Innovation and change in motor insurance using telematics

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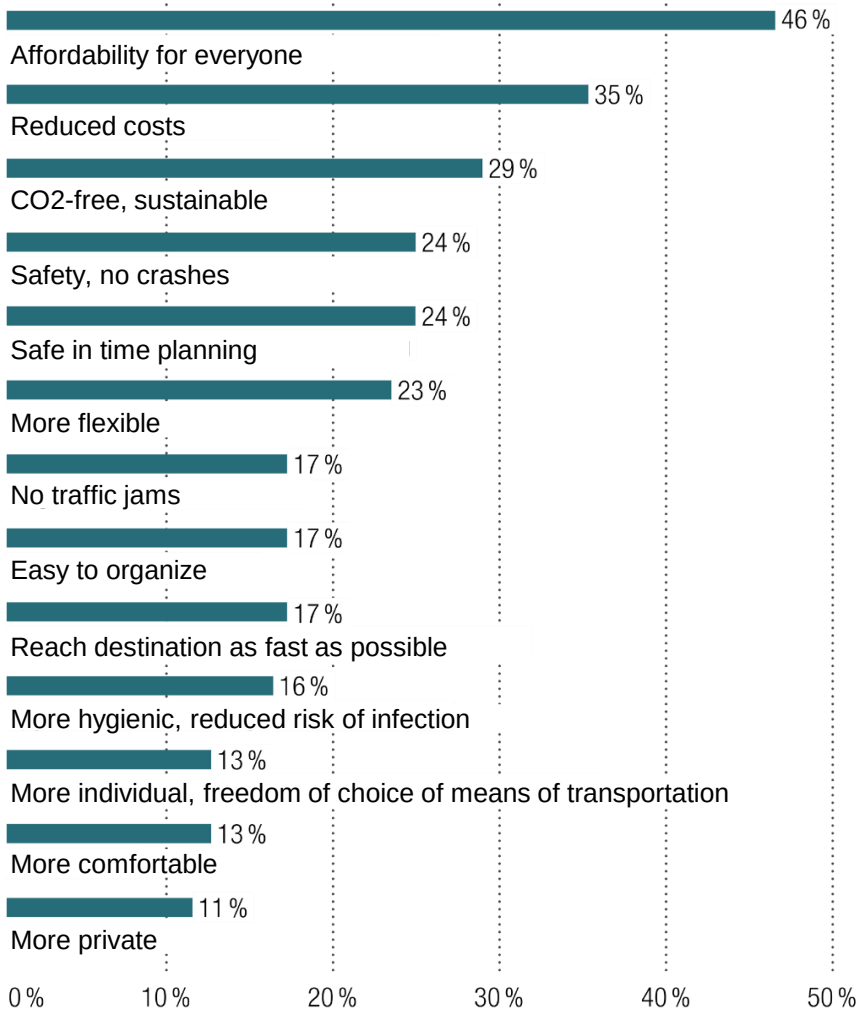
2022/05/18

ICMIF's reinsurance conference (MORO), Wiesbaden

HUK-COBURG mobility study 2021

Mobility study

What do you expect of a mobility concept of the future?

