**Concept**

Describe the model concept.

The model seeks to understand the behavior of why people run red lights. Drivers that get to their destination fastest will receive a bonus amount of happiness. At intersections, drivers have the opportunity ‘run the light’ or ‘wait’. The drivers have the potential to receive disutility (negative happiness) IF they either hit another car or passenger or IF they are caught by a police officer.

Why is this a model that lends itself to using ABM instead of, say, regression?

It would be better to use an ABM as it will provide a cleaner environment to simulate the rationality of *runaway drivers*.

What is the theory you are trying to model?

That *runaway drivers* are rational actors that aim to maximize personal utility at the cost of social utility.

No saction

shame

nash equilibrium of stop signs

**Agents & Rules**

Enumerate the agents in your models, and the rules they are governed by.

**Drivers**

States SOCIAL\_METER == ‘selfish’, ‘ambiguous’, ‘social’

RUNNING\_STOPSIGN\_PROBABILITY is the preset or previous days

RUNNING\_STOPSIGN\_THRESHOLD

DRIVERS\_PEDS\_IN\_VIEW == ‘yes’, ‘no’, or ‘running\_stop\_sign’

DRIVER\_MEMORY == ‘on’ or ‘off’

IN\_INTERSECTION == ‘yes’ or ‘no’

DRIVE\_IS\_HOME == ‘yes’

IS\_ALIVE == ‘yes’ or ‘no’

Instructions

1. **IF** IS\_ALIVE == ‘yes’

*driver defines optimum route, driver leaves origin, travels down street*

1. *driver approaches* *intersection*, *re-calculates* **RUNNING\_STOPSIGN\_PROBABLITY**

**IF** driver’s SOCIAL\_METER == ‘selfish’ or ‘ambiguous’

**IF** driver’s DRIVERS\_PEDS\_IN\_VIEW == ‘no’ **add 5%**

**IF** DRIVER\_MEMORY == ‘on’

**IF** N\_SUCCESSFUL\_RUNNING\_STOP > 0 **add 5%**

**IF**  SOCIAL\_METER == ‘social’ or ‘ambiguous’

**IF** DRIVERS\_PEDS\_IN\_VIEW == ‘yes’ **subtract 10%**

**IF** DRIVER\_MEMORY == ‘on’

**IF** N\_ACCIDENTS\_LAST\_DAY > 0 **subtract 10%**

**IF** DRIVERS\_PEDS\_IN\_VIEW == ‘running\_stop\_sign’

**IF** SOCIAL\_METER == ‘selfish’ or ‘ambiguous’ **add 10%**

**ELSE**  SOCIAL\_METER == ‘social’ **add 5%**

**IF** POLICE\_IN\_VIEW == ‘yes’  **subtract 50%**

**IF** DRIVERS\_PEDS\_IN\_VIEW == ‘running\_stop\_sign’ **subtract 100%**

1. *at intersection,*

**IF** RUNNING\_STOPSIGN\_PROBABLITY >= RUNNING\_STOPSIGN\_THRESHOLD

*driver does not stop, IN\_INTERSECTION == ‘yes’*

**ELSE**

*driver stops at light*, *waits for all driver / pedestrians to have IN\_INTERSECTION == ‘no’,*

*drives through intersection & IN\_INTERSECTION == ‘yes’*

**IF** two drivers or one pedestrian/driver at the same intersection has IN\_INTERSECTION == ‘yes’

*any related driver receives* **subtract 100%**

N\_ACCIDENTS\_LAST\_DAY += 1

*each driver selects one number between 1 and 10 (DRIVER\_FATALITY\_CHANCE)*

**IF** DRIVER\_FATALITY\_CHANCE <= GLOBAL\_FATALITY\_CHANCE

driver’s IS\_ALIVE == ‘no’

*each pedestrian selects number between 1 and 10*

**IF** DRIVER\_FATALITY\_CHANCE <= GLOBAL\_FATALITY\_CHANCE \* 2

pedestrian's IS\_ALIVE == ‘no’

1. *after intersection / IN\_INTERSECTION == ‘no’*

**IF** IS\_ALIVE == ‘no’

*change*DRIVER\_IS\_HOME == ‘yes’

**IF** DRIVER\_IS\_HOME == ‘no’

*continue on street, restart to step 2*

**ELSE** DRIVER\_IS\_HOME == ‘yes’

**IF** DRIVER\_ARRIVAL\_TIME > EST\_ARRIVAL\_TIME x 10% **add 10%**

1. **IF** all drivers have DRIVER\_IS\_HOME == ‘yes’

*reset day*

**Pedestrians**

State *IN\_INTERSECTION == ‘yes’ or ‘no’*

IS\_ALIVE == ‘yes’ or ‘no’

Instructions continue walking in random pattern along network without stopping

**Auto\_Drivers** or **Police**

State *IN\_INTERSECTION == ‘yes’ or ‘no’*

IS\_ALIVE == ‘yes’ or ‘no’

Instructions continue driving in random pattern. behave as a driver without calculating RUNNING\_STOPSIGN\_PROBABILITY or IS\_HOME