RWR 4015

Traffic Simulation for Planning Applications

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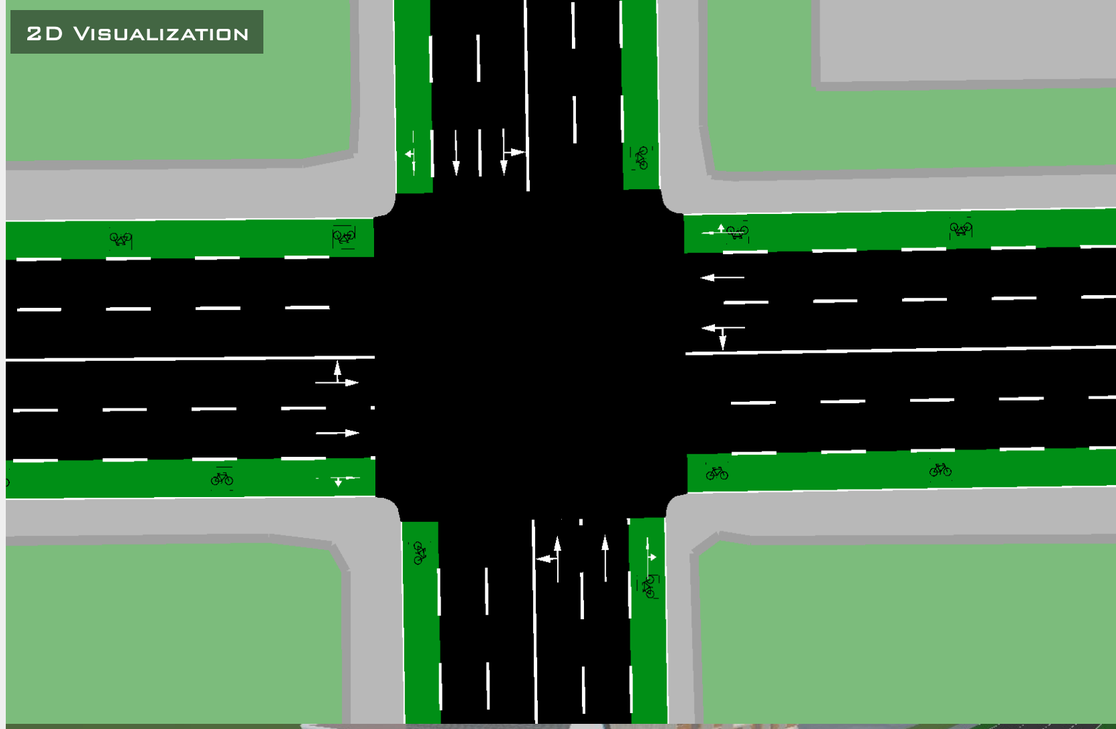
Week 12 | Lecture:
Final Project Report and Presentation

Fall 2026

RoadwayVR

roadwayvr.github.io/TrafficSimulationforPlanningApplications



Writing Report - Table of Content

❑ *Structure*

Title

Abstract

1. Introduction

- ***1.1. Background***
- ***1.2. Problem Statement***
- ***1.3. Study Goal and Objectives***

2. Literatue Review

3. Methodology

4. Result analysis

5. Conclusion and Recommendation

Writing Tips:

1. Formatting

2. Writing Style & Clarity

3. Referencing

Writing Paper- Structure

Title

Abstract

1. Introduction

1.1. Background

1.2. Problem Statement

1.3. Study Goal and Objectives → *Heart of Report*

2. Literatue Review

3. Methodology

4. Result analysis

5. Conclusion and Recommendation

Writing Paper- Order

Title 2

Abstract 8

1. Introduction

1.1. Background 3

1.2. Problem Statement 4

1.3. Study Goal and Objectives 1

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3. Methodology 6

4. Result analysis 7

5. Conclusion and Recommendation 7

Study Goal and Objectives

Study Goal:

The goal of study is … 1
This study has three objective as below:

- ❑ Developing …
- ❑ Designing …
- ❑ Implementing …

Title

… 1 → Take title from here

Study Goal and Objectives

Study Goal:

The goal of study is developing a novel artificial intelligence algorithm to capture risk of collisions between a vehicle and a pedestrian
This study has three objective as below:

- ❑ Developing input indicators to capture risk of collisions
- ❑ Designing an artificial intelligence algorithms based on input indicators to identify the risk
- ❑ Implementing the algorithm in a study are and comparing with existing scenario

Title

Developing a Novel Artificial Intelligence Algorithm for Collisions Risk Assessment

Introduction

Storyline:

1. First Level: Write bullet points (short titles) for the content in background
2. Second Level: Write each sentence

1. Introduction

1.1. Background

1. A. Importance of Collisions Involving Pedestrian
2. Sentence

B. Statistics of Collisions

Sentence

C. Traditional Method to Reduce Collisions

Sentence

1.2. Problem Statement

A. First Weakness of Traditional Methods (Proposing only one indicator)

Sentence

B. Second Weakness of Traditional Methods (Proposing simple algorithm)

Sentence

C. Third Weakness of Traditional Methods (Lack of real-world study area)

Sentence

1.3. Study Goal and Objectives

The goal of study is developing ...

This study has three objectives as below:

- ❑ Solving First Weakness
- ❑ Solving Second Weakness
- ❑ Solving Third Weakness

Literature Review

- ❑ Reviewing past studies considering three weaknesses in study objectives

Storyline:

1. First Level: Write bullet points (short titles) for the content in background
2. Second Level: Write each sentence

2. Literature Review

1. A. Reviewing input indicators → First Weakness
2. Sentence
   B. Reviewing algorithms → Second Weakness
   Sentence
   C. Reviewing study areas → Third Weakness
   Sentence

Methodology

- ❑ Write based on three weaknesses

Storyline:

1. First Level: Write bullet points (short titles) for the content in background
2. Second Level: Write each sentence

3. Methodology

1. A. Developing input indicators → First Weakness
2. Sentence
   B. Developing algorithms → Second Weakness
   Sentence
   C. Selecting study areas → Third Weakness
   Sentence

Results

- Should answer to three weaknesses by providing analysis

Storyline:

1. First Level: Write bullet points (short titles) for the content in background
2. Second Level: Write each sentence

4. Result Analysis

1. A. Sensitivity analysis on input indicator → First Weakness
2. Sentence and analysis → Second Weakness

B. Sensitivity analysis on algorithm

Sentence and analysis → Third Weakness

C. Sensitivity analysis and results based on study area

Sentence and analysis

Conclusions and Recommendation

- ***Conclusion:*** Summarize your findings based on three weaknesses and three objectives
- ***Recommendation:*** Explain about Limitations and explain what future studies can do

Storyline:

1. First Level: Write bullet points (short titles) for the content in background
2. Second Level: Write each sentence

5. Conclusion and Recommendation

5.1. Conclusion

1. A. First Weakness and Solutions and Results → First Weakness
2. Sentence

B. Second Weakness and Solutions and Results → Second Weakness

Sentence

C. Third Weakness and Solutions and Results → Third Weakness

Sentence

5.2. Recommendation

A. First limitation of the study

Sentence

B. Second limitation of the study

Sentence

Writing Tips:

1. Formatting

- ❑ *Justifying the text*
- ❑ *Use of Same Font Type Across the Content*
- ❑ *Use of Capital Letter*
- ❑ *Add Proper Title for Tables/Figures*
- ❑ *The Keywords come from Abstract*
- ❑ *Use of Abbreviations*

2. Writing Style & Clarity

- ❑ *Use of Active Voice*
- ❑ *Consistency (same word for same concept)*
- ❑ *Avoid long, indirect clauses*
- ❑ *Avoid using adverbs as much as possible*
- ❑ *Avoid using technical language/terms unless necessary*
- ❑ *Avoid using too long and unnecessary words*
- ❑ *Explain about Figures and Tables in detail*

3. Referencing

- ❑ *Use of Reference*
- ❑ *Reference as APA format*

1. Formatting

❑ *Justifying the text*

- **Align all body text to be justified (straight edges on both left and right).**
  - ✅ Professional and uniform appearance.
  - ❌ Left-aligned or uneven text blocks unless formatting rules specify otherwise.

