



# The absolute and social comparative analysis of driver performance on a simulated road network

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# Introduction

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The exploitation of Serious games in automotive domain to **inculcate the safe and green driving patterns** will be the best way to instill better driving traits among the road users.

## Need for proposed design ?

- The Qualitative evaluation schema to gauge and enhance the driver performance
- Establish a social serious game to benefit the road users
- The comparative analysis model to estimate the driver performance based on absolute and social comparisons.
- Visualization factor - Representation of user performance on Google maps .



# Research Collaboration

TEAM (Tomorrow's Elastic Adaptive Mobility) – EU FP7 project

## Major Aim:

Utilization of mobile devices (smartphones, tablets and etc.) to form a collaborative network of road users in order to adapt for dynamic situations that would account for road safety.

## Outcomes:

- Digitalization of system and processes
- Formation of collaborative network of road users
- Providing coaching and feedback on driver performance
- Inculcation of green and safe driving patterns





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# System Architecture

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# Design and control flow

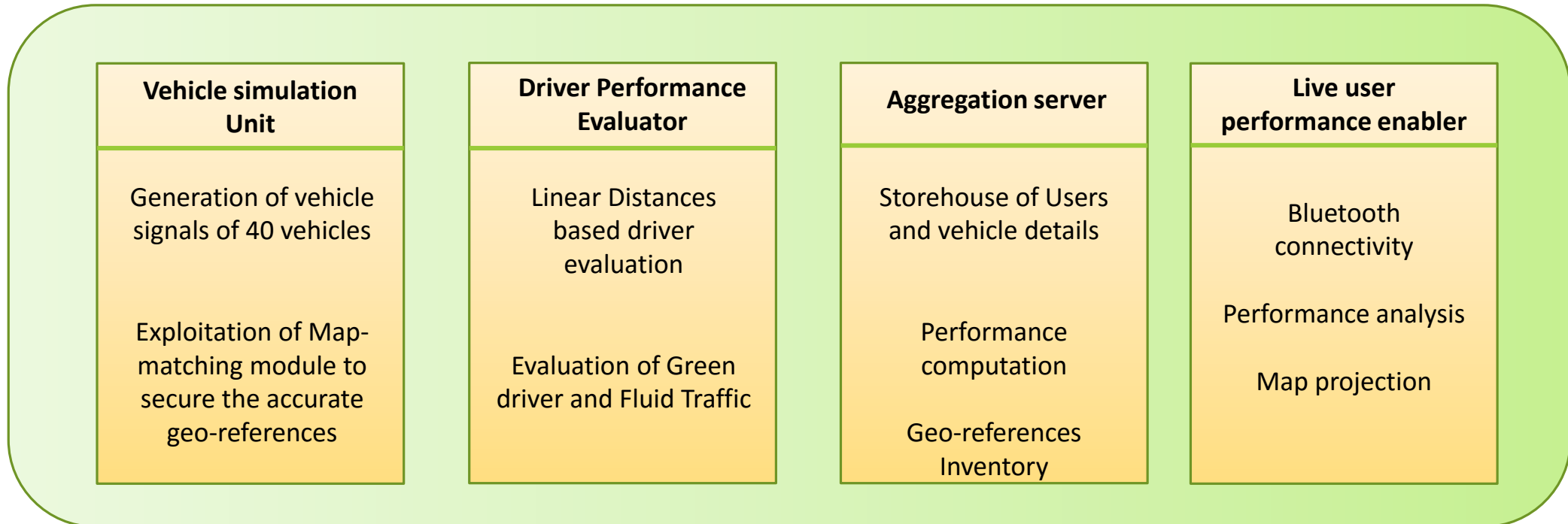
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- Simulation of road network by manipulating the vehicle signals
- Evaluation of Green drive and Fluid traffic by Linear distances driver evaluation module
- Use of Map-matching module to rectify the inaccurate Geo-references
- Tabulation of user performance on road network in Aggregation Server
- Representation of Live analysis of User performance on Smartphone