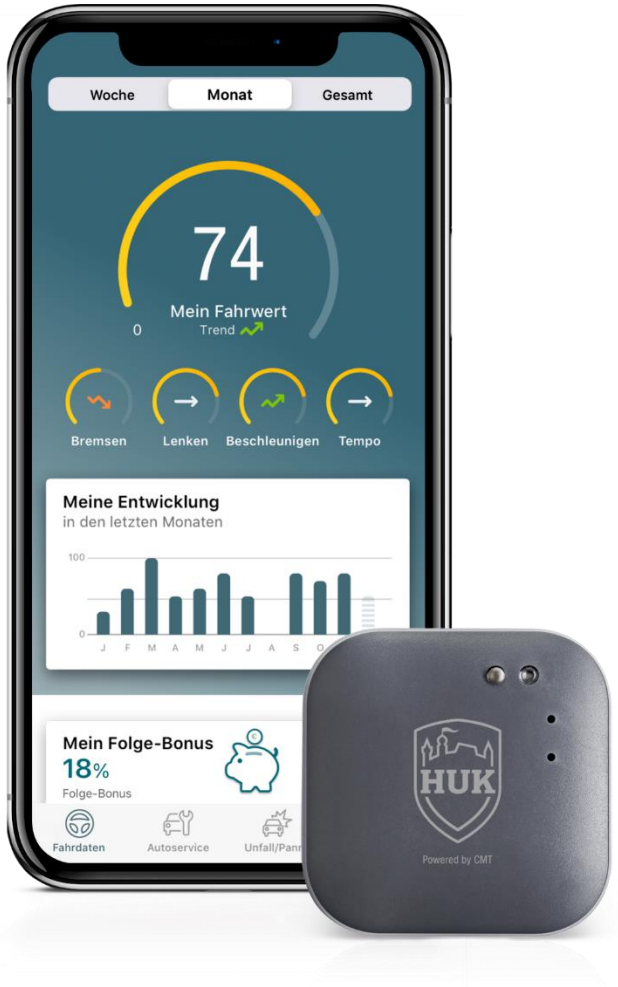


The top 3 results:

- Affordability
- Sustainability
- Safety

multiple answers possible

HUK Coburg‘s telematics program



Affordability
By driving safely, customers can get a discount of up to 30% for their car insurance policy in the upcoming insurance year.

Up to **30 %** discount

Sustainability
Eco Drive evaluates the driving behavior ecologically. Eco-friendly drivers are awarded with leaves, which transform to a donation at the end of the year.

Eco Drive

Safety
Telematics gives feedback for reducing risk while driving via the app. Besides, an automatic crash detection assists customers after accidents.

How does telematics work?

Telematics sensor

- Acceleration sensor
- Short term memory
- Status LED
- Battery
- Bluetooth LE
- Telematics sensor has to be connected to smartphone while driving

Smartphone App „Mein Auto“

- GPS sensor, acceleration sensor
- Transmitter and Receiver
- Data transmission only via Wi-Fi possible
- Feedback on driving behavior
- Interface to telematics services
- Definition of roles

Smartphone ideally always within car while driving

- All drivers of a vehicle can participate if allowed by policy holder
- Rising number of services within the application

How does telematics work?

Data acquisition

The telematics sensor and the app „Mein Auto“ capture data while driving.

Data of all drivers of a vehicle are captured which use the „Mein Auto“ app.

The data are transmitted via smartphone.

Evaluation of data

Holistic evalution of driving behavior using different feature categories like

- Acceleration
- Breaking
- Steering
- Speed

Single events, e.g. hard breaking in a dangerous situation, have no major impact on final evaluation of driving behavior.

Computation of Score

Based on the data of all drivers of a vehicle, a score between 0 and 100 is computed using a machine learning model.

- Drivers of a vehicle with a score of 0 show a very risky driving behavior.
- Drivers with a score of 100 show a very safe driving behavior.

Up to **30 %** discount

Mapping of Score to Bonus

The driving safety score from 0-100 describing behavior is mapped to a discount between 0% and 30%. This discount is provided to the customer for the car insurance policy for the consecutive insurance year.

The currently predicted bonus is transparent to the user within the app.

