

Research on the Application of GIS in the problem of Aging

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Abstract. The first purpose of this paper is to correct the analysis model of the past experience and provide a quantitative decision-making mode for the visual and accurate knowledge of the aging problem. The second is to improve the public service configuration related to the old people, to provide effective reference and suggestions to improve the old life and to promote the social development. In this paper, by using the literature research method, the concept of GIS is explained, and the application scope of the old problem is defined. This paper focuses on the method, degree, scope and effect of the application of GIS in the field of population research, so as to further analyze the application of GIS in the aging problem. The results show that GIS plays an important role in showing the temporal and spatial distribution of the aged population, the extent of utilization of facilities and the prediction of the surrounding hidden dangers.

1. Introduction

In March 2017, In the notice issued by the State Council on the development of the aged cause and the construction of the old-age system in the 13th five-year Plan, it is clear that the problem of the aged in China has a serious situation and obvious shortcomings.

In recent years, domestic scholars have done a lot of empirical research on the spatial distribution of the elderly population in different cities, counties and districts. In addition to the different distribution features, there are immobilization, experience and one-sided loopholes in the measures to deal with the aging problem. How to explore a new mode to realize the scientific and comprehensive management of population problem and old-age problem has more experiences to be used for reference abroad. According to the study, Population geographic information systems are being developed in all countries, the most well-known of which is the Tiger system of the United State, it was only at the beginning of the 21st century that China began to try to carry out population Geographic Information system (DGIS).

At present, the development degree of the combination of population and geographic information system in our country is still shallow, and it is still in the stage of local exploration and it can't be applied to the whole country. Therefore, the author summarized the academic research on the issue of the elderly population and GIS-related research, hoping to play a certain role in the future research on the aging problem.

2. The application of GIS in the field of population research abroad

Although Geographic Information system (GIS) began in the 1960s, the application of geographic methods began as early as the 18th century, and was first applied to the end of cholera epidemic in London. As far as the existing data and research are concerned, although there are few studies on the combination of GIS and population, the application time of the combination of GIS and population research abroad is earlier than that of China, from favoring the development of human being to the study of artificial protection of the environment.

Spatial analysis is the main function of GIS, among which buffer analysis and superposition analysis are two more commonly used analytical functions in population research. They are also

important tools for discovering and correcting empirical decision-making in the past. Buffer analysis means that "based on the concept of proximity, a buffer can be created to divide the map into two areas, one within the specified distance of the selected map feature and the other beyond the specified distance." The map elements of the buffer include points, lines, or surfaces. Buffers are often used for planning or management purposes. " Overlay analysis refers to the combination of geometric shapes and attributes of two feature layers to generate a new output layer. The geometry of the output layer represents the geometry intersection from each input layer feature[1].

In the application of combining with human behavior characteristics, the foreign countries describe and express the human behavior characteristics through the combination of GIS method and Arc Gis10.0 software. One is to operate the behavior range of the elderly who participate in daily life, physical exercise and recreational activities by establishing a buffer zone, and comprehensively analyze this part of the elderly in parks and fitness centers. Participation in public services, such as public transport systems, is used to study the characteristics of older people's sports behaviour [2].The other is that in the context of the current shortage of energy and resources, the public knows too much about the challenges posed by the shortage of resources, but very little is known about the level of communication between the officials who allocate the resources and their subordinate departments, and for this reason the public knows very little about the level of communication between the officials who allocate the resources and their subordinate departments.The GIS method is applied to the expression of human language and behavior features, and the visualization of the expression mechanism is realized in order to achieve the purpose of specific fields[3].

3. The present situation of the application of domestic GIS in the field of elderly population problems

3.1 A study on the temporal and Spatial Distribution of the elderly

The elderly are one of the most important subjects in the study of population. This part of the study is based on the large cities such as Beijing, Shanghai and Guangzhou, and focuses on describing the spatial and temporal characteristics of the distribution of the elderly population with the help of GIS.

