

Accuracy Evaluation of Indoor Positioning by Received Signal Strength using Deep Learning

Yuma Narita*, Shan Lu*, Hiroshi Kamabe*

*Graduate School of Natural Science and Technology, Gifu University, 1-1, Yanagido, Gifu, Japan
n.brian20202@gmail.com, shan.lu.jp@ieee.org, kamabe@ieee.org

Abstract—In this paper, we examined indoor positioning systems that combine the deep learning technology with the fingerprint using the received signal strength indicator(RSSI) of Wi-Fi. Because the fingerprint method used previously recorded data, positioning can be performed considering effects in actual indoor environments to obtain a high-precision result compared to other methods that use theoretical formulas. The accuracy of deep learning depends on data shaping and learning methods. Therefore, this study aimed to compare existing methods' accuracy by determining compatible shaping and learning methods. The effectiveness of the proposed method was demonstrated by comparing it with the existing methods.

Keyword—Deep Learning, Indoor Positioning, RSSI, Fingerprint, Wi-Fi



Yuma Narita was born on February 2, 1997 in Aichi Prefecture, Japan. He earned a bachelor's degree in information engineering from Gifu University in Gifu in 2019. He is currently studying to earn his master's degree from Gifu University Graduate School. His specialty is coding theory and communication engineering. His research interests are indoor positioning and efficient access point placement algorithms.



Shan Lu received the B.S. and M.S. degrees in telecommunications engineering from Xidian University, Xi'an, China, in 2007 and 2010, respectively, and the Ph.D. degree in information and computer science from Doshisha University, Kyoto, Japan, in 2014. From 2014 to 2016, she was a research assistant at Doshisha University. Currently, she is an assistant professor in the Department of Electrical, Electronic and Computer Engineering, Gifu University. Her research interests are in the areas of multiuser coding, coding for nonvolatile memories, and communications theory.



Hiroshi Kamabe received the B.E. and M.E. degrees from Toyohashi University of Technology in 1982 and 1984, respectively. He received the Ph.D. from Nagoya University in 1996. He joined Mie University in 1982 and Gifu University in 1998. Since 2010, he has been a professor at Gifu University. He is now a vice dean of faculty of engineering. He served as an associate editor of IEICE Trans. Fundamentals(EA), an editor of Fundamentals Review, a chair of IEICE technical committee of Information Theory, the chief editor of IEICE Trans. Fundamentals(Japanese Edition) and a chair of TPC of ISITA2020, and so on. He is interested in constrained coding.