CAS data exploration

Link to repository with code

Outline:

1. Dataset inspection
2. National trends
3. Regional trends
4. Holidays and open roads
5. Features and vehicle types
6. Lethal combinations

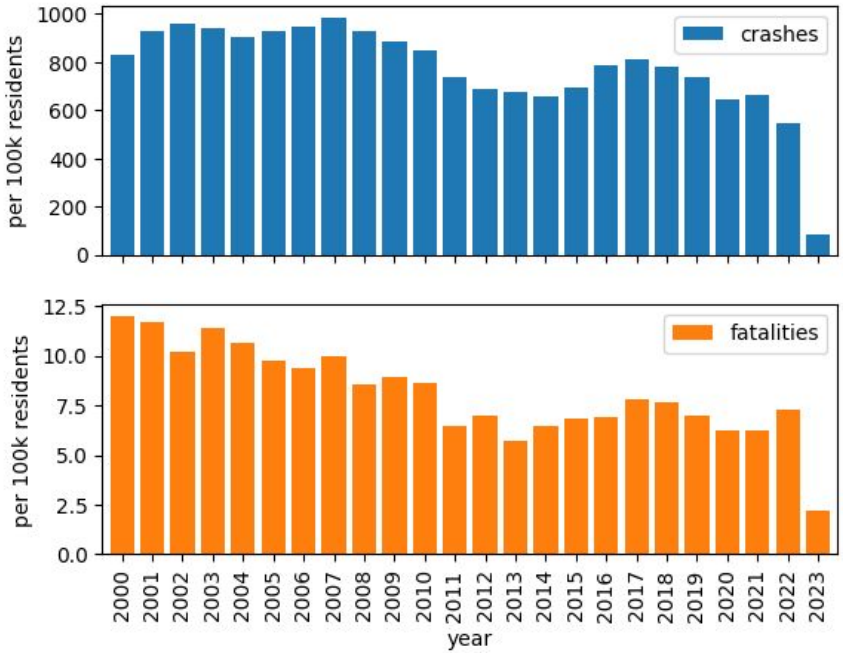
Data inspection

Out[2]:

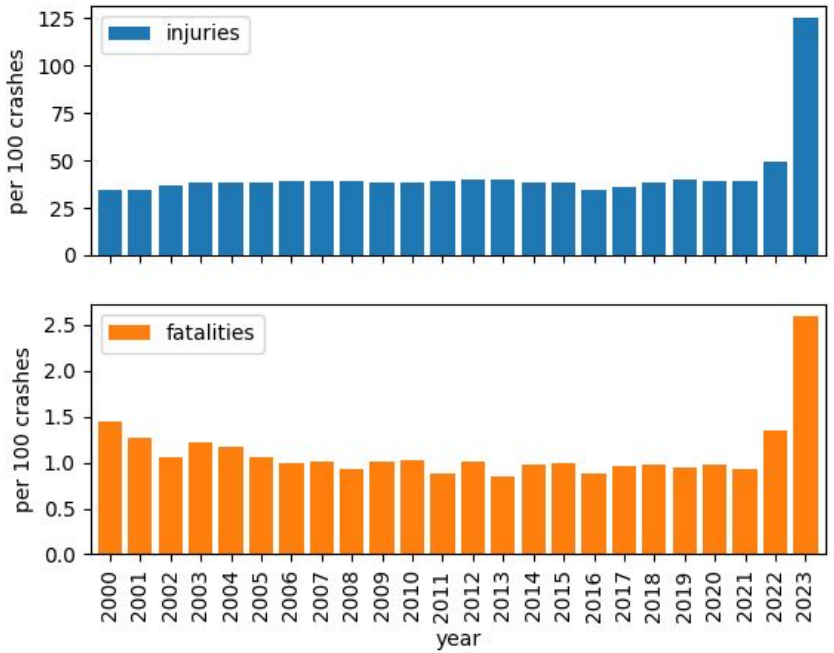
	X	Y	OBJECTID	advisorySpeed	areaUnitID	bicycle	bridge	bus	carStationWagon	cliffBank	...	tre
0	2.037858e+06	5.707835e+06	1	NaN	544801.0	0.0	NaN	0.0	2.0	NaN	...	Nal
1	1.799424e+06	5.815528e+06	2	NaN	528900.0	0.0	NaN	0.0	2.0	NaN	...	Nal
2	1.756461e+06	5.936053e+06	3	NaN	507000.0	0.0	NaN	0.0	0.0	NaN	...	Nal
3	1.551129e+06	5.171320e+06	4	NaN	597513.0	0.0	0.0	0.0	2.0	0.0	...	0.
4	1.245391e+06	4.849172e+06	5	NaN	611500.0	0.0	NaN	0.0	1.0	NaN	...	Nal
...	...	...	...	...	...	...	...	...	...	...	...	.
821739	1.757918e+06	5.914599e+06	1318959	NaN	518600.0	0.0	NaN	0.0	2.0	NaN	...	Nal
821740	1.833766e+06	5.638669e+06	1318960	NaN	554900.0	0.0	0.0	0.0	0.0	0.0	...	1.
821741	1.758255e+06	5.918060e+06	1318961	NaN	517400.0	0.0	0.0	0.0	1.0	0.0	...	0.
821742	1.773738e+06	5.888266e+06	1318962	NaN	NaN	0.0	0.0	0.0	0.0	0.0	...	0.
821743	1.754396e+06	5.875116e+06	1318963	NaN	526104.0	0.0	0.0	0.0	1.0	0.0	...	0.