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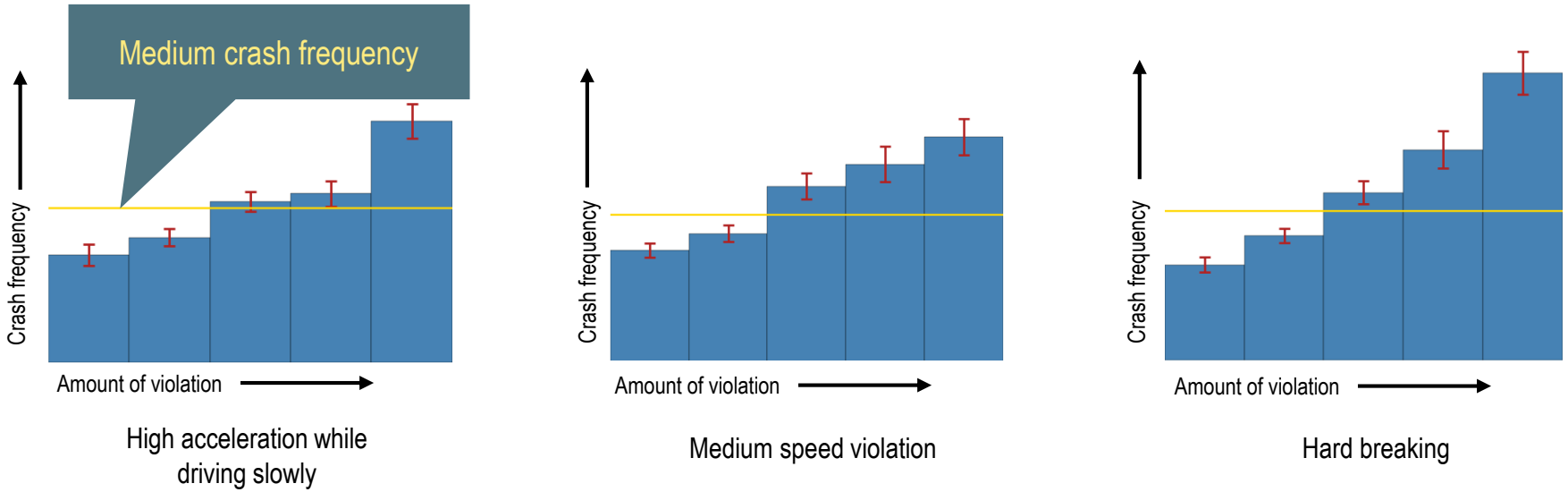
Correlation between driving behavior and crash frequency



