Visualized Map Online Publishing Model Based on Tourism Interest Field

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**Abstract.** Aiming at mining tourism client interest requirement, this paper brings forward visualized map online publishing model based on tourism interest field on the basis of analyzing current tourism map design and publishing. In this paper, tourism interest requirement model and modeling project are designed, and tourism interest field model and tourism map online publishing model are set up. Online publishing experiment platform based on tourism interest field is set up, including tourism client interest requirement acquisition terminal and tourism map online publishing design platform. The model can solve the current tourism map design and publishing problems and provide personalized map service for tourism client, which is feasible and practical.

**Introduction**

Tourism map is a necessary guide tool for tourism. As to current tourism map publishing, tourism theme maps take an important role, which provide elaborate sight spot information for tourists. Tourists get tourism maps mainly from shops or Internet. Though they can basically meet the needs of tourists, yet they hardly consider different and individual needs of each group. Purchasing in shop or online is not publishing relying on needs, and the amount of publishing is bigger than the amount of demand, which causes unnecessary waste. Aim at these problems, this paper brings forward visualized map online publishing model based on tourism Interest field, which sets up online publishing mode according to different groups’ needs and provides service for one single person or one group. Publishing relying on needs is realized, which can avoid unnecessary waste.

**Design of Tourism Interest Needs Model**

Different individuality or group has different value orientation and motive. According to the characters, individual tourism interest field is set up. Aim at the interest field of an individual \(i\), map design has individual features while aim at the interest field of a group \(I\), map design also has group features, and \(i \in I\).

![Model design process in this paper.](image)

Tourism interest field is the quantitative statistic’s visual representation of tourists on sight spots. Multi-relationship of quantitative statistic is the basic to set up net induction layer, which relates to the tourism needs module of online map publishing. Multi-database in the module is used to store...
tourism needs data. Internet is used to realize information transmission and sharing. It transmits tourism needs data to online publishing server. Online publishing server is the terminal of application layer, it uses multi-information database to receive data from net induction layer. Online publishing terminal designs tourism maps according to individual map needs and stores the maps in map database for users on the client terminal to download. Figure 1 is the model design process.

### Tourism Interest Field Modeling

Tourism interest field modeling is based on basic geographic information. Different level tourism maps have different amount of data size. Tourism information should be divided into multi levels. Each level’s tourism needs information has unique parameters. Questionnaire method is used to confirm different individual’s interest tendency and set up individual interest field. Classify plentiful samples and group interest field can be confirmed.

| Level A | Weather A1 | Traffic A2 | Entertainment A3 | Address A4 |
|---------|------------|------------|------------------|------------|
| District A1B1 | Subway A2B1 | Park A3B1 | ErQi District A4B1 |
| Time A2B2 | Bus A2B2 | Site spot A3B2 | ZhongYuan District A4B2 |
| Tourism index | Subway A2B3 | Playground A3B3 | HuiJi District A4B3… |
| A3B3… | Airline A2B4… | Shopping A3B4… | - |

#### Table 1. Tourism information divide level codes of Zhengzhou city.

| Level B | ZhongYuan District A1B1C1 | Subway line 1 A2B1C1 | Renmin Park A3B1C1 |
|---------|---------------------------|----------------------|--------------------|
| ErQi District A1B1C2 8:00-9:00 | Subway line 2A2B1C2 | Bishagang Park A3B1C2 |
| Time A2B2 9:00-10:00 | No.1 bus A2B2C1 | Yellow river ParkA3B2C1 |
| Tourism index | No.2 bus A2B2C2 | Zhengzhou Zoo A3B1C2 |
| A3B3… | Train Number A2B3C1 | Bar street,A3B3C1 |
| Subway Station A2B3C2 | Train Station A2B3C2 | Fount World,A3B3C2 |
| East Airline A2B4C1… | East Airline A2B4C1… | WangFuJin,A3B4C1… |

#### Step 1 Confirmation of Tourism Needs Information Level. Take Zhengzhou city for example. Zhengzhou has plentiful tourism data such as weather, traffic, entertainment and address, etc. They can be classified as level A, coded as $A_u$, $u \in (0,n] \in Z'$. $n$ is the type amount of level A. Level B is set up on the base of level A, entertainment contains parks, sight spots, etc. and coded as $A_uB_v$, $v \in (0,m] \in Z'$. $m$ is the type amount of level B. Level C is set up on level B. Parks contain Renmin park, Bishagang park, etc. and coded as $A_uB_vC_r$, and $r \in (0,p] \in Z'$. $p$ is the type amount of level C. Table 1 is the tourism needs information level code of Zhengzhou city.

| Level C | ZhongYuan District | Subway line 1 A2B1C1 | Renmin Park A3B1C1 |
|---------|-------------------|----------------------|--------------------|
| ErQi District A1B1C2 8:00-9:00 | Subway line 2A2B1C2 | Bishagang Park A3B1C2 |
| Time A2B2 9:00-10:00 | No.1 bus A2B2C1 | Yellow river ParkA3B2C1 |
| Tourism index | No.2 bus A2B2C2 | Zhengzhou Zoo A3B1C2 |
| A3B3… | Train Number A2B3C1 | Bar street,A3B3C1 |
| Subway Station A2B3C2 | Train Station A2B3C2 | Fount World,A3B3C2 |
| East Airline A2B4C1… | East Airline A2B4C1… | WangFuJin,A3B4C1… |

