Week 5

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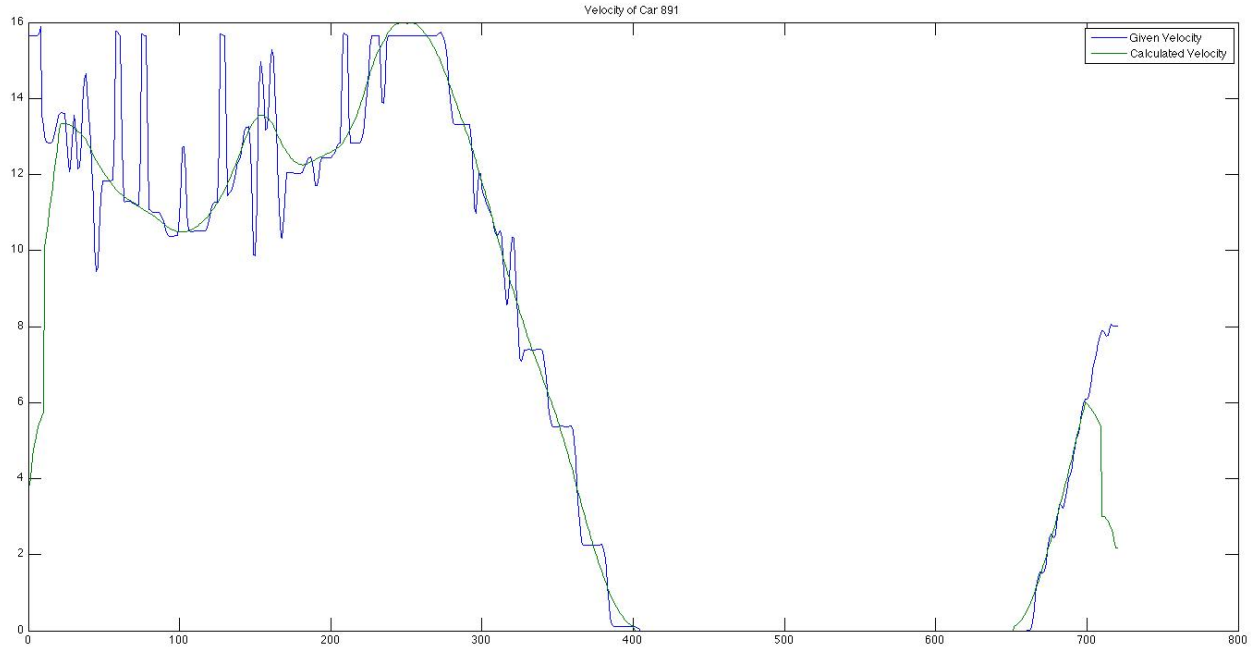
Identifying Aggressive or Unsafe Vehicle Behaviors

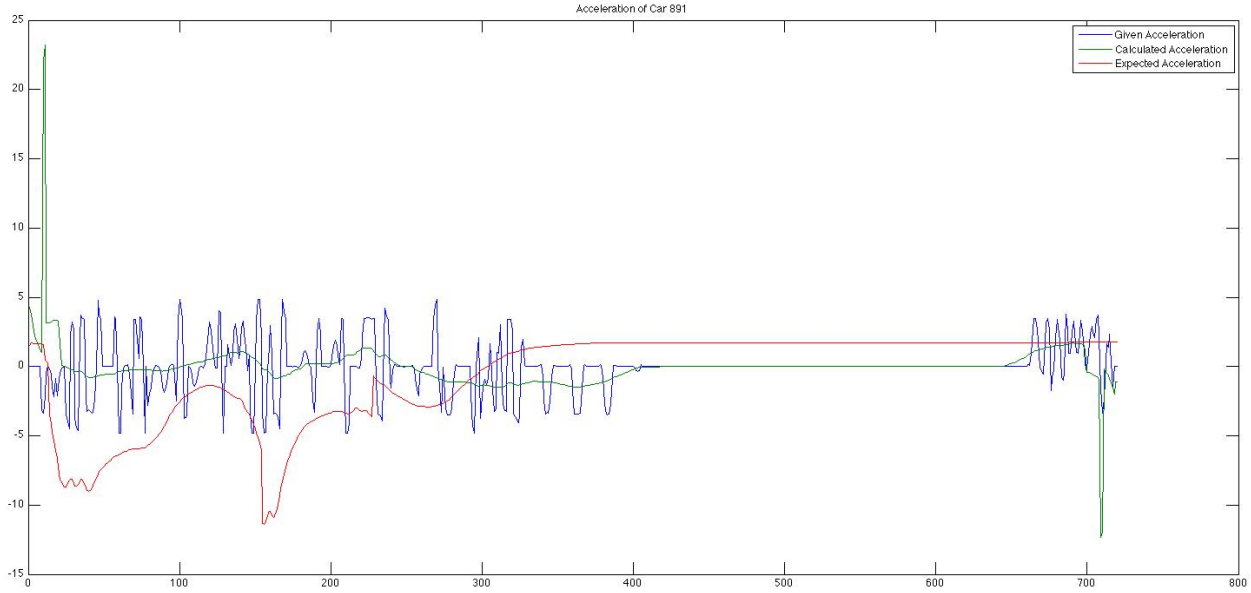
- Acceleration Behaviors
  - Accelerating too quickly
  - Braking too sharply
  - Not braking when should be braking
- Speeding
- Following too closely
- Lane Changes
  - Twice in rapid succession
  - Three lane changes in a short period of time

Weaknesses

- Accuracy of the results is based heavily on the accuracy of the input data
  - "Jittery" position data can cause extreme instantaneous velocity/acceleration calculations
  - Input position data is averaged to compensate for this

    x(i) = mean(x(i - n) : x(i + n))


Velocity of Car 891
Given Velocity
Calculated Velocity
0
2
4
6
8
10
12
14
16
0
100
200
300
400
500
600
700
800


Acceleration of Car 891
Given Acceleration
Calculated Acceleration
Expected Acceleration
-15
-10
-5
0
5
10
15
20
25
0
100
200
300
400
500
600
700
800

Weaknesses (contd)

- Intelligent driver model is difficult to calibrate, there are many variables
  - Max acceleration, comfortable deceleration, safe time behind leading vehicle, desired velocity
- Difficult to judge the correctness of the system and determine threshold values
  - How many lane changes is too many?
  - How much acceleration is aggressive?
  - Is 5 mph over the speed limit OK?
- Cannot easily look at the video to determine some aggressive behaviors
  - acceleration