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Research Article

Design of Dynamic and Electronic Tracking Route Plan of Bus

Chao Sun[1], Luming Wei[1], Lanhao Wang[1], Baidong Jiang[1], Lanhua Zhang[1]*
Department of Medical Information and Engineering, Taishan Medical University, Taian, China, 271016

*Corresponding Author
Lanhua Zhang

Abstract: Based on the investigation of the bus problem, the current operation status of the bus, the reaction of passengers (foreign tourists and local citizens), and the reaction of bus drivers. Through the analysis and comparison of the electronic circuit diagrams implemented at the present stage, and relying on the existing technology, this paper puts forward the idea of improving the design and implementation of the electronic circuit diagrams on the basis of a comprehensive summary of the existing problems and other related contents. The aim is to further improve the accuracy of positioning system and provide bus location information for passengers anytime and anywhere.
Keywords: dynamic tracking, real-time positioning; LED; bus router.

INTRODUCTION

In recent years, tourism has become a popular mode of people's leisure and entertainment (Sharpley R. 2018). During holidays, a large number of tourists will come to visit. Because they are not familiar with bus routes, tourists will always pay attention to the road map inside the bus (Schmitt, L. *et al* ., 2018). However, the paper-based road map can't visually and dynamically show the driving status and current arrival location of bus routes. If the bus passenger flow is large (rush hour, tourist season), even if the car body is at the start, there will be voice prompts at the arrival, but it can't avoid the situation that the passengers can't hear or miss the station prompts and get off the wrong stop because of the noisy environment inside and outside the car or the inconsistent location of the voice prompt body (traffic jam), which is not only happened to the foreign tourists. Even residents of the city occasionally encounter it.

The idea of public transport priority and green travel is not only conducive to improving the increasingly worsening environmental problems, but also to alleviating the pressure of urban traffic to a certain extent (De Keyser, O., *et al* ., 2018; Truong, L. T.; *et al* ., 2018). For cities with tourist attractions, the development of public transport is directly related to the rise and fall of local tourism. In recent years, with its convenient and preferential characteristics, public transport has become the travel of local citizens as well as the development of local tourism. Foreign tourists visit the preferred means of transport for travel. Relevant departments are also paying more and more attention to supporting the development of public transport: constantly improving the appearance design of the car body, optimizing and regulating the interior space of the car body, and promoting the increasing proportion of public transport in urban transport.

According to the survey data, the LDE electronic display technology appeared as early as 1960s and was rapidly adopted by developed countries such as the United States (Berner, E. S. *et al* ., 2005; Evenson, R. E., & Gollin, D. 2003). After nearly 50 years of development, the technology is relatively mature, and has the remarkable characteristics of power saving, long service life, low cost, high brightness, large perspective, and so on. Therefore, it has opened up a broad market space at home and abroad.

According to statistics, electronic roadmap has been gradually applied in the metro of Hong Kong, Wuhan, Nanjing, Shanghai and other cities (Yuan, J. *et al* ., 2004; Lin, Y. 2018). It has been well tested and welcomed by the general public. At present, paper-based road maps are used in most parts of the domestic buses. The drawings are pasted on the top of the bus exit, and only one in some buses, with small fonts and weak hints. Moreover, the original road maps are only marked. The station does not give the relevant well-

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known and important geographic information around the station, so it is extremely inconvenient for passengers unfamiliar with the route to choose the best boarding and getting off the station.

METHODS

In the preliminary investigation, the solutions to the existing problems are discussed with the help of patent documents, periodicals, networks and other related approaches (Bakhouya, M. *et al* ., 2010). The relevant design schemes of this study are discussed. The scientific knowledge to be used is arranged as a whole, the preliminary analysis and design work is done well, the design objectives are determined, and the repeated investigation work is avoided. At the same time, the help for the research work is sought. In the process of research, the product is optimized through discussion at a meeting to improve the performance of the product; when the research is completed, the documents sorted out before are arranged in a unified way.

Metro has its own special track route, so it can be set up according to the length of the distance. Although electronic circuit maps have been installed in some domestic cities, the effect is not obvious. During rush hour or travel season, traffic jam is caused by traffic congestion. The existence of factors such as road construction, vehicles need to bypass indicates that if we use distance, time or speed as the system procedure. According to the calculation basis, there must be a big error in accuracy (Cipriani, E. *et al* ., 2012; Seet, B. C. *et al* ., 2004, May).

In addition, many cities have promoted the trial implementation of electronic bus stop signs. Electronic bus stop signs can keep in touch with buses in real time by means of communication subsystems and constantly measure the distance from buses. At this time, we can set the display speed of yellow progress bars between stations by calculating programs to remind passengers to get ready for arrival.

RESULTS AND DISCUSSION

An electronic road map is added on the basis of the static road map network currently used by the bus. When the bus starts, the system starts to work, and the electronic road map system above the door automatically sets the no-arriving station as a red light. When the car body is moving, the progress bar between the stations flashes to indicate that the bus is in the running state. When the car body reaches a certain station, the station is shown as a green light (Quddus, M. A. *et al* ., 2007; Weiss, D. J. *et al* ., 2018).