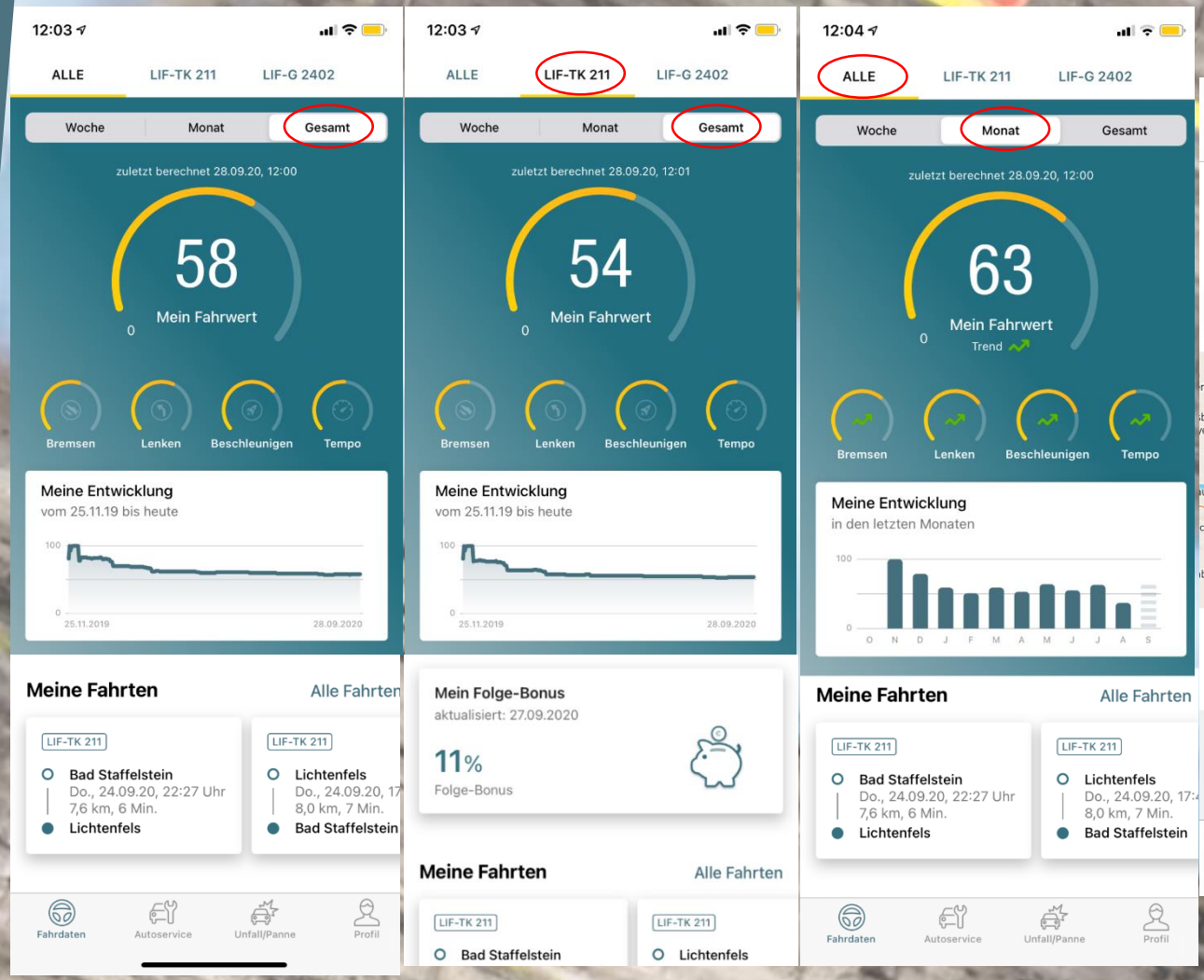
- We objectively learn how strong a certain aspects of driving behavior correlates to the crash frequency
- Only the most relevant features are extracted from the raw driving data. These include:
  - Speed (at a given speed limit)
  - Acceleration and breaking behavior
  - Lateral acceleration while steering

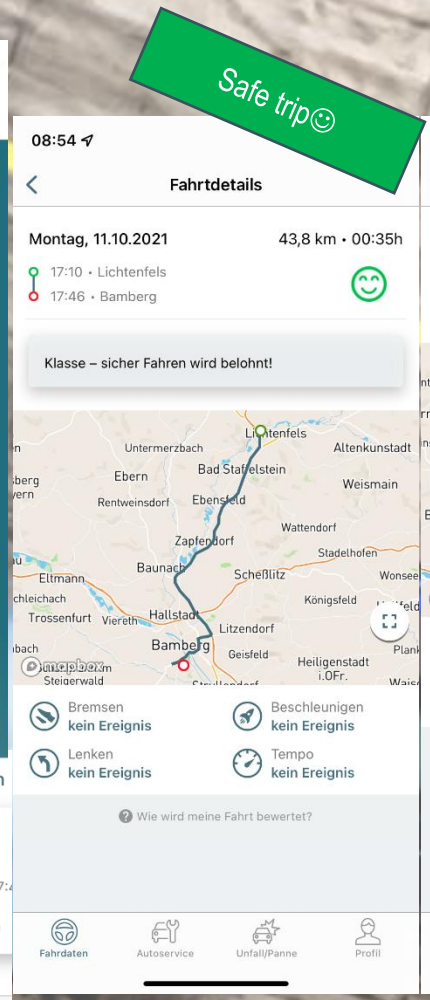
- The score is only influenced by driving features a customer can influence by himself.

