

My mathematical model:

1. Bayes:

As we know the Bayes Formula:  $P(A_i|B) = \frac{P(A_i)P(B|A_i)}{P(B)}$

Consider  $Sta$  as pass road,  $S_i$  as next possible street

Then we choose  $S_i$  which has biggest value  $P(S_i|Sta) = \frac{P(S_i)P(Sta|S_i)}{P(Sta)}$

We use  $P(S_i|Sta) = \frac{P(S_i)P(Sta|S_i)}{P(Sta)} = \frac{P(Sta, S_i)}{P(Sta)}$  to make prediction

2. Streets Property:

For each street we can divide it to three parts based on the Velocity:

Beginning: the start part, the vehicle's velocity will accelerated with acceleration  $a_1$

Middle: the middle part, the vehicle keeps constant speed  $v$

Ending: the end part, the vehicle's velocity will decreased with acceleration  $a_2$

Speed: the speed of vehicle, which is the constant in Middle part.

We use the information of Velocity and Position which belongs to one specific street to get the properties of that city.

For the time of intersections, we only calculate the time slots which  $LocaToStr(v, t)$  are zeros. This time is cost of passing the intersection

Using these we can predict the final position of one vehicle.