King's College London

Traffic Simulator

Group Project

Team Diversity

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1 About the project

1.1 Background

In a past of decade, population is seemed to be continuous increased which may not be predictable. The traffic management is becoming a serious problem a number of cities around the world due to the crowned people in these areas. The capital city especially in London, Bangkok, and New York has faced with the traffic congestion challenge. This is because the road is limit but the demand of road's user is high. Therefore, the traffic management is the method to relieve this problem by using the Traffic Simulator.

Traffic Simulator project is a part of coursework in Group Project (7CCSMGPR) of King's College London. This course is to provide the development in the software product: planning, designing, implementing, and reporting. Hence, the Traffic Simulator matches to the aim of Group Project Course and helps traffic management to resolve traffic challenge.

1.2 Objectives

- Develop a traffic simulator program.

- To help the traffic management method.

- To achieve the aim of Group Project (7CCSMGPR) course.

1.3 Objectives

- There are two lanes (left and right) in each road. The left lane is normal, but the right lane is for driver changing lanes or emergency.

- There has only one-way direction of the vehicle.

- This programme has only car and bus.

- This programme is designed for driver behaviour which can only be caution, reckless, and normal.

- The scale of the map is ???

1.4 Outline

Description : The Traffic Simulator is the programme that provides some traffic management policies to relief traffic congestion issues. The policy that forced to the system is fixed time policy and congestion control policy. This traffic simulator programme has only car and bus which each vehicle driver behavior can be caution, reckless, and normal. Moreover, the emergency strategy is used in the system to make the system is reliable. Therefore, the Traffic Simulator will be the one method of the traffic management policy to reduce the traffic congestion in the main road.

General Concept :

1. <u>Vehicle Types</u>: There are two types of vehicles—car and bus. This programme is assumed that car go faster and has higher acceleration than bus. The shape and size of the bus is bigger than car, so it takes more space in the road.

2. <u>Driver's Behaviours</u>: There are three types of driver's behaviour– caution, reckless, and normal. In the simulator, it is judged the behaviour of driver by using speed and acceleration, as illustrated in the table below. Moreover, the driving behaviour of abnormal people may not be the normal people.

Type	Car (X pixels)	Bus (2X pixels)
Cautious	Acceleration: Y Top Speed: X	Acceleration: Y - 10 Top Speed: X - 20
Normal	Acceleration: Y + 10 Top Speed: X + 20	Acceleration: Y Top Speed: X
Reckless	Acceleration: Y + 20 Top Speed: X + 40	Acceleration: Y + 10 Top Speed: X + 20

3. <u>Emergency Strategy</u>: The emergency policy in the simulator is to prioritise ambulances at traffic lights and on the road. When the ambulance is generated, all vehicles on the same road and area will avoid the ambulance. In addition, another vehicle in that area will stop and give the ambulance pass the intersection fist.

4. <u>Traffic Management Policy</u>: There are two different traffic management policies—Fixed Time and Congestion Control policy.

    - *Fixed Time Policy* is the policy to set the peak and off-peak time during a day. In a peak time period, the green light on the direction to the business centre area or working area will be 2X seconds before changing to red light. And off-peak time period, it will be set the green light time to X seconds before changing.

    - *Congestion Control Policy* is the policy that automatically changes the duration of the green light due to the congestion of the traffic. The green light time will be longer than other directions, when the congestion occurred.
    The two different will be compared by the average time in each vehicle on the system. In each vehicle will have a timer that starts when it enters the system and gets written to a log when the vehicle exists the system. The average time is calculated during this period (vehicle in/out to/from system). The both policies either fixed time or congestion control, which has lower average time in each vehicle, is better than another.

1.5 Methods and Strategies

- Software Development: developed by JAVA programming language.

- Source Code: done by GitHub.

- Documentation: done by GitHub and created by LaTeX.

- Management: Trello.

- Assessment: graded by Burger's Algorithm and Peer Assessment

1.6   Schedule

Progress and Period	Requirement and Analysis	Design and Code	Integration and Implementation	Testing	Evaluation
wk01					
wk02					
wk03		Initial report			
wk04		Presentation			
wk05					
wk06					
wk07					
wk08					
wk09					Initial report
wk10					Presentation

1.7   Expectation of Project Outcome

- Traffic Simulator is developed and implemented in the real situation.

- Traffic Simulator is the one of the method to help the traffic management policy.

- Traffic Simulator is achieved in any objectives of Group Project (7CCSGPR) programme.

2   About us

2.1   Project management

The Agile Methodology is used for this project.

2.2   Roles

Balázs Kiss: Lead programmer

Eddy Mukasa: Architect

Gabb Visessmit: Graphical designer

Pongsakorn N. Riyamongkol: Project Manager

Snorri Hannesson: Tester and Coordinator

2.3   Collaboration

Facebook: used facebook group, as a communication channel.

GitHub: used for collecting all source code and documentation.

Trello: used for management and follow up any tasks.

Meeting: set up a meeting in on Thursday 10:00 every week during the project period.

2.4   Peer Assessment and Self Assessment

This involves members of our group to evaluate other members regarding the performance of their tasks. In addition, self-assessment is used to grade yourself in term of duties and accomplishment tasks. Peer and Self Assessment can be used for both formative and summative purposes. There are some techniques about peer and self assessment, as followed:

- Assessment Form

- Noticed from GitHub and Trello.

2.5   Conflicts

If we have conflicts during this project, we also use simply method to resolve it.

  I.   Realise conflict

 II.   Handle conflict sooner rather than later.

III.   Find the solution together

IV.   Apologise

 V.   Appreciate