1. Formatting

❑ *Use of Same Font Type Across the Content*

- **Maintain consistency** → Use the same font type (e.g., *Times New Roman*, *Arial*) throughout the paper.
- **Avoid mixing fonts** → Do not switch between fonts for headings, body text, tables, or figures unless required by journal or professor.
  - ✅ *All text in Times New Roman, 12 pt.*
  - ❌ *Headings in Calibri, body in Times New Roman, captions in Arial.*

1. Formatting

❑ *Use of Capital Letters*

- **Capitalize only proper nouns and formal names.**
  - ✅ *"City of Toronto," "Highway 401," "World Health Organization"*
  - ❌ *"city streets," "highway system," "organization"*
- **Do not capitalize common nouns or concepts.**
  - ✅ *"speed enforcement cameras," "pedestrian flow," "traffic collisions"*
  - ❌ *"Speed Enforcement Cameras," "Pedestrian Flow," "Traffic Collisions"* (unless at the start of a sentence)
- **Capitalize section headings, acronyms, and abbreviations consistently.**
  - ✅ *"Introduction," "Methodology," "ASE"*
  - ❌ *"introduction," "methodology," "Ase"*

1. Formatting

❑ *Add Proper Title for Tables/Figures*

- **Every table and figure must have a descriptive title/caption.**
  - ✅ *Table 1. Summary of crash-risk measures*
  - ✅ *Figure 2. Pedestrian flow simulation in Unity*
  - ❌ *Table 1. Data / Figure 2. Graph*
- **Cite each table/figure in the text.**
  - ✅ *"As shown in **Figure 2**, pedestrian flow increases under Scenario B."*
  - ✅ *"Crash-risk measures are summarized in **Table 1**."*
  - ❌ *Figure inserted without any mention in the text.*
- **Follow numbering order.** Number tables and figures separately (Table 1, 2… / Figure 1, 2…).

1. Formatting

❑ *The Keywords come from Abstract*

- Choose 4–6 short keywords directly from the abstract.

1. Formatting

❑ Use of Abbreviations

- **Define at first use** → Write the full term followed by the abbreviation in parentheses.
  - ✅ *"Automated Speed Enforcement (ASE) reduces vehicle speeds."*
  - ❌ *"ASE reduces vehicle speeds."* (if ASE has not been defined earlier)
- **Use abbreviations consistently** → Once defined, use only the abbreviation throughout the paper.
  - ✅ *"Automated Speed Enforcement (ASE)... ASE is widely adopted."*
  - ❌ *"Automated Speed Enforcement (ASE)... automated enforcement systems..."*
- **Avoid unnecessary abbreviations** → Don't create abbreviations for terms that appear only once or twice.
  - ✅ *"traffic collisions"*
  - ❌ *"Traffic Collisions (TC)"* (if "TC" is not reused)
- **Keep formatting correct** → Acronyms and abbreviations are written in all caps, without periods.
  - ✅ *"USA, WHO, VR"*
  - ❌ *"U.S.A., W.H.O., V.R."*

2. Writing Style & Clarity

❑ *Use of Active Voice*

- **10.1. Watch for passive forms** → If you see *is/are/was/were + past participle*, rewrite it in active voice.
  - ❌ *"The data were normalized …"*
  - ✅ *"We normalize the data …"*
  - ✅ *"The method normalizes the data …"*
- **10.2. Use past tense only for specific completed events.**
  - ✅ *"The field study ran from May–June 2024."*
  - ✅ *"The survey was conducted in Toronto in 2023."*
- **Keep results and figures/tables in present tense.**
  - ✅ *"Table 2 shows the results."*
  - ✅ *"Results indicate that ASE reduces vehicle speeds."*

2. Writing Style & Clarity

❑ *Consistency --> Use same word to refer to similar concept*

- ❌ *Inconsistent*: “The analysis measures **traffic collisions**. The number of **accidents** has decreased.”

  ✅ *Consistent*: “The analysis measures **traffic collisions**. The number of **collisions** has decreased.”
- ❌ *Inconsistent*: “We focus on **pedestrian flow**. The **people movement** on sidewalks is modeled in Unity.”

  ✅ *Consistent*: “We focus on **pedestrian flow**. **Pedestrian flow** on sidewalks is modeled in Unity.”
- ❌ *Inconsistent*: “The variable captures **vehicle speed**. This **velocity** is important in crash-risk models.”

  ✅ *Consistent*: “The variable captures **vehicle speed**. **Speed** is important in crash-risk models.”