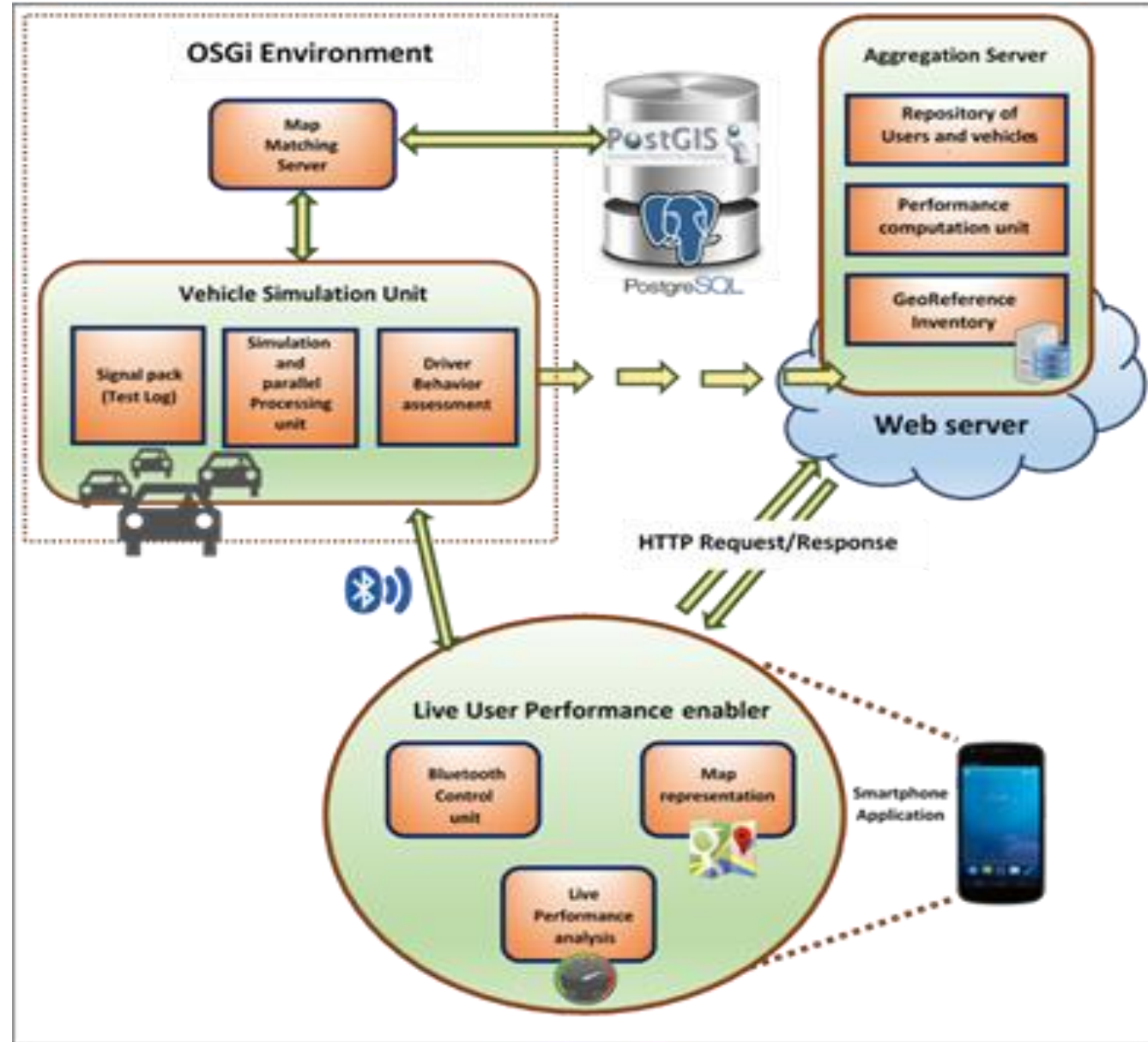
# Functionalities and Unit descriptions

## Unification of four architectures





# Implemented System Architecture







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# Evaluation Methodology

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# Evaluation methods

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## Absolute performance analysis:

- Display of user evaluation results based on green Drive and fluid Traffic on the scale of Traffic light(with colors corresponding to performances).

