

**ROADRUNNERS**

# **SINGAPORE TRAFFIC ACCIDENTS ANALYSIS**



**GWEE WEI LING**

**TAN MING KWANG**

**TAN ZHI CHONG**

# OBJECTIVES



- Detect patterns of traffic incidents in Singapore
- Identify potential accident hotspots



- Analyse potential causes of:
- traffic incidents
  - traffic-related issues such as heavy congestions or roadworks



- Evaluate the effectiveness of accident prevention measures implemented by LTA
- Provide recommendations to further reduce traffic incidents

# PROBLEM AND MOTIVATION

---



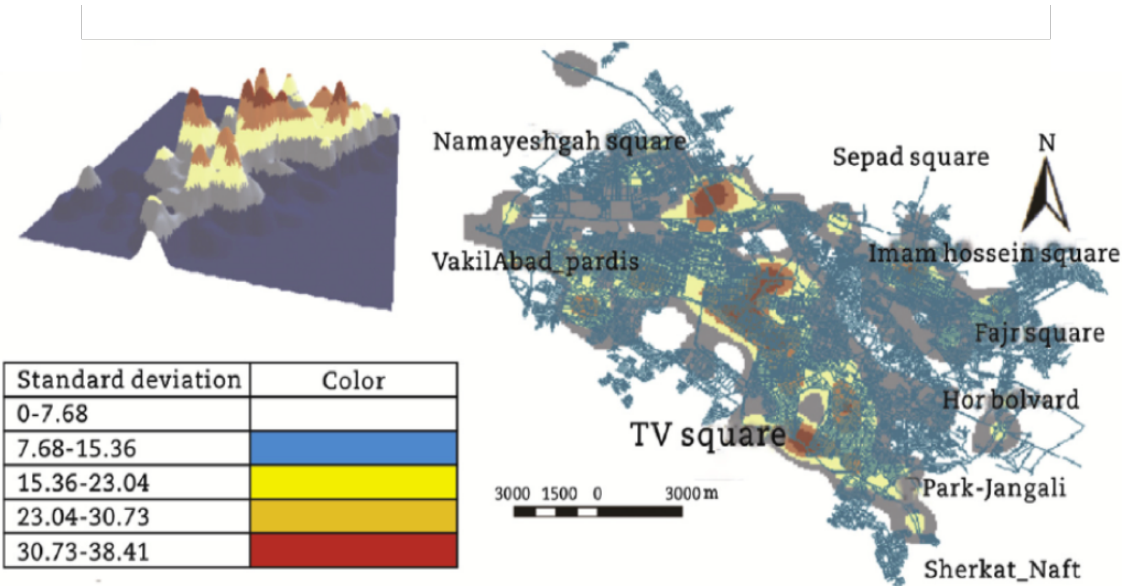
Currently no known system in place to analyze the occurrence of traffic accidents.



Traffic accidents are inevitable and poses a huge problem to the safety of road users as they often result in fatalities and injuries.

# RELATED WORKS

## GIS-based spatial analysis of urban traffic accidents: Case study in Mashhad, Iran



### Aim of study

To use geographic information technology (GIS) and spatial-statistical analysis to gain insights of the traffic accident patterns in Mashhad, Iran.

