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## NTU taking part in two international motor racing events in 2024



The writer, in March, at the wheel of the car built by Singapore students for the 2023 Formula Student race in Silverstone, Britain. ST PHOTO: DESMOND FOQ



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SINGAPORE – Nanyang Technological University (NTU) is revving up for two international motor racing events taking place within months of each other in 2024.

On April 27, an autonomous race taking place at Abu Dhabi's Yas Marina Circuit will feature a Formula Three car running on artificial intelligence (AI) algorithms programmed by NTU.

Led by Associate Professor Lyu Chen from NTU's School of Mechanical and Aerospace Engineering (SMAE), a team of PhD students and research fellows has been writing and refining the algorithms which allow the race car to take calculated risks like a human driver.

The team started work in November 2023 and is working around the clock to get the programs ready through a series of “reinforced learning” schedules based on the techniques of real racing drivers.

NTU is teaming up with Autocraft, an AI subsidiary of Kintsugi, a technology group in the United Arab Emirates. The driverless race car is equipped with seven cameras, three Lidars (Light Detection and Ranging), four radars and a global navigation system.

It weighs 690kg and is capable of reaching 300kmh, although in autonomous mode, speeds are likely to be much lower.

Eight teams are competing in the inaugural event and NTU is the only South-east Asian participant. The race will see up to four driverless cars trying to outgun one another in the 5.3km Formula One racetrack.



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The NTU team is no stranger to autonomous driving competitions.

In the last three years, it has won several awards at the Waymo Open Dataset Challenges, hosted by technology company Alphabet's Waymo. These include being the sole winner in the Interaction Prediction category in 2021 and placing second in the Motion Prediction category in the same year.

From July 17 to 21, another NTU team is fielding a student-built electric single-seat, open-wheel car to compete in the Formula Student race at the Silverstone circuit in Britain.

This is the second time NTU is taking part in the event. In 2023, a group of 20 students from various faculties formed the first Singaporean team to compete in the event. It secured an overall 41st position out of more than 80 teams from around the world.

This time, the team has grown to 40 students, led by Mr Yash Chandra Shekar, 21, a fourth-year student from SMAE. They are mentored by Emeritus Associate Professor Ng Heong Wah and Associate Professor Holden Li, both also from SMAE.

Mr Shekar says the new car will weigh less than 300kg, or some 100kg lighter than 2023's car.

Most of the weight saving comes from the new 4.8kWh lithium polymer nickel manganese cobalt battery, which is 60kg lighter than the previous lithium ferro phosphate battery.

The car will run on lighter 10-inch wheels, instead of the previous 13-inch ones.

Built on a steel frame with Kevlar-carbon composite and 3D-printed plastic body parts (including the nose cone), the car will compete in five stages at Silverstone, including a 22km endurance segment, which tests the cars' speed and efficiency.

The rear-motor car has 20kW of power, with a 10-second burst of up to 50kW. It is designed to reach up to 120kmh, but is expected to range between 80kmh and 90kmh at the race circuit.

Although this is the second time NTU is going to Silverstone, students at the university have been building cars for competition since 2009.

Including the 2024 car, they have built 14 vehicles – which run on solar energy, hydrogen fuel cell and diesel – to take part mostly in economy and endurance challenges.

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