Accident Analysis
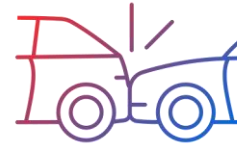
Causes and possible measures

Credit: John Lockwood

Motivations behind this preliminary study

- Increase in **accident numbers** in the state of **Victoria**, after years of decline

- Understand the cause to adapt the **preventive and active strategy**

Credit: Pat Whelen

Dataset used

306 000 accidents (2000 – 2020)

vic roads

Time info	Accident details	Vehicles involved
Day, hour	*Type and causes*	*Model, type, power, age*

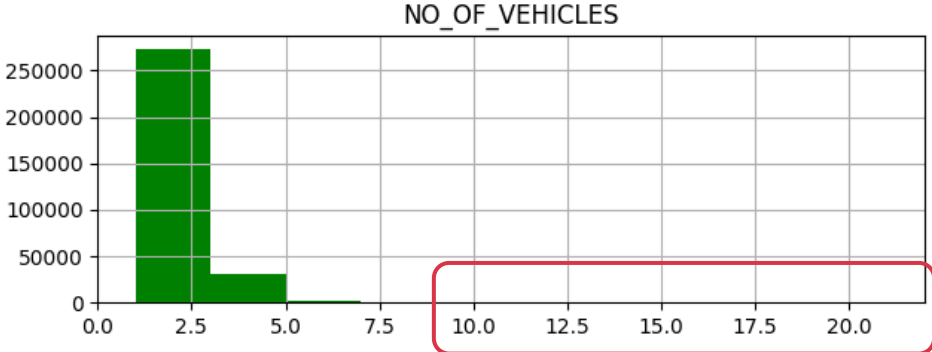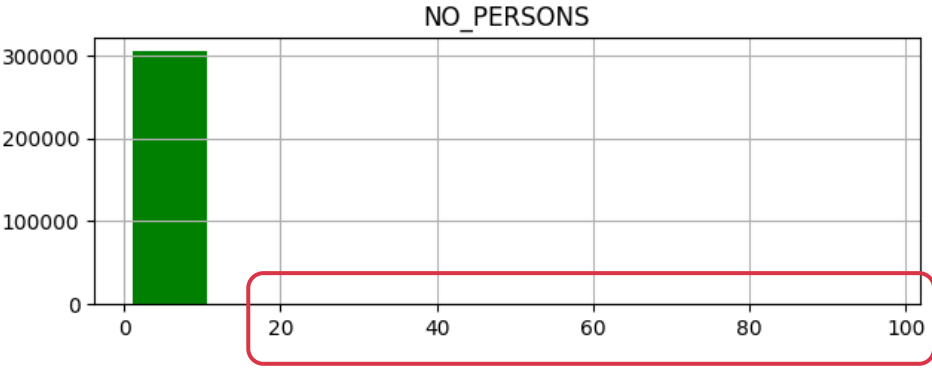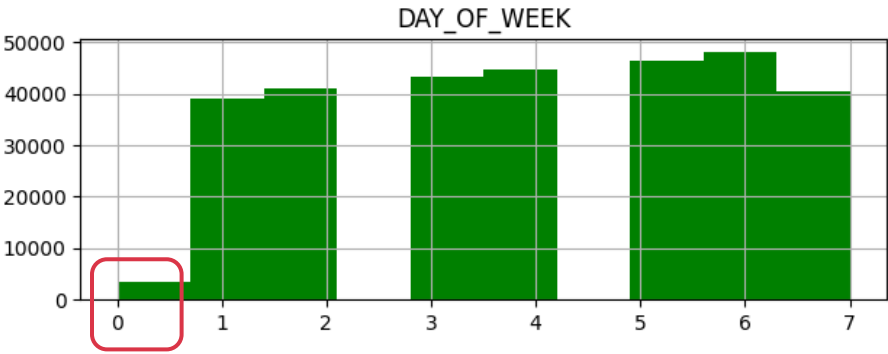| Driving conditions	Consequences	Driver info
Weather, Speed limit	*Severity, Injuries*	*Age, Sex, Driving licence*

