CLAIMS

1. A method for adaptively dividing a ~~graph network~~map into a plurality of submaps, the ~~graph network~~map comprising a plurality of ~~nodes~~roads, each of the plurality of ~~nodes~~ roads being connected to at least one other ~~node~~road of the plurality of ~~nodes~~roads, the method comprising:

for each pair of ~~subnetworks~~ submaps from ~~a~~ the plurality of submaps~~networks~~ within the ~~graph network~~map, calculating an association score based on a first accuracy metric in predicting a first latent attribute of at least one first ~~node~~ road of a first ~~subnetwork~~ submap of the each pair of ~~subnetworks~~ submaps using parameters optimized for accurately predicting a second latent attribute of at least one second ~~node~~ road of a second ~~subnetwork~~ submap of the each pair of ~~subnetworks~~submaps; and

forming one of a plurality of new ~~subnetworks~~ submaps within the ~~graph network~~map from each pair of a pair set of ~~subnetworks~~ submaps from the plurality of ~~subnetworks~~ submaps based on a result of determining a sum of the association scores of the pair set of ~~subnetworks~~ submaps is higher than that of another pair set of ~~subnetworks~~ submaps from the plurality of ~~subnetworks~~submaps.

2. The method of claim 1, wherein the association score is calculated further based on a second accuracy metric in predicting the second latent attribute of the at least one second ~~node~~ road of the second ~~subnetwork~~ submap using parameters optimized for accurately predicting the first latent attribute of the at least one first ~~node~~ road of the first ~~subnetwork~~submap.

3. The method of claim 2, further comprising:

determining if the first accuracy metric is higher than a third accuracy metric in predicting the first latent attribute of the at least one first ~~node~~ road of the first ~~subnetwork~~ submap of the each pair of ~~subnetworks~~ submaps using the parameters optimized for accurately predicting the first latent attribute of the at least one first ~~node~~ road of the first ~~subnetwork~~ submap and/or the second accuracy metric is higher than a fourth accuracy metric in predicting the second latent attribute of the at least one second ~~node~~ road of the second ~~subnetwork~~ submap of the each pair of ~~subnetworks~~ submaps using the parameters optimized for accurately predicting the second latent attribute of the at least one second

~~node~~ road of the second ~~subnetwork~~submaps; wherein forming the one of the plurality of new ~~subnetworks~~ submaps within the ~~graph network~~map from the each pair of ~~subnetworks~~ submaps is carried out in response to the determination of the first accuracy metric being higher than the third accuracy metric and/or the second accuracy metric being higher than the fourth accuracy metric.

4. The method of any one of claims 1-3, wherein the associated score is calculated further based on a degree of connectedness between ~~nodes~~ roads in the first subnetwork and the second ~~subnetwork~~ submap of the each pair of ~~subnetworks~~ submaps of the plurality of ~~subnetworks~~submaps.

5. The method of any one of claims 1 to 4, further comprising:

determining if the number of ~~subnetworks~~ submaps within the ~~graph network~~map is higher than a pre-configured threshold number of ~~subnetworks~~submaps, wherein the calculation of the association scores is carried out in response to the determination of the number of ~~subnetworks~~ submaps being higher than the pre-configured threshold number of ~~subnetworks~~submaps.

6. The method of any one of claims 1 to 5, further comprising:

identifying a third ~~node~~ road in a target ~~subnetwork~~ submap of the plurality of ~~subnetworks~~ submaps based on a highest fifth accuracy metric in predicting a third latent attribute of the third ~~node~~ road using parameters optimized for accurately predicting the third latent attribute of the third ~~node~~road;

for each of the remaining ~~subnetworks~~ submaps of the plurality of the ~~subnetworks~~submaps, calculating a reassignment score to assign the third ~~node~~ road to the each of the remaining ~~subnetworks~~ submaps based on a sixth accuracy metric in predicting the third latent attribute of the third ~~node~~ road using parameters optimized for accurately predicting a fourth latent attribute of at least one fourth ~~node~~ road of the each of the remaining ~~subnetworks~~submaps; and

reforming the target ~~subnetwork~~ submap to remove the third ~~node~~ road from the target ~~subnetwork~~ submap and one of the remaining ~~subnetworks~~ submaps with a highest

reassignment score from the calculated reassignment scores to further comprise the third ~~node~~road.

