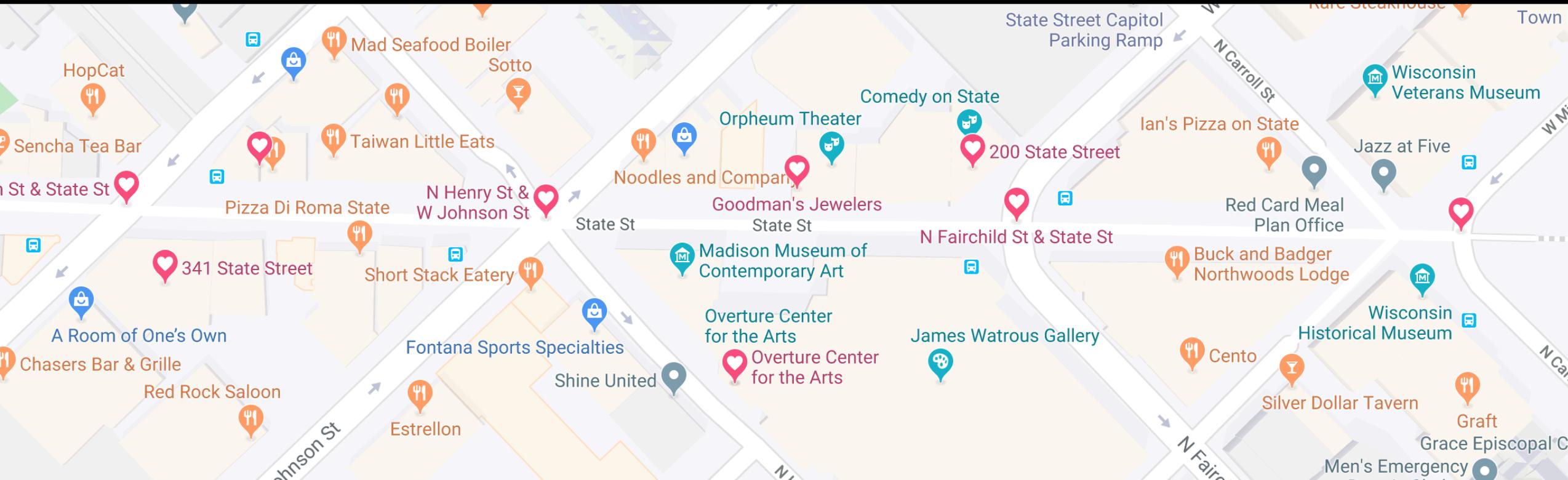
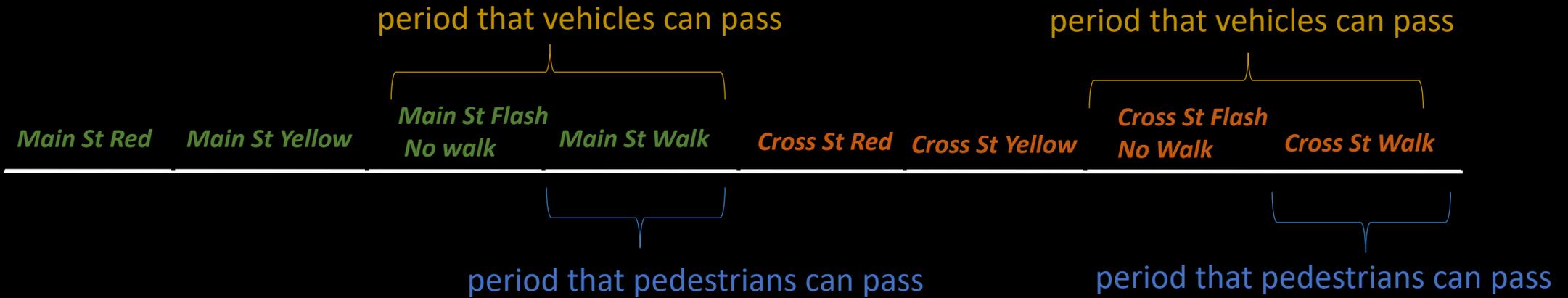