821744 rows × 73 columns

National trends



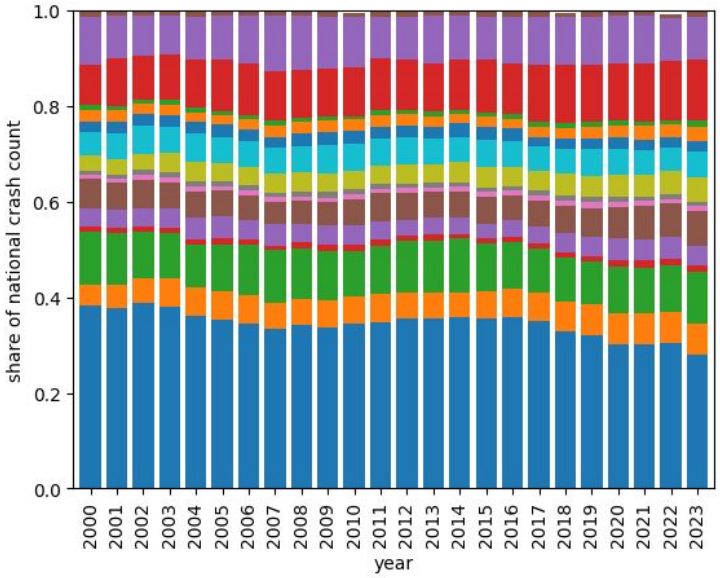
Current global average is about
18 deaths per 100k pop. per year



Could the apparent recent spike be
an artefact due to lag in data entry?