Dataset corrections

- Removed missing values
- Identify/Correct/remove faulty values
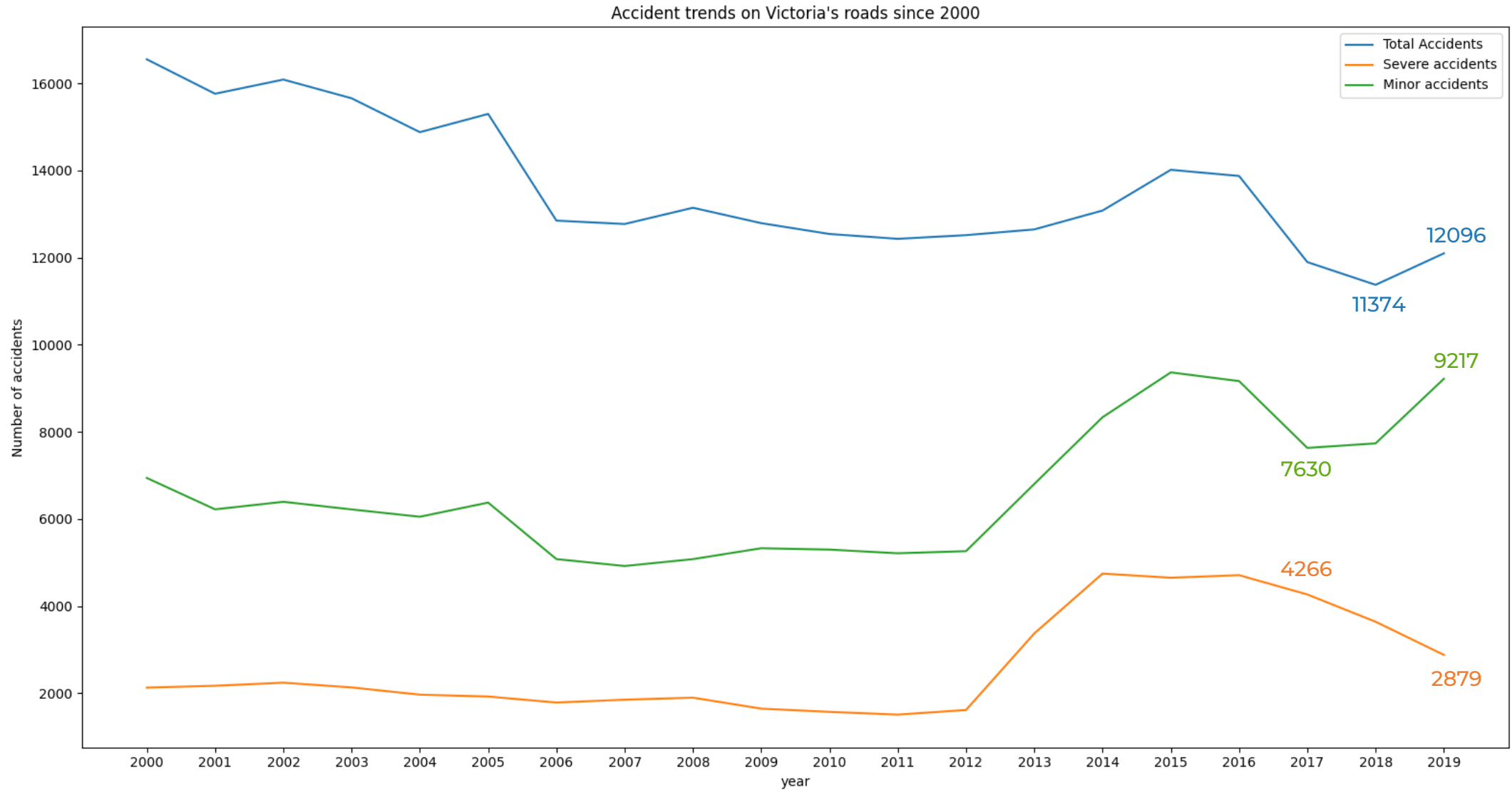- Remove edge cases using AI
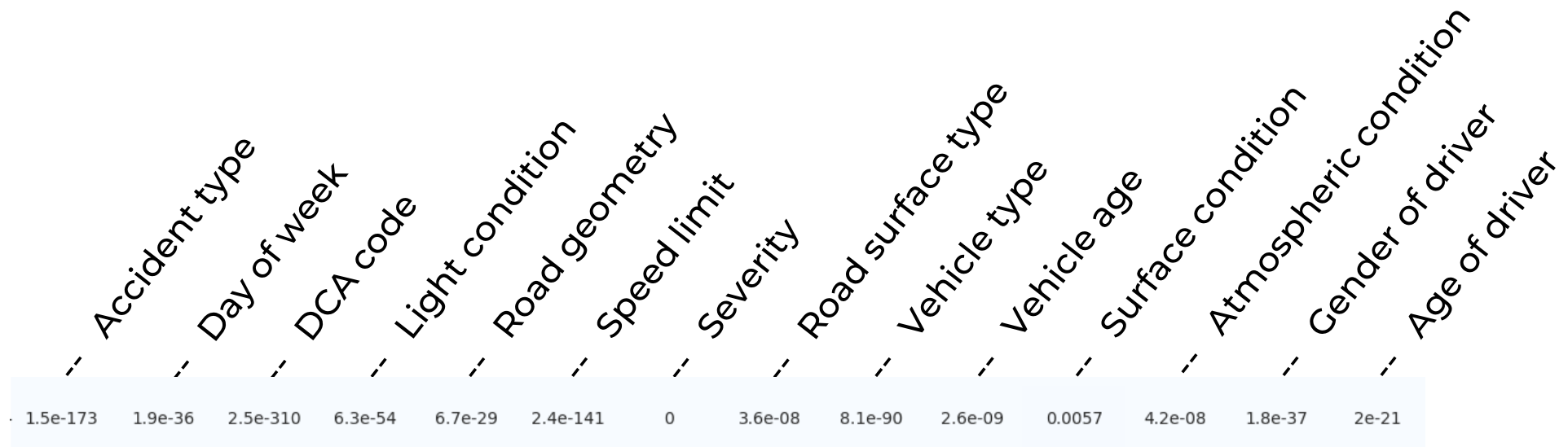
277 000 accidents