#### Step 2 Foundation of Tourism Needs Information Network. Set up tourism needs database in online publishing client terminal. Client terminal provides data, whose size is determined by the needs of multi-level tourism data. Set up indexes for level C as table 2 shows. Tourism needs offered by the client terminal contains at least one kind of tourism data on level C. The more information offered, the bigger of the database should be, the more complex the map design will be.

| Client terminal | $A_uB_vC_r$ | $A_uB_vC_r$ | $A_uB_vC_r$ | $A_uB_vC_r$ | $A_uB_vC_r$ | $A_uB_vC_r$ |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1               | 1           | 0           | 0           | 0           | 0           | 0           |
| 2               | 1           | 1           | 0           | 0           | 0           | 0           |
| 3               | 1           | 1           | 1           | 0           | 0           | 0           |
| 4               | 1           | 1           | 1           | 1           | 0           | 0           |
| ...             | ...         | ...         | ...         | ...         | ...         | ...         |
| $h$             | 1           | 1           | 1           | 1           | 1           | 1           |

Group all tourists in certain spatial scale. Age is used to divide tourists into children, youth, middle-aged and old. In spatial scale, each domain has many groups. Set the collected information of different domains into quantitative indexes. Use set to define each domain’s tourism needs.
Define tourism needs indexes \( A_i B_j C_k \), offered by one tourist client terminal \( \forall i \) in one sub domain group is the sub domain’s tourism needs subset group \( \Sigma_i \), \( i \in (0, h) \in Z^+ \). Define tourism needs indexes \( A_i B_j C_k \), offered by all tourist client terminals \( I \) in one sub domain group is the sub domain’s tourism needs group \( \Phi \). Define tourism needs indexes \( A_i B_j C_k \), offered by the domain formed by the same group is tourism needs space subset \( \Psi \). Define all the tourism needs indexes \( A_i B_j C_k \), offered by sub domain groups is tourism needs space set \( \Omega \). Tourism needs network is set up as Figure 2.

**Step 3 Foundation of Tourism Needs Information Database.** Tourism needs of client terminal \( i \) are stored in client terminal database \( H^1_{it} \), \( i \in (0, h_{s(t)}) \in Z^+ \), \( h_{s(t)} \) is individual amount of one group in one sub domain, \( \max s(t) \) is group amount of sub domain, \( s(t) \in (0, \max s(t)) \in Z^+ \). Group tourism needs are stored in tourism needs collect database \( H^2_{s(t)} \), \( e \in (0, \max s(t)) \in Z^+ \). Figure 3 is tourism needs collect database based on one group. Two levels of high-class databases are based on multiple groups and sub domains. Group needs in the same sub domain is stored in multiple databases \( H^2_e \), which forms higher class sub domain tourism collect database \( H^3_z \), \( z \in (0, 4) \in Z^+ \). The Children group is \( H^3_1 \). The youth group is \( H^3_2 \). The middle-aged group is \( H^3_3 \). The old group is \( H^3_4 \).

**Step 4 Foundation of Quantitative Statistic Tourism Interest Field.** Aim at the tourism needs offered by client terminal, individual interest field is set up. Traverse all the tourism needs information offered by each individual. According to the statistic data, the group tourism needs interest field is set up. Take one hundred samples for each group as research object. Make level \( A \) entertainment information into quantitative indexes and get statistics amount of tourists offering needs. \( A_i B_j C_k \) indexes are represented by \( (v, r) \). Figure 5 interest field is obtained.

**Foundation of Map Online Publishing Model**

Online publishing system is composed of information reception layer, information transmission layer and information processing layer. Tourism map online publishing system is composed of
tourism needs information layer, tourism information sharing and transmission layer and tourism map design layer. Figure 6 is the tourism map online publishing system based on interest field.

Tourism Needs Information Module. Tourism needs module is designed on the base of tourism interest field. It contains single individual needs module and group needs module. Individual needs module data is the needs offered by individuals in groups. Client terminal database stores individual needs, which is transmitted to the tourism map design layer to design maps.

Tourism Information Sharing and Transmission Layer. Data stored in the tourism needs module is transmitted by Internet. Individual and group tourism information collect database transmits data by line 1 and line 2 respectively.

Tourism Map Design Layer. Tourism map design layer is composed of individual tourism map design layer and group tourism map design layer. They get data and information from line 1 and line 2 respectively. After receiving data and information, map online publishing server designs and develops tourism maps. Tourism map data is transmitted through line 1 and line 2 respectively to tourist client terminal. The map forms contains PC electronic maps, mobile phone APP maps and online printing maps, which are sent to tourists and downloaded for usage.

Conclusions

This paper brings forward visualized map online publishing model based on tourism Interest field. It aims at individual interests and sets up individual and group tourism interest field. By studying the interest field, it designs and develops the tourism map online publishing mode based on interest field, after which tourism needs information collect terminal and tourism map online publishing model are set up. They can provide humanized maps relying more on individual needs and interests for tourists. In all, the model can basically solve the current problems of tourism map publishing.

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