

During the past one year, I finished two projects:

(1) We set up a practical implementation of a VLC (Visible Light Communication) system in a University building. To finalize this work, it is important that we analyze the properties of the reception signal, especially the length of the data string that can be received at different walking speed. We present a model and a series of formulae for analyzing the relationship between positioning signal availability and other important parameters, such as sensor angle, walking speed, data transmission rate, etc. We performed a series of real-life experiments using VLC system and compare the results with those generated by the formula. The outcome is an improved design for determination of the reception area with more than 97% accurate signals, and an optimal transmission data length, and transmission rate.

(2) A VLC (Visible Light Communication) system using fluorescent lights has been developed for indoor guidance of the visually impaired. While it is relatively straightforward to provide generalized location information for a blind user, precise location information is much more difficult to determine. We propose that the effective data reception range and the receiver's precise location can be calculated using measured sensor angles. A series of experiments have been performed in a practical platform with 22 fluorescent lights, 39 measuring points (MP). The average distance error could reach as low as 10 cm. This development will provide greater accuracy and therefore less stress for blind users.

発表論文等

1	Xiaohan Liu , Hideo Makino , Suguru Kobayashi and Yoshinobu Maeda : Research of Practical Indoor Guidance Platform Using Fluorescent Light Communication IEICE Transactions on Communications 2008.11 Vol.E91-B,No.11, pp:3507-3515
2	X. Liu , and H. Makino : An Intelligent Indoor Environment Solution: Compact Fluorescent Down Light System using Visible Light Communication 7th Asian Symposium on Geographic Information Systems, Incheon, South Korea (2009. 5)

3	<p>X. Liu, H. Makino, and Y. Maeda : Basic Study on Indoor Location Estimation using Visible Light Communication 30th IEEE EMBS Annual International Conference, pp: 2377-2380, Vancouver, Canada (2008. 8)</p>
4	<p>X. Liu, H. Makino, and Y. Maeda : Fundamental Characteristic of an Indoor Navigation System using Fluorescent Light Communication 6th Asian Symposium on Geographic Information Systems, pp:173-176, Niigata, Japan (2008. 5)</p>