Dataset corrections

→ Remove unknown values

→ Remove edge cases

Increasing in car crashes // Can we confirm the trends ?

Accident trends on Victoria's roads since 2000

What are the causes ?

Accident type	Day of week	DCA code	Light condition	Road geometry	Speed limit	Severity	Road surface type	Vehicle type	Vehicle age	Surface condition	Atmospheric condition	Gender of driver	Age of driver
1.5e-173	1.9e-36	2.5e-310	6.3e-54	6.7e-29	2.4e-141	0	3.6e-08	8.1e-90	2.6e-09	0.0057	4.2e-08	1.8e-37	2e-21

Chi2 test results for severity

0.05   0

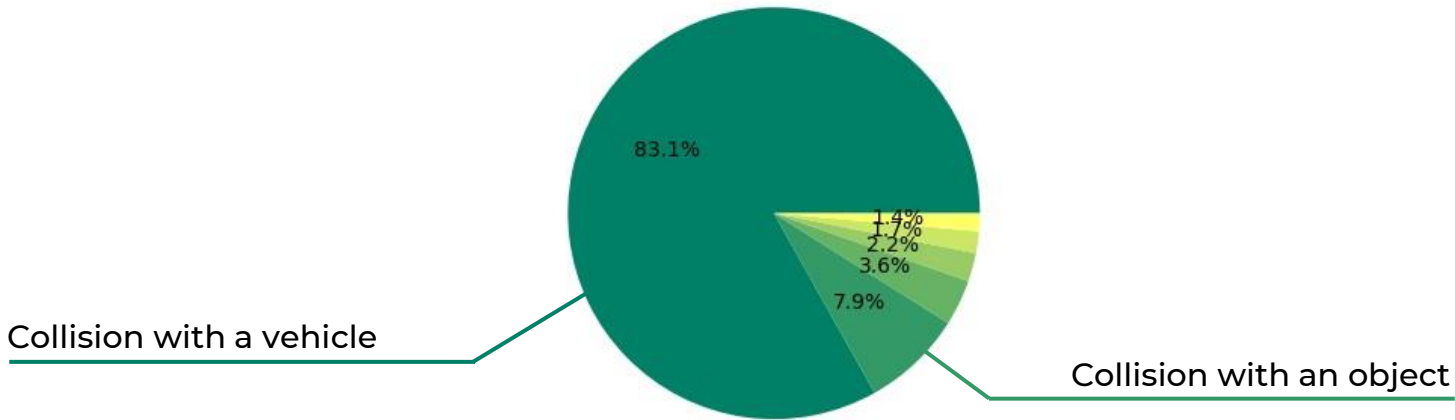Non discriminant   Highly discriminant

Preventive measures

Figures and proposal
Awareness campaign suggestions

Prevention measures // Types of accident

Legend
- Collision with vehicle
- Collision with a fixed object
- Struck pedestrian
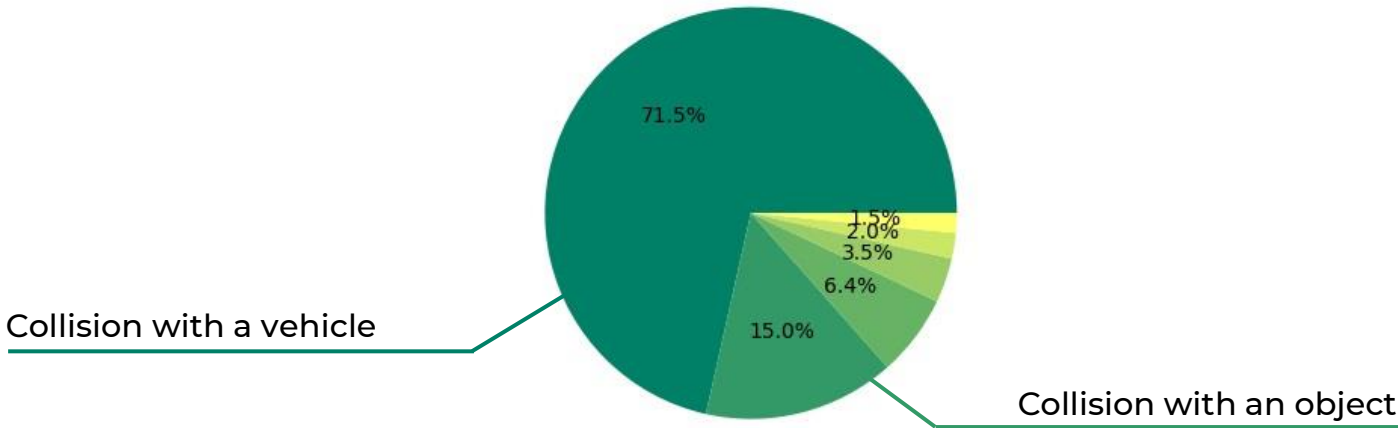- Vehicle overturned
- No collision
- Others
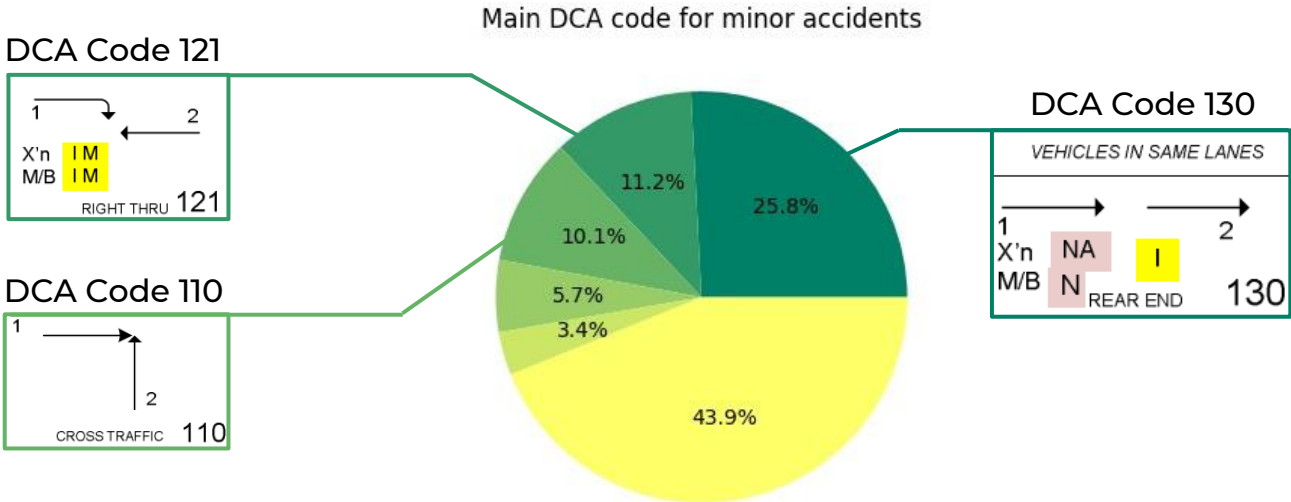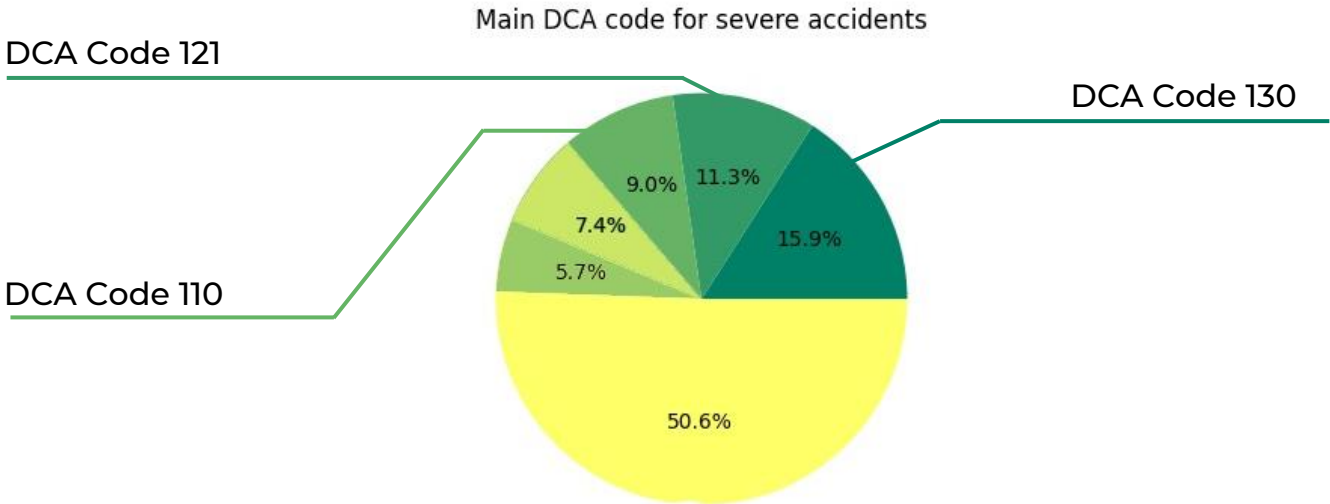
Main types of minor accidents