# Optimization towards State St Traffic Light Patterns

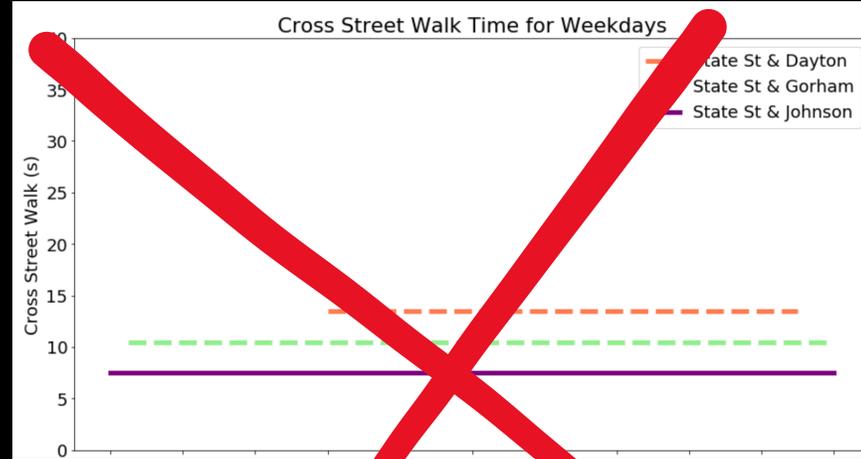
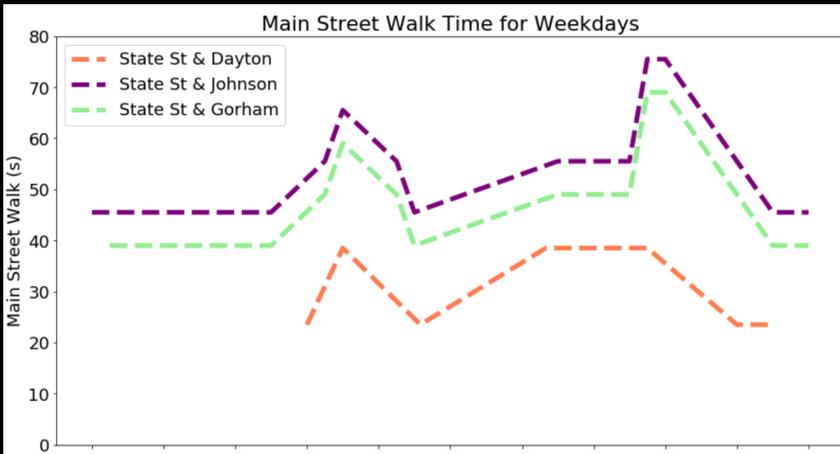
--- By Hanyu Cai



# What a complete traffic light "cycle" consists of ?



# Current Light Patterns



Fixed all the time

# Build the new traffic light patterns

Use scipy.optimize

Constraints/Assumptions:

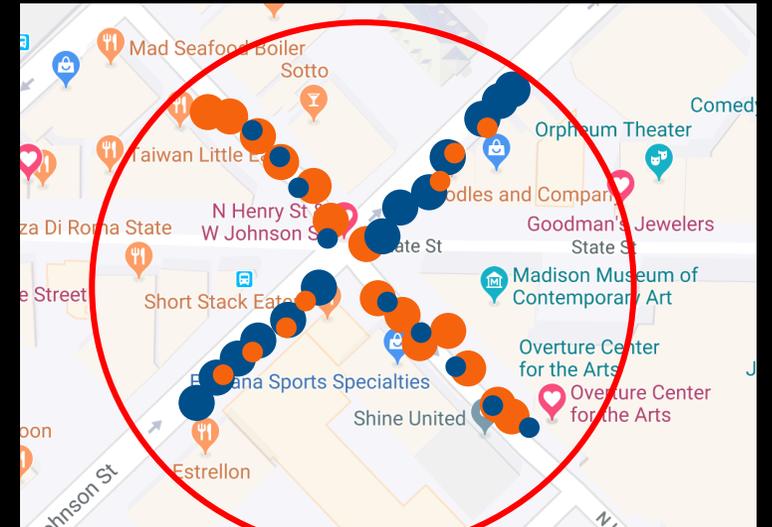
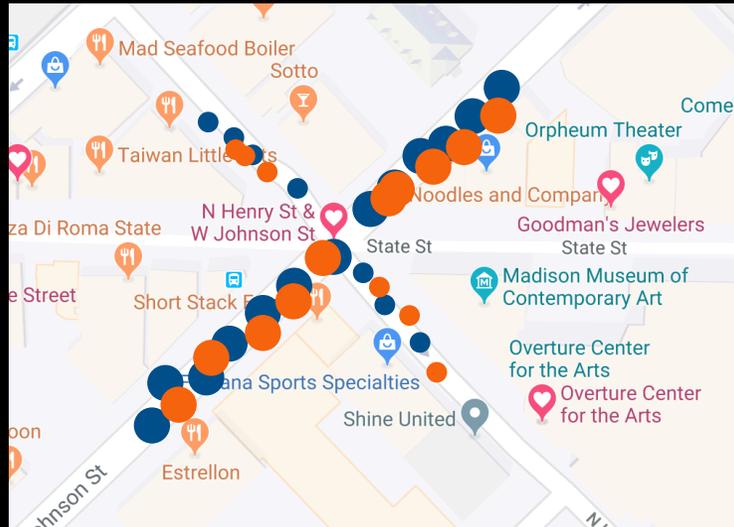
1. Total Cycle is 60-110s  
(adjust according to different intersections)

2. The differences between main st & crs st cycle is less than a constant  $C$   
(adjust  $C$  according to different intersections)

## What if pedestrians and vehicles follow different directions on State St?

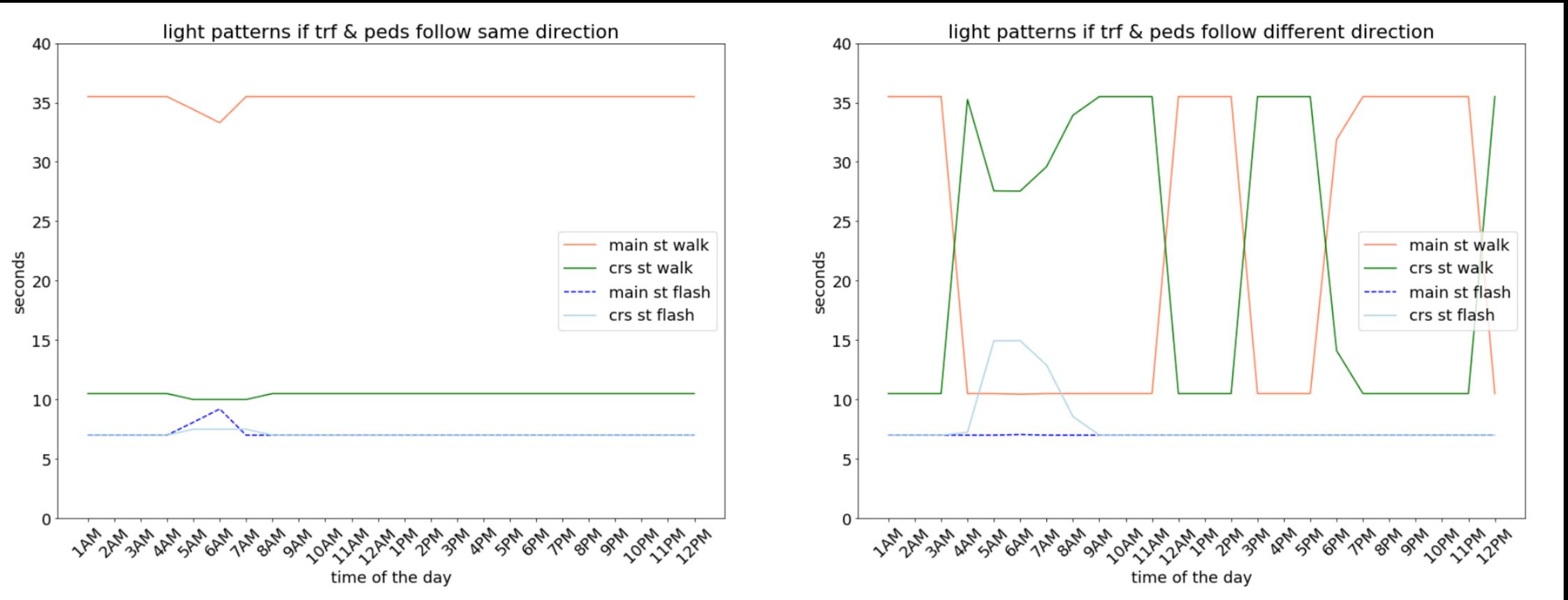
80% peds & vehicles go main st,  
20% peds & vehicles go crs st