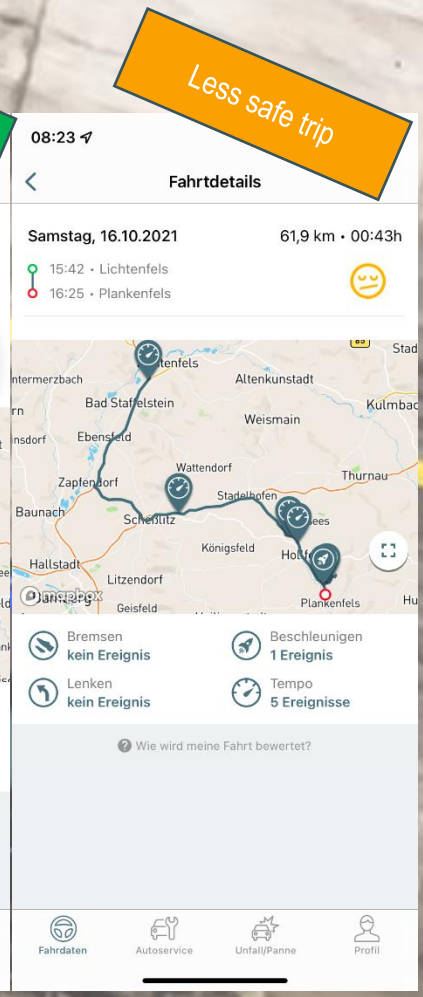
Feedback on how to improve driving behavior

Feedback on driving behavior

After a few minutes, customers get feedback on feature categories, events and rating of trips.







Eco Drive


Eco Drive

Auf geht's!
Strengen Sie sich noch etwas mehr an. Die Umwelt dankt es Ihnen.
Hätten Sie's gedacht?
aktualisiert: 01.09.2021
Alle Telematik Plus-Kunden haben durch eine umweltbewusste Fahrweise bisher folgenden Betrag in diesem Jahr erfahren:
302.218
von 1.000.000
Übergeben Sie Ihre Blätter
an Umwelt-, Verkehrs- oder soziale Projekte
Zu den Projekten
Was ist Eco Drive?
Nachhaltiges Fahren wird belohnt

How does Eco Drive work?

- Approximation of fuel/energy consumption based on driving data
- Simulation of fuel/energy consumption of eco friendly driver on same route
- Eco Friendly driver characterized by
  - Anticipatory driving
  - Coasting
  - No speed limit violation and reduced time at high speeds (especially on highways)
- Not considered
  - Drive technology (diesel, petrol, electric)
  - Type of car (small car vs. SUV)
- Eco friendliness purely based on personal driving behavior
- Eco Drive model validated externally by DEKRA

DEKRA Business Assurance Services

ZERTIFIKAT

Für den Zeitraum 5.10.2021 bis 4.10.2022 validiert DEKRA Assurance Services GmbH hiermit gegenüber

HUK-COBURG Datenservice und Dienstleistungen GmbH

dass der Einsatz des von HUK-COBURG entwickelten Eco Drive Modells einen positiven Einfluss auf eine effizientere Fahrweise hat und somit auch die Umweltbelastung reduziert.

Alle Punkte konnten ohne wesentliche Unstimmigkeiten validiert werden. Somit kann die Aussage von DEKRA Assurance Services GmbH bestätigt werden.

Folgende Angaben wurden von DEKRA Assurance Services GmbH überprüft:

- Validierung der Funktionsweise
- Überprüfung der Berechnung des Eco Drive Modells
- Korrekte Kommunikation des Ergebnisses

Weitere Details finden Sie in dem *Validation Statement HUK-Coburg Eco Drive Modell*.

Stuttgart, den 05.10.2021

Zertifikatsnummer: 991021060

ppa.
DEKRA Assurance Services GmbH
Simona Gläser - Director

i.V.
DEKRA Assurance Services GmbH
Peter Paul Ruschin - Head of Sustainability Services

DEKRA Assurance Services GmbH – Handwerkstraße 15 – 70565 Stuttgart – Germany

Advantages for customer

Drivers learn how to drive eco friendly and sustainable.

