

SCHOLARS' CHOICE 2025

Charting Singapore's maritime future with AI solutions

This MPA scholar is pioneering the next wave of innovation at sea and across the globe

For four months each year, employees from the shipping department at the Maritime and Port Authority of Singapore (MPA) examine over 12,000 statutory certificates – essential documents to keep vessels registered under the Singapore Registry of Ships – mostly manually.

Foo Chi Jao was surprised to learn of such tiresome work processes when he joined MPA in 2020. While Singapore may be one of the world's most advanced ports, the global shipping industry remains surprisingly heavily reliant on paper.

"I did not realise that the maritime industry was not very technologically advanced. I thought these processes would have been fully automated years ago," says the 29-year-old.

As an assistant senior data analyst in the statistics and data systems department, these tedious and repetitive processes presented him with a perfect opportunity for transformation. The result: one of the Singapore Government's first public-facing artificial intelligence (AI) solutions that uses large language models (LLMs).

Previous attempts to automate the process using conventional document-scanning tools saw a decline in performance over time – their accuracy would plummet whenever documents deviated from standard templates which changed throughout the years.

Chi Jao co-led his team to take a different approach, building an AI solution that leveraged LLMs.

By combining these capabilities, the system could understand their content in context, making it more

“Being a **tech person** in a space that is not technologically developed offers a lot of **untapped potential for innovation.**”

→ **Foo Chi Jao**
Recipient of the Maritime and Port Authority of Singapore Mid-Term Scholarship



Through partnership with the International Maritime Organization, MPA's assistant senior data analyst Foo Chi Jao has helped ports in developing countries embrace digitalisation.
PHOTO: SPH MEDIA

adaptable to variations in formats and layouts. Named DocuMind, the tool has managed to achieve 99 per cent accuracy in extracting and validating document data – and is projected to save MPA employees about 270 work days annually.

It will also enable shipping companies to submit and receive their application results in minutes instead of up to three days. This faster turnaround time helps them better plan the renewal process, along with other business dealings.

Chi Jao finds deep satisfaction in knowing his work makes a difference, especially when a colleague from the shipping department praised the tool's accuracy, saying it would cut a significant portion of her time spent manually verifying documents.

A culture of innovation

As a leading maritime hub, MPA is spearheading the use of digital technologies to enhance efficiency, safety and sustainability across the entire global maritime supply chain.

Success hinges on attracting tech talents like Chi Jao, who was awarded the MPA Mid-Term Scholarship in 2017 while studying information systems at Singapore Management University.

"Data science is about taking all the information around us and turning it into useful insights," he says.

"I leverage coding and statistical methodologies to identify patterns and develop solutions to complex problems," he adds.

While the maritime industry might not seem an obvious choice for tech talents, Chi Jao found that MPA

offered unique opportunities to drive meaningful change.

He says: "Being a tech person in a space that is not technologically developed offers a lot of untapped potential for innovation."

Identifying areas where digital solutions can make the biggest impact in maritime operations, Chi Jao works with his team to implement advanced technology across the organisation.

What keeps him excited is MPA's strong support which enables him to bring innovative projects to life.

Creating a ripple effect globally

Chi Jao has also represented the country in international maritime forums held in London and Stockholm, where Singapore's digital solutions help to streamline operations and enhance communication across the entire sector.

He has also worked on a partnership with the International Maritime Organization, an agency of the United Nations, to implement solutions that help ports in developing countries embrace digitalisation.

Looking ahead, Chi Jao plans to harness his experience with DocuMind to tackle even bigger challenges in maritime digitalisation.

His team is already exploring ways to automate port clearance processes, which currently require managing 16 different types of certificates, often handwritten and in different languages.

Digitalisation also includes areas such as digital twin and autonomous shipping systems. This enables capabilities like real-time tracking, remote operations and predictive maintenance to help optimise operations and cut costs.

"There are innumerable projects to work on," he says.



Scan for more on the MPA Mid-Term Scholarship.