83.1%
1.4%
1.7%
2.2%
3.6%
7.9%

Collision with a vehicle

Collision with an object

Main types of severe accidents

71.5%
1.5%
2.0%
3.5%
6.4%
15.0%

Collision with a vehicle

Collision with an object

Prevention measures // DCA codes

Main DCA code for minor accidents

DCA Code 121
- 1 → 2 ←
- X'n: I M
- M/B: I M
- RIGHT THRU 121

DCA Code 110
- 1 →
- 2 ↑
- CROSS TRAFFIC 110

DCA Code 130
- VEHICLES IN SAME LANES
- 1 → 2 →
- X'n: NA
- M/B: N I
- REAR END 130

Pie chart (minor accidents):
- 25.8%
- 11.2%
- 10.1%
- 5.7%
- 3.4%
- 43.9%

Main DCA code for severe accidents

DCA Code 121

DCA Code 110

DCA Code 130

Pie chart (severe accidents):
- 11.3%
- 9.0%
- 7.4%
- 5.7%
- 15.9%
- 50.6%

Prevention measures // Road Geometry

Road geometry for minor accidents

47.1% — Straight road

0.1%
1.9%

26.2% — Cross intersection

24.6% — T intersection
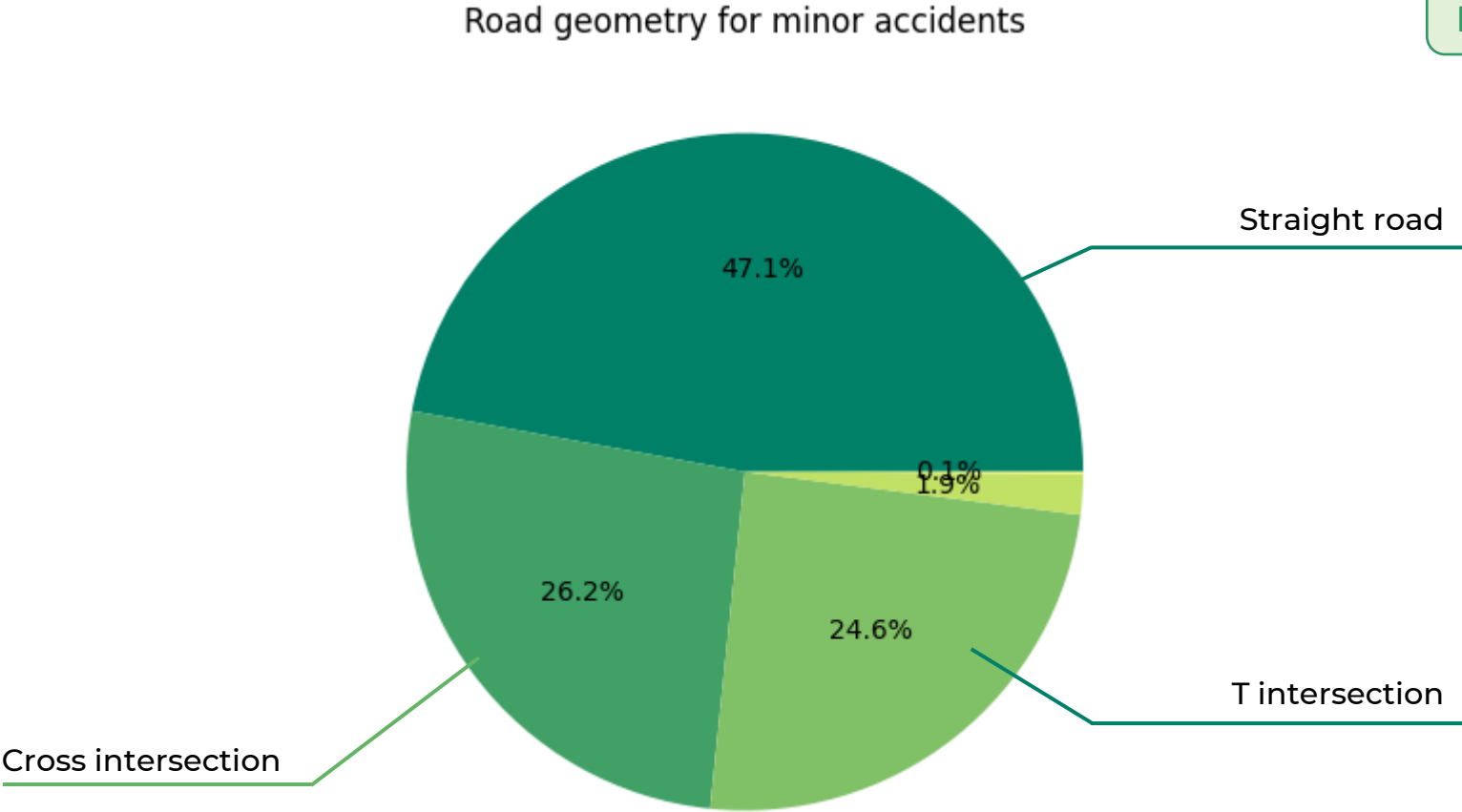
Prevention measures // Age Group

