Study on the Behaviors of Inbound Tourists based on Geotagged Photo Metadata
– A Case of the City Group in the Upper Reach of the Yellow River in China

SHEN Ruru [a, b], YAN Haowen [a,b,*], SUN Qinke [a,b], LI Xiaojun [a,b]

[a] Faculty of Geomatics, Lanzhou Jiaotong University, Lanzhou 730070, China, 1050182127@qq.com , H.Yan, haowen2010@gmail.com , Q.Sun, 874694642@qq.com , X.Li, 80102169@qq.com

[b] Gansu Provincial Engineering Laboratory for National Geographic State Monitoring, Lanzhou730070, China, 1050182127@qq.com , H.Yan, haowen2010@gmail.com , Q.Sun, 874694642@qq.com , X.Li, 80102169@qq.com

* Corresponding author

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Abstract: The spatial distribution of geotagged photos is a projection of the tourist's tourism activities in the geospatial space, which contains spatial attributes and interrelationships of tourists' activities. Using the Flickr photo sharing website, the paper utilizes new data mining technologies to discover and capture the metadata of geotagged photos uploaded by visitors from January 2008 to October 2018 in the upper reach of the Yellow River in China. The spatial information processing and expression of the collected data are processed and the characteristics of the inbound tourists' behavior are explored by the P-DBSCAN, the path tracking technology and the UCINET network analysis. The main results are as follows: ① By using the P-DBSCAN cluster analysis, the area of interest (AOI) has a feature of high agglomeration and forms a "V" shaped in the Xining-Lanzhou-Yinchuan area. The concentration of AOIs is closely related to the urban functional area and has a clear Urban functional orientation. ② Using tracking analysis, the paper reveals single node trajectory, intraregional path trajectory and interregional path trajectory. Among them, 68.42% visitors chose single node trajectory, 9.78% visitors chose intraregional path trajectory and 21.80% tourists chose interregional path trajectory. ③ Ten cross-regional tourism mainstream lines are picked by the UCINET network analysis mode. It has been found that the tourists tend to visit those famous scenic spots (points) such as the Qinghai Lake, the YaDan Geological Park, the 'Danxia' Landform, the Zhenbeibu China West Film Studio. It is apparent that the Gansu-Qinghai Great Circle Tour is a hot tourist route that tourists are keen to choose. The research results have certain reference significance for improving the transformation and upgrading of tourism industry in the upper reach of the Yellow River.

Table1. Flickr photo data (Partial example)