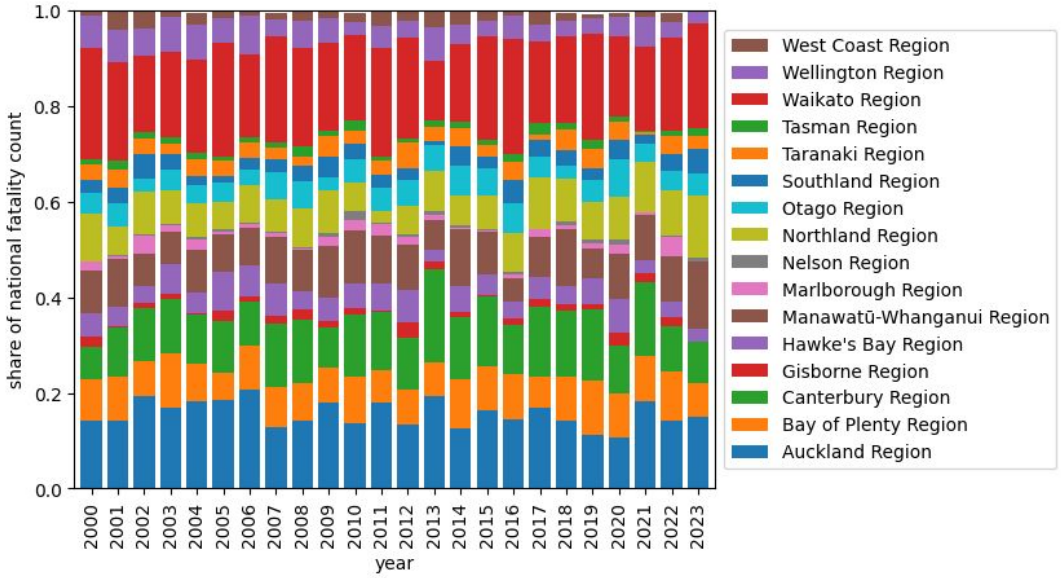
Regional trends

Crashes



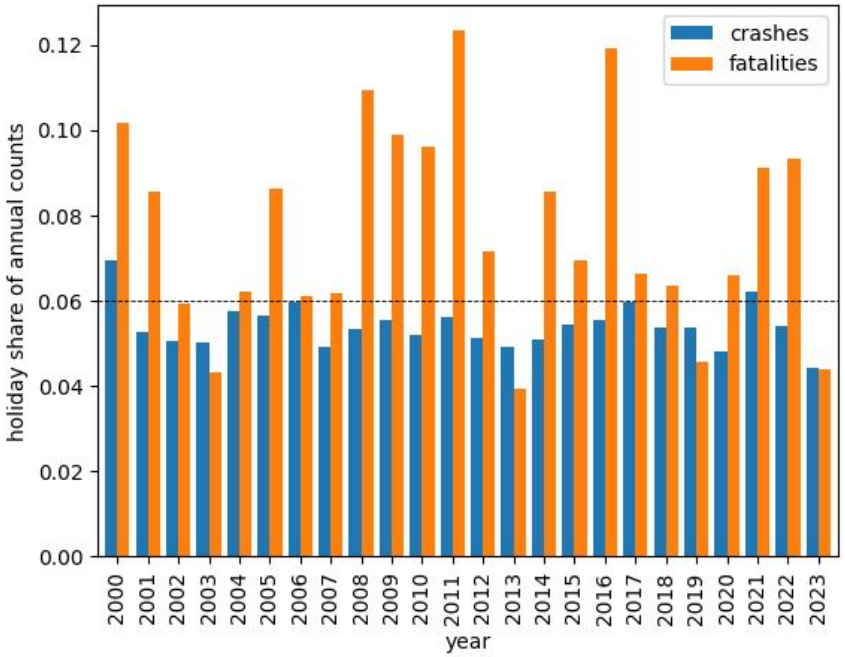
Auckland Region's share diminishing slightly

