



Newsletter #2, 07/2021



Dear reader,

We are pleased to send you the second edition of our KI Familie newsletter. Our top story today is the first successful measurement campaign for real data of the KI Data Tooling project. Other highlights amongst others include the DNN-specific Safety Concerns of KI Absicherung and the KI Delta Learning ERCVAD Workshop at the renowned ICCV2021 conference.

Best wishes,

The KI Familie editorial team



Successful real data measurement campaign in Aschaffenburg

KI Data Tooling has conducted a first successful measurement campaign for real data between the 17th and 19th May 2021. Manuel Hetzel (University of Applied Sciences Aschaffenburg, UAB), Jihad Miramo (Bosch) and Tobias Wagner (Valeo) report on the extensive preparations, the practical implementation and what lessons they have learned for the next measurement campaigns.

[Read more](#)

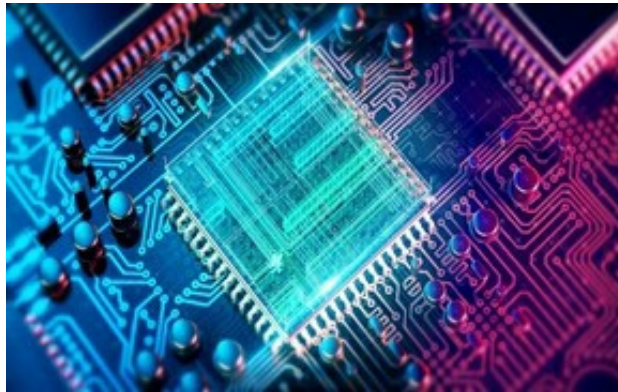
Project Highlights



Path to a comprehensive examination of corner cases

An analysis of corner cases is one of the elementary topics in the project KI Data Tooling. The project goal of creating a comprehensive data kit for autonomous driving can only be achieved, when these rarely occurring scenarios are included and contemplated. Two recent publications illustrate the progress of the project with regard to this topic.

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ERCVAD Workshop at ICCV2021

Partners of the KI Delta Learning research project were once again successful and received an invitation to lead a workshop – this time on October 11th 2021 at the renowned [ICCV2021](#) conference. As autonomous driving moves closer to serial production and to its wide use in the real-world, it becomes increasingly important to deploy models on safety-certified automotive hardware with real-time operating systems.

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DNN-specific Safety Concerns			
Functional insufficiency	DNN-characteristic-related concerns	Task-related concerns	Other
<p>FS-1 INSUFFICIENT GENERALIZATION CAPABILITY Wrong results by an AI-based function that was trained on a limited database. Erroneous input to output mapping or wrong approximation.</p>	<p>SC-1.4 INSUFFICIENT PLausIBILITY AI-based functions usually lack basic plausibility checks, which are intended to identify weaknesses of the perception function that relate physical laws.</p>	<p>SC-1.4 INSUFFICIENT PLausIBILITY AI-based functions usually lack basic plausibility checks, which are intended to identify weaknesses of the perception function that relate physical laws.</p>	<p>SC-1.4 INSUFFICIENT PLausIBILITY AI-based functions usually lack basic plausibility checks, which are intended to identify weaknesses of the perception function that relate physical laws.</p>
<p>SC-1.1 UNRELIABLE CONFIDENCE INFORMATION DNNs tend to be overconfident in their predictions under certain conditions or in general outputting verifiable confidence information.</p>	<p>SC-2.1 DATA DISTRIBUTION IS NOT A GOOD APPROXIMATION OF REAL WORLD The distribution of data used in the development should be a good approximation of the DNN in the real world.</p>	<p>SC-2.1 DATA DISTRIBUTION IS NOT A GOOD APPROXIMATION OF REAL WORLD The distribution of data used in the development should be a good approximation of the DNN in the real world.</p>	<p>SC-2.5 DISTRIBUTIONAL SHIFT OVER TIME A DNN is trained and tested at a certain point in time. Changes will occur naturally and therefore can potentially harm the performance of DNNs.</p>
<p>SC-1.2 INSTABILITY OF DNNs Non-redundant against common perturbations such as noise or certain weather conditions as well as targeted perturbations known as adversarial examples.</p>	<p>SC-2.2 INSUFFICIENT IDENTIFICATION OF TEST AND TRAINING DATA Test data might be combined to training data which might reduce overfitting on test data.</p>	<p>SC-2.2 INSUFFICIENT IDENTIFICATION OF TEST AND TRAINING DATA Test data might be combined to training data which might reduce overfitting on test data.</p>	<p>SC-2.6 UNKNOWN BEHAVIOUR IN SOME CRITICAL SITUATIONS The long tail problem describes the fact that there exists an enormous amount of possible safety-critical street scenes that have a low occurrence probability.</p>
<p>SC-1.2.1 LACK OF TEMPORAL STABILITY Detection results quickly changing in time whereas little change occurs in the ground truth.</p>	<p>SC-2.3 DEPENDENCE ON LABELING QUALITY Labeling quality can directly affect the resulting model performance. Accidents due to missing labeling quality, evaluation results might be misleading.</p>	<p>SC-2.3 DEPENDENCE ON LABELING QUALITY Labeling quality can directly affect the resulting model performance. Accidents due to missing labeling quality, evaluation results might be misleading.</p>	<p>SC-3.1 SAFETY-AWARE METRICS Some state-of-the-art metrics only evaluate the average performance of DNNs. Safety-aware metrics are required to systematically evaluate the performance of DNNs.</p>
<p>SC-1.3 INCOMPREHENSIBLE BEHAVIOUR Ability to explain exactly how DNNs come to a decision.</p>	<p>SC-2.3.1 MISSING LABEL DETAILS OR META LABELS Missing meta-labels or label details possibly leads to improper data selection or insufficient training algorithms.</p>	<p>SC-2.3.1 MISSING LABEL DETAILS OR META LABELS Missing meta-labels or label details possibly leads to improper data selection or insufficient training algorithms.</p>	<p>--- LACK OF EFFICIENCY Based on real-time requirements, state-of-the-art DNN model architectures can put high computational load on existing hardware. Among others, pruning mechanisms are required to reduce the load to meet real-time requirements.</p>