2. Writing Style & Clarity

❑ *Avoid long, indirect clauses*

- **State the idea directly in one clear sentence.**
  - ❌ *"When the community views enforcement as punitive rather than protective, it hinders the development of a collaborative road safety culture."*
  - ✅ *"Public perception of enforcement shapes road safety culture."*

2. Writing Style & Clarity

❑ *Avoid using adverb as much as possible*

- **Do not rely on adverbs (e.g., *quickly, clearly, significantly, often, usually, normally*) to make your point.**
- Instead, **use precise verbs or concrete data.**
  - ❌ *"The model clearly shows the results."*
  - ✅ *"The model shows the results."*
  - ❌ *"Collisions usually increase at night."*
  - ✅ *"Collisions increase at night."* (or better: *"Collisions increase by 30% at night."*)

Adverbs often make sentences **vague, weaker, or slightly confusing** because they add a *loose qualifier* instead of a precise fact. For example:

- ❌ *"The system significantly improves safety."* → vague: how significant?
- ✅ *"The system improves safety by reducing crashes 25%."* → precise and clear.

2. Writing Style & Clarity

❑ *Avoid using technical language/terms*

- **Only use technical language if it is essential to your point.**
- If you must use it, **define the term clearly for the reader.**
  - ❌ *"The persistent issue of speeding is a primary contributor to the frequency and severity of traffic incidents."*
  - ✅ *"Speeding increases how often crashes occur (frequency) and how serious they are (severity)."*

2. Writing Style & Clarity

- ❑ ***Avoid using too long and Unnecessary words***
- ❑ ***Avoid breaking sentences into too many parts with commas, colons***

- **Do not pack too many ideas and filler words into one sentence.**
- **Say it directly and simply.**
  - ❌ *"The fundamental benefit of Automated Speed Enforcement is clear and empirically supported: by providing consistent and impartial enforcement of speed limits, these systems effectively reduce vehicle speeds and, consequently, save lives."*
  - ✅ *"Automated Speed Enforcement reduces vehicle speeds and saves lives by enforcing speed limits consistently."*

2. Writing Style & Clarity

❑ *Explain about Figures and Tables in detail*

Do not assume the reader already understands your figures or tables.

Explain clearly:

For tables → describe what each column and row represents, and highlight the main insight.

For figures → explain the legend, axes, colors, symbols, and what the figure shows.

Examples:

- ❌ *"Table 2 shows the results."*
- ✅ *"Table 2 summarizes crash-risk measures. Column 1 lists the four indicators (time-to-collision, deceleration rate, speed variance, and headway), while Column 2 reports their threshold values. These results show that speed variance has the strongest influence on collision risk."*
- ❌ *"Figure 3 presents the pedestrian simulation."*
- ✅ *"Figure 3 illustrates pedestrian flow in Scenario B. The x-axis shows time in seconds, while the y-axis shows pedestrian density per square meter. The red line represents the baseline condition, and the blue line shows the condition with advertising panels. The figure indicates that density increases sharply between 60–80 seconds under Scenario B."*

3. Referencing

❑ Use of Reference

4.1. Order by Year

- In the text and in the reference list, order multiple references by **year of publication (oldest to newest)**.
  - ✅ *"...as shown in earlier studies (Smith, 2015; Jones, 2018; Lee, 2022)."*
  - ❌ *"...as shown in earlier studies (Lee, 2022; Smith, 2015; Jones, 2018)."*

4.2. References in Content

- **If two references:** join with *and* (APA) or *&*.
  - ✅ *"...(Brown & Green, 2019)."*
- **If more than two references:** list the first author + *et al.* (APA style).
  - ✅ *"...(Taylor et al., 2020)."*