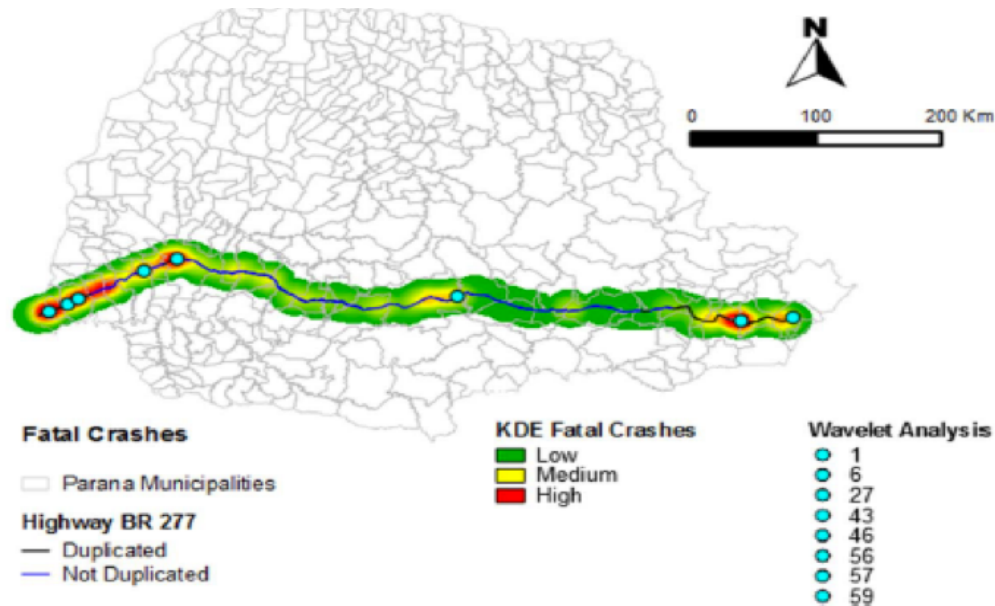
### Methodology

- 1. Kernel Density Estimation**  
To determine static hotspots
- 2. Nearest Neighbour Distance Analysis**  
Used to determine if the accidents are clustered based on the nearest distance between two neighbouring accident points
- 3. K-function output analysis**  
Used to provide a more accurate analysis of points distribution

# RELATED WORKS

## Brazilian Road Traffic Fatalities: A Spatial and Environmental Analysis

A



### Aim of study

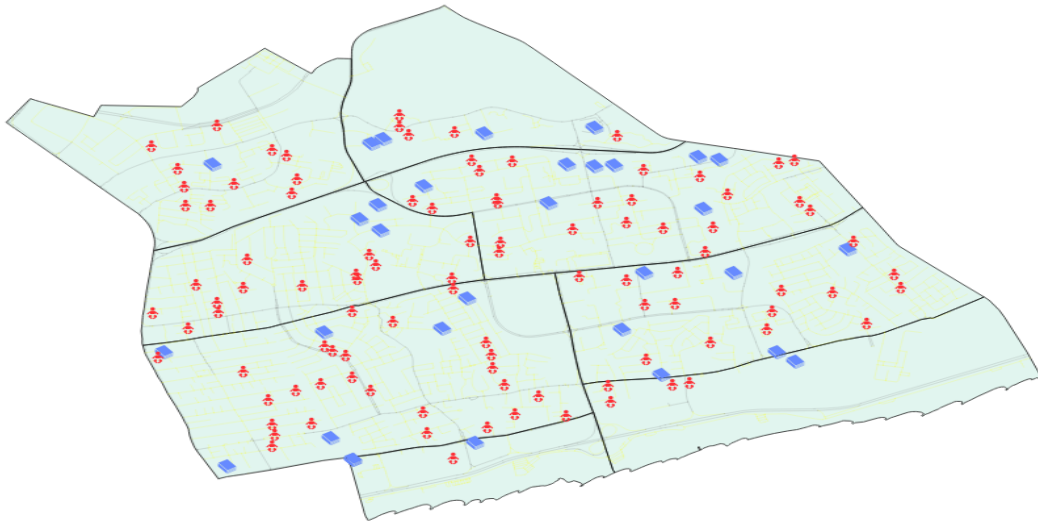
- Analyse road traffic accidents hotspots in BR 277 highway located in the state of Parana, southern Brazil
- Performed environmental analysis to identify patterns contributing to the traffic accidents.

