Traffic Jam Analysis

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Abstract: [1] Road architecture design is a challenge, with the need to avoid traffic growth, allow for traffic development, and meet the financial plan and the urban environment requirements. Their influence must be perceived when building public places. AnyLogic simulation issues a road traffic library that enables simulation of traffic flow with the potential to provide good road traffic technology and planning. Visualizations hamper the creation of traffic flow and traffic jam lightness and animations. The opportunity to investigate, and thus the ability to refine models, offers the most effective forum for road traffic planning and engineering achievement. Using road traffic simulation software is the key to featured analysis and well appreciated solutions in your administration.

INTRODUCTION TO ANYLOGIC:

AnyLogic system simulation library is a useful tool for an expert to develop a full-level project in Legalities, Marketing, Education, Development and Finance, Traffic Jam Analysis and other processes in complex economic processes and utilities. The library provides models of the company system and allows customers to understand process complexities and frameworks between process entities. When using the process model library, users can model real-world structures in terms of process (sequences of operations typically including waits, delays, and resource usage), entities going through the process flow (transaction, consumers, and products), energy sources. With the Road Traffic library, you can envision any business process vastly, easily, and validate the results using AnyLogic animation. AnyLogic software primary uses Dijkstra's algorithm [7]. AnyLogic [5] pedestrian is allocated to design sidewalk floors in the urban area. It allows to layout structures (like stations, etc.) and roads (a significant number of car drivers. Models allowed the selection of demographics of passenger volume in different areas, the allocation of suitable road service points, the measurement of the length of stay in specific areas and the analysis of design problems. The models generated with pedestrian libraries distance move via a constant phase reacting to different types of barriers and other sidewalks.

THE ROAD TRAFFIC LIBRARY:

The road traffic library is a platform for designed to simulate traffic technology and transportation management in road traffic systems [9]. Road traffic design application traffic on highways, featuring crossings, bridge, cycles in traffic, loading stops.

The skill of libraries is beneficial when:

- Carrying along roads and traveling on highways.
- Capacity and capacity road evaluation and road congestion level measurement.
- Completing traffic light schedules
- Integrating public buildings into a road network

AnyLogic software is also used to build:

- railway stations
- metro stations
- airports
- car parks
- Pedestrian Passageways [10]
- Shopping malls

TRAFFIC MODELLING IN ANYLOGIC:

- Vehicle is an agent capable of having its physical parameters such as length velocity and acceleration. A flowchart is used to model vehicle activity, which can be easily drag-and-dropped. Extracting behaviour is essential to assessing the performance of the whole road system.

- The library offers resources to quickly monitor interjections.
- The libraries include predefined algorithms which allow for driving enforcement, such as speed control, the use of busiest road, Lane mixing laws, and collision avoidance and identification.
- The road traffic density map is instrumental for visualising traffic congestions in collecting statistics on traffic rules
- Logic allows users to convert GIS shapefiles, with the data on the existing roads, through AnyLogic Road space mark-up shapes.

WHY USE SIMULATION?

- Modelling simulation addresses problems in the real world efficiently and safely. It provides a significant methodology that is simple to understand and communicate. Modelling simulation provides important options by giving a clear summary of dynamic systems.
- In comparison to physical modelling, such as making copies of a structure on a level, simulation modelling is a software based on algorithms and equations. Simulation provides framework for computer model evaluation when working, making it easy to represent it in 2D/3D.
- Simulation applications are diverse in industry that are often used while conducting studies on a physical model is difficult or impossible, neglected and abused due to lack of funds or time.

TECHNOLOGIES DEVELOPED IN ANYLOGIC:

- museums
- amusement parks
- stadiums
- concert halls
- Street events (Festivals, rallies, demonstration)
Multi method modelling environment
- Animation and visualisation
- data interoperability [8]
- industry specific libraries
- professional agent-based simulation software
- GIS maps integration
- simulation in the cloud
- rich experiment framework
- model expert and integration
- support in model building

**DISADVANTAGES OF ANYLOGIC:**

- New versions of AnyLogic require to reinstall it which is annoying. We can skip an update, but there can be some problems we could find.
- We need to understand the core basics like OOP, Java, experimentation, bag of features as well as possibilities opens up.
- It requires effort to master the basics of the software, but with good technical support and great examples and training materials which can be overcome easily and we are good to go.

**LITERATURE SURVEY:**

**Junction:**
- It is a spot where traffic moves in various directions to eradicate/make the roads safer.
- Vehicles can change between routes or directions.

**Factors that affect Junction Load:**
- Framework plan
- location design
- Turning space
- Traffic capacity and attributes

**Highway Interface [14]:**
- Highway is a form of intersection of road connecting to another highway or from an interstate.

**T-Intersection [3,15]:**
- It's a 3-way intersection at one point where three roads cross. Like so many other crossings, if you reach it, you should be careful and we'll have to ease down and watch other junctions even if you're on the next road or past the junction.

**Roundabout:**
- A Roundabout [11,13] is a circular junction in which road traffic is allowed to flow in unidirectional around a central place.

**City Square:**
- City square [12] is an open public space habitual assembly.

**EXPERIMENTATION RESULTS:**

1.Roundabout:

2.City square:
DISCUSSION OF RESULTS:
We assume that by analysing the experimental data-

1. Roundabout [11,13]
   - Stops count per car is very low and consistent [2]
   - Average speed is mediocre [2]
   - Average time in system is above mediocre
   - Cars are entering the system and leaving the system without any congestion
The Density of the map shows more green (low congestion) than red (high congestion)

2. City Square [12]
- Stops count per car is low and consistent [2]
- Average speed is low [2]
- Average time in system is low [2]
- Cars are entering the system and leaving the system with less congestion
- The Density of the map shows less green (low congestion) and mediocre red (high congestion)

3. T-intersection [3,15]
- Average time in system is low [2]
- Cars are entering the system and leaving the system with congestion near signal lights
- The Density of the map shows more green (low congestion) and mediocre red (high congestion)

4. Highway Junction [14]
- Cars are entering the system and leaving the system with congestion near signal lights [2]
- The Density of the map shows more green (low congestion) and low red (high congestion)

CONCLUSION:
We have found out that the root cause of the congestion in road network is due to no proper management of traffic lights. It is important to maintain a proper traffic lights to reduce congestion which results in a fluid flow of road network. Another reason for the congestion in road network is due to straight roads, cars cannot enter to adjacent lanes easily. Roundabout model will easily address this problem by providing a curve road along the road network. I also appreciate the

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