Press Release

Industry-University Collaboration for IoT Business Creation:
SMU and PS Solutions signed software licence agreement for High-Speed Geofence Query Engine

Singapore, 14 June 2016 (Tuesday) - Singapore Management University (SMU), one of Asia's leading universities, through its School of Information Systems (SIS), and PS Solutions Corp (PSSOL), a wholly owned subsidiary of the Japan headquartered telecommunications and Internet company, SoftBank Group Corp., have entered into a software licence agreement. The license provides PSSOL world-wide exclusive rights to use an SMU developed software module which implements high-speed processing of geofence* queries, and the application of the software module to solutions that require sophisticated spatial data analysis in real time.

The algorithms to determine the location via a geofence are already well established technological abilities. However, processing many simultaneous geofence queries on large-volume incoming streams of data, at high speed, is technically very challenging, and therefore, it is difficult to achieve high efficiency in processing big data at lower cost for commercial use.

A team of researchers at SMU SIS, led by Associate Professors Kyriakos Mouratidis and Baihua Zheng, collaborated with PSSOL for research and validation, and successfully developed an algorithm to process many simultaneous geofence queries on large-volume incoming streams of data, at very high speed, and in a highly efficient manner. Through this agreement, SMU grants PSSOL the software license for commercial use of the said algorithm.

This license agreement is an excellent example of mutually beneficial industry-university collaboration, where SMU's deep academic knowledge in terms of the use of geofence function meets PSSOL's vision of new business creation.

Professor Steven Miller, SMU's Vice Provost (Research) and Dean (School of Information Systems) said, "Our two SIS faculty members had both been doing academic work and high quality academic publishing in the area of high performance spatial data management and analytics methods for many years, and were delighted to hear about a specific real-world business problem that would benefit from their prior work.

It was an excellent example of how the university group and the industry team can productively work together. We will also be delighted to see new projects where high quality academic work can be used to contribute to real-world economic value creation in partnership with a company."

Masanori Ueno, PSSOL's Director of the Board said, "PS Solutions develops and offers several IoT solutions that can be utilized in various fields. One such instance is "e-kakashi", which collect agricultural data from the sensor network installed on an agricultural field, and visualize the data to share the cultivation method and know-hows. Also, "Setouchi Karen", a

rental electrical motorcycle solution, installed with IoMT (Internet of Moving Things) technology connecting to mobile communication network, is another example. We expect that this technology could be applied to IoMT domain, or for drones (unmanned aerial vehicle), by determining whether a monitored object would enter or reaches to a dangerous region or a particular area and that triggers next dynamic action. We will further collaborate with universities or other research institutes having advanced technologies, and will enhance research and development for new value creation."

A mechanism to determine whether an object is within a region by setting up a virtual perimeter (fence) on a map, and automatically call a preset procedure if it is.

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About Singapore Management University
Singapore Management University (SMU) is internationally recognised for its world-class research and distinguished teaching in the areas of Management, Social Sciences, Analytics and Computing, and for interdisciplinary work across these areas. Established in 2000, SMU's mission is to generate leading-edge research with global impact and produce broad-based, creative and entrepreneurial leaders for the knowledge-based economy. SMU education is known for its highly interactive, collaborative and project-based approach to learning, and for its technologically enabled pedagogy of seminar-style teaching in small class sizes. Comprised of six schools that specialise in Accountancy, Business, Economics, Information Systems, Law and Social Sciences, it offers a wide range of bachelors', masters' and PhD degree programmes and is home to 9,300 students. With an emphasis on generating relevant multi-disciplinary research that addresses Asian issues, and being Singapore's only university in the city, SMU enjoys strategic linkages with business, government and the wider community through its research institutes, centres and labs. www.smu.edu.sg.

About SMU School of Information Systems
SIS was set up in 2003 to extend SMU's research and education efforts into the areas of Information Systems Technology, Information Systems Management, and problems at the intersection of IS technology and management.

 The School possesses deep research R&D capability in four strategically-selected areas of IS technology: Cybersecurity; Data Management & Analytics; Intelligent Systems & Decision Analytics; and Software & Cyber-Physical Systems. The fifth strategic area of the School is Information Systems & Management, where the faculty investigate the managerial aspects and economic impacts of IT in private sector and public sector organisations, and across value chains, markets and industries. Since its inception, SIS has established a strategic partnership with Carnegie Mellon University. Through SIS, SMU and Carnegie Mellon

University have established the Living Analytics Research Centre (LARC) to conduct research on behavioural and social network analytics and behavioural experiments.

About PS Solutions
PS Solutions (PSSOL) is a company that continuously generates leading edge IT services, to practice "Information Revolution - Happiness for everyone", the corporate philosophy of the SoftBank Group. PSSOL offers IT solutions, IT outsourcing and oversea marketing business. Additionally, PSSOL develops and provides IoT solutions, such as "e-kakashi" and "Setouchi Karen"
- e-kakashi (https://www.e-kakashi.com/)
A solution that collects the environmental data and growth information of crops from agricultural field, analyzes the data in the cloud, and feedback the clearly visualized results. Users can refer to a variety of data required for cultivation through PC, tablet or smartphone, and accumulate and share the actual cultivation records to help direction, quality control or efficiency in cultivation.
- Setouchi Karen (http://www.setouchi-karen.com/)
Rental motorcycle service provided in Teshima Island at Kagawa prefecture. It supports drivers in real time by connecting electric motorcycle to the mobile communication network through Internet of Moving Things technologies, and automatically detect inappropriate riding behavior such as sudden acceleration, braking, off the track, from the battery charge status and location data.

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