7. The method of claim 6, further comprising:

determining if the sixth accuracy metric associated with the highest reassignment score from the calculated reassignment scores is higher than the fifth accuracy metric, wherein reforming the target ~~subnetwork~~ submap to remove the third ~~node~~ road from the target ~~subnetwork~~ submap and the one of the remaining ~~subnetworks~~ submaps to further comprise the third ~~node~~ road is carried out in response to the determination of the sixth accuracy metric being higher than the fifth accuracy metric.

8. The method of any one of claims 1 to 7, further comprising:

dividing the ~~graph network~~map into a plurality of ~~subnetworks~~submaps, wherein the calculation of the association scores is carried out based on the plurality of divided ~~subnetworks~~submaps.

9. The method of any one of claims 1 to 8, further comprising:

calculating a sum of the association scores of each of a plurality of pair sets of ~~subnetworks~~submaps; and

selecting a pair set of ~~subnetworks~~ submaps from the plurality of pair sets of ~~subnetworks~~ submaps with a highest sum among the sums of the association scores, wherein the one of the plurality of new ~~subnetworks~~ submaps within the ~~graph network~~map is formed from each pair of the pair set of ~~subnetworks~~ submaps with the highest sum.

10. The method of any one of claims 1 to 9, wherein each of the plurality of ~~subnetworks~~ submaps exclusively comprises one or more ~~nodes~~ roads of the plurality of ~~nodes~~roads, and ~~the graph network is a map, each of the plurality of nodes is a road on the map and each of the plurality of subnetworks is a submap within the map, and~~ wherein the step of predicting a latent attribute of a ~~node~~ road corresponds to a step of predicting at least one of a number of points of interest (POIs) on the map that are accessible from the road, a type of the road, an average traffic speed on the road at a given time~~,~~ and an average number of vehicles traversing the road at a given time .

11. A system for adaptively dividing a ~~graph network~~map into a plurality of submaps, the ~~graph network~~ map comprising a plurality of ~~nodes~~roads, each of the plurality of ~~nodes~~ roads being connected to at least one other ~~node~~ road of the plurality of ~~nodes~~roads, the system comprising:

at least one processor; and

at least one memory including computer program code;

the at least one memory and the computer program code configured to, with at least one processor, cause the server at least to:

for each pair of ~~subnetworks~~ submaps from ~~a~~the plurality of ~~subnetworks~~ submaps within the ~~graph network~~map, calculate an association score based on a first accuracy metric in predicting a first latent attribute of at least one first ~~node~~ road of a first ~~subnetwork~~ submap of the each pair of ~~subnetworks~~ submaps using parameters optimized for accurately predicting a second latent attribute of at least one second ~~node~~ road of a second ~~subnetwork~~ submap of the each pair of ~~subnetworks~~submaps; and

form one of a plurality of new ~~subnetworks~~ submaps within the ~~graph network~~map from each pair of a pair set of ~~subnetworks~~ submaps from the plurality of ~~subnetworks~~ submaps based on a result of determining a sum of the association scores of the pair set of ~~subnetworks~~ submaps is higher than that of another pair set of ~~subnetworks~~ submaps from the plurality of ~~subnetworks~~ submaps.

12. The system of claim 11, wherein the at least one memory and the computer program code configured to, with the at least one processor, cause the server at least to further:

calculate the association score based on a second accuracy metric in predicting the second latent attribute of the at least one second ~~node~~ road of the second subnetwork using parameters optimized for accurately predicting the first latent attribute of the at least one first ~~node~~ road of the first subnetwork.

13. The system of claim 12, wherein the at least one memory and the computer program code configured to, with the at least one processor, cause the server at least to further:

determine if the first accuracy metric is higher than a third accuracy metric in predicting the first latent attribute of the at least one first ~~node~~ road of the first subnetwork of the each pair of ~~subnetworks~~ submaps using the parameters optimized for accurately predicting the first latent attribute of the at least one first ~~node~~ road of the first ~~subnetwork~~ submap and/or the second accuracy metric is higher than a fourth accuracy metric in predicting the second latent attribute of the at least one second ~~node~~ road of the second subnetwork of the each pair of ~~subnetworks~~ submaps using the parameters optimized for accurately predicting the second latent attribute of the at least one second ~~node~~ road of the second ~~subnetwork~~submap; and

form the one of the plurality of new ~~subnetworks~~ submaps within the ~~graph network~~map from the each pair of ~~subnetworks~~ submaps is carried out in response to the determination of the first accuracy metric being higher than the third accuracy metric and/or the second accuracy metric being higher than the fourth accuracy metric.

