

Snap-shoot Indoor Positioning System

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Abstract: With the advent of global positioning systems based on satellite timing, such as GPS, Beidou, Glonass and European Galileo, accurate outdoor positioning is no longer a problem. Although there have been some researches on inertial navigation and A-GPS technologies, there is no technical solution to achieve indoor positioning perfectly. Thus, the advent of this work, based on OCR and cloud computing technologies, enables users to retrieve character elements in the indoor environment to obtain accurate indoor location services.

1. Background and Purpose

At present, existing satellite navigation systems do not provide efficient indoor positioning and navigation services. To solve this problem, some people have proposed a Bluetooth-based indoor positioning system, such as beacon. But similar wireless solutions need to deploy a large number of equipment in the building, the implementation is also more difficult, so it has not been large-scale applications.

Therefore, an indoor positioning system not based on any radio signal is conceived and designed without the need to install any equipment in the building and is quite quick and easy to use. The system is written as an APP that runs on the Android operating system and is named Snap-shoot.

2. Concept and Idea

Fig.1 shows the working principle of the whole system. As can be seen from the figure, Snap-shoot uses the cell phone to photograph the interior of the room and upload it to the cloud for OCR identification and matching in the database.

After the cloud completes the recognition of the image and the matching of the data, the coordinate information is transmitted back to the user's cell phone and displayed on the map.

Hopefully, Snap-shoot is well utilized in large public spaces. As shown in Fig.2, Snap-shoot can provide users with accurate location services in places such as hospitals, schools, railway stations, airports, shopping malls and other places.



Fig.1 How Snap-shoot works.

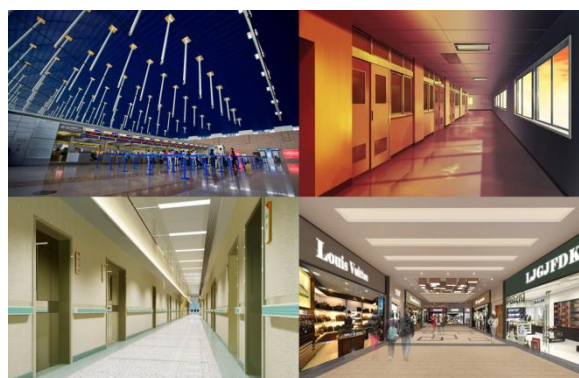


Fig.2 Snap-shoot application scenarios.

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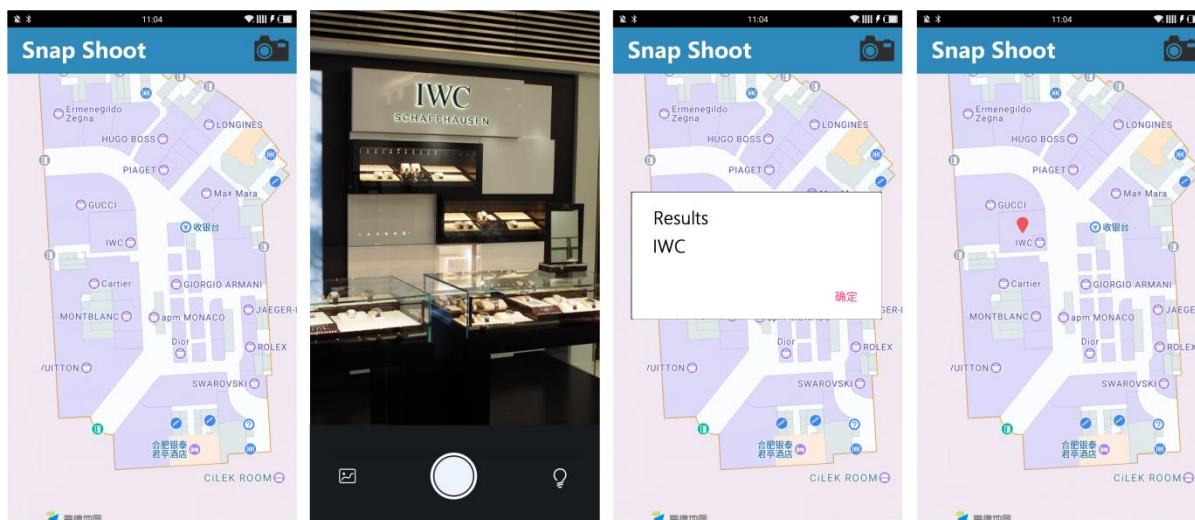


Fig.3 Snap-shoot application's interfaces.

It is worth to note that, using Snap-shoot, just need to take any text, or even the entire paragraph, the system will be able to extract effective keywords to locate.

3. Design and Functions

Encapsulate the framework envisioned by Snap-shoot as an Android app. Fig.3 shows the process of using the software and the corresponding interface. It can be said that the use of Snap-shoot is very simple and quick.

After running the Snap-shoot, you only need to take pictures of indoor scenes, the system will return the identified information and give accurate positioning. The whole process can be completed within 10 seconds.

4. Problems and Future Work

So far, only a relatively simple database of coordinate information has been built, and users are still not supported to upload coordinate information. In addition, the operation of Snap-shoot is affected by its use of Alibaba Cloud and Amap (GaoDe Maps), such as in non-China regions where the services of AMap and Alibaba Cloud become extremely vulnerable.

In the future, we plan to use Google Maps and AWS to re-establish the overall framework so that the service can be used unobstructed throughout the world. In addition, ports and permissions will be open to users in the future, so users can add entries to the coordinate information database themselves.



Fig.4 Snap-shoot application scenarios