AI tool to revolutionize polar ship navigation

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RRS Sir David Attenborough completed ice trials on its maiden voyage to Antarctica. Credit: British Antarctic Survey

Artificial Intelligence (AI) will enable ships navigating in polar ocean conditions to be more efficient using a new route planning tool created by British Antarctic Survey (BAS) researchers. The tool aims to reduce carbon emissions and optimize science.

The system, being developed by the BAS AI Lab, will be used by the crew of the U.K.'s polar research ship RRS Sir David Attenborough to make decisions about route planning. It will recommend the fastest and most fuel-efficient routes between two locations taking into account all the polar conditions such as sea ice, ocean dynamics and weather. The

Captain and officers, with their vast knowledge and experience of sailing around the icy continent, can evaluate the options provided and select the best route.

The project team has developed algorithms that make use of a wide variety of existing environmental datasets and forecasts, to develop a navigational route planner that updates as conditions change, just like an in-car navigation system. The tool will be able to look ahead and predict environmental conditions over an entire research season of up to six months, allowing long-term seasonal route-planning.

Professor Maria Fox, from the BAS AI Lab who leads the project, says, "We've created something that is very similar to the kind of in-car navigation system like Google maps that many of us use already, but with the added complication that in the ocean there are no roads, and the conditions are changing constantly, which affects the routes between destinations.

"The key driver here is to create something that reduces the ship's carbon emissions and makes our science more efficient. We're really excited about this open-source project which we think will be of value to all ships operating in the polar oceans."

The first stage of the project is to develop a tool which can optimize route planning for carbon efficiency. This route planner is therefore a key piece in the puzzle in helping BAS achieve its aim of being net zero by 2040. Integration with on-board systems on the SDA began in November this year.

As the tool develops, the team will integrate more live data from the ship, such as speed and fuel requirements in different conditions, to refine the model and improve route efficiency even more. The team also intends eventually to integrate science and logistics tasks into the

planning tool.

Captain Will Whatley, Master of RRS Sir David Attenborough, says, "This innovative new tool is going to help us ensure RRS Sir David Attenborough remains as fuel efficient as possible. I'm particularly excited to see how it performs around ice. There are many systems out there that can give weather routing in open ocean but this tool is unique by adding the capability to consider ice, allowing us to reduce our fuel usage and environmental impact during the field season."

Provided by British Antarctic Survey

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