Age group for minor accidents

Legend
- 30-39
- 40-49
- 50-59
- 22-25
- 26-29
- 17-21
- Others

40-49 — 16.1%
50-59 — 12.8%
30-39 — 19.4%
10.1%
9.4%
8.5%
23.8%
17-29 (28%)
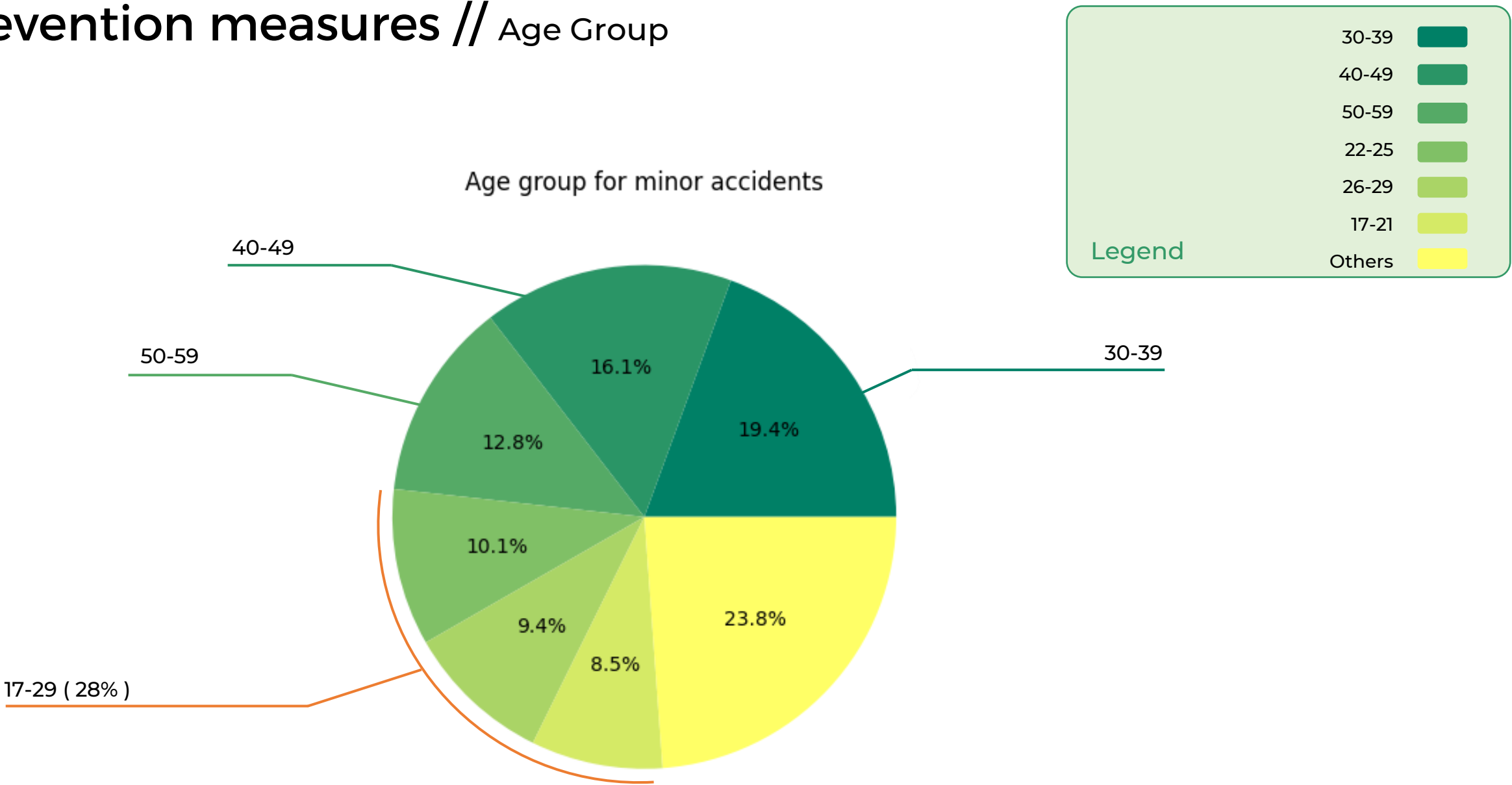
Prevention measures // Speed Limit

Speed zone for minor accidents

- 60: 36.6%
- 80: 16.7%