Fatalities

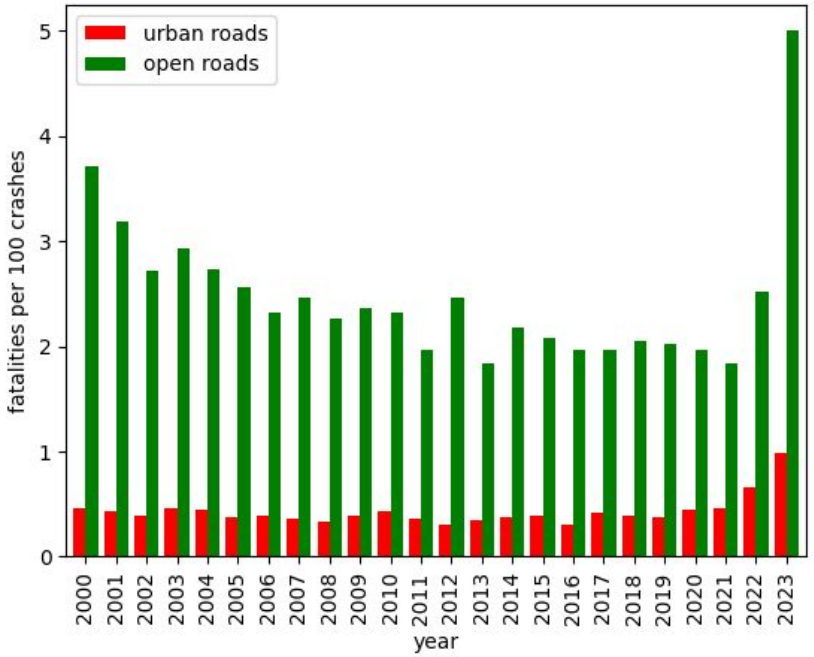


No clear trend

Holidays and open roads

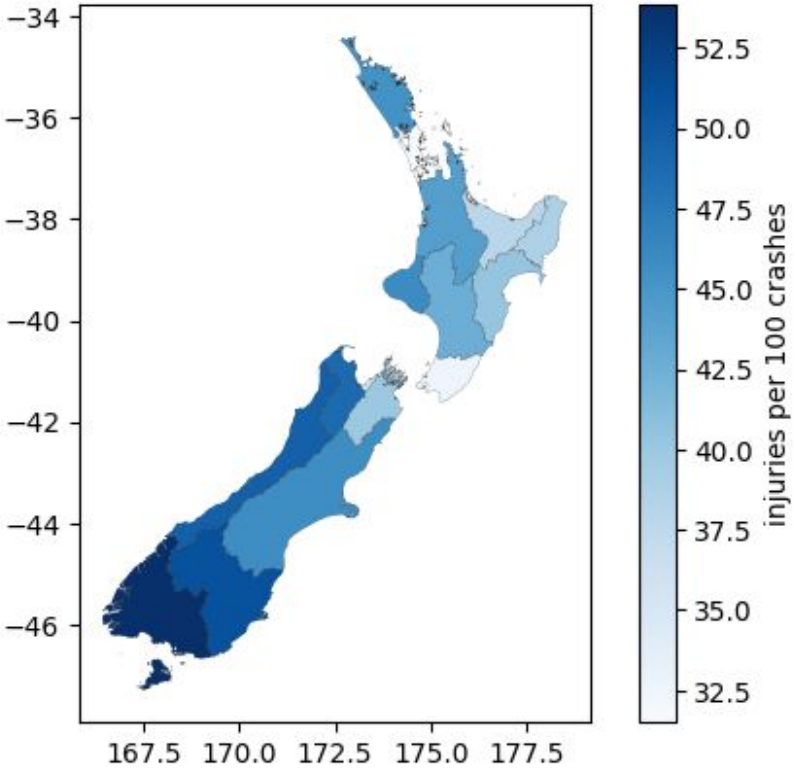


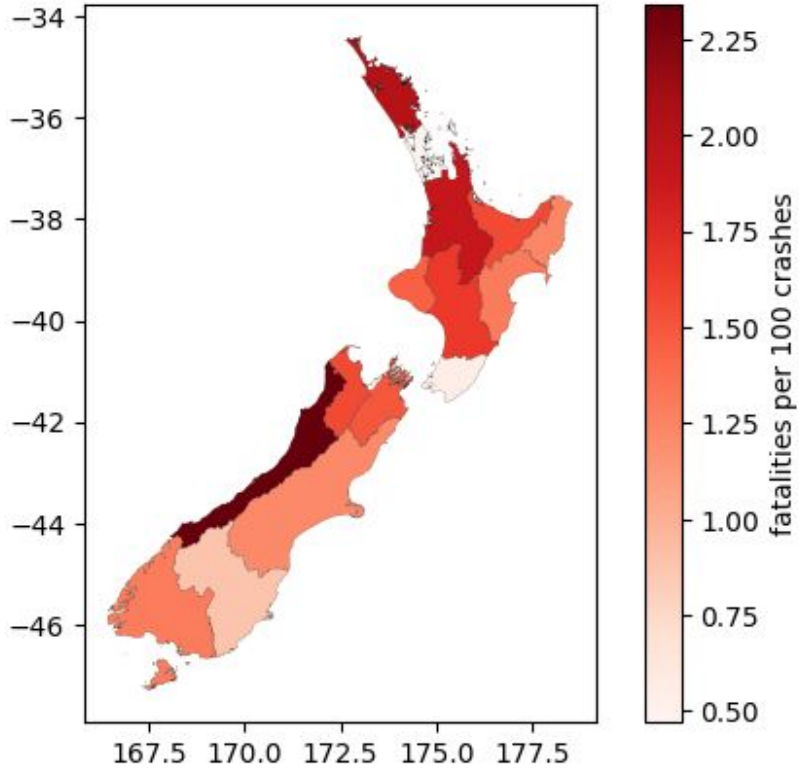
Note: “holidays” account for almost 6% of a whole year



