

National AI Healthcare Initiatives get boost from RIE funding with new national supercomputer resource built and sited at NUHS. Singtel and NUHS to set up a 5G Indoor Network, a first for a public healthcare institution

Two key announcements, and more AI initiatives announced at the 4th **Singapore Healthcare AI Datathon & Expo 2021** (27 Nov to 5 Dec):

- National Supercomputing Centre Singapore (NSCC) and National University Health System (NUHS) finalise an agreement to build a petascale ¹ national supercomputing resource that will serve Singapore's medical and healthcare research needs by middle of next year.
- NUHS and Singtel are building the first 5G indoor network with Multi-Access Edge Compute Capabilities at NUH by middle of next year.
- First real time vein mapping device using the Microsoft HoloLens2, devised by NUH clinicians and NUS engineers, to aid blood taking.

Singapore, 3 December 2021 @1300 hours – Hospitals around the world produce an average of 50 petabytes of data per year² or a staggering 50 million GB of storage space. Research into modern medical technologies and applications that rely on tools such as artificial Intelligence (AI), machine learning and automation, helps to make sense of the massive amounts of data to improve patient outcomes. The development of such tools can be exponentially enhanced using supercomputers as it allows medical researchers to build more complex AI models that can accommodate the large amounts of data. However, to run AI and machine learning at scale, it requires massive amounts of

¹ A petascale supercomputer refers to computing systems capable of performing at least 1 quadrillion floating point operations per second (FLOPS), which is the measurement of the number of calculations that can be performed in one second.

² <https://www.weforum.org/agenda/2019/12/four-ways-data-is-improving-healthcare/>

computing power to train the models. This morning, NSCC (National Supercomputing Centre Singapore) and NUHS (National University Health System) inked a collaborative agreement, **to build the national infrastructure for supercomputing to support AI programmes at public healthcare institutions** by middle of next year. The five-year Research, Innovation and Enterprise 2020 (RIE2020) plan had allocated funds for research and development (R&D) in three high impact areas, including healthcare. Collaborating to provide the infrastructure and operational components respectively, the new system by NSCC and NUHS will benefit clinical researchers who will be able to train and run complex computations of healthcare models. **This supercomputing infrastructure, named “PRESCIENCE”**, is used to train AI models that predict patient health trajectories and recommends when a patient’s condition may deteriorate. “The National University Health System sees a large number of patients per day and generates large amounts of data which can be used to train AI models that improve the quality of care,” said Associate Professor Ngiam Kee Yuan, Group Chief Technology Officer, NUHS, at this morning’s media briefing held on the sideline of the opening session of **Singapore Healthcare AI Datathon & Expo 2021**. “Normally, these could take days to process but the new supercomputer could help to cut our training times down to hours allowing our medical and para-medical staff to optimise patient trajectories and to improve the quality of patient care,” he added.

2 In another key announcement made this morning, NUHS said it is entering into an agreement with Singtel to deploy **5G indoor network with Multi-Access Edge Compute capabilities at NUH operating theatres and wards**. This is a first for a public hospital. For NUHS, 5G is a key enabler of new services and technologies, such as mixed reality applications, robotics and internet of things. The high-speed connectivity of 5G would address current limitations in latencies and bandwidth, and open up possibilities for better healthcare experiences, such as smoother teleconsultations, augmented surgical

navigation using mixed reality devices, and robot AI capabilities using cloud and edge computing.

3 In her keynote as the Guest-of-Honour to the **4th Singapore Healthcare AI Datathon and Expo 2021 (27 Nov – 5 Dec)**, Ms Yong Ying-I, Permanent Secretary (Communications and Information), Ministry of Communications and Information and Permanent Secretary (Cybersecurity), Prime Minister’s Office, emphasised the importance of developing AI, “Singapore is actively involved in international discussions on ethical AI. For example, IMDA and PDPC are developing an AI Governance testing framework consistent with internationally recognized principles from the EU, UNESCO, OECD and others. Best practices in AI feature in our digital economic agreements with other countries. These various efforts support Singapore’s vision to become a global hub for development, test-bedding, deployment and scaling of AI solutions.”

