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Amelio-rater

Detection and Classification of Driving Abnormal Behavior for Automated Ratings and Real-time Monitoring

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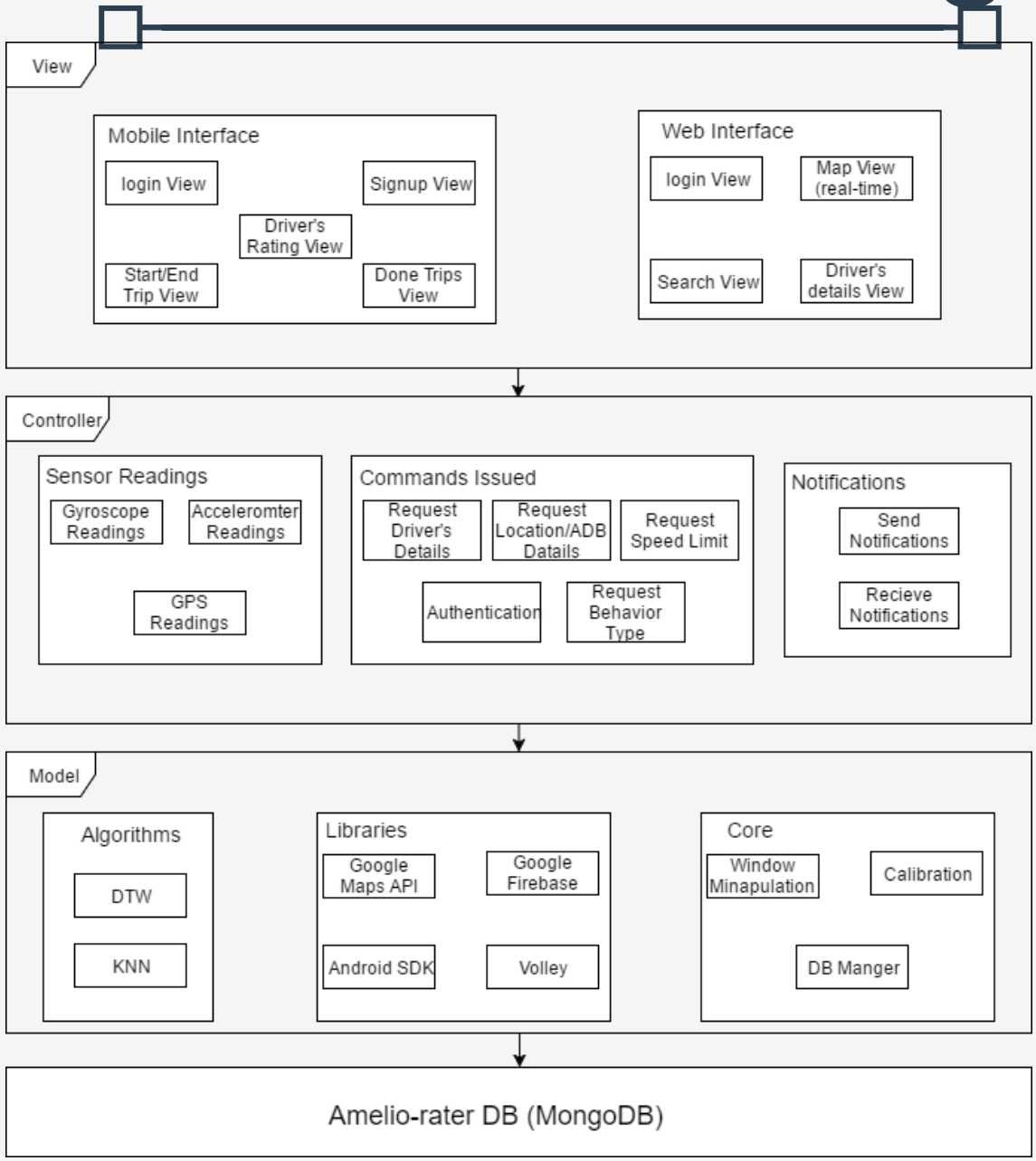
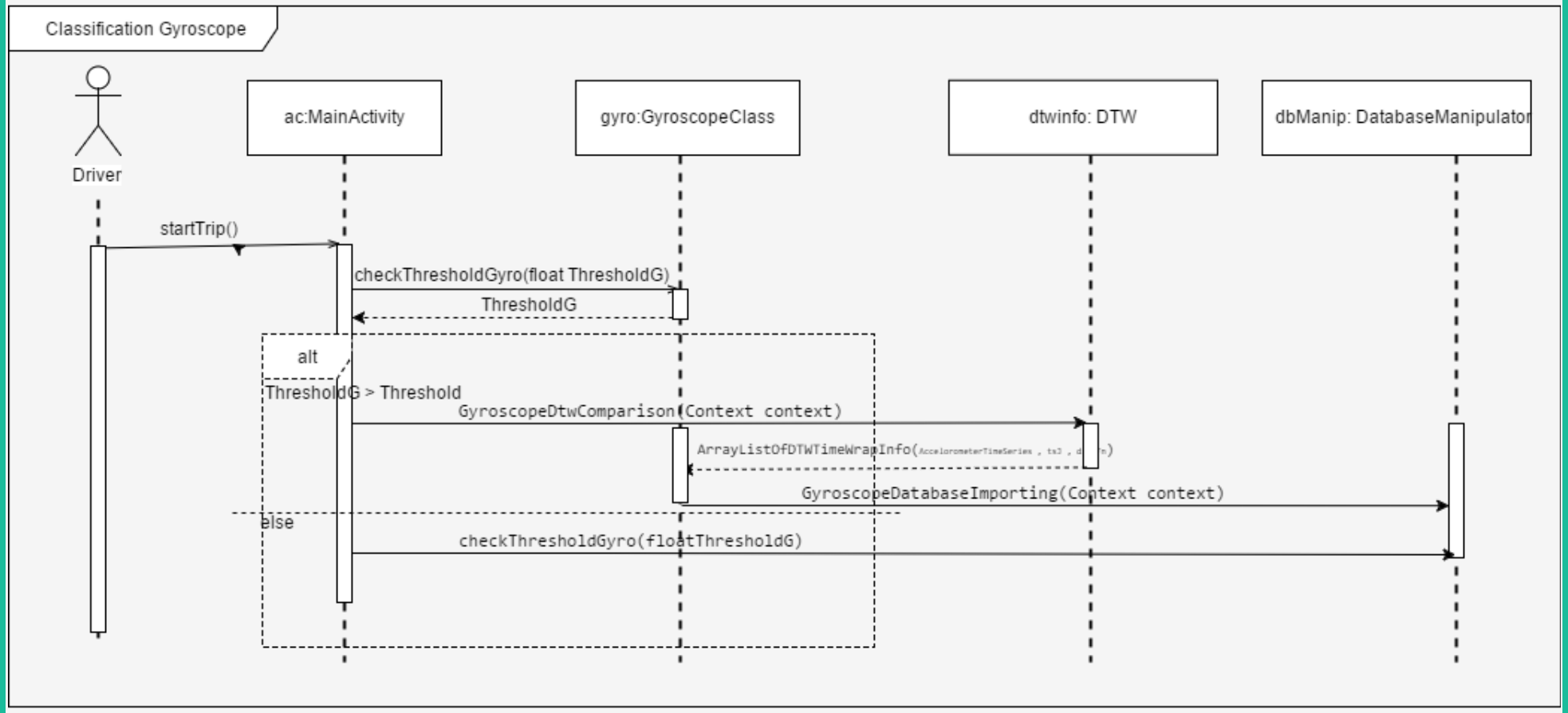
Introduction

