A Study on the Population Distribution Prediction in Large City using Agent-Based Simulation

Bumho Kim, Chang-Gyu Lim, Seong-Ho Lee, Yung-Joon Jung

ETRI(Electronics and Telecommunications Research Institute), Korea

mots@etri.re.kr, human@etri.re.kr, sholee@etri.re.kr, jjing@etri.re.kr

Abstract— **In the smart city, digital twins replicate buildings, urban infrastructure, and utilities into a virtual space. In this paper, we create a virtual city simulation platform that can simulate the movement of people and present infrastructure such as urban buildings, roads, and public transport to predict urban change and population movement. In particular, we analyze mobile phone statistics data and exploit it as a movement distribution model to replicate the movement of population within a city and between neighboring cities. The urban simulation platform can estimate population movement and various urban problems and infrastructure changes.**

Keyword— **Modeling and Simulation, Agent based Modeling, Smart City, Digital Twin, Geographic Information Systems**

Bumho Kim received the BS degree in computer science from Sogang University in 2000 and MS degree at KAIST in 2002, respectively. Currently, he is a senior researcher in the Artificial Intelligence Research Lab. at Electronics and Telecommunications Research Institute (ETRI), Daejeon, Korea. His research interests include modeling and simulation, distributed system, and multimedia.

Chang-Gyu Lim is a senior researcher in the Artificial Intelligence Research Lab. at Electronics and Telecommunications Research Institute (ETRI), Daejeon, Korea. He received his Master degree at KAIST in 2002. His key research interests are: Modeling and Simulation, Future Internet, Software Defined Networking and Transport Network.

Seong-Ho Lee received the B.S., M.S., and Ph.D. degrees in computer science from Chungbuk National University in 1997, 2000, and 2019, respectively. He has joined the research staff of ETRI in 2000. He is currently working on the Urban Administration Digital Twin project as a senior researcher. His research interests include spatio-temporal database systems, geographic information systems, and agent-based modeling.

Yung-Joon Jung received the B.B. degree in Physics from, Hankuk University of Foreign Studies, Korea in 1997, received the MS degree in Computer Science from same University in 1999 and received Ph. D degree in Computer Science from Chungnam National University in 2016. Since 2001, he has been with ETRI, Korea, as a Principal Researcher. His research interests are embedded operating system, real-time distributed computing, power management system, digital twin data analytics and software simulation.