Architecture for an Interactive Motion-based Traffic Simulation Environment

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Objective

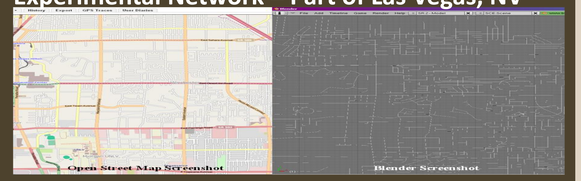
- In simple words, the objective of this research is to identify the effect of human behavior on traffic

  To enhance the traffic simulation modeling realism by involving actual human beings navigating the system along with simulated entities in an immersive environment

Introduction

- This study proposes an architecture for an interactive motion-based traffic simulation environment
- Integrates: a motion based driving simulation, a pedestrian simulation, a motorcycling and bicycling simulation, a traffic flow simulation
- the interaction between human, actual, and background traffic has tremendous implications. For example, in the real world, an accident as consequence of a human error, can affect a large portion of the traffic system
- Studies that can be done
  - evaluation of driver and pedestrian behavior for traffic safety projects
  - simultaneous study among interactions between the drivers, pedestrians, bikers and their interaction with the infrastructure and environment
  - training for first responders, emergency personnel and teen drivers in safe and controlled environment
- Implementation faces significant challenges, ranging from multi-platform and multi-language integration to multi-event communication and coordination

Experimental Network – Part of Las Vegas, NV



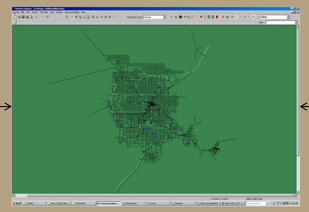
Blender Modeling

SketchUp Buildings

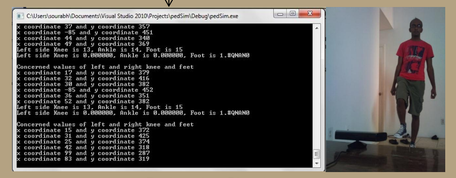
System Architecture – Proposed Approach

Car Simulator

Bicycle and Motor Cycle Simulator

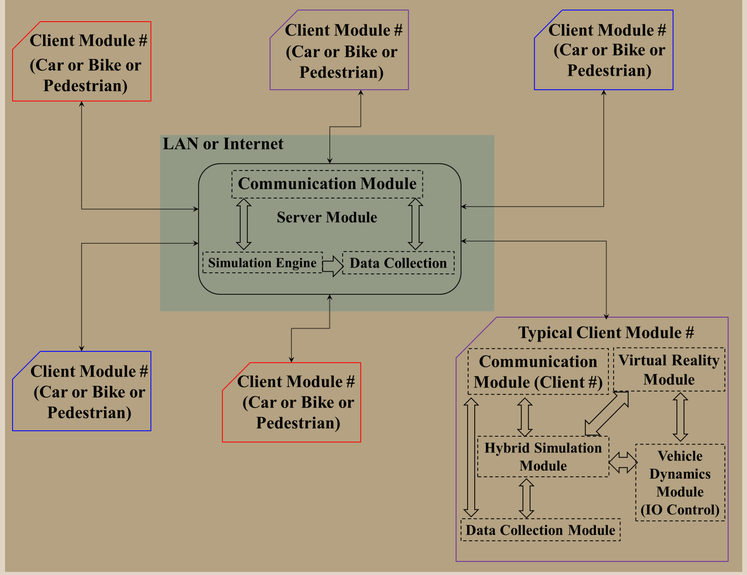


Central Simulation Server

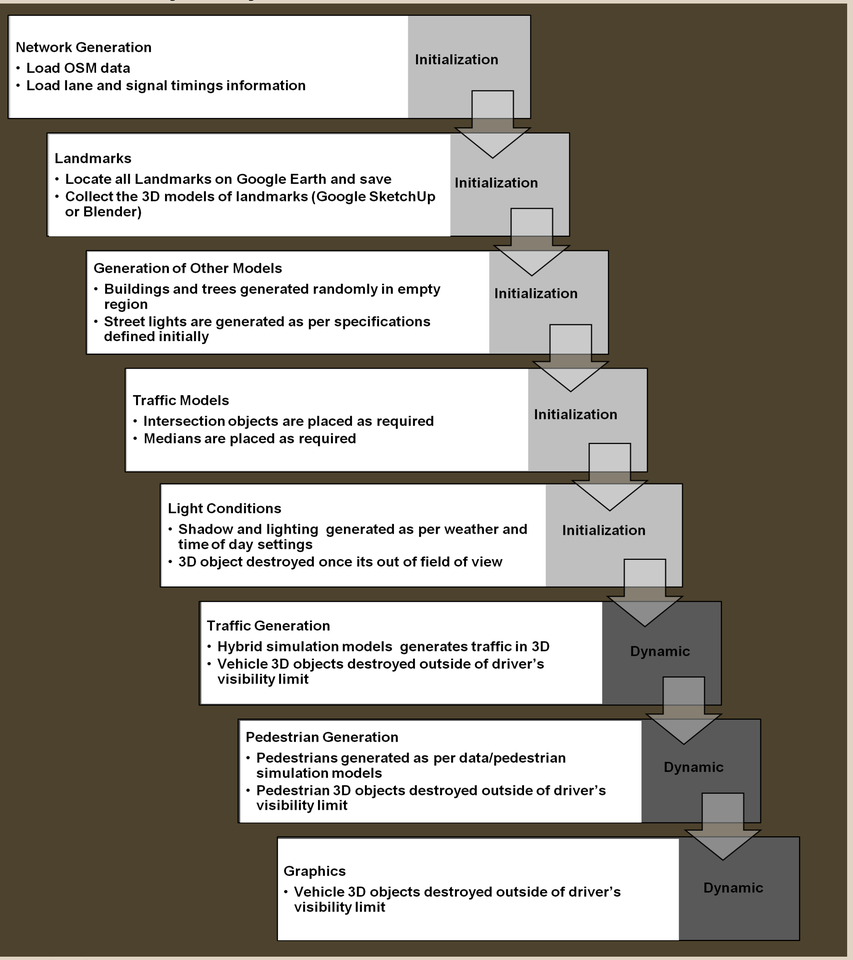


Pedestrian Simulator

Data-flow Diagram



Virtual Reality – Layered Architecture



Concluding Comments

- Existing modeling frameworks focus on a particular component of the real-world system; the remaining components are ignored or modeled using artificial entities
- The proposed architecture increases the realism of existing alternative modeling approaches by explicitly and simultaneously including actual drivers, pedestrians, and bikers – not attempted as per our knowledge
- Implementation of the architecture will provide the unique capability to study countless traffic problems using actual human beings

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