CLAIMS

1. A geospatial transportation data processing method, comprising:

acquiring a location-path pair dataset comprising a plurality of pairs of location information and path information having a correspondence;

performing corresponding feature encoding on the location-path pair dataset based on a pre-trained location encoding model and a pre-trained road segment encoding model, respectively, to obtain location feature information and path feature information of a plurality of location-path pairs; and

performing multimodal training based on the location feature information and the path feature information of the plurality of location-path pairs to obtain a geospatial transportation data processing model.

2. The method according to claim 1, wherein performing multimodal training based on the location feature information and the path feature information of the plurality of location-path pairs to obtain the geospatial transportation data processing model comprises:

based on the location feature information and the path feature information of the plurality of location-path pairs after feature alignment, performing pre-training by using multimodal geospatial information masking and location-path matching to obtain the geospatial transportation data processing model.

3. The method according to claim 1, further comprising:

acquiring a specific-task dataset corresponding to each of at least one specific task; and

performing supervised training on parameters of the geospatial transportation data processing model based on the at least one specific-task dataset.

4. The method according to claim 3, wherein the at least one specific task comprises at least one of:

a distance task, and the specific-task dataset comprises a plurality of pairs of location information and distance information having a correspondence;

a time determination task, and the specific-task dataset comprises a plurality of pairs

of location information and time information having a correspondence;

a route scoring task, and the specific-task dataset comprises a plurality of pairs of location information and route information having a correspondence; or

a road label mining task, and the specific-task dataset comprises a plurality of pairs of route information and label information having a correspondence.

5. The method according to claim 1, wherein a training step of the location encoding model comprises:

acquiring a location dataset;

acquiring a feature information sequence of a location object in the location dataset, wherein the feature information sequence is determined based on geospatial information objects within a predetermined range of the location object; and

performing training based on feature information sequences to obtain the location encoding model.

6. The method according to claim 5, wherein acquiring the feature information sequence of the location object in the location dataset comprises:

acquiring feature information of geospatial information objects of the location object within a predetermined distance range; and

sorting feature information of the geospatial information objects based on a predetermined condition to obtain the feature information sequence of the location object.

7. The method according to claim 6, wherein

the predetermined condition comprises distance proximity of the geospatial information objects relative to the corresponding location object; and/or

the feature information of the geospatial information object comprises one or a combination of: an object identifier, an object shape, an object location, a relationship with the location object, or location information relative to the location object.

8. The method according to claim 5, wherein the geospatial information objects comprise an AOI object, a POI object, and/or a road network object within a predetermined range of a corresponding task object; and/or

wherein performing training based on the feature information sequences to obtain the location encoding model comprises:

performing pre-training based on the feature information sequences by using a geospatial contrastive learning method to obtain the location encoding model.

9. The method according to claim 8, wherein performing training based on the feature information sequences to obtain the location encoding model further comprises:

acquiring a location map-matching pair dataset, wherein the location map-matching pair dataset comprises a plurality of pairs of a location feature and map-matching information having a correspondence; and

performing supervised training on a pre-trained location encoding model based on the location map-matching pair dataset to obtain the location encoding model.

10. The method according to claim 1, wherein a training step of the road segment encoding model comprises:

acquiring a path sequence dataset comprising a plurality of path sequences, wherein each of the path sequences comprises at least one road segment; and

performing pre-training based on the path sequence dataset by using a masked training method to obtain the road segment encoding model; and/or

wherein the method further comprises:

inputting target task information into a geospatial transportation data architecture for processing, to obtain a corresponding task result, wherein the target task information comprises location information and/or path information, and the task result comprises one or a combination of: distance information, time prediction information, route information, or road label information that correspond to the target task; and

the geospatial transportation data architecture comprises a location encoding model, a road segment encoding model, and a geospatial transportation data processing model.

11. A geospatial transportation data processing method, comprising:

acquiring target task information comprising location information and/or path

information; and

inputting the target task information into a pre-trained geospatial transportation data processing architecture for processing to obtain a corresponding task result;

wherein the geospatial transportation data processing architecture comprises a location encoding model, a road segment encoding model, and a geospatial transportation data processing model, wherein the location encoding model is configured to perform feature encoding on location information, the road segment encoding model is configured to perform feature encoding on route information, the geospatial transportation data processing model is obtained by performing multimodal training based on a location-path pair dataset, the location encoding model and the road segment encoding model, and the location-path pair dataset comprises a plurality of pairs of location information and path information having a correspondence.

12. A geospatial transportation data processing apparatus, comprising:

a dataset acquisition unit configured to acquire a location-path pair dataset comprising a plurality of pairs of location information and path information having a correspondence;

a feature encoding unit configured to perform corresponding feature encoding on the location-path pair dataset based on a pre-trained location encoding model and a pre-trained road segment encoding model, respectively, to obtain location feature information and path feature information of a plurality of location-path pairs; and

a training unit configured to perform multimodal training based on the location feature information and the path feature information of the plurality of location-path pairs to obtain a geospatial transportation data processing model.

13. A geospatial transportation data processing apparatus, comprising:

an information acquisition unit configured to acquire target task information comprising location information and/or path information;

a processing unit configured to input the target task information into a pre-trained geospatial transportation data processing architecture for processing to obtain a corresponding task result;

wherein the geospatial transportation data processing architecture comprises a

location encoding model, a road segment encoding model, and a geospatial transportation data processing model, wherein the location encoding model is configured to perform feature encoding on location information, the road segment encoding model is configured to perform feature encoding on route information, the geospatial transportation data processing model is obtained by performing multimodal training based on a location-path pair dataset, the location encoding model and the road segment encoding model, and the location-path pair dataset comprises a plurality of pairs of location information and path information having a correspondence.

14. A computer-readable storage medium, wherein the computer-readable storage medium stores therein a computer program that, when executed by one or more processors, implements the method according to any one of claims 1-10.

15. A computer program product that, when run on a computer, causes the computer to perform the method according to any one of claims 1-10.