Detection and IMPROVEMENT OF CLASSIFICATION ACCURACY of Driving Abnormal Behaviors and Road Conditions to AUTOMATICALLY Generate RATINGS in REAL-TIME

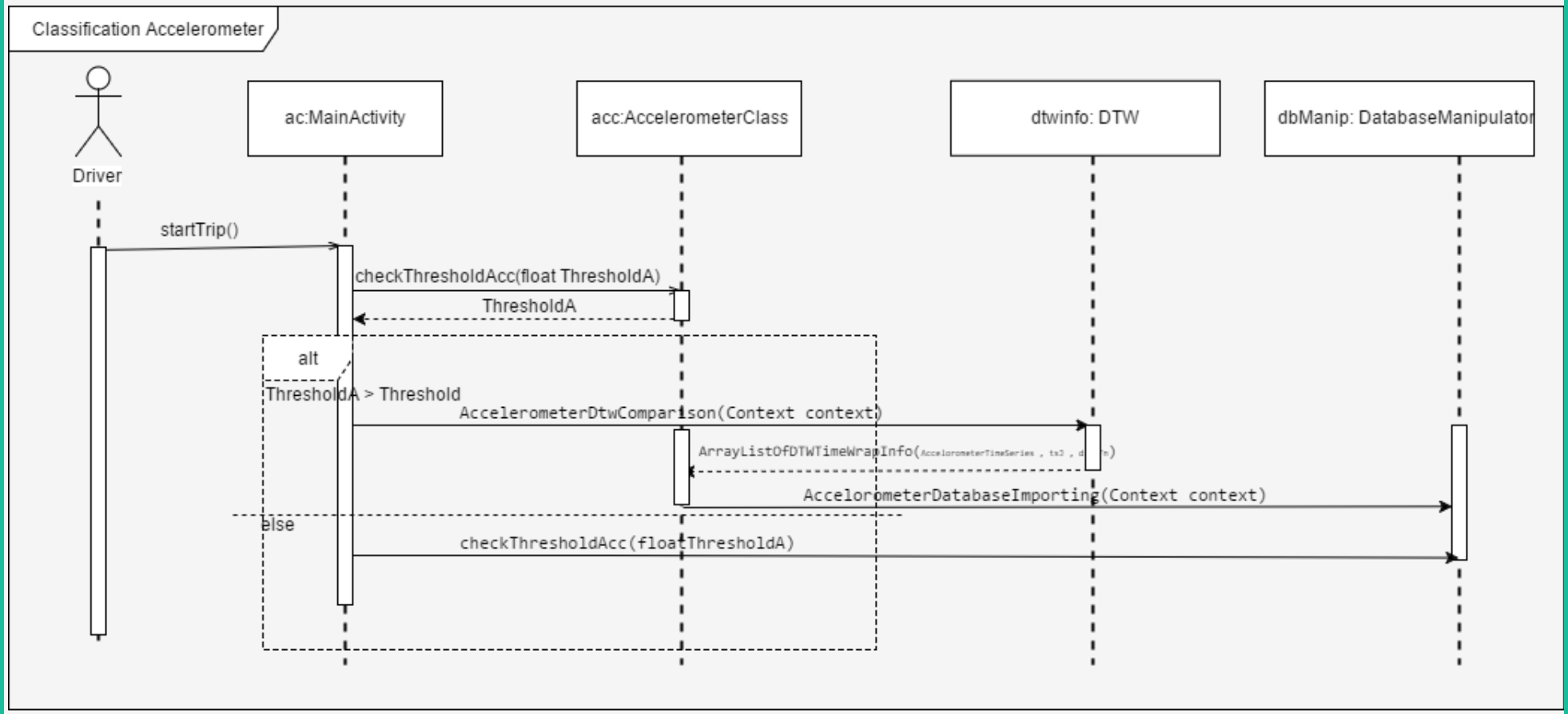
Architecture Diagram



