Claims

1. A communications system for determining a name for a road in a network of roads, the communications system comprising:

a communications server apparatus comprising a processor and a memory;

at least one user communications device; and

a communications network connecting the communications server apparatus and the at least one user communications device;

wherein the communications server apparatus is configured, under control of the processor, to execute instructions in the memory to:

receive, via the communications network from the at least one user communications device, data corresponding to at least one candidate point-of-interest identified for association with the road in the network of roads;

for each candidate point-of-interest of the at least one candidate point-of-interest:

generate first data indicative of a first relationship relating to a distance between the candidate point-of-interest and a road segment of the road;

generate second data indicative of a second relationship between the road segment and a projection of the candidate point-of-interest in a direction of the road segment; and

if the first relationship satisfies a first condition for association and the second relationship satisfies a second condition for association, generate data indicative of the candidate point-of-interest being an associated point-of-interest that is associated with the road;

process, for each associated point-of-interest, data corresponding to the associated point-of-interest to extract name data indicative of a road name associated with the associated point-of-interest;

generate, based on the name data, data indicative of the name for the road; and

transmit, via the communications network to the at least one user communications device, data indicative of the name for the road.

2. The communications system of claim 1, wherein the first condition for association defines a threshold for a perpendicular distance between the candidate point-of-interest and the road segment, and the first condition is satisfied if the perpendicular distance is equal to or less than the threshold; and

the second condition for association defines an orthogonal projection of the candidate point-of-interest in the direction of the road segment, and the second condition is satisfied if the orthogonal projection intersects the road segment.

3. The communications system of claim 1, wherein the at least one candidate point-of-interest comprises a plurality of candidate points-of-interest defining a plurality of associated points-of-interest, and wherein the communications server apparatus is further configured to:

process, for each associated point-of-interest of the plurality of associated points-of-interest, data corresponding to the associated point-of-interest to extract name data indicative of a road name associated with the associated point-of-interest; and

if the road names associated with the plurality of associated points-of-interest include a plurality of different candidate road names, determine a number count of associated points-of-interest having a candidate road name, out of the plurality of different candidate road names, that occurs the highest number of times, and generate, based on the name data indicative of the candidate road name that occurs the highest number of times, the data indicative of the name for the road.

4. The communications system of claim 1 or claim 3, wherein the communications server apparatus is further configured to:

generate data indicative of a confidence indicator for the name for the road; compare the confidence indicator with a threshold; and

if the confidence indicator satisfies the threshold, generate data indicative of validation of the name for the road.

5. The communications system of claim 1, wherein the communications server apparatus is further configured to, prior to processing the data corresponding to the associated point-of-interest to extract the name data:

modify at least one part of a road name associated with the associated point-of-interest based on at least one standardisation processing; and

generate modification data indicative of the road name with the at least one modified part, the modification data being included in the name data;

wherein processing the data corresponding to the associated point-of-interest to extract the name data comprises processing the data to extract the name data including the modification data.

6. The communications system of claim 5, wherein the at least one standardisation processing comprises processing of abbreviations, and wherein the communications server apparatus is configured to replace a non-abbreviated term in the road name with an abbreviated term corresponding to the non-abbreviated term, or replace an abbreviated term in the road name with a non-abbreviated term corresponding to the abbreviated term.

7. The communications system of claim 5, wherein the at least one standardisation processing comprises processing of number substrings, and wherein the communications server apparatus is configured to remove at least one number substring in the road name, the at least one number substring comprising at least one of a house number or a unit number.

8. The communications system of claim 5, wherein the at least one standardisation processing comprises processing of equivalent terms, and wherein the communications server apparatus is configured to replace a word in the road name with an equivalent term corresponding to the word, the word and the equivalent term having a similar meaning.

9. The communications system of claim 5, wherein the at least one standardisation

processing comprises spelling correction processing, and wherein the communications server apparatus is configured to correct at least one spelling error in the road name by reference to a language dictionary.

10. The communications system of claim 1, wherein, for identifying the road segment associated with each candidate point-of-interest, the communications server apparatus is configured to index road segments of the network of roads using a Quadtree data structure to determine the road segment nearest to the candidate point-of-interest.

11. The communications system of claim 1, wherein the at least one user communications device is configured to receive the data indicative of the name for the road transmitted by the communications server apparatus and to display a digital map comprising the road with the name for the road annotated thereon.

12. A method of operating a communications system for determining a name for a road in a network of roads, the communications system comprising a communications server apparatus, at least one user communications device, and a communications network connecting the communications server apparatus and the at least one user communications device, the method comprising:

receiving, by the communications server apparatus via the communications network from the at least one user communications device, data corresponding to at least one candidate point-of-interest identified for association with the road in the network of roads;

for each candidate point-of-interest of the at least one candidate point-of-interest:

generating, by the communications server apparatus, first data indicative of a first relationship relating to a distance between the candidate point-of-interest and a road segment of the road;

generating, by the communications server apparatus, second data indicative of a second relationship between the road segment and a projection of the candidate point-of-interest in a direction of the road segment; and

if the first relationship satisfies a first condition for association and the second relationship satisfies a second condition for association, generating, by the communications server apparatus, data indicative of the candidate point-of-interest being an associated point-of-interest that is associated with the road;

processing, by the communications server apparatus, for each associated point-of-interest, data corresponding to the associated point-of-interest to extract name data indicative of a road name associated with the associated point-of-interest;

generating, by the communications server apparatus, based on the name data, data indicative of the name for the road; and

transmitting, by the communications server apparatus via the communications network to the at least one user communications device, data indicative of the name for the road.

13. The method of claim 12, wherein the method further comprises, prior to processing the data corresponding to the associated point-of-interest to extract the name data:

modifying at least one part of a road name associated with the associated point-of-interest based on at least one standardisation processing comprising spelling correction processing, wherein the spelling correction processing comprises correcting at least one spelling error in the road name by reference to a language dictionary; and

generating modification data indicative of the road name with the at least one modified part, the modification data being included in the name data.

14. A computer program product comprising instructions which, when executed by a processor of a communications server apparatus connected via a communications network to at least one user communications device, cause the processor to:

receive, via the communications network from the at least one user communications device, data corresponding to at least one candidate point-of-interest identified for association with a road in a network of roads for determining a name for the road;

for each candidate point-of-interest of the at least one candidate point-of-interest:

generate first data indicative of a first relationship relating to a distance between the candidate point-of-interest and a road segment of the road;

generate second data indicative of a second relationship between the road segment and a projection of the candidate point-of-interest in a direction of the road segment; and

if the first relationship satisfies a first condition for association and the second relationship satisfies a second condition for association, generate data indicative of the candidate point-of-interest being an associated point-of-interest that is associated with the road;

process, for each associated point-of-interest, data corresponding to the associated point-of-interest to extract name data indicative of a road name associated with the associated point-of-interest;

generate, based on the name data, data indicative of the name for the road; and

transmit, via the communications network to the at least one user communications device, data indicative of the name for the road.

15. The computer program product of claim 13, wherein the instructions further cause the processor to, prior to processing the data corresponding to the associated point-of-interest to extract the name data:

modify at least one part of a road name associated with the associated point-of-interest based on at least one standardisation processing comprising spelling correction processing, wherein the spelling correction processing comprises correcting at least one spelling error in the road name by reference to a language dictionary; and

generate modification data indicative of the road name with the at least one modified part, the modification data being included in the name data.