One kind of research is comparative study, through the aid of population density distribution, the year change chart carries on the analysis to the Beijing, Shanghai, Wuhan, Guangzhou and so on big city population aging commonness and the individuality.It is found that "active residue" and "passive residue" are common in large cities and the problem of the aggregation of the elderly is caused by "active and passive residues"[4].

The other one is a focused study, which focuses on an area or a city and describes the distribution characteristics of the elderly population in different places, so as to find out that the distribution of different age circles still exists in the aged population, and through the superposition analysis, The spatial autocorrelation analysis explains the reasons of the correlation between the residential sites of the elderly and the surrounding environment and facility planning [5] .There are mainly studies on the "spatio-temporal double lines" of the distribution of the elderly population in Nanjing. It is found that, with the change of time, the dynamic trend of the distribution of the elderly population in different areas of Nanjing, as well as the aggregation and exclusivity of the activity space of the elderly.Based on the study on the "spatial aggregation" and "spatial heterogeneity" of the distribution of the elderly population in Guiyang City, it is concluded that the elderly population in Guiyang will enter an all-round aging in 2020 and will present the characteristics of "urban-rural inversion". Based on the research on the distribution layer structure of the elderly in Shanghai, this paper analyzes the differences of the spatial agglomeration of the elderly population in Shanghai in 2013 and 2015 by using the hot spot analysis tool of Arc GIS software.Concentration index is an indicator of the degree of concentration of economic activities in a region. The change of population concentration index reflects the evolution of spatial concentration of population. On the above-mentioned regional population research and the application of GIS, there is not only the

study of showing the historical dynamic change of population with the aid of GIS, predicting the future trend of population characteristics, but also covering the characteristics that are not limited to the study of the population itself. It also relates to the study of providing high-quality service for the precise allocation of urban pension resources.

3.2 Research on the utilization of facilities for the elderly

In the study of GIS and the utilization of service facilities for the elderly, it mainly focuses on the study of the elderly in cities and towns. This is related to the economic conditions of large cities, the economic base makes the configuration of various security facilities more perfect, this is not available in small and medium-sized cities and even rural areas.

3.2.1 Low frequency

The first is because the distribution of the set-up point is not reasonable. Facilities are distributed in the intersection of urban areas. For the elderly, daily distance is remote, the frequency of use is low. The second is because of economic fluctuations. With the rapid development of social economy, economic center, urban planning land constantly changes, the rural elderly labor force in the urban migrant life fluctuate. With the increase of age and the consideration of emotional factors, some elderly peasant-born workers choose to return home to live, the frequency of changing work places is higher, and the utilization rate of service facilities in one place is also greatly reduced. With the aid of superposition analysis, the influence of the change of economic center of gravity on the distribution of population center of gravity is explored in urban land use. It is also found that the population center of gravity will change slowly as the economy shifts and administrative planning changes[6].

3.2.2 Narrow utilization range

At present, GIS has been mainly applied to the administration, old-age care, health care, public transportation, other fields of the elderly and the whole population. In 2000, China began to establish a population-wide geographic information system. Shanghai and other large and medium-sized cities have set up census, death statistics database and applied GIS to the layout of urban public transport space and the optimization of medical service facilities[7-8].

3.3 A study on the situation of surrounding Hidden trouble in the elderly

In residential areas of the elderly, fire, electricity, other household disasters and industrial accidents threaten the lives of the elderly. The application of GIS in this field provides visual expression for the prediction and prevention of fire hidden dangers in old blocks[9]. It provides a safe living environment for the elderly.

4. Summary

Using the method of literature research, this paper mainly analyzes the application status of GIS method in the problem of aging in China. It is divided into three parts: the study of the distribution of space and time of the elderly, the study of the utilization of facilities and the study of the hidden danger situation in the surrounding areas.

However, the author also found out that the application scope of GIS in the aging problem is narrow and the level is shallow. For those caused by the impact of labor market, the competitiveness of intensive enterprises decreases. The combination of social security system pressure and other old-age problems is still less. Due to the limitation of the author's own ability, the collection of foreign data is less, and the year of domestic literature collection is only nearly 5 years, which affects the comprehensiveness of the research, which is not enough.

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