## Social Performance Analysis:

- Comparison of average User performance against the average of all the users on the road network.
- 1 user Vs. 40 users.
- Comparison based on historic and current values

# User Interface on Smartphone



Live Analysis



Map Projection

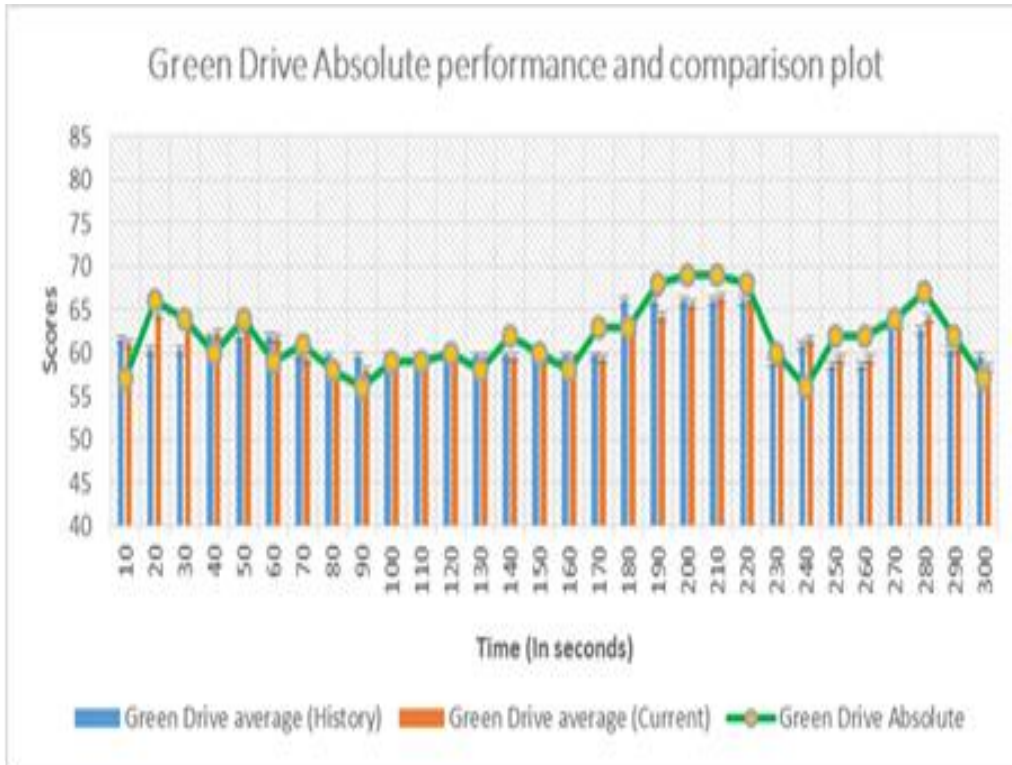
- Representation of Live analysis based on absolute and social comparisons
- Performance analysis of historic and current values.
- Display of links on Google Maps



