An Analysis of Canadian Marine Accident Fatality Factors

Abstract

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Marine accidents in Canada's waters affect the lives of Canadian citizens and foreign individuals every year. On an annual basis, the Transportation Safety Board (TSB) of Canada is responsible for maintaining an accurate understanding of all marine incidents via its Marine Safety Information Systems (MARSIS) database. TSB reports that on average between 200-300 marine incidents occur within Canadian territorial waters, of which 16-25% result in serious injuries, and 5-7.5% end in fatalities[1].

Despite modern marine safety standards, accident rates per annum have not decreased significantly since 2010. The research question is to identify the key factors involved in Canadian marine accident fatalities and quantify the respective factors' contributions to serious marine incidents.

Analysis will be conducted on a marine occurrence dataset spanning from 1995 to 2022[2] using Python. Techniques used in this analysis include essential data cleaning, exploratory analysis coupled with summary statistics, and dimensionality reduction in the form of feature selection following calculations of feature importance. In addition, logistic regression and naive bayes models will be created to predict the probability of a marine incident resulting in a fatality. Lastly, a dashboard application will be developed using Plotly Dash[3] to visualize the data and map out predictions based on user input.

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[1] Government of Canada, T. S. B. of C. (2020, July 17). *Marine transportation occurrences in 2020*. Statistical Summary - Transportation Safety Board of Canada. Retrieved September 24, 2022, from https://www.bst-tsb.gc.ca/eng/stats/marine/2020/ssem-ssmo-2020.html

[2] Transportation Safety Board of Canada. (n.d.). *Marine occurrence data from January 1995 to present - occurrence*. Open Government Portal. Retrieved September 24, 2022, from https://open.canada.ca/data/en/dataset/ad8d1b73-df09-4521-9bdb-61c529328218/resource/1a548829-f7f8-4c2e-a344-a707b13e01c7

[3] *Introduction: Dash for python documentation*. Plotly. (n.d.). Retrieved September 24, 2022, from https://dash.plotly.com/introduction