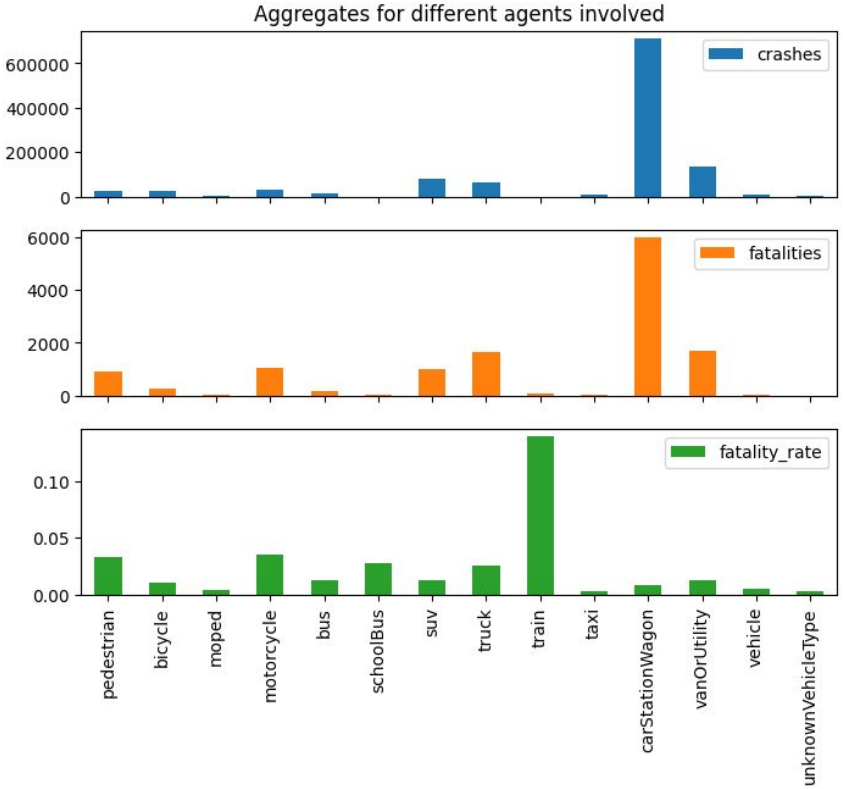
This comparison is a striking illustration that speed kills

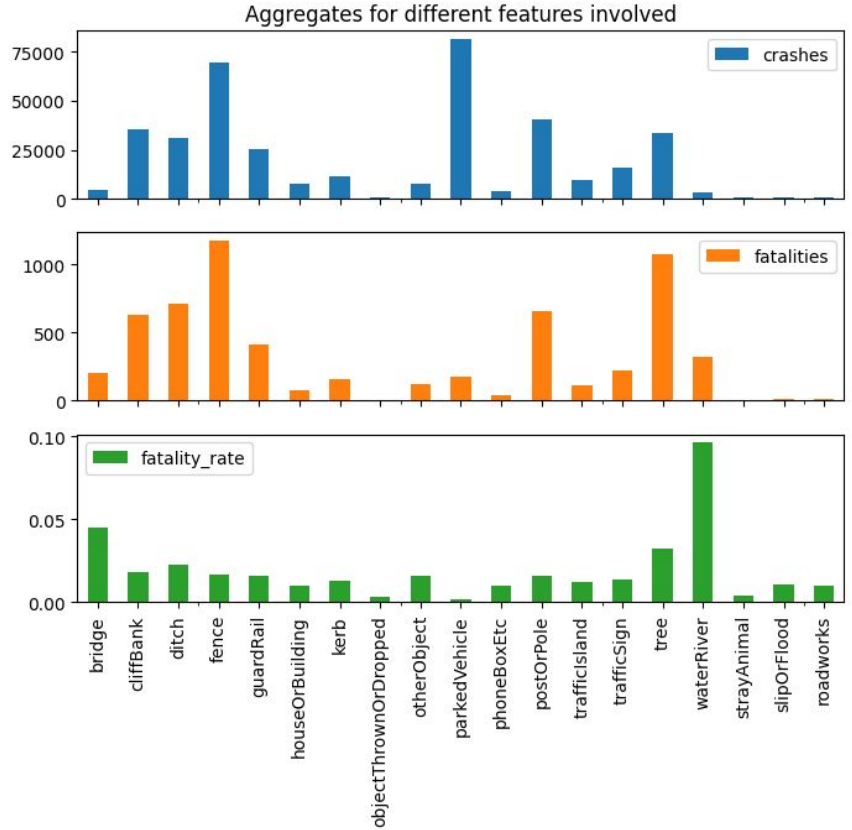
Regional variation in total harm rates





Lethal features and vehicle types





Lethal combinations

Started looking for *lethal combinations* of vehicle types and particular features involved in crashes. Preliminary findings:

1) Crashes involving at least two station-wagons are the most fatal, with **1137 deaths** in 322170 crashes.
2) Crashes involving at least one truck and one station-wagon come second, featuring in 38284 crashes with **723 deaths**.
3) For **pedestrians**, data shows that encountering a truck is more lethal than any other vehicle type (almost 14 deaths per 100 crashes).

Interpretation of these partial aggregates becomes more subtle, so more care will need to be taken when communicating them.

Potential future work

1) Geospatial analysis based on crash coordinates.
2) Detailed visualisation of major urban centres.
3) Cluster analysis in feature space.

General idea: try using historical crash data to enable probabilistic modelling of potential future crashes, so that targeted preventative measures could be implemented.