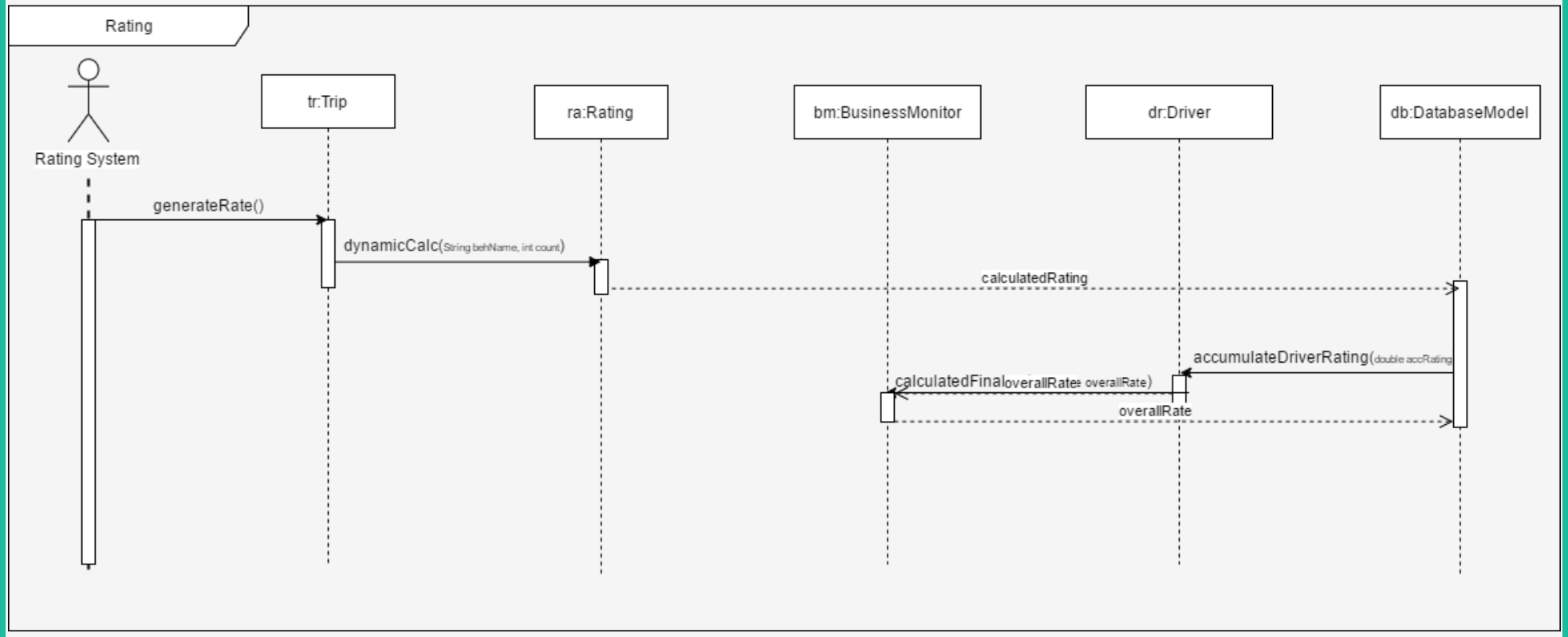
Sequence Diagram1/3



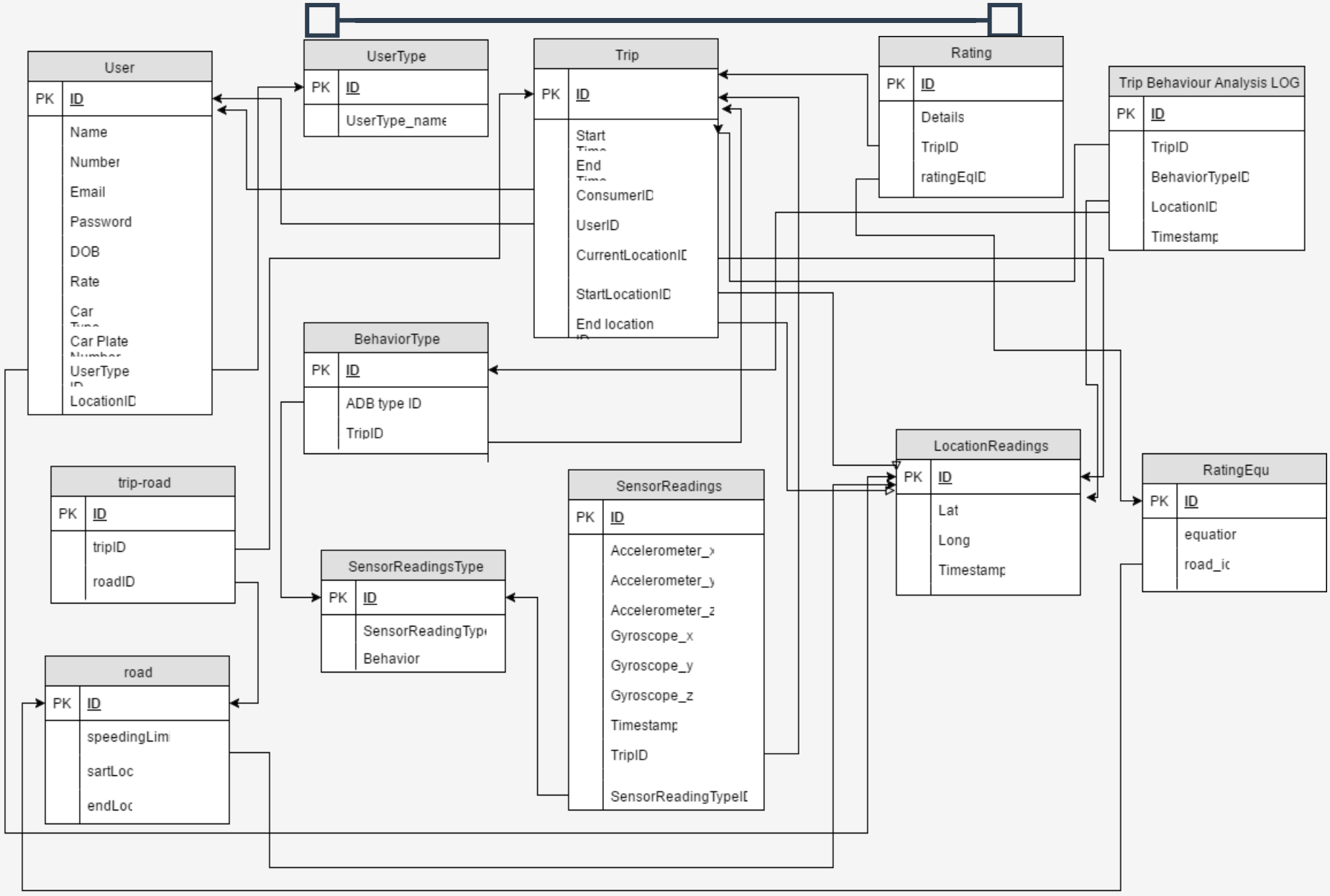
Sequence Diagram 2/3



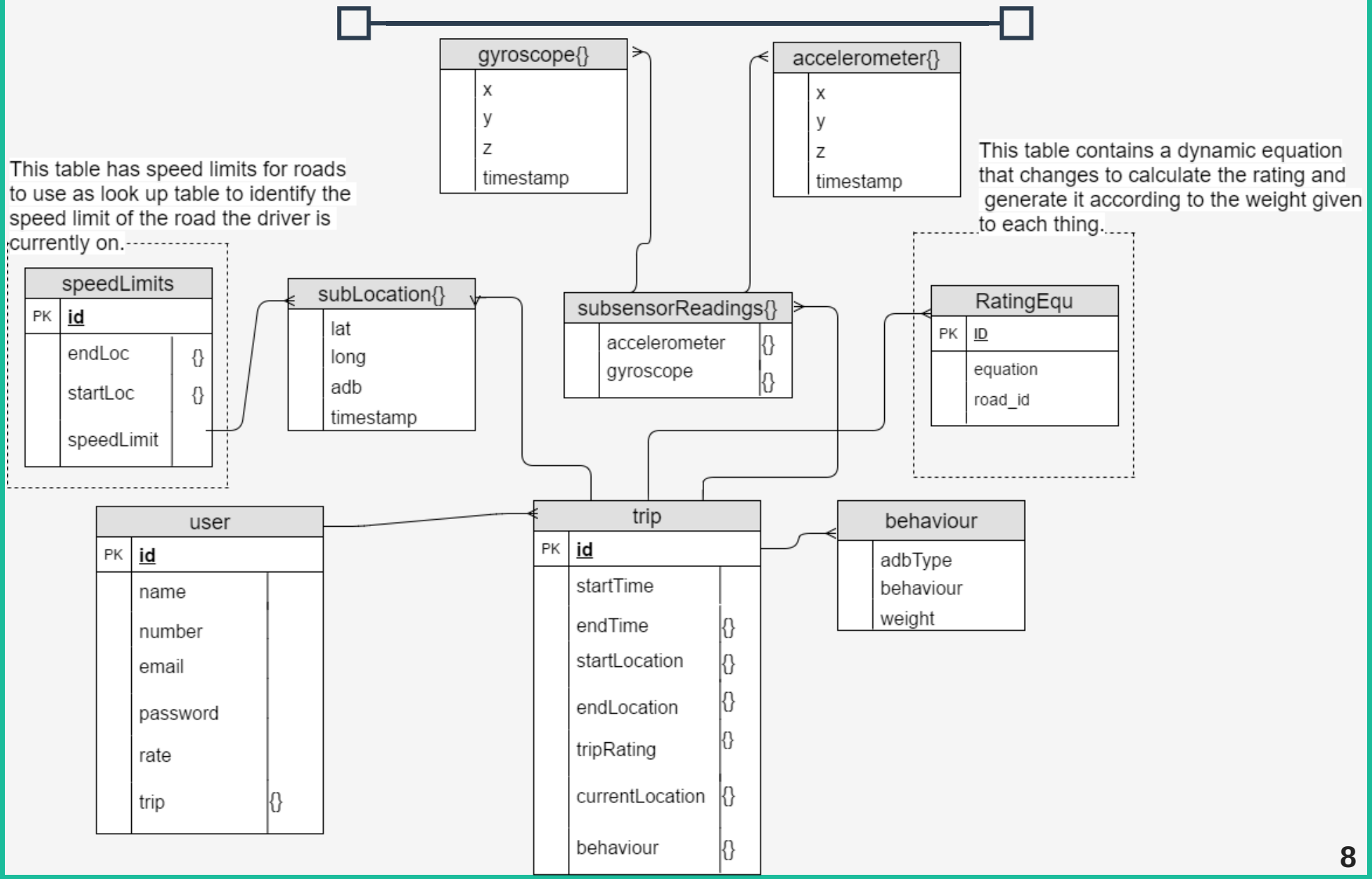
Sequence Diagram3/3



Database- Relational



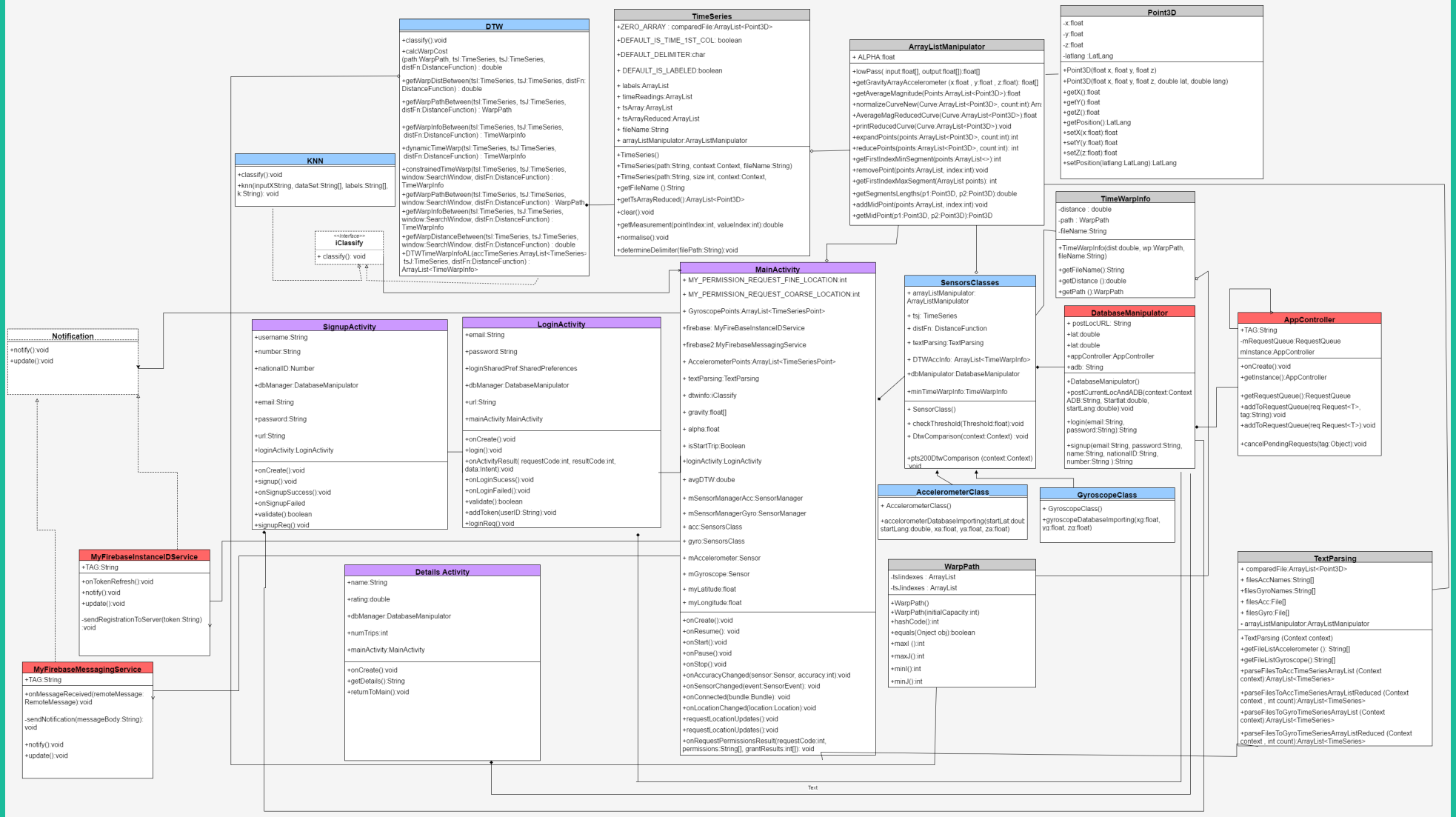
