

STEP NAVI

A Navigation Support System by Visualization of Walking Speed

Kazuya Fujisawa¹ and Michiaki Yasumura²

¹Graduate School of Media and Governance, Keio University, Kanagawa, Japan

²Faculty of Environment and Information studies, Keio University, Kanagawa, Japan

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Abstract: In recent years, users of walking navigation services is increasing with the spread of smart phones, such as iPhone and Android. Walking navigation utilizes GPS function in a smart phone to find out current position of a user. When using route navigation, users would like to arrive at their destination correctly. However, in many cases, this is not the only purpose that they would like to accomplish. They also would like to arrive at the destination in time. In this research, we propose a system called "StepNavi" that allows a user to know current walking speed is over paced or under paced.

1 INTRODUCTION

In this research, we propose a speed navigation system called "StepNavi" which presents the optimal pace as support for arrival at the destination in time.

In recent years, users of walking navigation services is increasing with the spread of smart phones, such as iPhone and Android. Walking navigation utilizes GPS function in a smart phone to find out current position of a user. Together with destination information, detailed route navigation help the user arrive at the destination without seeing the map of paper medium. When using route navigation, users would like to arrive at their destination correctly. However, in many cases, this is not the only purpose that they would like to accomplish. They also would like to arrive at the destination in time. At present, whether the user will be in time for a target time or not is left to the user. As a result, one user may be too late for the target time, another may be too early, thus giving them some uneasiness while using navigation systems.

In this research, we propose a system called "StepNavi" that allows a user to know current walking speed is over paced or under paced. Walking speed is computed based on user's positions and travel time between them. Besides a numerical display, the system displays the walking speed of user's in an intuitive interface, which helps users understand adequate pace of walking.

2 STEP NAVI

Figure 1 expresses the novelty of this research "StepNavi". "StepNavi" performs speed Navigation. Speed navigation is realized based on the existing route navigation. Speed Navigation is using walking speed and arrival time and offers various support.

Figure 2 is a screen of screenshot of this system "STEP NAVI". The purpose of "STEP NAVI" is to allows a user to know current walking speed is over paced or under paced. Walking speed is computed based on user's positions and travel time between them, it visualizes with the intuitive interface which proposed a speed information for a user.

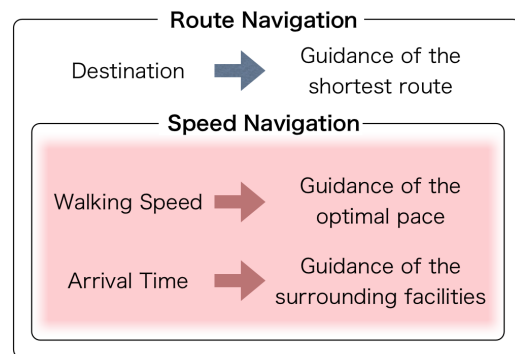


Figure 1: Novelty.



Figure 2: Step Navi.

2.1 Gradation Interface

This system displays current speed and necessary speed as a numerical value of speed per minute. However, since we hardly consider walking speed by speed per minute or speed per hour, we considered that the intuitive interface which can understand necessary speed is required.

Figure 3 shows the proposed gradation interface. It is a gradation bar from red to blue, yellow sphere expresses a user's current speed and a central purple portion expresses necessary speed. Moreover, it expresses that a left-hand side of red portion has a low pace and a right-hand side of blue portion has an high pace. Therefore, if a sphere is on the right from the center, it turns out that the user can arrive earlier than time to reach. A left end expresses speed 0 m/s and the right end expresses speed twice the necessary speed. However, since necessary speed is computed from the remaining distance and the remaining time, it changes relatively.