KI Absicherung: DNN- specific Safety Concerns

For image-based perception, DNNs are the state-of-the-art means of choice but not error-free. This fact creates challenges for safety-critical tasks, such as pedestrian detection, for automated driving realized with deep learning technologies. Under some conditions, the output of the DNN might be wrong or inaccurate.

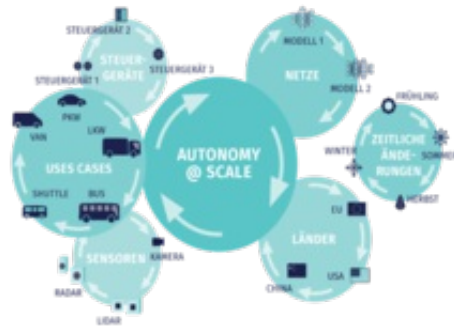
[Read more](#)



Joint workshop of KI Absicherung and KI Wissen

Following an internal workshop in May, project partners of both KI Absicherung and KI Wissen plan to discuss DNN interpretability in a joint workshop reinforcing their collaboration. Goal of the workshop is to set a common ground for further work on this important topic within the KI Familie.

[Read more](#)



First milestone of the KI Delta Learning project successfully completed

There is reason to celebrate: The first milestone of KI Delta Learning has been reached and all basic work has been successfully completed! What does that mean in concrete terms?

[Read more](#)



KI Delta Learning interim presentation on 7th October 2021

Save the date for the KI Delta Learning interim presentation. More information will be announced soon.

Academic Corner



Behavior Driven Synthesis of Human Dynamics

Andreas Blattmann, Timo Milbich, Michael Dorckenwald, Björn Ommer

[Link to publication](#)

[More information](#)

Understanding Object Dynamics for Interactive Image-to- Video Synthesis

Andreas Blattmann, Timo Milbich, Michael Dorckenwald, Björn Ommer

[Link to publication](#)

[More information](#)

Multi-Modal Fusion Transformer for End-to-End Autonomous Driving

Aditya Prakash, Kashyab Chitta, Andreas Geiger

[Link to publication](#)

Seeing Behind Objects for 3D Multi-Object Tracking in RGB-D Sequences

Norman Müller, Yu-Shiang Wong, Niloy J. Mitra, Angela Dai, Matthias Nießner

[Link to publication](#)

An Unsupervised Temporal Consistency (TC) Loss to Improve the Performance of Semantic Segmentation Networks

Serin Varghese, Sharat Gujamagadi, Marvin Klingner, Nikhil Kapoor, Andreas Bär, Jan David Schneider, Kira Maag, Peter Schlicht, Fabian Hüger, Tim Fingscheidt

[Link to publication](#)

Patch Shortcuts: Interpretable Proxy Models Efficiently Find Black-Box Vulnerabilities

Julia Rosenzweig, Joachim Sicking, Sebastian Houben, Michael Mock, Maram Akila

[Link to publication](#)

Reevaluating the Safety Impact of Inherent Interpretability on Deep Neural Networks for Pedestrian Detection

Patrick Feifel, Frank Bonarens, Frank Köster

[Link to publication](#)

Towards Black-Box Explainability with Gaussian Discriminant Knowledge Distillation

Anselm Haselhoff, Jan Kronenberger, Fabian Küppers, Jonas Schneider

[Link to publication](#)

Events & News



International Conference on Machine Learning

The thirty-eight International Conference on Machine Learning will take place from 18th-24th July virtually. [Find out more](#)



ITS World Congress

The ITS World Congress will take place in Hamburg from 11-15th October 2021. [Find out more](#)



International Conference on Computer Safety, Reliability and Security - SafeComp 2021 The 40th International Conference on Computer Safety, Reliability and Security will take place from 7-10th September 2021 in York, UK or virtually.

[Find out more](#)



Self-driving cars to be allowed on UK roads this year

"Self-driving" vehicles could be allowed on UK roads by the end of this year.

[Read more](#)

Contact us for comments & feedback

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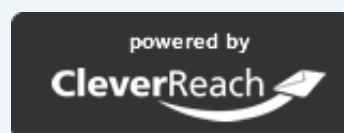
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Image sources:

Cover picture: TH Aschaffenburg; Path to a comprehensive examination of corner cases: Universität Kassel; ERCVAD workshop at ICCV2021: ZF Friedrichshafen AG; DNN-specific Safety Concerns: Continental; Joint Workshop KI Absicherung & KI Wissen: Gillis, Unsplash; First milestone of KI Delta project: KI Delta Learning project; ICML 2021: ICML; ITS World Congress: ITS; Safecomp: Safecomp; Self-driving cars to be allowed on UK roads: Genni, Unsplash

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