An Interactive Web Tool for Understanding Vehicle Behaviour

Course Name	**Project in Computer Science and Engineering**
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INTRODUCTION

General Objective

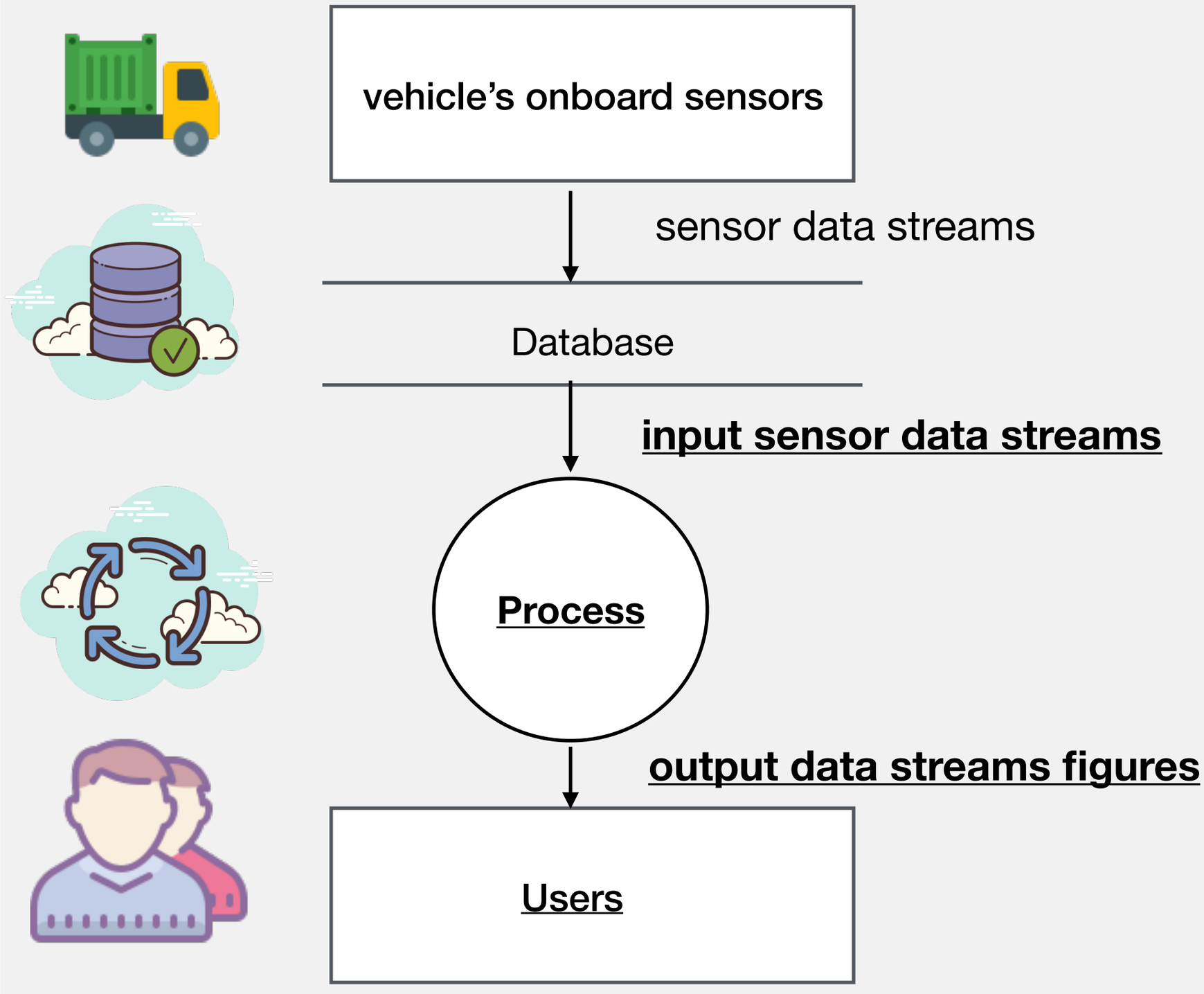
A A web interface for plotting the sensor data streams

B Provide support for data scientists or fleet operators in understanding the vehicle's behaviour