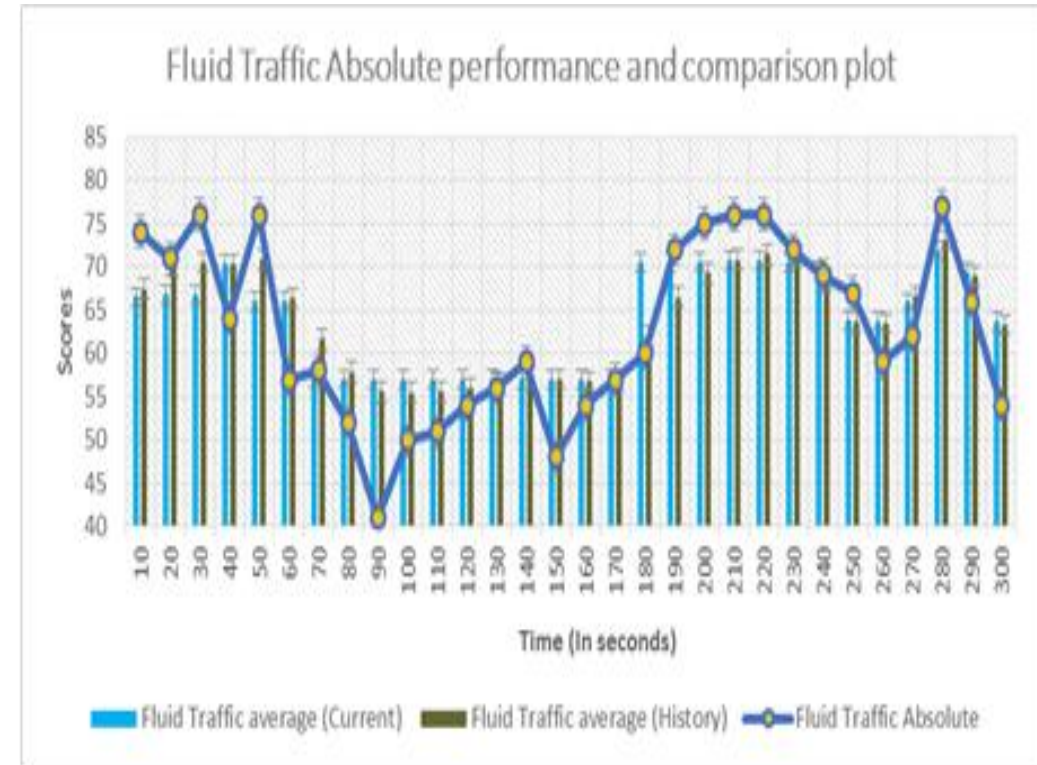
# Results

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# Results - Absolute performance plots

