

# A Pedestrian Data System for Safety Analyses

A method developed for concentrated urban areas

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## I. The Problem

No comprehensive data set exists for pedestrian activities and exposure at the macro and the micro levels.<sup>1, 2, 3, 4, 5</sup> This limits in-depth study of pedestrian crash risk.

Pedestrian treatments are often devised on the basis of estimation, expert opinion and political imperatives, rather than quantitative knowledge about risk.

## II. Aims

To develop a pedestrian data system to: Collect, synthesise and complement the existing pedestrian/vehicle data, and Estimate pedestrian exposure for pedestrian risk assessments purposes

## III. Method

1. Preparing an inventory of all the existing pedestrian and vehicle data sources:
  - National/local censuses
  - Surveys of travel and activity
  - Pedestrian monitoring systems
  - Public transport tracking systems
  - Ad hoc counts and surveys
1. Cross-validation of the existing data bases
2. Conducting observational studies to validate and enhance the existing data
3. Building models to predict pedestrian activities
4. Synthesising the data into a practical and robust pedestrian data system for safety analyses

## IV. Focus Area: the CBD\* of Melbourne

- A 1.9 km by 0.9 km grid in the central city area
  - Multitude of activities and land uses
  - Diversity of the transport modes
  - 700,000 visitors a day ( 1 million tourists a year)
  - High pedestrian crash zone: over 6.6% of severe crashes (0.06% of the metro land area)
  - Plans for 6 new Central Activities Districts in Melbourne by 2030
- \* Central Business District

## V. Existing Data Sources

- **Victorian Integrated Survey of Travel and Activity (VISTA):** a sample of 4000 pedestrian trips in the CBD providing age, gender, socio-economic status, and vehicle ownership data of pedestrians
- **Pedestrian Monitoring System (PMS):** pedestrian counts on footpaths at 9 different spots in the CBD
- **Public Transport Ticketing System:** exit/entry counts at the five main railway stations in the CBD
- **Sydney Coordinated Adaptive Traffic System (SCATS):** vehicles volume at the signalised intersections

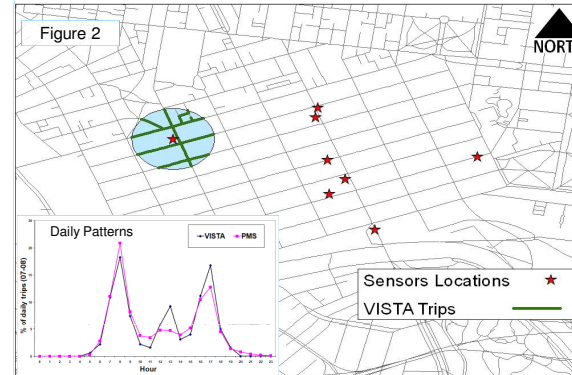
## VISTA: Density of Pedestrian Activities in the CBD



## Vehicle Volumes (SCATS)



## Cross-Validation: VISTA vs. PMS



## VI. Observational Study

Real time video-taping of pedestrians at some intersections and mid-blocks in the CBD to collect:

- Pedestrian volumes, and
- Their demographic characteristics and infringement rates

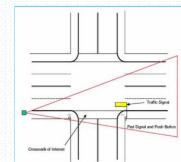


Figure 4: Camera Location



Figure 5: Camera Installation



Figure 6: Pedestrian Flow

## VII. Modeling Pedestrian Activity

**Aim:** building a simple model to predict pedestrian activities using the observed sample and GIS techniques

**Predicting Factors will include:**

- Land Use type (retail, residential...)
- Transport System Facilities
- Socio-economic characteristics

## VIII. Pedestrian Data System

Synthesising data from the existing data sources, observation study and the predictive model  
Estimating pedestrian/vehicle activities at individual locations (Intersections and mid-blocks) and CBD-wide  
Estimating pedestrian exposure for pedestrian risk assessment purposes

## IX. Next Phases/Future Research

- Assessing pedestrian crash occurrence risk in the CBD of Melbourne
- Identifying/developing safety countermeasures to mitigate or eliminate the pedestrian risk factors
- Examining temporal and spatial transferability of the models and the method

## X. References

1. Cottrell, W. D. and D. Pal (2003). "Evaluation of Pedestrian Data Needs and Collection Efforts." Transportation Research Record(1828): 12-19.
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