**Towards a long-term trend vehicle crash forecast model**

This research study unravels the long-term trends of fatal crashes in New Zealand (NZ) since its peak in 1987, which has since consistently declined over the past 36 years at a regressed mean rate of -14 fatal crashes per year to -7 fatal crashes in 2023. Key road safety initiatives spanning the past three decades encompassing public awareness campaigns, vehicle technology improvements, and comprehensive strategies like "Safer Journeys" have aimed to reduce fatalities and serious injuries

Despite the sustained efforts to enhance road safety, the study critically examines the presumed cause-and-effect relationships between major safety interventions and the observed crash trends. It postulates whether the continuous decline in fatal crashes is primarily attributable to the gradual, cumulative impact of safety campaigns or to other influential factors, such as advancements in vehicle safety technology.

Critically, the analysis challenges conventional approaches to understanding road safety by examining cyclical variations correlated with economic indicators such as vehicle kilometres travelled (VKT), population, and GDP. Economic downturns, such as the global financial crises and COVID-19, emerge as significant influencers on crash trends, overshadowing the impact of safety campaigns.

The research identifies novel predictors for future trends and explores their potential as surrogates for underlying factors. Employing ARIMA time series, OLS trend series analysis (R2 = 0.85) and a multinomial regression model (R2 = 0.7), the study overlays 20 years of trend data with key GDP-influenced predictors. The findings aim to unveil the underlying drivers of fatal crash trends, providing a nuanced understanding that surpasses generalised road safety campaigns.

This ongoing research, funded by DaVinci Research, reveals insights that challenge traditional paradigms in road safety. By deciphering the intricate relationship between economic indicators and fatal crash trends, the study aims to provide a more accurate framework for shaping future road safety strategies in New Zealand.