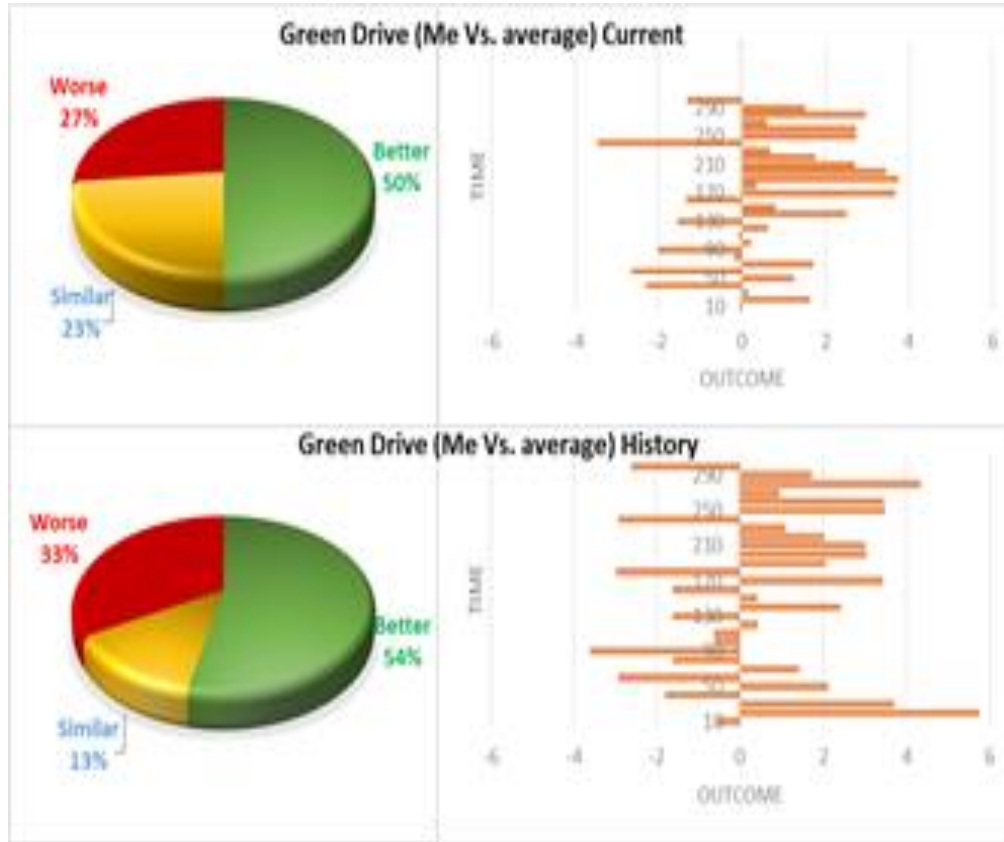


Green Drive Absolute Analysis



Fluid Traffic Absolute Analysis

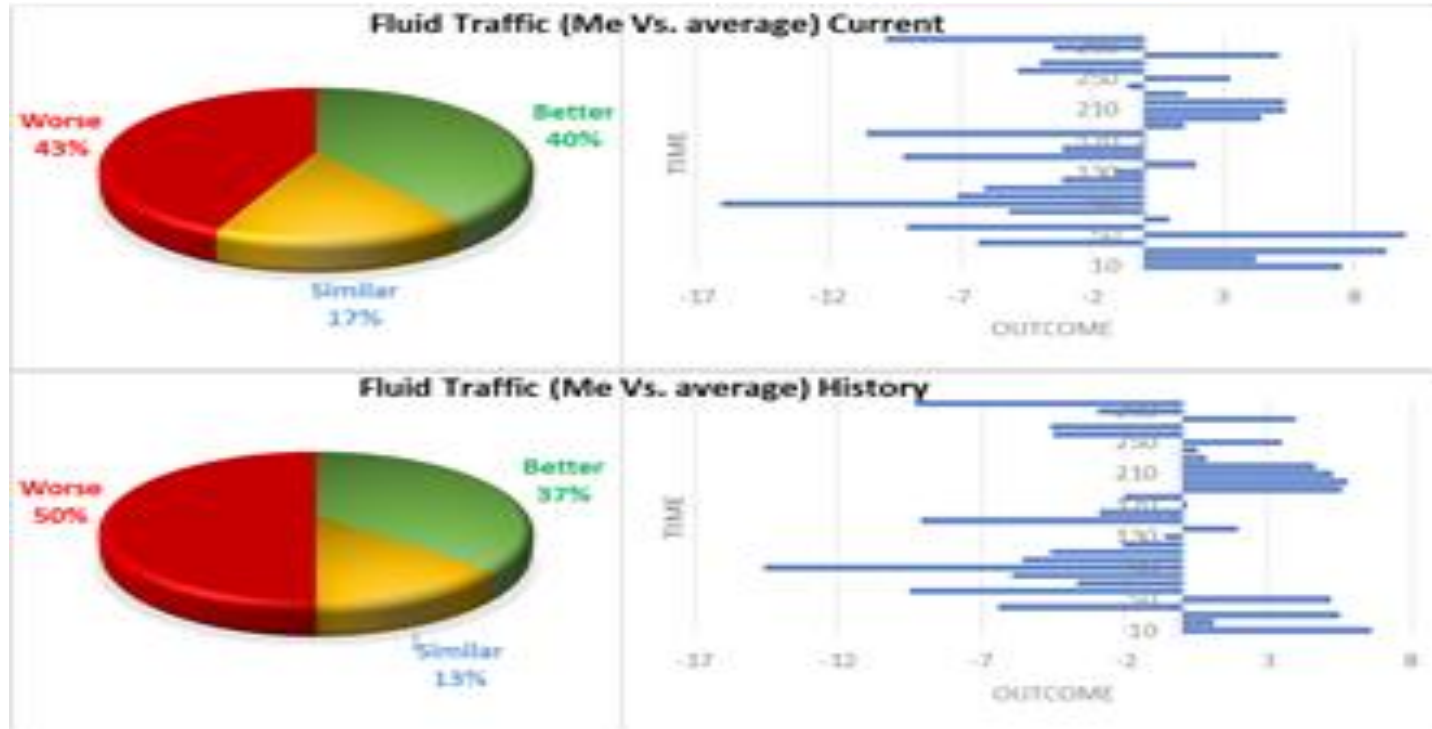
# Results – Green Drive statistical report