### Methodology

1. **Kernel Density Estimation**  
To determine accident hotspots
2. **Wavelet**  
Complement Kernel exploratory analysis
3. **K-function output analysis**
  - To reduce the variables into similar variance components
  - Then developed regression models to evaluate the impact of built environmental components on fatal crashes

# RELATED WORKS

## IS415 2013-14 Assignment 2 - Heng U San



### Aim of study

- Analyse the distribution of GP Clinics, Preschools and Bus Stops in Bedok.
  - Spatial distribution of the facilities
  - Provide recommendation on how amenities could be better planned

### Methodology

1. **Nearest Neighbour Index**  
lpp function – to measure distance between points along a linear network
2. **K-function**
  - To determine the clustering type

# STORYBOARD

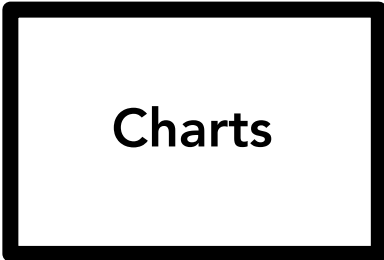
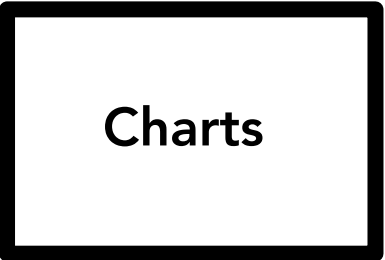
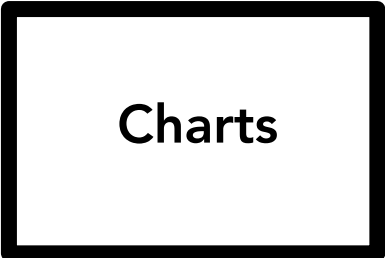
## Singapore Traffic Accident Analysis

### Data:

XXXXXXXXXX	<input type="checkbox"/>	▲
XXXXXXXXXX	<input checked="" type="checkbox"/>	
XXXXXXXXXX	<input type="checkbox"/>	
XXXXXXXXXX	<input type="checkbox"/>	
XXXXXXXXXX	<input checked="" type="checkbox"/>	
XXXXXXXXXX	<input type="checkbox"/>	▼

### Analysis:

- XXXXXXXXXX >
- XXXXXXXXXX >
- XXXXXXXXXX >
- XXXXXXXXXX >
- XXXXXXXXXX >
- XXXXXXXXXX >



# KEY TECHNICAL CHALLENGES

---

## 1. Unfamiliarity with R's function to perform analysis

- Read through R-documentation and Point Pattern Analysis tutorials
- <https://training.fws.gov/courses/references/tutorials/geospatial/CSP7304/documents/PointPatternTutorial.pdf>

## 2. Unfamiliarity with R Shiny

- Use DataCamp to equip ourselves with knowledge

## 3. Difficulty in handling time-related analysis

- Look for similar works that uses such analysis
- Consult Prof Kam



# MILESTONES

Assigned to:  
Wei Ling  
Ming Kwang  
Zhi Chong  
All

## Map Development

### Expressway Analysis

- Kernel Density Analysis
- K-Function Analysis
- Nearest Neighbor Analysis
- Multitype K-Function
  - Accidents vs Road Cameras
  - ERP vs Heavy Traffic
- Exploration of R-Shiny

## Map Development

- Improvement and refining of previous analysis performed
- Start building web application

### Others

- Drafting of Research Paper

- Debugging of entire web application
- Drafting of Research Paper
- Poster Submission
- Deployment of web application
- Prepare for Townhall Poster Presentation

WEEK

8

- Interim Project Presentation Preparation
- Stop autonomous calling of API for accidents dataset and consolidation
- Data cleaning

9

## Map Development

### Central Region Analysis

- Kernel Density Analysis
- K-Function Analysis
- Nearest Neighbor Analysis
- Multitype K-Function
  - Accidents vs Hump, Speed-regulating strip, Traffic light
- Exploration of R-Shiny

10

11

12

## Map Development

- Improvement and refining of previous analysis performed
- Continue web application development

### Others

- Drafting of Research Paper
- Drafting of Poster

13

14

- Townhall Presentation
- Final Submission