DIGITALEUROPE

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DIGITALEUROPE's guiding points on safety in automated driving

Executive Summary

Today's roads and drivers across Member States are comparatively safe. Yet, road traffic accidents do still occur, and in the EU human error is involved in about 95% of all cases.[1]

Automated driving can truly make our roads safer. By 2025, the technology will create profits of up to €620 billion for the EU automotive industry.[2] It is now key for the EU to play a contributing role.

Defining safety metrics is crucial to accelerate the development of the technology. The EU must support their adoption and model them after industry proposals in its type-approval regulation. It must take a global leadership role and make safety metrics a core aspect of its regulatory proposals in the United Nations Economic Commission for Europe (UNECE) fora, where governments and stakeholders shape global vehicle safety standards.

Any safety metrics should entail a mix of methods and foresee:

- testing, including track testing to validate control systems in contexts that cannot be assessed via real world or simulation testing, and simulation testing of the decision-making model, with the addition of real-world testing to validate the results obtained through other methods.
- auditing of the safety concept for its adherence to metrics and design requirements.

[1] European Commission, Saving Lives: Boosting Car Safety in the EU, 2016

[2] European Parliament, Self-driving cars in the EU: from science fiction to reality, 2019

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Why we need legislation on automated driving

Automated driving, i.e. an ever-vigilant system, has great potential to improve road safety. Today's cars and their drivers on European roads offer a commendable degree of safety. Yet, human driving performance remains a key factor in traffic accidents. Human error is involved in about 95% of all road traffic accidents in the EU.

This is means we must establish a baseline of safety to ensure common minimum standards for automated vehicles (AVs). This will get automated driving technology to the European market and reduce existing crash rates. The baseline will ensure the safety of the public and raise the bar for automated vehicle safety above current levels. It will also build critical consumer confidence in the technology, by providing transparency in how operational safety is achieved.

Safety in automated driving: how to assess it and limitations of current methods

There are three main ways to test an automated car:

- on the road
- on a test track
- using simulation

Real-world testing on the road is the only true measure of automated vehicle safety, but it is impossible to cover enough kilometres within a reasonable amount of time to be confident that a vehicle can handle all situations.

Track testing in a highly controlled environment does not replicate the complex and random nature of real-world environments, but is appropriate for testing the "stress test" emergency response procedures of a vehicle.

Simulation is a powerful tool to assess the implementation of decision-making models. Like other testing methods, it has limitations: the modelling of a driving environment is by necessity a simplified approximation of reality with its own assumptions.

It is fundamental regulators and the industry promote the adoption of test scenarios that are representative of real-world accident scenarios and technology-neutral test metrics that promote safe operation in all conditions.

This approach will ensure the positive contribution of AVs to road safety through effective testing methods.

The road ahead to ensure safety in automated driving

A combination of methods is the best way to establish a baseline for AV safety through the type-approval process.

We promote an approach that entails:

- testing, including track testing to validate control systems in contexts that cannot be assessed via real world or simulation testing, and simulation testing, with the addition of real-world testing to validate the results obtained through other methods.
- auditing of the vehicle safety concept for its adherence to metrics and design requirements.

Vehicle safety metrics should formalise the notion of safety in human driving not for specific scenarios, but in a universal fashion that defines a safety envelope applicable to all scenarios the vehicle encounters.

The definition of a safety envelope as a safety metric for automated vehicles must be independent from the control logic dictating the efficiency, comfort, and assertiveness of an AV, which may vary from one manufacturer to another and with which it should not compete. The safety envelope will set boundaries for the control logic of the AV in relation to other road users, to ensure that it remains in a safe situation.[3] It would determine safe and unsafe region for the operation of the vehicle. If the vehicle is found to be outside its safe operating area, the safety envelope must trigger a proper response to return the vehicle to a safe state. The safety envelope defining safety metrics should act as a filter to constrain the actions of an AV without having an impact on these actions, as long as they are defined as safe.

[3] Shashua et al., On a Formal Model of Safe and Scalable Self-driving Cars, 2018

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DIGITALEUROPE represents the digital technology industry in Europe. Our members include some of the world's largest IT, telecoms and consumer electronics companies and national associations from every part of Europe. DIGITALEUROPE wants European businesses and citizens to benefit fully from digital technologies and for Europe to grow, attract and sustain the world's best digital technology companies. DIGITALEUROPE ensures industry participation in the development and implementation of EU policies.

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