Tech hiccups dash NTU team's hopes in UAE self-driving car race

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ABU DHABI – Technical difficulties put the brakes on the hopes of a Nanyang Technological University (NTU) team of winning an autonomous car race in the United Arab Emirates (UAE) on April 27, signalling that it will be many years before artificial intelligence (AI) can finally take the driver's seat.

Team Kinetiz, a collaboration between NTU and UAE technology group Kintsugi, was one of eight teams from around the world competing in the inaugural event of the Abu Dhabi Autonomous Racing League (A2RL).

Three other teams also did not compete in the final: US-based professional autonomous racing team Code 19; Fly Eagle, a collaboration between the Beijing Institute of Technology and UAE's Khalifa University; and Humda Lab from Hungary. During pre-qualifying trials, the Fly Eagle car also suddenly swerved out of control.

In the final race on April 27, four teams competed simultaneously on a Formula 1 track for the first time. A team from the Technical University of Munich (TUM) clinched first place.

A2RL is organised by Aspire, the business development and programme management arm of Abu Dhabi's Advanced Technology and Research Council. One of the objectives of the event is to promote greater safety and the wider adoption of self-driving technology.

The league's first race on the 5.3km-long Yas Marina Circuit in Abu Dhabi saw all teams racing Dallara SF23 cars, which can reach speeds of up to 300kmh.

The cars, provided by the organiser, were equipped with seven cameras, three lidar (light detec-

tion and ranging) sensors, four radars and a global navigation system. Computers on board the cars were programmed by the teams to interpret the data from the sensors and decide how the vehicle should steer, change gears and accelerate.

The teams, which were competing for prizes amounting to US$2.25 million (S$3.05 million) on April 27, were not able to intervene during the race.

During pre-qualifying on April 25, the NTU team was in sixth place. The team – comprising more than 28 researchers, engineers and students – were plagued by a series of issues in the two days leading up to the event. These included sen-

sors in the car losing power, as well as its global positioning system (GPS) failing – issues which affected other teams as well, said Associate Professor Holden Li, the NTU team lead.

The NTU team attributed to inexperience its inability to anticipate potential problems.

"It's only in the last one or two months that our team actually just touched the car, compared with other teams that have raced three times already in similar races," said NTU innovation and entrepreneurship vice-president Louis Phee, noting that working on simulations could take them only so far.

Noting that NTU and Kintsugi

are committed to working together for the next three years, Kinetiz team principal Tareq Albannay – who is also future systems vice-president at Kintsugi – said the team will take lessons learnt from the 2024 event into future races.

Said Professor Phee: "We have learnt much from this challenge, and with our combined strengths in computer science and engineering disciplines, we are determined to aim for a spot on the podium in next year's race."

While there have been other races featuring autonomous vehicles, these have featured only up to two vehicles.

In Abu Dhabi, though other

teams were able to hit speeds of up to 250kmh during the trials, they too faced technical difficulties during the main event on April 27, which drew more than 10,000 spectators.

The eight-lap race was forced to stop temporarily after a car programmed by a team from the Polytechnic University of Milan spun out, while the entries from Italy's University of Modena and Reggio Emilia as well as Constructor University in Germany both stopped in the middle of the track.

In January, TUM also won the Indy Autonomous Challenge, which featured nine teams from 17 universities competing in the Las Vegas

Motor Speedway.

The Straits Times has asked A2RL how it plans to address the inaugural race's technical issues in future races.

The event in Abu Dhabi also had former F1 driver Daniil Kvyat taking on an autonomous car from Abu Dhabi's Technology Innovation Institute, with the 30-year-old Russian triumphant in a Super Formula car.

Autonomous vehicles are very much in the research and development phase, said Associate Professor Raymond Ong, a transport infrastructure researcher at the National University of Singapore (NUS).

As such, many of the algorithms for the racing environment – including control and the ability to react in a rapid manner – still need to be developed, he noted.

Computation and AI algorithms must also cope with the challenge posed by other vehicles that are also speeding, said the NUS Advanced Robotics Centre's director, Professor Marcelo Ang.

Prof Ong said: "The race shows much more needs to be done."

Aspire executive director Tom McCarthy said the greater aim of A2RL is to make autonomous technology safer by testing it under the extreme conditions of motorsports.

Beyond self-driving cars, such technology can complement human drivers by acting as a "co-pilot" that could intervene by slowing or stopping a vehicle in times of danger, he added.

A2RL aims to hold its second race in the first quarter of 2025, with plans to expand into autonomous drone racing that year and self-driving dune buggy races in the future.

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The fast and the autonomous

The inaugural Abu Dhabi Autonomous Racing League on April 27 was a showdown between eight teams from around the world in self-driving race cars around the 5.3km-long Yas Marina Circuit, home of the Abu Dhabi Grand Prix. The single-make series saw all teams using Dallara SF23 race cars.
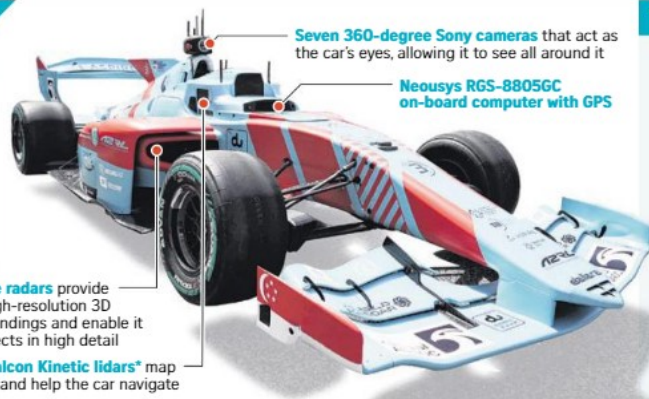

THE CAR

Maximum speed
300kmh

Weight including computer
690kg

Seven 360-degree Sony cameras that act as the car's eyes, allowing it to see all around it

Neousys RGS-8805GC on-board computer with GPS

Four ZF ProWave radars provide the car with a high-resolution 3D view of its surroundings and enable it to recognise objects in high detail

Three Seyond Falcon Kinetic lidars* map the environment and help the car navigate

NOTE: *Light detection and ranging

THE RACE

Yas Marina Circuit

5.3km

Teams programme their race cars with algorithms that allow the vehicles to interpret data and make decisions while on the track.

Artificial intelligence allows the cars to survey their environment, including feedback from sources such as grip levels, and strategise to beat the competition.

Source: ABU DHABI AUTONOMOUS RACING LEAGUE   PHOTO: SAMUEL RUBY   STRAITS TIMES GRAPHICS