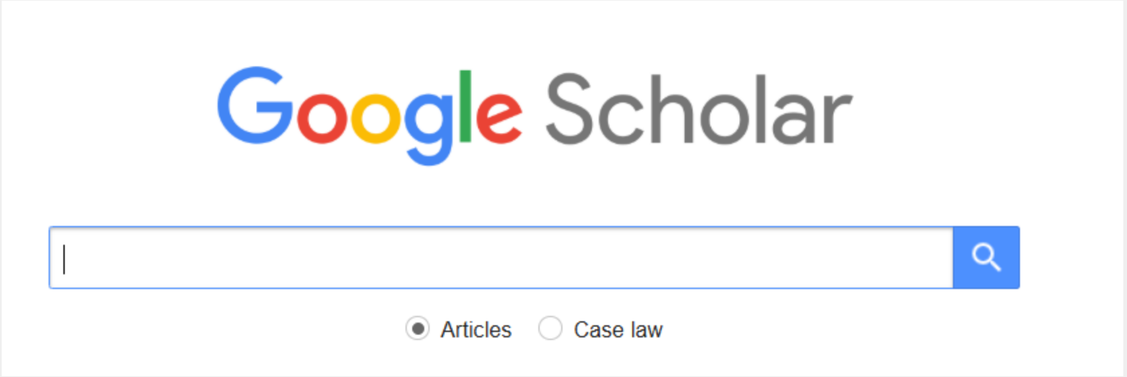
4.3. References in Reference Section

- **Academic Papers** → Author(s). Year. Title. *Journal Name*, Volume(Issue), pages.
  - Example: *Smith, J. (2018). Evaluating automated speed enforcement. Journal of Road Safety, 10(2), 45–58.*
- **Governmental Reports/Documents** → Government body. Year. Title. Publisher/URL.
  - Example: *Transport Canada. (2021). Road safety strategy 2025. Government of Canada.*

3. Referencing

❑ *Reference as APA format*

1



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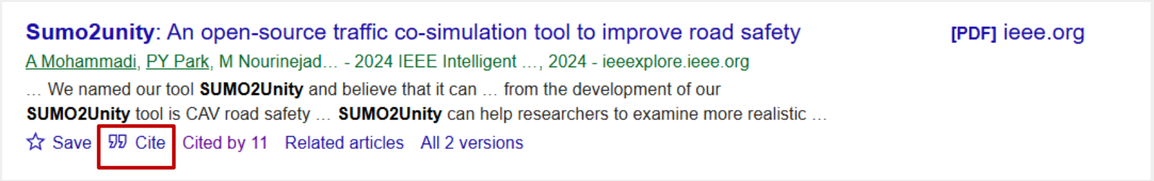

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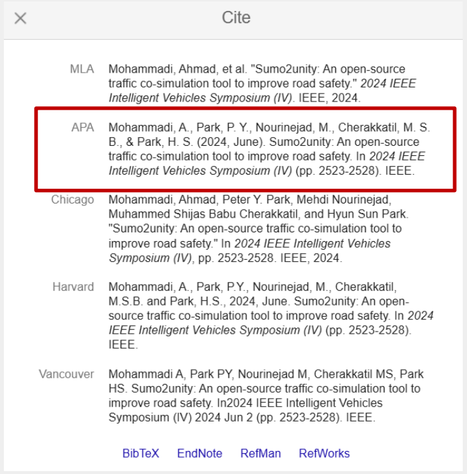

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A Sample of First Draft

For Each Sentence → We need to see a Short Title as A, B, C, D …

3.2.1 Study Area

The selected study area is a sidewalk at York University in Toronto, Ontario, Canada, commonly known as York Lanes. The sidewalk section studied is 75 meters long and 3 meters wide, with adjustments made for seating and stairs to determine the effective width.

York Lanes connects York University's central shopping centre, with a bookstore, drugstore, medical offices, and several fast-food restaurants to the main campus. This sidewalk is a popular route for students, faculty, and workers to take, and gets crowded and busy, especially at peak hours.

Figure 3.5 illustrates the study area used in this thesis. **Figure 3.5a**. shows the study area through the camera monitoring system and represents real-world conditions. **Figure 3.5b**. is a visualization of the 2D microsimulation created for the study area using PTV Viswalk. **Figure 3.5c**. shows the rendering of the 3D microsimulation that was developed using Unity.

3.2.1 Study Area

A. Sidewalk dimensions

The selected study area is a sidewalk at York University in Toronto, Ontario, Canada, commonly known as York Lanes. The sidewalk section studied is 75 meters long and 3 meters wide, with adjustments made for seating and stairs to determine the effective width.

B. Why the study area is a good case study to use

York Lanes connects York University's central shopping centre, with a bookstore, drugstore, medical offices, and several fast-food restaurants to the main campus. This sidewalk is a popular route for students, faculty, and workers to take, and gets crowded and busy, especially at peak hours.

C. Figure 3.5 Summary

Figure 3.5 illustrates the study area used in this thesis. **Figure 3.5a**. shows the study area through the camera monitoring system and represents real-world conditions. **Figure 3.5b**. is a visualization of the 2D microsimulation created for the study area using PTV Viswalk. **Figure 3.5c**. shows the rendering of the 3D microsimulation that was developed using Unity.