

## A Positioning and Navigation System based on Internet Big Data

Taizhi Lv <sup>1, a,\*</sup>, Yong Che <sup>2, b</sup>

<sup>1</sup>School of Information Technology, Jiangsu Maritime Institute, Jiangsu Nanjing 211170, China

<sup>2</sup>Nanjing Longyuan Microelectronic Company Limited, Jiangsu Nanjing 211106, China

<sup>a</sup>lvtaizhi@163.com, <sup>b</sup>68151247@qq.com

---

*Abstract: In order to obtain road condition information in time and provide road condition simulation for the route, this paper designs a system for real-time updating of map information through Internet big data storage. The system includes an internet terminal and a positioning and navigation terminal. The positioning and navigation terminal includes a communication module, a positioning module, a navigation module and a map module for transmitting data with an Internet terminal. The navigation module also includes a display input module, a speed measurement module, and a reminder module. The display input module is used to input the detailed addresses of the departure and destination, and can display the route simulation display, speed display and early warning display on the map module.*

*Keywords: Navigation, Position, Mapping, Internet big data.*

---

### 1. INTRODUCTION

The vehicle-mounted network is the communication between the sensors, controls and actuators in the early car. It is connected into a complex network structure by a point-to-point connection [1]. With the rapid development of technology, the driverless system has gradually entered people's daily life, and the driverless positioning and navigation in the driverless system mode is particularly important. At the same time, improve the reliability and other aspects of the fast-developing computer network, realize CAN, LAN, LIN, MOST and other basic structure of the automotive electronic network system [2]. The existing vehicle-mounted network is mainly based on the vehicle-mounted navigation system, which is mainly composed of a host, a display screen, an operation keyboard and an antenna. It realizes the digital intelligent navigation of field exploration and travel. It has accurate maps, geographic information, and clear travel routes. Global, all-weather and timely application, there is never a blind spot, and free satellite resources make users use it as they please. Various data information, position coordinates, voyage distance, voyage time, azimuth, yaw azimuth, yaw distance, preset alarm. Whether the user is in the vast wild grassland, wild flowers and fragrant flowers, the mountains and valleys of the streams and rivers, or the bustling city, the system can enable the user to accurately reach the destination at any time while working and swimming.

However, the existing navigation systems provide navigation services to vehicles based on preset maps, which can only provide route information but cannot provide road condition information, and cannot plan navigation routes based on road conditions [3-4]. Not only that, the maps of traditional navigation systems are updated Relying on satellite and municipal planning drawings, the information update is not timely enough.

**2. SYSTEM ARCHITECTURE**

A positioning and navigation system based on Internet big data includes an Internet terminal and a positioning and navigation terminal, as shown in Figure 1.