Database-Non Relational



Database-JSON Format

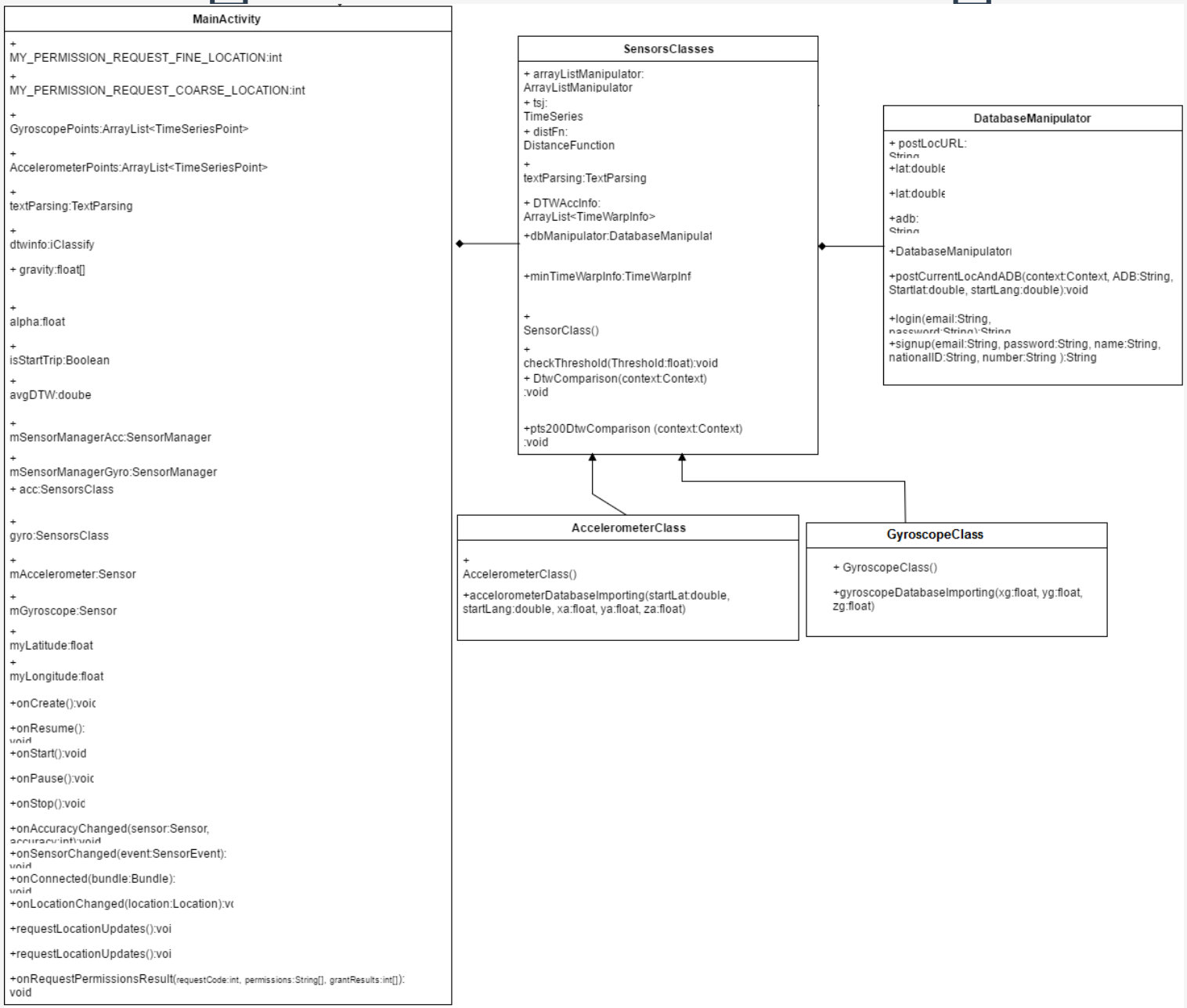
```
{
    "_id" : ObjectId("58dac9e3c0fba914e42dd6ae"),
    "name" : "passant",
    "number" : "01000437282",