80% peds & 40% vehicles go main st,  
20% peds & 60% vehicles go crs st



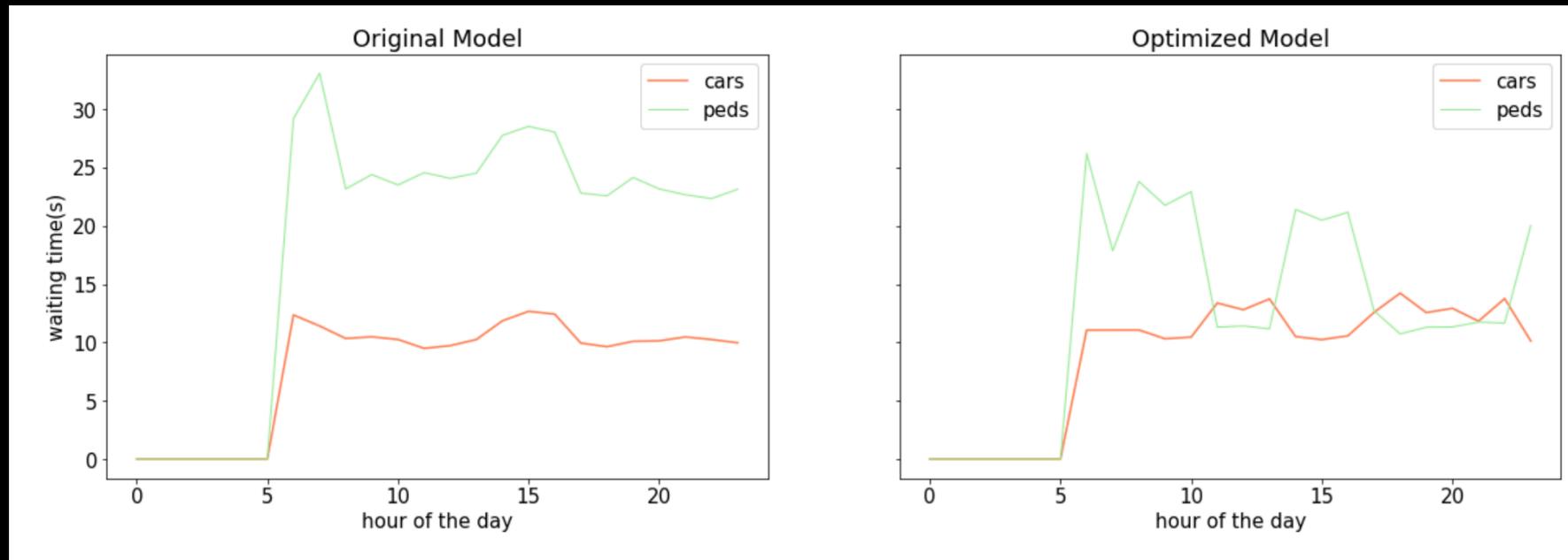
Traffic congestions may arouse

# The rate of vehicles/peds matters



# Vehicles oriented → more pedestrians oriented

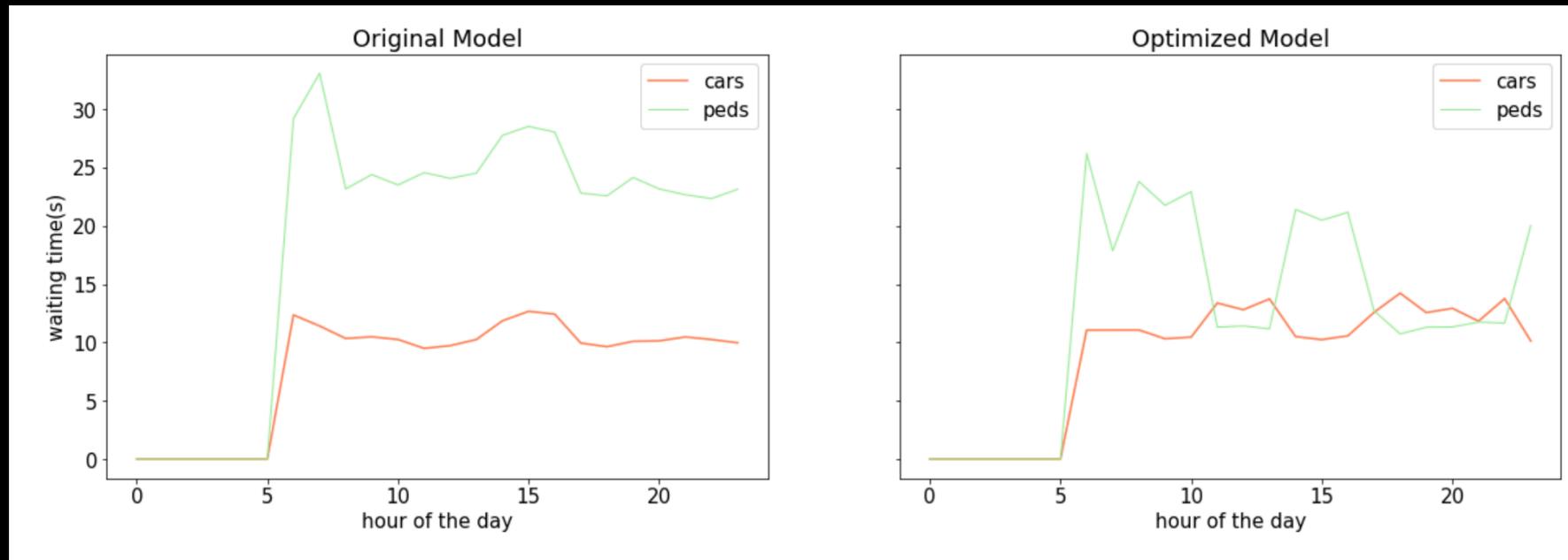
Optimization result for traffic on Mon-Thurs



|                                       | Main ST cars | Crs ST cars | Main ST peds | Crs St Peds |
|---------------------------------------|--------------|-------------|--------------|-------------|
| <b>Avg waiting</b>                    | 12.4         | 4           | 20.6         | 9.2         |
| <b>Avg waiting after optimization</b> | 9.3          | 8.7         | 12.6         | 12.2        |

# Vehicles oriented → more pedestrians oriented

Optimization result for traffic on Mon-Thurs



|                                | Main ST cars | Crs ST cars | Main ST peds | Crs St Peds |
|--------------------------------|--------------|-------------|--------------|-------------|
| Avg waiting                    | 12.4         | 4           | 20.6         | 9.2         |
| Avg waiting after optimization | 9.3          | 8.7         | 12.6         | 12.2        |