4 A/Prof Ngiam Kee Yuan, Group Chief Technology Officer at NUHS, also introduced the latest capability developed on Microsoft’s **HoloLens 2 device to visualise veins under the skin surface in real time**. The NUHS team consisting of clinicians at NUH, and engineers at NUS devised an AI software with Augmented Reality, deployed on the hololens2 to support venipuncture – the process of inserting a needle into a vein for blood taking or for intravenous access. Hundreds of such crucial procedures are carried out daily in healthcare institutions and it is especially important in patients with difficult to find, or small veins. This system is completely contactless and can display veins of various sizes in 3 dimensions. The system will be deployed on the VSI software designed by the German company, Apoqlar GmbH.

5 The “**Singapore Healthcare AI Datathon & Expo 2021**”, has achieved record size and scale this year, with all three national health clusters (NUHS, SingHealth and National

Healthcare Group) represented, together with international participants from over 10 countries from as far as Brazil, to the countries in Asia Pacific. Esteemed academic institutions from China, Japan, South Korea, Thailand and Australia are among the site organizers. This annual event organized by NUHS and co-organized with the National University of Singapore (NUS) and MIT Critical Data, brings together clinicians, data scientists and innovators in healthcare to address current problems in healthcare with data analytics and AI. There are more than 60 international speakers, 12 industry workshops, and a record number of over 50 datathon teams vying for the prize money of S\$20,000 (with results to be announced on 5 Dec 2021).

In closing, A/Prof Ngiam said, “Public healthcare institutions are making fuller use of AI tools to enable medical practitioners to make faster, more accurate diagnoses and precise treatments.” – end



From Left to Right, NUHS Grp Chief Technology Officer, A/Prof Ngiam Kee Yuan, NUHS CE, Prof Yeoh Khay Guan, NSCC CE, A/Prof Tan Tin Wee and NSCC Director of Strategy Planning, Mr Bernard Tan

About the National University Health System (NUHS)

The National University Health System (NUHS) aims to transform how illness is prevented and managed by discovering causes of disease, development of more effective treatments through collaborative multidisciplinary research and clinical trials, and creation of better technologies and care delivery systems in partnership with others who share the same values and vision.

Institutions in the NUHS Group include the National University Hospital, Ng Teng Fong General Hospital, Jurong Community Hospital and Alexandra Hospital; three National Specialty Centres - National University Cancer Institute, Singapore (NCIS), National University Heart Centre, Singapore (NUHCS) and National University Centre for Oral Health, Singapore (NUCOHS); the National University Polyclinics (NUP); Jurong Medical Centre; and three NUS health sciences schools – NUS Yong Loo Lin School of Medicine (including the Alice Lee Centre for Nursing Studies), NUS Faculty of Dentistry and NUS Saw Swee Hock School of Public Health.

With member institutions under a common governance structure, NUHS creates synergies for the advancement of health by integrating patient care, health science education and biomedical research.

As a Regional Health System, NUHS works closely with health and social care partners across Singapore to develop and implement programmes that contribute to a healthy and engaged population in the Western part of Singapore.

For more information, please visit <http://www.nuhs.edu.sg>.

About National Supercomputing Centre (NSCC) Singapore

The National Supercomputing Centre (NSCC) Singapore was established in 2015 to manage Singapore's national petascale facilities and high-performance computing (HPC) resources. As a National Research Infrastructure funded by the National Research Foundation (NRF), the HPC resources that we provide helps support the research needs of the public and private sectors, including research institutes, institutes of higher learning, government agencies and companies. With the support of our stakeholders, for example, the Agency for Science Technology and Research (A*STAR), Nanyang Technological University (NTU), National University of Singapore (NUS), Singapore University of Technology and Design (SUTD), National Environment Agency (NEA) and Technology Centre for Offshore and Marine, Singapore (TCOMS), NSCC catalyses national research and development initiatives, attracts industrial research collaborations and enhances Singapore's research capabilities. For more information, please visit <https://www.nscg.sg/>.