



January 23, 2018

SIGVerse to be used as simulator at World Robot Summit sponsored by METI/NEDO

Tool developed by the research group of NII's Associate Professor Inamura

Japan's National Institute of Informatics (NII; Chiyoda-ku, Tokyo; Dr. Masaru KITSUREGAWA, Director General), one of four organizations that constitute the inter-university research institute corporation, the Research Organization of Information and Systems, announces that SIGVerse™, a robotic environment simulator developed by the research group of Associate Professor Tetsunari Inamura of NII's Principles of Informatics Research Division, will be used as a simulator for robot competitions at the World Robot Summit (WRS) (<http://worldrobotsummit.org>), an international robotics convention sponsored by Japan's Ministry of Economy, Trade and Industry (METI) and the New Energy Industrial Technology Development Organization (NEDO). METI and NEDO released a joint announcement on January 23 discussing the WRS and the nature of its robotics competitions.

The SIGVerse^(*1) is a simulator designed to use robots in virtual-reality spaces, versus actual physical robots, for experiments and tests involving intelligent robot systems that perform tasks through human-robot interaction. A key feature of this system is that it enables interactions between humans and virtual robots, something that was difficult in previous robot simulators. The SIGVerse uses real-time communication to combine the Unity^(*2) platform for VR application development with the ROS (Robot Operating System) middleware for intelligent robots. The system allows human participants to log on to an avatar in virtual space, by wearing a head-mounted display, and experience embodied and social interactions with virtual robots through body movements, hand movements, and spoken dialogue.

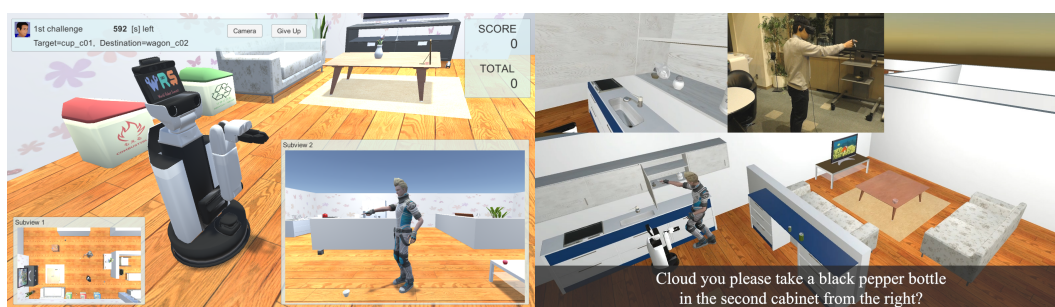


Figure: SIGVerse: The SocioIntelliGenesis Simulator

WRS is co-sponsored by METI and NEDO. Participants from all over the world will come together in one location with the aim of accelerating the R&D and practical implementation of robots, in both the personal and industrial sectors of society. The WRS program includes the World Robot Challenge, the Partner Robot Challenge (Virtual Space) using the SIGVerse simulator, and the World Robot

Expo, an exhibition of the latest robot technology. A pre-event will run from October 17-21, 2018 at Tokyo Big Sight, and the main event will take place in October 2020 at the Aichi International Exhibition Center in Japan's Aichi Prefecture (with some competitions taking place in August 2020 at the Fukushima Robot Test Field).

The World Robot Challenge is designed to facilitate information exchange among robot experts, on topics such as improved robotic techniques for assisting in daily human life, and to explore the lifestyle and societal changes brought about by social implementations of robots. Competitions will be held in four categories: *industrial robotics*, *service robotics*, disaster robotics, and *junior*. The SIGVerse simulator will be used in the Partner Robot Challenge (Virtual Space), one of the events in the *service robotics* category. In this category, robots use natural language to guide humans to achieve tasks, cleaning a room while having a conversation with a human, and so on. SIGVerse was thus chosen to facilitate these tests.

These will be the world's first competitions to use real-time interactions between a human operator, logged in to an avatar via Unity, and a robot in a ROS-controlled virtual-reality space. The World Robot Challenge competition is expected to accelerate functional development and performance testing for intelligent robots.

Previously, the SIGVerse was used to facilitate dialogue between humans and Toyota's HSR human-support robot in the Robocup@home division of the Robocup 2017 Nagoya International Tournament, held in Nagoya City, Japan in July 2017. Associate Professor Inamura and his research group look forward to continuing to improve the capabilities of the SIGVerse and helping to facilitate research on intelligent robots playing useful roles in society.

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Media Contact:

**Research Organization of Information and Systems
National Institute for Informatics**

Communications

TEL: +81(0)3-4212-2164; E-mail: media@nii.ac.jp

(*1) **SIGVerse:** The SocioIntelliGenesis Simulator. For more information, visit the SIGVerse information page: <http://www.sigverse.org/wiki/en/>.

(*2) **Unity:** A game engine provided by Unity Technologies. Allows development and execution of games and VR applications for a variety of platforms. Also known as Unity3D. For more information, visit the web page for Unity3D (Unity Technologies) : <http://www.unity3d.com/>.