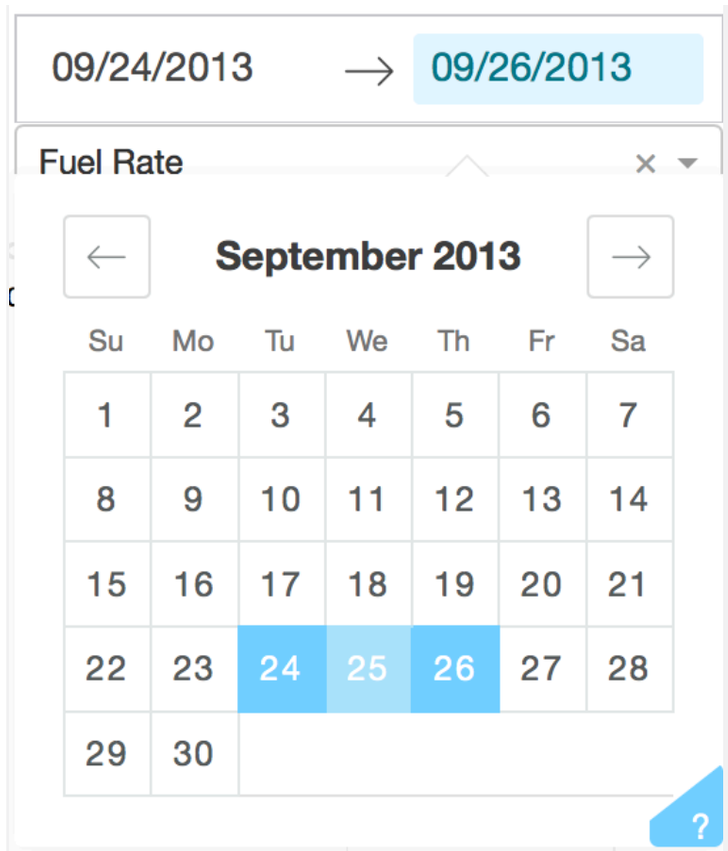
Motivation

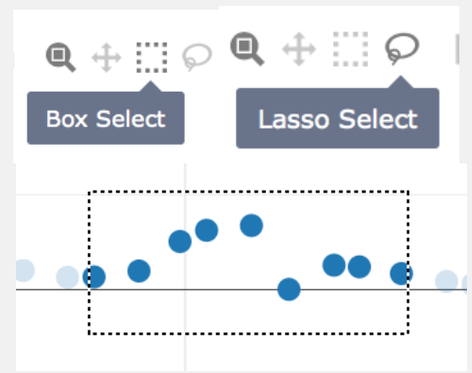
- Assist users to analyse sensor data streams
- Detect outliers or unusual behaviours of the vehicle

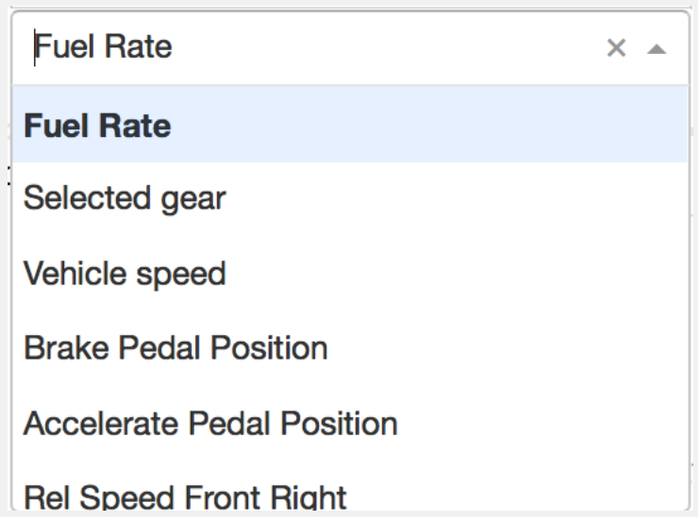
Methods


vehicle's onboard sensors
sensor data streams
Database
input sensor data streams
Process
output data streams figures
Users

Methods: Input Mechanism







Tool

- IDE PyCharm
- Dash
  - -a productive Python framework
  - -for building data visualisation with custom user interfaces

Dash core components

- Date picker range
- Dropdown menu
- Multi dropdown menu
- Slider
- Box / Lasso Select
- Text input

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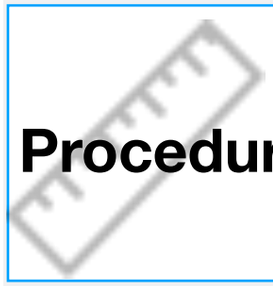
Methods: Process

Given a training set of labelled examples like
$\{(x_1,y_1),(x_2,y_2)\ldots(x_n,y_n)\}$
to estimate the best **classifier**

Procedure1

Training classifier Decision Tree, Support Vector Machine, Neural Network, K-nearest neighbours