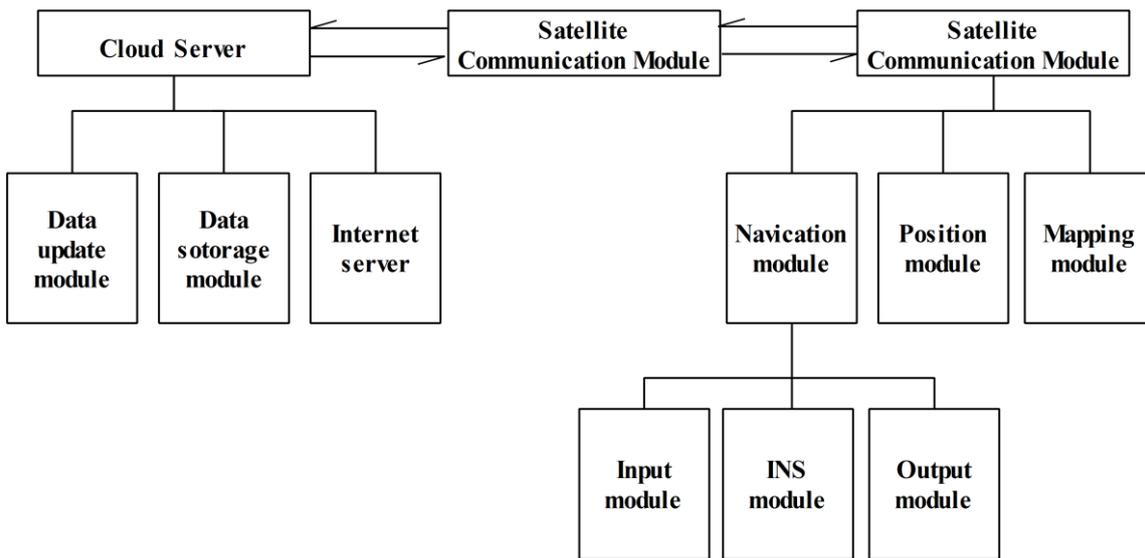


Figure. 1 System architecture diagram

The positioning and navigation terminal includes a communication module, a positioning module, a navigation module and a map module for transmitting data with an Internet terminal; the Internet terminal includes an Internet server, a data storage module and a data update module; the navigation module also includes a display input module and a speed measurement module And the reminder module; the display input module is used to input the detailed address of the departure and destination, the display input module is also used to display the route simulation display, speed display and warning display on the map module; the map module is based on the map stored in the data storage module Download the data information, update the data according to the data update module, and also simulate the route of the navigation information on the display input module through the map module; the speed measurement module measures the driving speed and judges whether the vehicle is speeding and passes according to the route information downloaded in the map module The reminder module reminds, and the reminder module can also judge whether the vehicle deviates from the route through the Internet terminal and then remind the reminder through the reminder module or promptly change the route in time.

The Internet server connects to the network to update and load new map information in a timely manner. The map information includes new road sections, abandoned road sections, road section styles, road section signs, speed limit information, photo information, and restricted passage information. The map module simplifies the graphic simulation of the road segment at the branch of

each road segment according to the road segment pattern obtained by the data storage module. The Internet terminal and the positioning and navigation terminal are remotely connected by the Internet through a communication module. The positioning and navigation terminal is provided with an external power supply. The display input module, speed measurement module, reminder module, and map module are all electrically connected to the external power supply. The map module is bidirectionally connected to the Internet terminal. The speed measurement module obtains the distance traveled during the period through the Internet terminal connection to measure the travel speed.

### 3. NAVIGATION FLOW

The positioning process is shown in Figure 2. There are three steps. Obtain the GPS coordinate signal of the user's current location through the positioning module or determine the user's current coordinate signal from the starting point in the display input module; plan the nearest route according to the destination GPS coordinate signal obtained in the display input module; time during the driving process The GPS coordinate signals of the positioning and navigation terminal are monitored through the Internet terminal to ensure the accuracy of navigation.

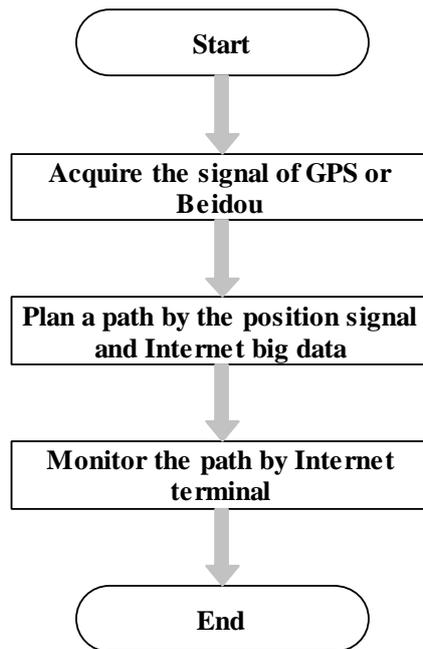


Figure. 2 Navigation flowchart

### 4. CONCLUSION

The map updating of traditional navigation systems relies on satellites and municipal planning maps, and the timeliness of information updating is insufficient. In order to provide real-time traffic information, this paper designs a positioning and navigation system based on Internet big data. The system consists of an internet terminal and a positioning and navigation terminal. The Internet terminal implements the data update, and the navigation module updates the map information in real time based on the sensor device data and the Internet big data, ensuring the timeliness of the information update, so that the user can accurately reach the destination.

## **ACKNOWLEDGEMENTS**

This work was financially supported by the funding of Jiangsu province postdoctoral science foundation (2018K035C), China postdoctoral science foundation(2019M651844), six talent peaks project in Jiangsu province(XYDXX-149) .

## **REFERENCES**

- [1] Abbas T , Sjoberg K , Karedal J , et al. A Measurement Based Shadow Fading Model for Vehicle-to-Vehicle Network Simulations[J]. International journal of antennas and propagation, 2015, 2015(PT.3):190607.1-190607.12.
- [2] Ling, Bin, Peng, Fengchao, Li, Ailan. The Car Body Control Bus Design Based on CAN/LIN Bus[C]// International Conference on Computational & Information Sciences. IEEE, 2011.
- [3] Vu V D , Lützhöft, Margareta, Emad G R . Frequency of use - The First Step Toward Human-Centred Interfaces for Marine Navigation Systems[J]. Journal of Navigation, 2019:1-19.
- [4] Betz J W , Lu M , Morton Y T J , et al. Introduction to the special issue on the BeiDou navigation system[J]. Navigation, 2019, 66(1):3-5.