- Evaluation of green drive results based on acceleration, brake and RPM signals
- Comparative analysis of current and historic performances



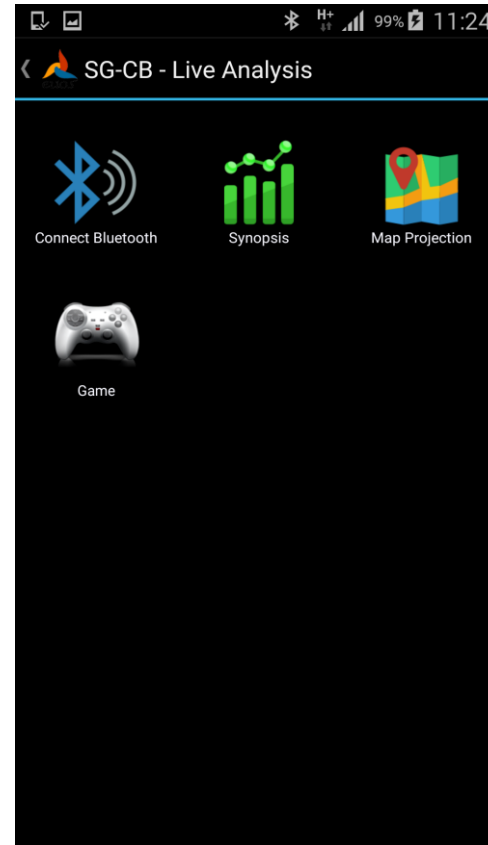
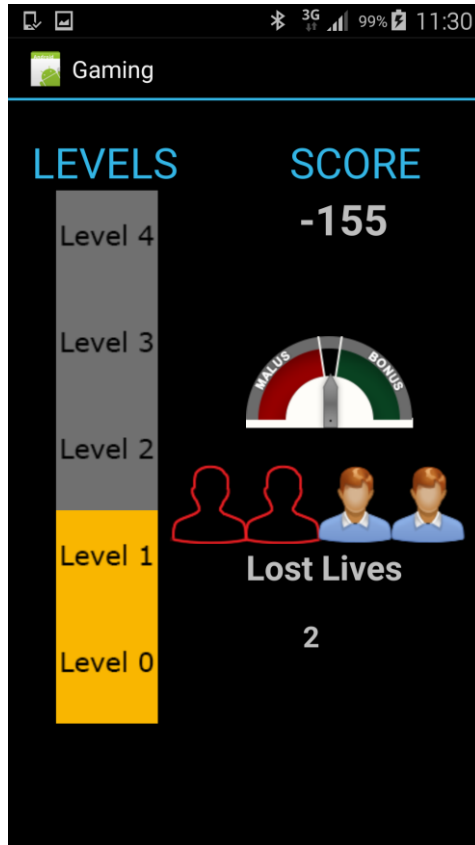
# Results – Fluid Traffic statistical Report



Evaluation of Fluid traffic results based on Speed signals



# Ongoing work



- Extended real-time driver performance analysis
- Development of live gaming scenario for gauging user performance on the basis of Green drive.
- Statistical performances of users
- Evaluation models using the sensors of smartphone (Accelerometer and Gyroscope) for assessing harsh driving patterns.
- Establishment Inter app communication for live gaming





# Conclusion

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- An evaluation approach for uplifting the driver behavior using Gamified Environment.
- Prudent mechanism for real-time analysis of driver performance.
- Smartphone based User interface:
  - Live analysis of Absolute and relative performance reports.
  - Representation of performance on Road links.
- Instilled the qualitative grading pattern for gauging the user performance on the aspects of Green Drive and Fluid Traffic.



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# Thank You for Listening

## Questions?