Procedure2

Evaluating a classifier
Cross-validation, Accuracy, F1 Score

Procedure3

Prediction apply classifier to a never before seen test examples **x** and output the predicted value y=f(x)

Tool Scikit-learn machine learning library

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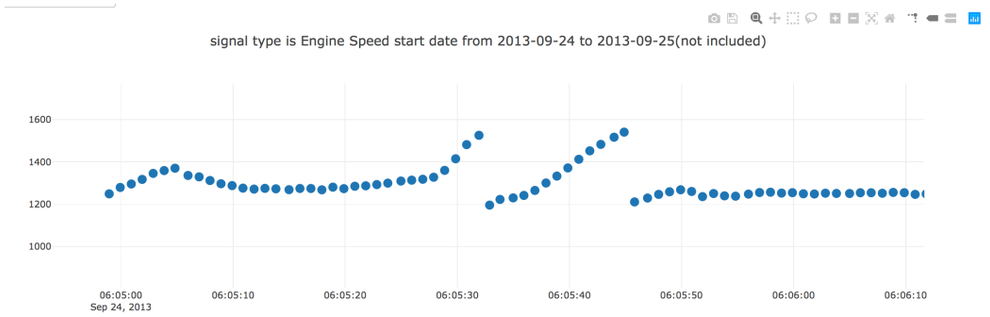
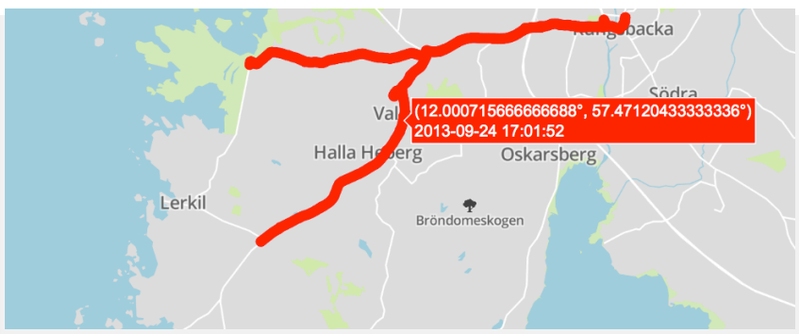
Methods: output data streams figures



Scatter plot



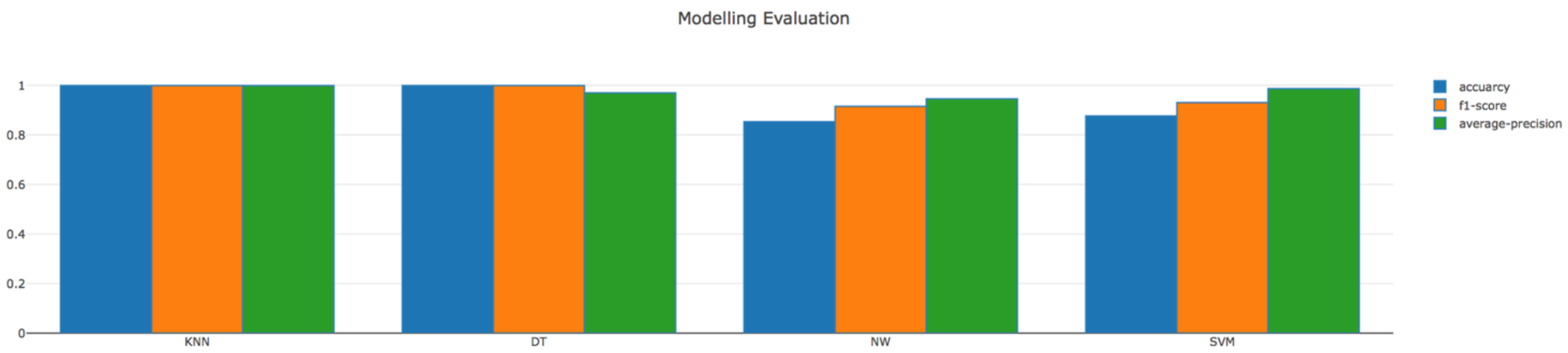
Map

Enter a column name... ADD COLUMN

	Column 1	Column 2	Column 3	Column 4
×	0	5	10	15
×	1	6	11	16
×	2	7	12	17
×	3	8	13	18
×	4	9	14	19

ADD ROW

Data table



Bar chart

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Results

Project Results

Show use-case

Results

Summary
- achieve our goal
- some limitations
  - -improvement of performance
  - -binary classifier (two class)

Further work
- survey
- functionality
  - -more types of classification algorithms

Acknowledgement

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Introduction

Methods

Results

Conclusion

Thanks!