**20% Project:**

Smart Traffic Model

Final Presentation on May 27th

**SmartTrafficModel.java**

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| **Return Type** | **Method Name** | **Description** |
| Constructor | SmartTrafficModel(int numCars, int comTime, int numAccidents, int mpg) | This method creates the Smart Traffic Model. |
| Void | Static main(String[] args) | This method runs the program. |
| Void | measureCommutingTime() | This method measures the commuting time of the random scenario/simulation. |
| Void | measureGasMileage() | This method measures the gas mileage of the cars during the scenario/simulation. |
| Void | measureNumberOfAccidents() | This method measures the number of accidents that occurred during the random scenario/simulation. |
| **Variable Type** | **Variable Name** | **Purpose** |
| Int | numCars | Keeps track of the amount of cars that pass through the stoplight. |
| Int | comTime | Keeps track of the commuting time of the cars. |
| Int | numAccidents | Keeps track of the number of accidents at the intersection. |
| Int | mpg | Keeps track of the gas mileage (mpg) of the cars passing through the intersection/stoplight. |

**Needs and Opportunities**

Stoplights are an essential part of our transportation infrastructure. They strive to maximize intersection safety and efficiency for both vehicles and pedestrians. However, the lack of a predictive ability can cause stoplights to have negative effects on traffic flow. Stoplights that operate with a timing apparatus or vehicle sensor lack the ability to react to dynamic traffic situations. These drawbacks can cause driver frustration and compromise vehicle and pedestrian safety. The Smart Traffic Model (STM) is an algorithm that employs predictive modeling to traffic flow. This model is intended to be employed with stoplight to vehicle communication infrastructure that is predicted to be widely adopted in the near future.

The Smart Traffic Model will:

1. Increase traffic flow.
2. Decrease fuel usage.
3. Increase safety.
4. Decrease commuting time.

**Audience / Clients / Users**

The Smart Traffic Model will directly benefit drivers and benefit pedestrians. With the Smart Traffic Model, drivers should find themselves less frustrated with poor stoplight timing. Drivers should also notice an improvement in their commuting time and fuel usage. On the macroscopic scale, the reduced amount of fuel usage and commuting time will benefit consumers and the economy. The reduction of emissions will additionally help in the abatement of city smog considerably.

**Timeline**

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| **February 6 Deliverables** | Draft scenarios for different traffic patterns.  Research intersection related accidents.  Research current stoplight operation. |
| **March 6 Deliverables** | Create simulations of commuting time, accident probabilities, traffic flow, and fuel usage for current stoplight operation. |
| **April 3 Deliverables** | Code an algorithm for predictive stoplight communication.  Apply algorithm to traffic flow simulations developed for March 6th deliverables. |
| **May 1 Deliverables** | Measure improvements in commuting time, safety, fuel usage, and traffic flow from current stoplight operation to STM operation.  Include results in final report. |

**Product/Live Demo**

The Smart Traffic Model is a software program that would alter traffic light patterns through application of a predictive algorithm to achieve the stated objectives. This will be demonstrated on a 25X25 grid displaying different traffic simulations and comparing them to the original stoplight design by measuring:

1. Time from Point A to Point B.
2. Number of cars passing through light.
3. Number of wrecks
4. Amount of fuel used

**Reality Check**

No funding is needed for equipment in order to complete this project since all tasks will be completed with computing resources previously acquired.

**Conclusion**

The Smart Traffic Model aims to help drivers improve their commuting time and improve their gas mileage/fuel usage. It also strives to create a safer environment on the roads, decreasing the amount of wrecks and increasing the amount of traffic flow through intersections.