



BUILD ON

SINGAPORE 2021

BUILDING YOUR FUTURE

CHALLENGE STATEMENTS

Things to note

- Register for the hackathon [here](#) and await for us to contact your team leader. Challenge statements are on a first-come-first-served basis, please register early to avoid disappointment. When a challenge statement is fully subscribed, your team can no longer select it during registration.
- More info will be shared via email on the proposal template and details for submission. If you didn't receive the email, check your junk/spam folder.
- The top 6 teams per company will be [shortlisted based on their proposal](#), to proceed onto prototype development. Regardless if the company has provided 1 or 2 challenge statements, the company can only pick the top 6 teams who worked on their statements, for e.g.
 - Challenge statement A (1 team); Challenge statement B (5 teams)
 - Challenge statement A (3 teams); Challenge statement B (3 teams)
 - Challenge statement A (4 teams); Challenge statement B (2 teams)
 - Challenge statement A (6 teams)
- Subsequently, we will add your team members into the Slack channel for mentorship. You can discuss with your mentors if you require additional help/time from them. The top 6 shortlisted teams will also be provided with an AWS exclusive SWAG box.
- After 2 weeks of prototype development, you will be doing a live pitch against the other 5 teams in the Company Finale. You will be evaluated against [this set of judging metrics](#).
- Additional prizes and internship opportunities may be awarded by the individual companies at their own discretion.
- All hackathon participants will receive a certificate of participation.

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(Open to both Junior and Institute category)

Challenge Statement #1

E-commerce / Online Marketplace

A C2C marketplace brings a buyer and seller together for a deal. How might we help them deal amicably, bringing their best to each other?

[Find out more about Carousell here](#)

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(Open to both Junior and Institute category)

Challenge Statement #2

E-commerce / Online Marketplace

Buying and selling pre-owned items helps buyers save money and sellers generate spare cash. And more importantly, it helps to reduce waste and save the environment. How might we encourage more people to buy and sell pre-owned items?

[Find out more about Carousell here](#)

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(Open to both Junior and Institute category)

Challenge Statement #3

Healthcare

(Junior category) Many countries around the world are facing another surge of COVID and for most, the surge has been stronger or more devastating than the initial onslaught. Initially, COVID strains were found to severely impact the elderly and those with comorbidities. As the COVID strains have mutated, the younger population is also starting to get more impacted. What can be done to increase awareness in communities across different age-groups and provide correct information especially regarding vaccination and safety protocols?

(Institute category) As the COVID pandemic has dragged on and is threatening to extend further, cities, municipalities, provinces, and countries struggle to meet the healthcare demands and supplies are scarce. Hospitals are running out of basic supplies such as oxygen, PPE, equipment and even rooms for the patients afflicted with COVID. Government and health officials are finding themselves having logistics dilemmas. What can be done to improve coordination with sources of these supplies, including aid from other locations to speed up the distribution? What can be done to solve the issue of space and patient monitoring when hospitals are full capacity?

[Find out more about Cognizant here](#)

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(Open to both Junior and Institute category)

Challenge Statement #4

Inclusive Society

The United Nations Sustainable Development Goals 10, 11 and 12 calls for reduced inequalities, inclusive resilient cities, and responsible and sustainable consumption. One of the best ways to achieve them together is to enable a city-level community sharing and caring model which enables easy and safe sharing of knowledge and resources. This could be sharing of resources such as clothes, toys, books, food and doing so easily, with minimum transport cost with those who need them. Similarly with volunteering time, talent, skills - help with studies, help with understanding digital applications, buying groceries, etc.

To summarize, Singapore has a lot of volunteers, donors and others who want to share or provide help in different ways while there are many others in different categories who require support and help in multiple ways. There are challenges connecting the people who need help or resources with the set of people who can provide timely help and resources based on location, availability, nature of assistance required etc. We need to develop a system that can help connect multiple stake holders and at the same time avoiding misuse.

Propose a solution which enables easy, safe, low-to-no-cost sharing of time, resources, services and skills so that we build thriving, sustainable communities.

[Find out more about Cognizant here](#)

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(Open to Institute category only)



Challenge Statement #5

Healthcare

(Institute category only) AI for Predicting Complications in Chronic Diseases

Hyperglycaemia (diabetes), Hyperlipidaemia (high cholesterol), and Hypertension (high blood pressure) are three of the top chronic diseases that affect Singaporeans. Some of the major complications for these diseases include cardiovascular disease, renal failure, and eye/foot problems. Understanding which patients will develop major complications can allow for early diagnosis and interventions to manage the complications and even prevent the development of complications.

Challenge: To predict the time to developing complications in patients with type 2 diabetes or hypertension or hyperlipidaemia from the time of first diagnosis. You will be provided with a dataset that includes patient demographics, information on hospital visits, lab test results, medication, and diagnoses.

[Find out more about NUHS here](#)

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(Open to Institute category only)

Challenge Statement #6

Robotics

(Institute category only) Develop your own robotic assistant in our simulated ward environment to solve real-world challenges.