    "email" : "passant@example.com",
    "password" : "$2a$10$7zeaCl4VZUvEpVAl5BhbYOjmViDDm7xEtjb7r2G1kixIORCop5AMy",
    "trips" : [
        ObjectId("58dacae0c198be00f06c0507")
    ],
    "__v" : 1
}
```

Class Diagram



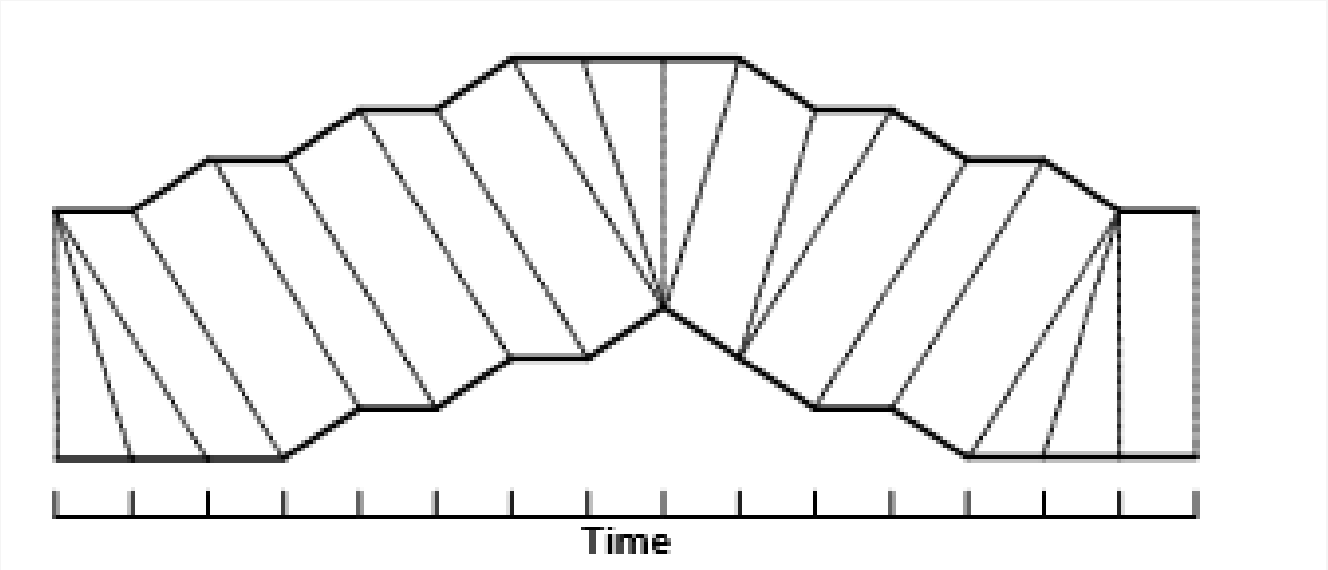
Class Diagram - Strategy

Class Diagram-Sensors



Algorithm- DTW

- Dynamic Time Warping
- Measure the distance between the two time series (testing and training)
- Euclidean distance calculation