- 50: 14.9%
- 100: 10.7%
- 70: 6.8%
- 40: 6.5%
- 0: 7.7%

50-80 km/h : ~72%

Speed zone for severe accidents

- 60: 31.6%
- 100: 19.3%
- 80: 18.4%
- 50: 12.9%
- 70: 7.2%
- 40: 4.5%
- 0: 6.1%
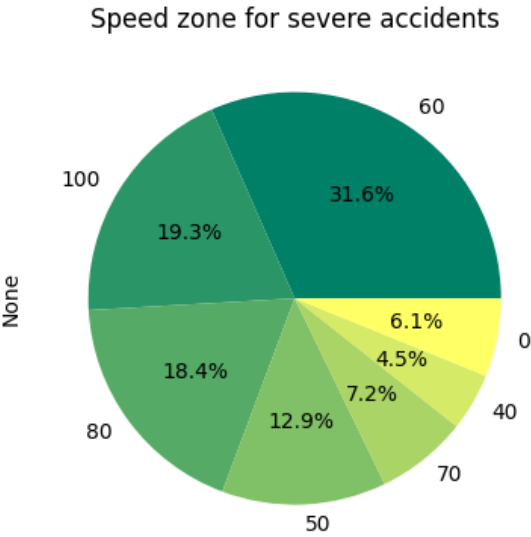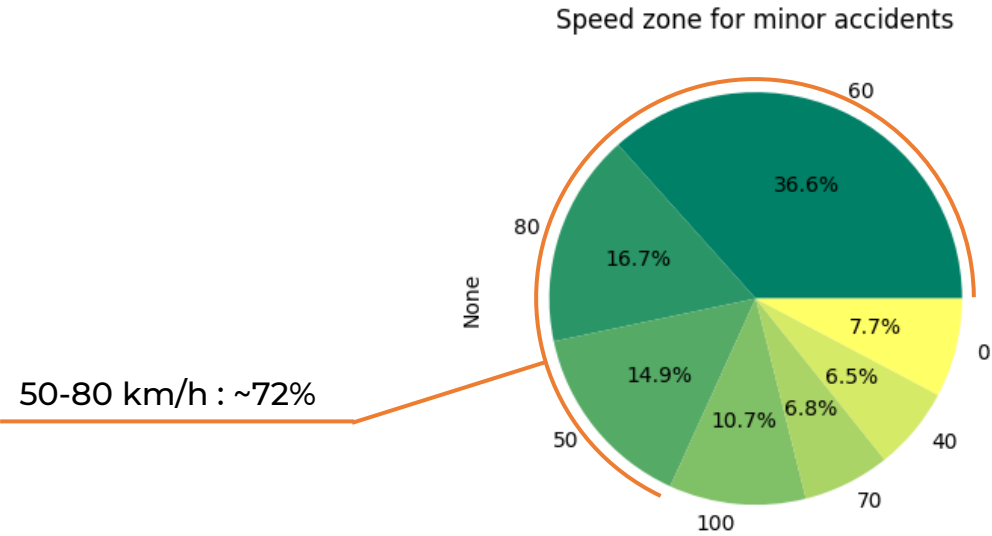
Prevention measures // Outcomes

