     the wireless signal measurements, and

        (ii)     data indicative of a location for the mobile station,

wherein said association is determined by a training process using a plurality
of data pairs, each said pair including: first information indicative of a location of
some mobile station, and second information from wireless signal measurements
between said some mobile station and one or more of the base stations when said
some mobile station is at the location;

        (c)     a stochastic technique, wherein each said stochastic technique uses a
statistical correlation for correlating:

        (i)     the wireless signal measurements, and

        (ii)     data indicative of a location for the mobile station,

wherein said correlation is used for determining a probability that the mobile
station is within an area, and

    (B)     for at least a particular one of said techniques performed by said first location
estimator, said second location estimator does not perform said particular technique when supplied
with said wireless signal measurements;

first supplying said first location estimator with first data obtained from the wireless signal measurements;

first generating, by said first location estimator, first location related information having at least a first estimate for the mobile station's location;

second supplying said second location estimator with second data obtained from the wireless signal measurements;

second generating, by said second location estimator, second location related information having at least a second estimate for the mobile station's location;

determining a resulting location estimate of the mobile station [using] that is dependent upon: (a) a first value obtained from said first location related information, and (b) a second value obtained from said second location related information.

6.    (Once Amended)    A method as claimed in Claim 1, further including a step of retrieving at least one of (a1) and (b1) following:

(a1)    first historical location data having: (i) a first set of historical location estimates generated by said first location estimator for wireless signal measurements obtained from transmissions between one or more mobile stations, at a first plurality of locations, and said plurality of base stations[ at a first plurality of locations], wherein a distance between at least one of said location estimates of said first set, and said first estimate of said mobile station's location is determined to be less than a first predetermined value, and (ii) data identifying said locations of said first plurality of locations;

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(b1)    second historical location data having: (i) a second set of historical location estimates generated by said second location estimator for wireless signal measurements obtained from transmissions between one or more mobile stations, at a second plurality of locations, and said plurality of base stations[ at a second plurality of locations], wherein a distance between at least one of said location estimates of said second set, said second estimate of said mobile station's location is determined to be less than a second predetermined value, and (ii) data identifying said locations of said second plurality of locations.

7.    (Once Amended)    A method as claimed in Claim 1, further including, for at least one location estimate of said first and second estimates, a step of obtaining one of a likelihood value and a probability that a location of said mobile station is in said one location estimate, wherein said likelihood value is obtained using historical location estimates generated by the location estimator that generated said one location estimate [when the location estimator is supplied with wireless signal measurements obtained from transmissions between one or more mobile stations and said plurality of base stations at a plurality of locations].

14.    (Once Amended)    A method as claimed in Claim 1, wherein said first location estimator includes an artificial neural network, wherein said artificial neural network is one of: a multilayer perceptron, an adaptive resonance theory model, and a radial basis function network.

15.    (Once Amended)    A method as claimed in Claim 1, wherein said step of determining includes deriving a likelihood measurement that said mobile station is in said resulting

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location estimate, wherein said likelihood measurement is dependent upon <u>at least one of</u>: a first likelihood measurement that said mobile station is in said first estimate, and a second likelihood measurement that said mobile station is in said second estimate.

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17.    (Once Amended)    A location system for locating a mobile station, wherein said mobile station is one of a plurality of mobile stations, and [wireless] signal measurements are capable of being obtained from wireless transmissions between the plurality of mobile stations and a plurality of base stations, the improvement characterized by:

one or more location estimators, each said location estimator for estimating a location for each of one or more individual mobile stations of the plurality of mobile stations, when said location estimator is supplied with data <u>obtained</u> from a set of said wireless signal measurements [obtained from] <u>corresponding to</u> wireless transmissions between the individual mobile station and <u>at least one of</u> said plurality of base stations;

an archive for storing a plurality of data item collections, wherein for each geographical location of a plurality <u>of</u> geographical locations, there is one of said data item collections having (a1) and (a2) <u>following</u>:

(a1)    a representation of the geographical location, and

(a2)    wireless signal measurements corresponding to one of the plurality of mobile stations transmitting from approximately the geographical location of (a1);

a performance [estimator] <u>evaluator</u> for determining, for [each] <u>at least</u> one of said location estimators, <u>a</u> corresponding one or more performance measurements indicative of a previous performance of said one location estimator in locating one or more of the plurality of mobile stations,

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