LED electronic roadmap can realize real-time and dynamic tracking of bus route status throughout the whole journey, and provide accurate bus location information to passengers anytime and anywhere (Evenson, R. E., & Gollin, D. 2003; Ilčev, S. D. 2018).

The key point of this technology is to use wireless technology, location technology, communication technology and computer technology to realize the dynamic real-time tracking of the whole bus route. The difficulty lies in the synchronous operation of the electronic road map and the whole bus line (Bakhouya, M. *et al* ., 2011; Batistić, L., & Tomic, M. 2018, May; Liu, F. *et al* ., 2018).

The technical router diagram to be adopted is as follows by Figure 1.

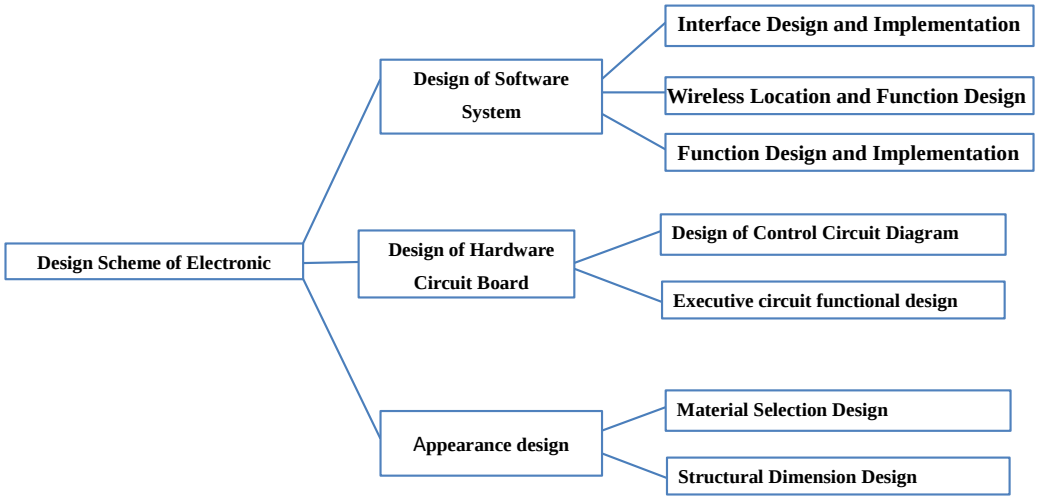

Fig. 1. Technical router diagram of the system

According to the existing paper road map, we add the electronic route dynamic tracking display map on the basis of it. The electronic equipment adopts 89C52 single chip computer (compared with 89C51 single chip computer), which has better performance and price (Zheng, B. G. 2018, October; Zheng, B. G. 2018, October). When the bus arrives at the station, the station is set as a green light to remind the passengers of

the station location. During the process of bus driving, the body state is displayed by flashing yellow progress bar, with the purpose of real-time determination. The location of a bus station can provide accurate location information for passengers at anytime and anywhere. According to the calculation value of the program, after many studies and discussions, and combined with the characteristics of most bus stop signs established, the longitude and latitude are decided to be the basis for the calculation of the system program (Bakhouya, M. *et al* ., 2011; Seet, B. C. *et al* ., 2004, May). We will take the median value of the latitude and longitude range of each bus stop sign as the benchmark (allowing errors in a certain range, but not exceeding the length of the whole bus stop sign). This value is embedded in the database of statistical analysis subsystem as data. Buses match the data value in the database with the GPS navigation system on board. If matched to the set range, the lights at the corresponding sites on the roadmap are shown in green. When the system matches the longitude and latitude of the next station, the lights are set to go out from the perspective of economy.

The characteristics of this study are to upgrade the bus route map from static to dynamic, to track the bus trajectory dynamically with the help of GPS positioning system, to provide real-time bus route information, and to facilitate passengers to view their location at any time. The device can be easily embedded in the existing bus system after the product is formed.

CONCLUSION

As a well-known tourist city, public transport is undoubtedly the most direct city business card. In order to better convenience for citizens to travel, enhance the image of tourist city, and build a modern international tourist city, the development of public transport is particularly important (Schmitt, L. *et al* ., 2018; Truong, L. T. *et al* ., 2018). On the one hand, the installation and application of electronic road map can not only clearly and accurately show bus routes for passengers to find, but also can reduce indirect language. In order to improve work efficiency, provide high-quality bus service for passengers and make bus service more humanized, the bus driver manually adjusts the number of voice programs. While promoting the development of bus operation industry, it can also reduce traffic pressure and truly implement the environmental protection concept of bus priority and green travel. The further development of urban public transport provides a favorable opportunity.

At present, some cities in China are devoting themselves to the development of new-type buses. In addition to the improvement of the appearance and performance of the bus body, the optimization of the bus line is particularly important. The electronic circuit diagram, which integrates automation, networking and intelligence, can improve the safety and reliability of bus operation as a whole.

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