DTW Confusion Matrix

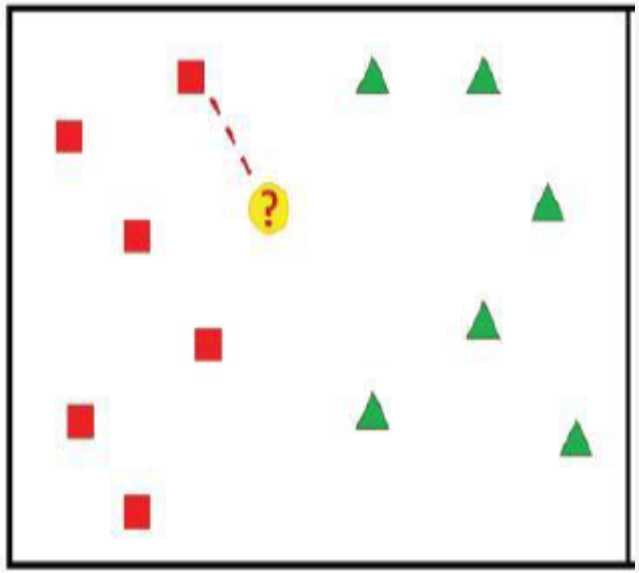
Behaviours+Directions

2 templates for each behaviour		
ADB	Accuracy	
SLL	8/9	
SLR	5/9	
SWLR	0/9	read as SLL and SLR one after the other
SWRL	0/9	
W	0/9	read as SLL , SLR and SWLR

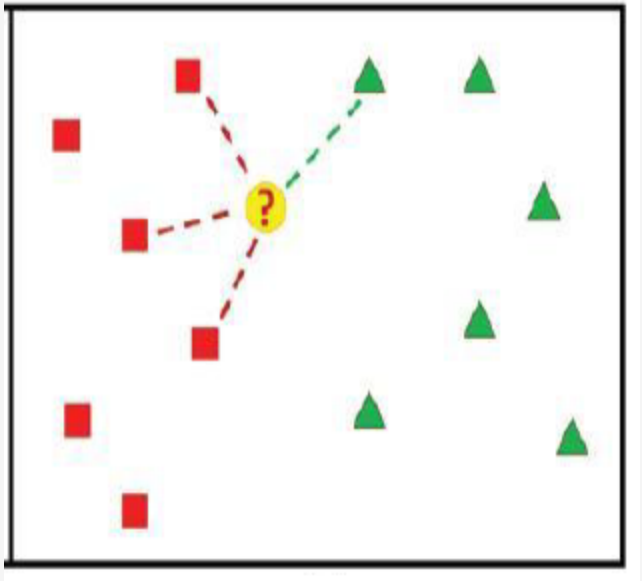
Behaviours Only

ADB	Accuracy	
SL	15/18	
SW	9/18	
	Window of 200pts: 0/9	read as SW and SLR
W	Window of 300pts : 9/9	

Algorithm- KNN



(A) 1-NN



(B)4-NN

Cross Validation

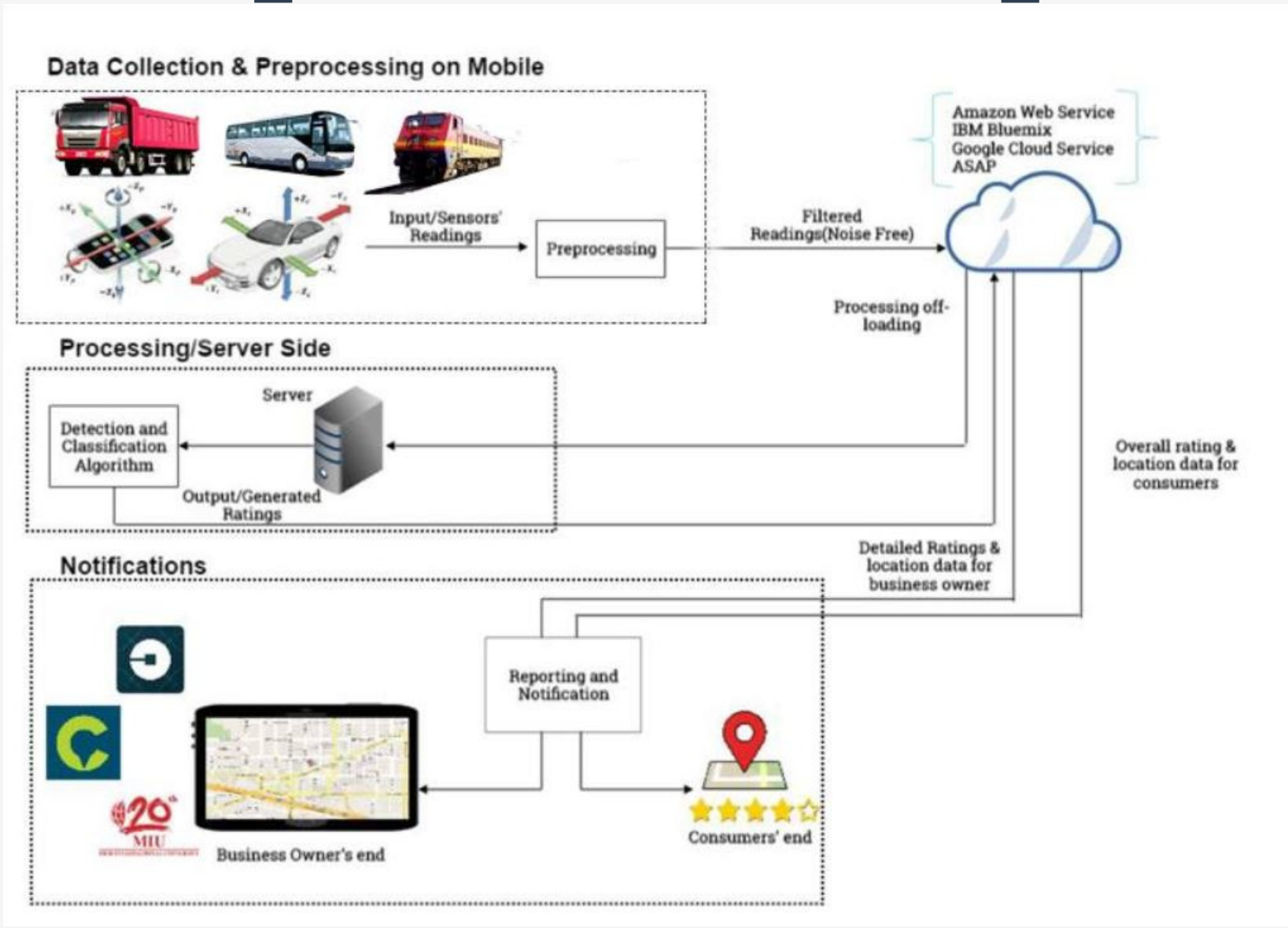
For each behaviour:

