SURVEY ON LOCAL POSITIONING SYSTEM AND IT'S APPLICATIONS

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ABSTRACT

Global position system (GPS) and Local position system (LPS) have important roles in several applications in real life such as healthcare, monitoring and tracking, etc. GPS has many limitations due to some reason, the signal has lack when used inside building this is because of lack of line of sight (LoS). Therefore LPS is one of best solution which used to avoid weakness problem and it become very necessary for estimate user's or object position inside building with a good accuracy. This paper gives a survey on LPS technologies. Furthermore, the LPS's applications such as tracking which is involved several types like human tracking, object tracking, animal tracking and AGV tracking which is done by previous researches are presented

Keywords: LPS; GPS; LPS Techniques and Application; Tracking, AGV.

INTRODUCTION

Positioning system is navigation system which give a position information of the object or people at any location. Position system contained two parts, first, is GPS and another is LPS. GPS gives a position of the object/person on the outside area or earth surface with longitude and latitude coordinates (1). Generally GPS has several limitations firstly, the signal of GPS satellite is slowly because it need to pass through the atmosphere. Secondly, due to the lack of LoS to satellite, GPS signal is blocked through any obstacle. Thus, the GPS is not appropriate for finding the position in indoor (2)(3). On the other hand, LPS is approach used to estimate the location of persons or objects inside a building. There are a several technologies in LPS like infrared (IR), Bluetooth, ultrasound systems, radio frequency identification (RFID, Wi-Fi (4).

TYPICAL OF LOCAL POSITIONING TECHNOLOGIES:

In order to determine the location of object / people inside building there are several LPS technologies can be used. More information of each technology as follows:

- 1. Infrared Radiation (IR) Technology:** This technologe used to track people or object by using both of infrared emitters and receivers. The accuracy of IR is 57cm to 2.3m (5).
- 2. Wi-Fi Technology:** It is used widly in LPS for several reason such as it is not require to any LoS also the ability to find the location of person or object is good (4).
- 3. Ultra-wideband (UWB) Technology:** UWB is regarded as wireless technology. It can estimate location of any object by using ultra – short pluse which is depended on radio signals (6).

LPS APPLICATIONS:

There are several applications can be used to estimate position in LPS such as tracking (4). There are vareios of traching types which is following:

- 1. Human Tracking:** Here depth camera used to track and detect human's position in LPS application, it is not need to utilize any RGB camera and wearable device(7).
- 2. Object Tracking:** It is used a camera based localization for detecting position change of object without required to use extra references(1). IR system also used to find the location of the object.
- 3. Animal Tracking:** Basically, to determine the motion of animal tracking, the video tracking technology is used. It is implementation for used to find the poition and motion of mice's limbs(8).

4. AGV Tracking: It uses widely in manufacturing system in different application. Nowadays other application of AGV is extensively developed in different area such warehouse, container terminals and transportation system.

RESULTS

Table 1. Comparison of LPS

Technology	Accuracy (m)	Researcher	Coverage (m)
IR	1-2,0.57-2.3, 0.01	Chaimaa (2017), Brena (2017), Luca(2014)	Good Indoor,1-5
UWB	0.2,0.025	Khaoula (2016), Luca (2014)	50-100,15-25
Wi-Fi	1-5	Chaimaa (2017), Farid (2013) , Luca (2014)	Building level, 20-50

Table 2. Comparison between LPS technology and it's techniques

Technology	Techniques	Typical Environment	Researcher
IR	Proximity TOA, Thermal imaging active beacons	Indoor	Chaimaa(2017), Farid(2013) , khaoula(2016)
UWB	TOA, TDOA, Simulation TDOA	Indoor	Khaoula (2016), Luca (2014), Mohamed R. Mahfouz (2008)
Wi-Fi	Proximity TOA, TDOA, RSSI, Theoretical propagation model.	Building level, Indoor	Chaimaa (2017),Farid(2013) , khaolua (2016)

CONCLUSION

This paper give a servay of LPS includes technologies and it's application. On the other hand, the comparison between LPS technologies is also introdused. Moreover, the LPS's applications such as tracking which is involved several types like human tracking, object tracking, animal tracking and AGV tracking which is done by previous researches are presented.

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