- Most of accident: collision between vehicles in the same lane, one following another
- Straight Road
- At low speed

→ Awareness campaigns should focus on travels where the driver feels safe and loose attention

- Drivers mainly aged of 17-29
- Second category: 30-39

→ They should target specific range of the population

- Most of minor accidents in speed zones 60
- In straight roads

→ Besides, changing speed limits, increasing speed controls and renovate certain roads could help

Prevention measures // Typical target profile

Aged 22-25 & 30-39

Easily distracted

Self-confident driver

Daily commute

Small roads (60 km/h)
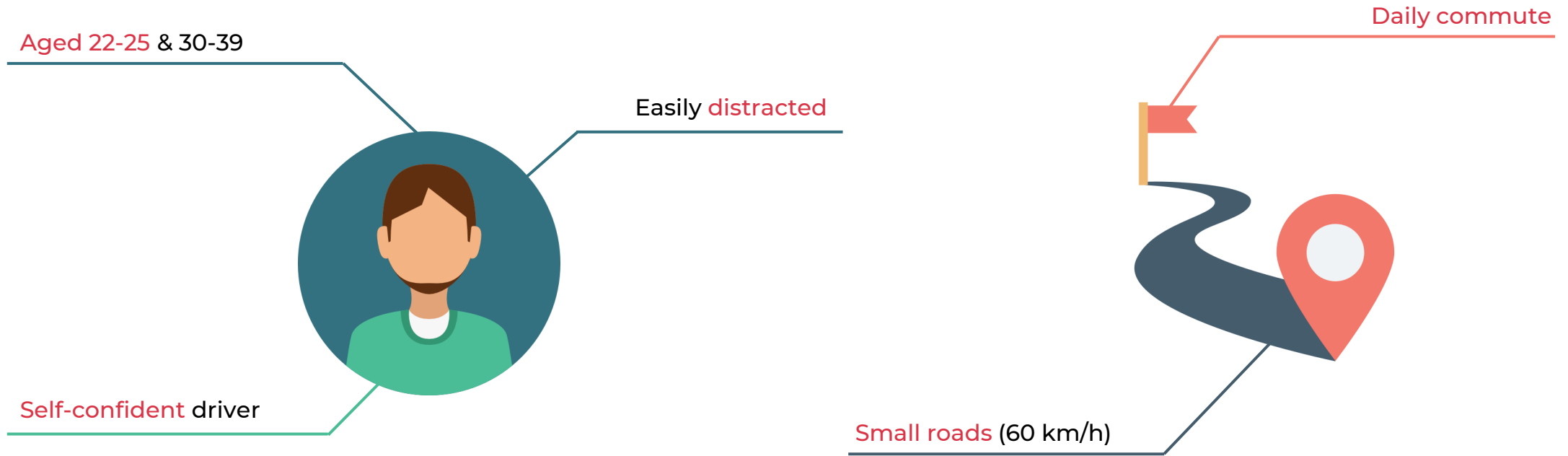
Questions ?

Possible further work

- Use clustering ML methods to locate the epicentre of these accidents
- Observe the evolution of these features in time to identify which one cause the increase
- Complete the missing values in dataset using regression