14. The system of any one of claims 11 to 13, wherein the at least one memory and the computer program code configured to, with the at least one processor, cause the server at least to further:

calculate the association score based on a degree of connectedness between ~~nodes~~ roads in the first ~~subnetwork~~ submap and the second ~~subnetwork~~ submap of the each pair of ~~subnetworks~~ submaps of the plurality of ~~subnetworks~~submaps.

15. The system of any one of claims 11 to 14, wherein the at least one memory and the computer program code configured to, with at least one processor, cause the server at least to further:

determine if the number of ~~subnetworks~~ submaps within the ~~graph network~~map is higher than a pre-configured threshold number of ~~subnetworks~~submaps, wherein the calculation of the association scores is carried out in response to the determination of the number of ~~subnetworks~~ submaps being higher than the pre-configured threshold number of ~~subnetworks~~submaps.

16. The system of any one of claims 11 to 15, wherein the at least one memory and the computer program code configured to, with the at least one processor, cause the server at least to further:

identifying a third ~~node~~ road in a target ~~subnetwork~~ submap of the plurality of ~~subnetworks~~ submaps based on a highest fifth accuracy metric in predicting a third latent attribute of the third ~~node~~ road using parameters optimized for accurately predicting the third latent attribute of the third ~~node~~road;

for each of the remaining ~~subnetworks~~ submaps of the plurality of the ~~subnetworks~~submaps, calculating a reassignment score to assign the third ~~node~~ road to the each of the remaining ~~subnetworks~~ submaps based on a sixth accuracy metric in predicting the third latent attribute of the third ~~node~~ road using parameters optimized for accurately predicting a fourth latent attribute of at least one fourth ~~node~~ road of the each of the remaining ~~subnetworks~~submaps; and

reforming the target ~~subnetwork~~ submap to remove the third ~~node~~ road from the target ~~subnetwork~~ submap and one of the remaining ~~subnetworks~~ submaps with a highest reassignment score from the calculated reassignment scores to further comprise the third ~~node~~road.

17. The ~~method~~ system of claim 16, further comprising:

determine if the sixth accuracy metric is higher than the fifth accuracy metric in predicting the third latent attribute of the at least one third ~~node~~ road of the target ~~subnetwork~~submap; and

reform the target subnetwork to remove the third ~~node~~ road from the target ~~subnetwork~~ submap and the one of the remaining ~~subnetworks~~ submaps with the highest reassignment score from the calculated reassignment score to further comprise the third ~~node~~ road is carried out in response to the determination of the sixth accuracy metric being higher than the fifth accuracy metric.

18. The system of any one of claims 11 to 17, wherein the at least one memory and the computer program code configured to, with the at least one processor, cause the server at least to further:

divide the ~~graph network~~map into a plurality of ~~subnetworks~~submaps, wherein the at least one memory and the computer program code configured to, with at least one processor, cause the server at least to calculate the association scores based on the plurality of divided ~~subnetworks~~submaps.

19. The system of any one of claims 11 to 18, the at least one memory and the computer program code configured to, with the at least one processor, cause the server at least to further:

calculate a sum of the association scores of each of a plurality of pair sets of ~~subnetworks~~submaps; and

select a pair set of ~~subnetworks~~ submaps from the plurality of pair sets of ~~subnetworks~~ submaps with a highest sum among the sums of the association scores, wherein the one of the plurality of new ~~subnetworks~~ submaps within the ~~graph network~~map is formed from each pair of the pair set of ~~subnetworks~~ submaps with the highest sum.

20. The system of any one of claims 11 to 19, wherein each of the plurality of ~~subnetworks~~ submaps exclusively comprises one or more ~~nodes~~ roads of the plurality of ~~nodes~~roads, ~~and wherein the graph network is a map, each of the plurality of nodes is a road on the map and each of the plurality of subnetworks is a submap within the map,~~ and wherein the step predicting a latent attribute of a ~~node~~ road corresponds to a step of predicting at least one of a number of points of interest (POIs) on the map that are accessible from the road, a type of the road, an average traffic speed on the road at a given time~~,~~ and an average number of vehicles traversing the road at a given time.