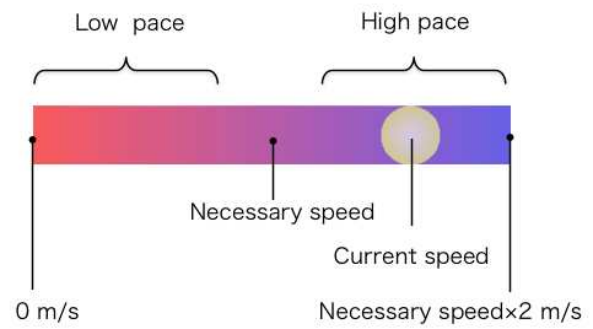


Figure 3: Gradation interface.

2.2 Display of a Track

Figure 4 shows the user's track. The color of the current speed in the moment is added to a user's track. The color of the current speed is a color in the position where the sphere which expresses the current speed was displayed on gradation Interface of Figure 3. When a user judges that the current speed is low pace and pick up the pace, it is for understanding pick up the pace by seeing change of the color of the track. Since the user can understand intuitively know how much speed are fluctuating, it becomes unnecessary for a user to look at a screen frequently.



Figure 4: Display of the user's track.

2.3 Surrounding Facilities

Figure 5 shows the structure of the system. A surrounding facilities is recommended according to between a user's arrival time. Only a cafe and a convenience store are recommended now.



Figure 5: Surrounding facilities.

3 IMPLEMENTATION

Figure 6 shows the structure of the system. This system is divided into two main classes, a client side and a server side. In client side, navigation is performed using Google maps API which Google offers. In server side, recommendation is performed using Open Local Platform which Yahoo offers.

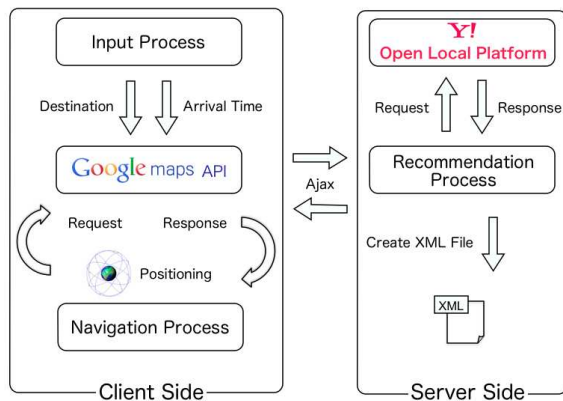


Figure 6: The system configuration diagram.

4 DISCUSSION

Since this system is carrying out positioning of the location information using the GPS function of a smart phone, a user's walking speed computed from location information is dependent on the accuracy of positioning. Now, the acquisition accuracy of GPS is set up highly and only location information with a high accuracy value is acquired. However, a place with many buildings and the place where the positioning

by GPS is difficult, it may acquire the location information from which it may be separated greatly from a its present location. Therefore, distance is periodically computed from two or more location information, and when distance becomes large, it is necessary to delete as a noise.

5 CONCLUSIONS

In the conventional navigation, a user has the uneasiness whether the current walk pace good or not, when the pace is too late, the problem the user can't reach in time as a result many occur. Then, we computed the user's walking speed in real time, and considered that it should make it compare with necessary speed. In this research, we proposed a concept as speed navigation and prototyped the "StepNavi" which displays a user's walking speed and necessary speed.

REFERENCES

Google (2011a). Google maps api. <http://code.google.com/intl/ja/apis/maps/>.
 Google (2011b). Mobile google map. <http://www.google.co.jp/mobile/maps/>.
 ItumoNAVI (2011). <http://www.its-mo.com/>.
 NAVITIME (2011). <http://www.navitime.co.jp/>.
 Nike+GPS (2011). <http://itunes.apple.com/jp/app/nike-gps/id387771637>.
 Yahoo (2011). Yahoo open local platform api. <http://developer.yahoo.co.jp/webapi/map/>.
 Yano, M., Iwasaki, Y., and Kawaguchi, N. (2010). Ekilocky: Time table information system using wifi location technology. In *Proceedings of the 72th Annual Convention IPS Japan*.