- 11 training templates
- Selected 3 with minimum averages
- Templates stored for comparison; where testing dataset is compared against the 3 selected training dataset templates.

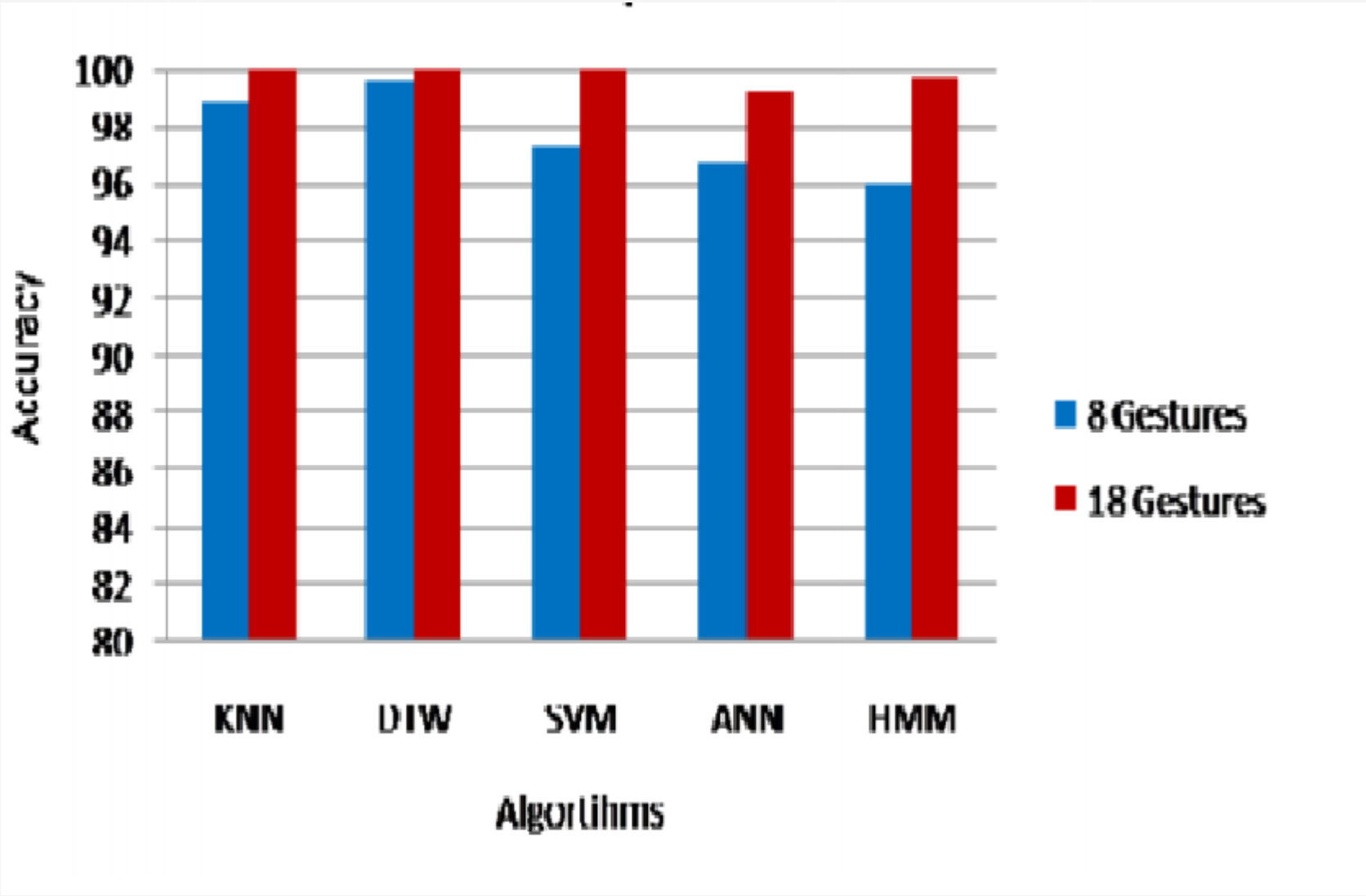
DEMO

APPENDIX

System Overview



Why DTW


100
98
96
94
92
90
88
86
84
82
80
Accuracy
KNN
DTW
SVM
ANN
HMM
Algorithms
8 Gestures
18 Gestures

How Real-time

- Socket.io: real-time bidirectional event-based communication