Physics 234

Special Project Topic Proposal

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After discussing about multiple possible topics, we decided to move further with potentially either one of the two chosen: the optimal traffic sign distribution for road diet, and the expected time of avalanche happening (when uniformly snowing in an area) on a slope, representing a simplified mountain.

Topic 1:

For the traffics topic, our main concern is about where to put the sign(s) to have maximum efficiency for avoiding congestion. We chose this topic because road diet is one of the main reason of traffic jam, which is a major problem for citizen in big cities.

The constants of the model:

The percentage of drivers that will emerge when see the sign

Car length(s) and its distribution

Drivers’ personalities and the distribution (whether the driver will accelerate when no car is in the front of him/her and to which speed)

The variable of the models:

The position and the number of signs

Traffic flow

Number of lanes before the diet

Number of lanes after the diet

Time

Next step:

Find the relation between variables in mathematical formula.

Begin to write the notebook!

Reference:

1. “10-Year-Old Shot in Road Rage Incident in NW Houston." ABC13 Houston.   
ABC13.com, 13 Nov. 2015. Web. 13 Nov. 2015. <http://abc13.com/news/10-year-old-shot-  
in-road-rage-incident-in-nw-harris-co/1082207/>.

Topic 2:

For our avalanche topic, we will try to predict the time elapse from the start time of snow to the happening of an avalanche on a given slope. And our model will act like a warning mechanism that tell people if they should prepare for a potential avalanche ahead of time.

The variables of our model:

The degree of the slope

Coefficient of friction k

The wind speed/direction

Snow precipitation

Time of snowing

The constants of our model:

Snow speed

Critical condition for an avalanche.

Next steps:

Generate a 3D snow aggregation model simulating the process before an avalanche.

Explore how to add in variables to our model efficiently without affecting one another.

Find the effects that the degree of slope, coefficient of friction, wind, snow precipitation and time have on avalanche.

Source of reference:

*Snow Avalanche Formation*, Jürg Schweizer, J. Bruce Jamieson and Martin Schneebeli. Published 15 November 2003. (https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2002RG000123)