One of the most common tasks in the ward is to deliver and dispense medications to patients in the ward. This must be done in a timely manner as patients are waiting for medications to go home. The robot's task is to deliver medications from the satellite pharmacy to a particular desk next to the patient's bed in the ward within the shortest possible time without collision. It will be done in a virtual ward environment with random simulated people and objects (e.g. food cart, beds) moving in the replicated ward space. The robot must be capable to autonomously navigate and route plan using video-based object recognition for optimal route planning and dynamic object avoidance. Varying video images will be provided for the video recognition part of this challenge.

The robot will have a bin in its body for medications and a single robotic arm to pick and place a package of medication on the patient's desk. The robot must use its arm to pick and place a medication package on a patient's table to complete its task. The robot arm is equipped with a depth camera attached coaxially to enable it to place a medication package precisely.

The challenge requires the robot to recognize video images of a patient's table, determine its location (X,Y) and move to a position nearby the table. Using a machine vision algorithm, it should detect specific items on the table and use the robot arm to pick an the item based on the position and orientation (X,Y,Z, p, r, y).

[Find out more about NUHS here](#)



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(Open to both Junior and Institute category)

Challenge Statement #7

Healthcare: Increasing accessibility to care

In today's world, healthcare is facing new and unprecedented challenges. At the same time, technology has never played such a significant role when it comes to assisting healthcare professionals, patients and the public.

The COVID-19 pandemic has caused rapid dynamic fluctuations in demand and capacity of health care. Most importantly, the traditional face-to-face (F2F) patient-physician care model has to be re-examined to meet new requirements from public health measures to mitigate against COVID-19 transmission. Digital technology (e.g: telehealth) and new models of care (e.g: retrofit existing spaces, integrated offline and online care management etc) are rapidly deployed to meet the various challenges of the pandemic.

Challenge Statement: In the midst of COVID-19 pandemic, how can we allow for a more efficient healthcare system via the use of cloud-based services?

[Find out more about TechForShe here](#)

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(Open to both Junior and Institute category)

Challenge Statement #8

Sustainability: Sustainable food production in Singapore

Process or actions to meet the current needs of the people that can be continued at a certain level, without depleting resources of future generation's to meet their needs.

Singapore is heavily dependent on other countries for its food supplies. The Covid-19 pandemic has highlighted the risk of being this dependent on other countries for food especially during times of adversity. This has resulted in the '30 by 30' target for Singapore where the country hopes to produce 30% of its food needs locally by 2030. In the next 10 years, Singapore aims to increase its local produce by 30%. It is important to implement that in a sustainable long term manner that can be scaled in the future too. There are a lot of ways to do that, including high tech farming, vertical gardening etc.

Challenge Statement: How can resources (land/effort) be allocated to ensure that this target is achieved and sustained beyond 2030?

[Find out more about TechForShe here](#)

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(Open to both Junior and Institute category)



Challenge Statement #9

Mask-off detection (Smart City)

During COVID19 pandemic, Singapore/Thailand/Vietnam has made wearing face mask mandatory in public. A lot of surveillance systems are integrating computer vision in order to monitor whether people are wearing masks or not.

Challenge: In this challenge you will build a system that is able to distinguish between people wearing a mask vs people not wearing a mask:

- Train the inference model from a dataset of faces with a mask and without a mask
- Optimize the model for the hardware and deploy the inference model to an edge device.
- For predictions with low confidence, the images are to be sent from the edge to cloud for retraining purposes.

[Find out more about Versent here](#)

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(Open to both Junior and Institute category)

Challenge Statement #10

Carbon footprint insights for Innovative Green Fintech / Food Delivery Carbon Footprint

With

- Singapore's goal of capping Greenhouse Gas (GHG) emissions by 2030 and MAS focusing on Green FinTech
- Thailand's goal of reducing gas emissions by 20% by 2030; and
- Vietnam to cut gas emissions growth by 9% by 2030

Carbon tracking is one of the methods that can help achieve these goals. For businesses, carbon tracking can offset their carbon footprint as a key part of their Corporate Social Responsibility (CSR) strategy. For individuals, carbon tracking can play a vital role in Collective Climate Action.

The COVID-19 pandemic has impacted consumer behavior with increased online shopping, and smaller but more frequent orders. The behavioral change has resulted in the increase of delivery services that contribute to the GHG emissions.

Challenge: In this challenge, you will build a solution to track carbon emissions for a given delivery. It should be user friendly and avoid disrupting the user experience of any delivery services. To encourage opt-in for the delivery, you need to gamify the tracking of carbon emissions. Ideally the solution should provide:

- A mobile app that estimates the carbon emissions for a given delivery, taking into account any factors that can affect emissions. For E.g., the distance travelled, time taken, the vehicle type etc.
- Recording of carbon emissions in an immutable way
- A web app to show the carbon footprint of all deliveries, with identifiable information hashed and obfuscated

[Find out more about Versent here](#)

