

RSSI-BASED WLAN INDOOR POSITIONING USED WITHIN A DIGITAL MUSEUM GUIDE

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Keywords: RSSI, WLAN, Indoor, Positioning, Localization, PDA, Digital Museum Guide, Location Based Services, User Position, User Behavior

Abstract

As modern mobile devices are often equipped with a WLAN interface and many buildings are equipped with a WLAN infrastructure, WLAN could be used for localization. The aim of this work is to investigate the quality of different indoor positioning methods based on values of WLAN received signal strength index (RSSI) using commercially available devices (smart phones, personal digital assistants). Three positioning algorithms were considered: minimal Euclidian distance, intersections of RSSI-Isolines and a stochastic model based on Bayes' theorem. A measuring test bed within an empty seminar room, four different types of personal digital assistants (Dell, Fujitsu, HP, T-Mobile) and two types of access points (Netgear, Lancom) were used. No modification of hardware and software was conducted. Furthermore this paper shows how WLAN localization can be applied in a museum guide application. This paper also shows the visualization of spatial user position frequency pattern during a field trial within a museum.

References

Meurer M., Heilmann S., Reddy D., Weber T., Baier P.W. A signature based localization technique relying on covariance matrices. in Kamakya K, Jobmann K., Kuchenbecker, H.-P. (eds). Joint 2nd Workshop on Positioning, Navigation and Communication (WPNC'05), Hannover, 17.3.05, p 31-40.

Ladd A. M., K. E. Bekris, A. Rudys, L. E. Kavraki, D. S. Wallach. Robotics-based location sensing using wireless Ethernet. *Wireless Networks*, vol 11, no 1-2, 2005, p. 189– 204.

Retscher G., Moser E., Vredeveld D. and Heberling D. Performance and accuracy test of the WLAN indoor positioning system ipos. in Kamakya K, Jobmann K., Kuchenbecker, H.-P. (eds). Proceedings of the 3rd Workshop on Positioning, Navigation and Communication (WPNC'06), Hannover. 16.3.06, p 7-15.

Teuber A., Eissfeller B. WLAN indoor positioning based on Euclidean distances and fuzzy logic. in Kamakya K, Jobmann K., Kuchenbecker, H.-P. (eds). 3rd Workshop on Positioning, Navigation and Communication (WPNC'06), Hannover, 16.3.06, p 159-168.

Ekahau; "Ekahau positioning engine 2.0; 802.11 based wireless LAN positioning system"; An Ekahau Technology Document, 2002.

Roehrig C., Kuenemund F. Mobile robot localization using WLAN signal strength. Personal Communication, FH Dortmund 2006, unpublished.

Grossmann U, Schauch M. RSSI based WLAN indoor positioning with personal digital assistants, in: Proceedings of the 4th IEEE Workshop on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications IDAACS 2007, (Ed. Sachenko, A), pp. 653 - 656; Dortmund, 2007.

Tate Modern: Tate Modern Multimedia Tour Pilots 2002-2003, Online: http://www.tate.org.uk/modern/multimediatour/phase1_keyfindings.pdf, last reviewed 15.04.2008.

Modsching M., Kramer R. ten Hagen K. Gretzel U. Using geographic tracking data to analyse spatial behaviour in eTourism, Online: <http://www.ikaros-projekt.de/CmodsDownload-index-req-getit-lid-62.html>, last reviewed 15.04.2008.

Larson S., Bradlow E.T., Fader P.S. An exploratory look at supermarket shopping paths. in: International Journal of Research in Marketing, Vol. 22, Issue 4, December 2005, pp.395-414.

Klein R. Algorithmische Geometrie, Addison-Wesley, Bonn, 1997.

Dalhaus M. WLAN-Ortung innerhalb von Gebäuden mittels Signalstarkelinien. Internal Report, FH Dortmund 2006, unpublished.

Grossmann U., Roehrig C., Hakobyan S., Domin T., Dalhaus M. WLAN indoor positioning based on Euclidian distance and interpolation (isobars). In Wollert J. (ed). Wireless Technologies, Dortmund, 27./28.9.06, Fortschritt-Berichte VDI, Reihe 10, Nr. 772, S.296-305, 2006.

Grossmann U., Schauch M., Hakobyan S. The accuracy of algorithms for WLAN indoor positioning and the standardization of signal reception for different mobile devices. International Journal of Computing, Vol . 6 (2007), Issue 1, pp 103-109.

L'hoest A. Entwicklung mobiler Anwendungen mit Microsoft.NET. Internal Report, FH Dortmund 2005, unpublished.

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Published

2014-08-01

How to Cite

Grossmann, U., Gansemer, S., & Suttorp, O. (2014). RSSI-BASED WLAN INDOOR POSITIONING USED WITHIN A DIGITAL MUSEUM GUIDE. *International Journal of Computing*, 7(2), 66-72. Retrieved from <http://www.computingonline.net/computing/article/view/512>

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Index terms: Indoor Positioning, RSSI, Tri-lateration, Access points, signal propagation model. —  — 1. introduction. Positioning finds its applications in locating a person in an area, helping person to navigate or to reach desired location. GPS is the most famous positioning system that we know. GSM technology is used in indoor positioning. It is based on cellular signals and makes use of existing hardware in mobile phone. GSM fingerprints are used to achieve better accuracy in positioning. In [2], zigbee(IEEE 805.4) is used for indoor localization purpose. In this paper, indoor positioning system using wifi (WLAN IEEE 802.11n) is explained. In wifi, various methods are used for positioning purpose. Indoor Positioning System based on RSSI fingerprint positioning using WLAN signals and effective machine learning methods. 8 commits. 1 branch. Want to be notified of new releases in HUbbm409/bbm406-project-wi-fi-based-indoor-positioning? Sign in Sign up. Launching GitHub Desktop