| user_id	photo_id	photo_time	upload_time	lng	lat	location
35398468@N03	3305743397	2008:02:19 12:15:09	2008/2/19	102.496	33.465	Gannan, Gansu
7290366@N03	5763419903	2008:10:14 13:46:06	2008/10/14	106.266	38.583	Xigang, Ningxia
99425225@N00	3875485264	2013:09:04 10:47:48	2013/9/4	100.658	36.308	Xining, Qinghai
99425225@N00	3875486194	2013:09:05 08:07:00	2013/9/5	95.802	34.127	Yushu, Qinghai
93207539@N00	4178784070	2018:04:18 22:31:31	2018/4/18	106.370	38.326	Yingchuan, Ningxia
12669311@N06	4263684210	2018:08:31 17:47:39	2018/9/3	104.934	37.449	Menjiawan, Ningxia
77123890@N07	4430036344	2018:10:01 15:30:15	2018/10/1	99.722	37.780	Gangcha, Qinghai
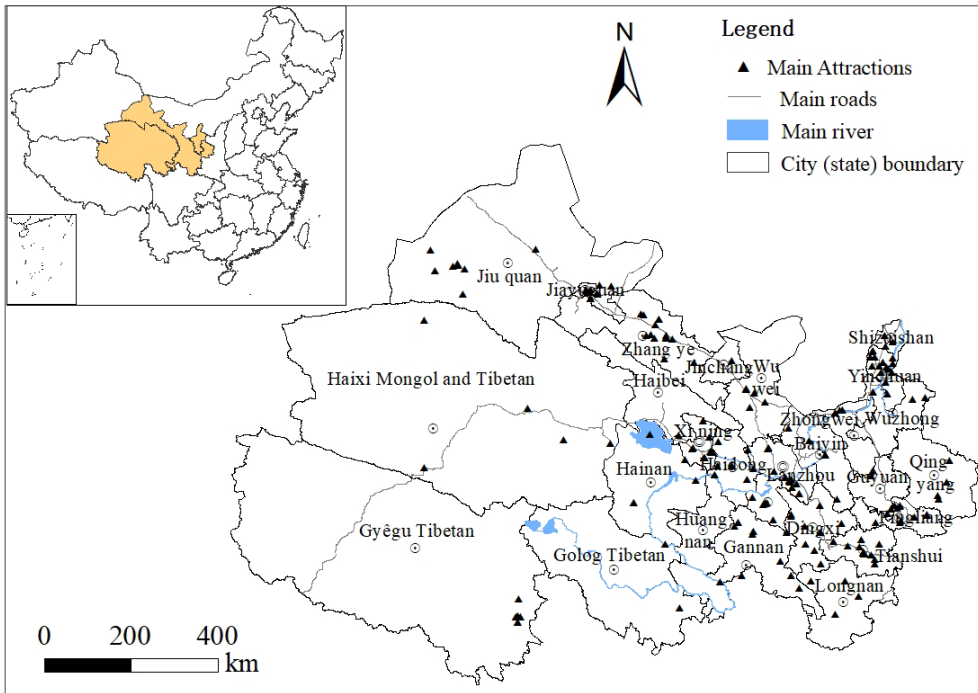
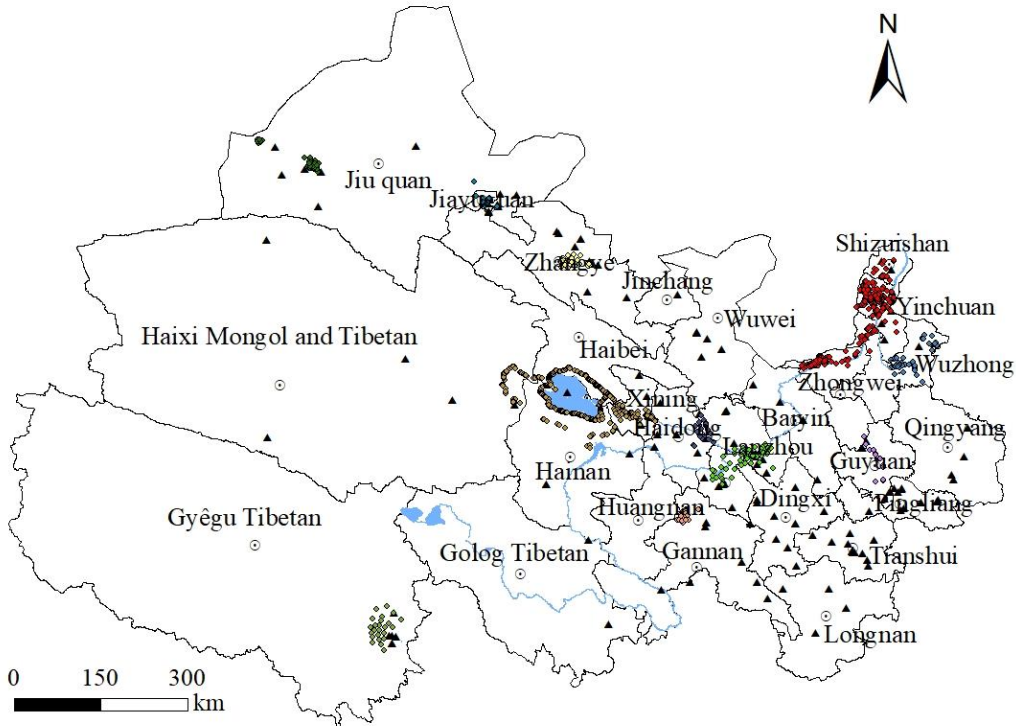Figure1. City group in the upper reach of the Yellow River

Figure2. AOIs in the upper reach of the Yellow River by the P-DBSCAN