Drivers save money by reduced fuel consumption.

Donation based on Eco Drive leaves in 2021:
~740.000 €

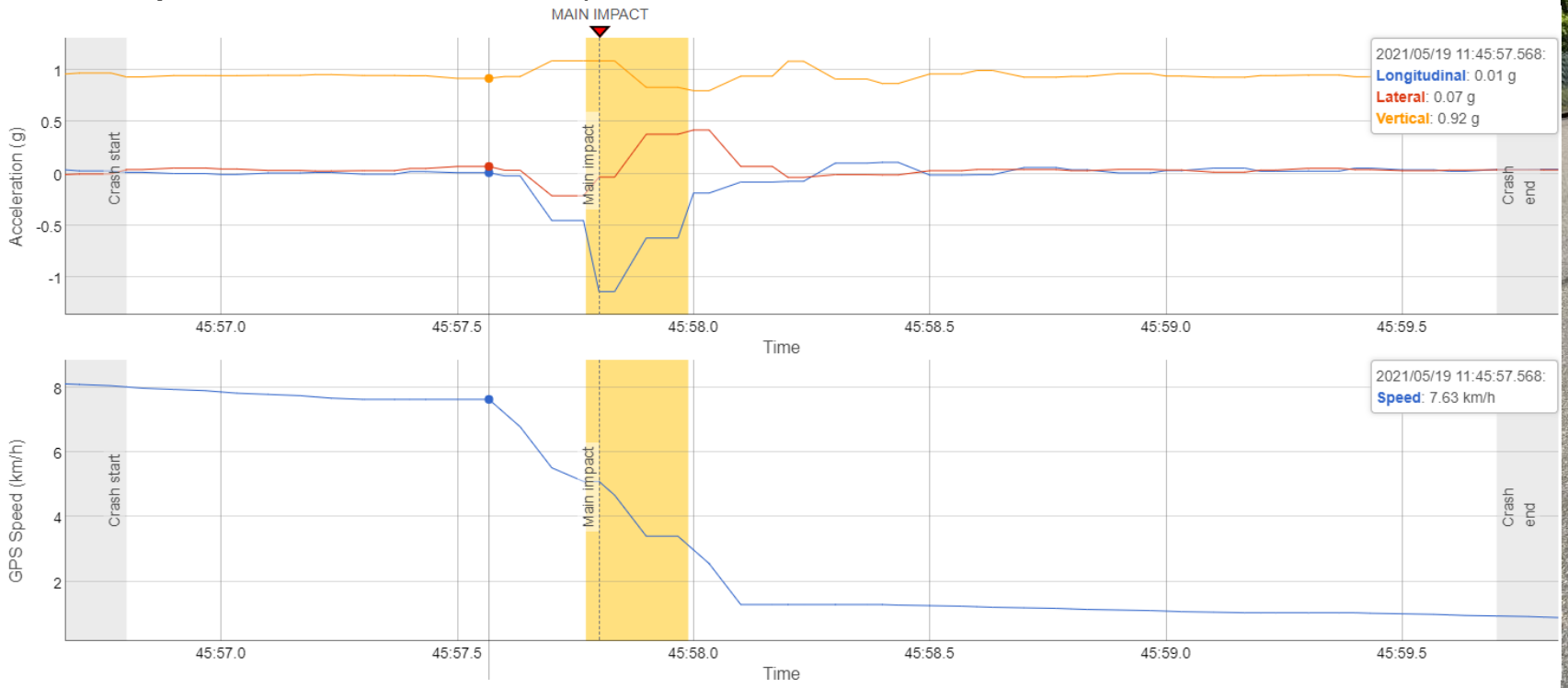
Leaves earned by drivers convert into donation to non profit organization.

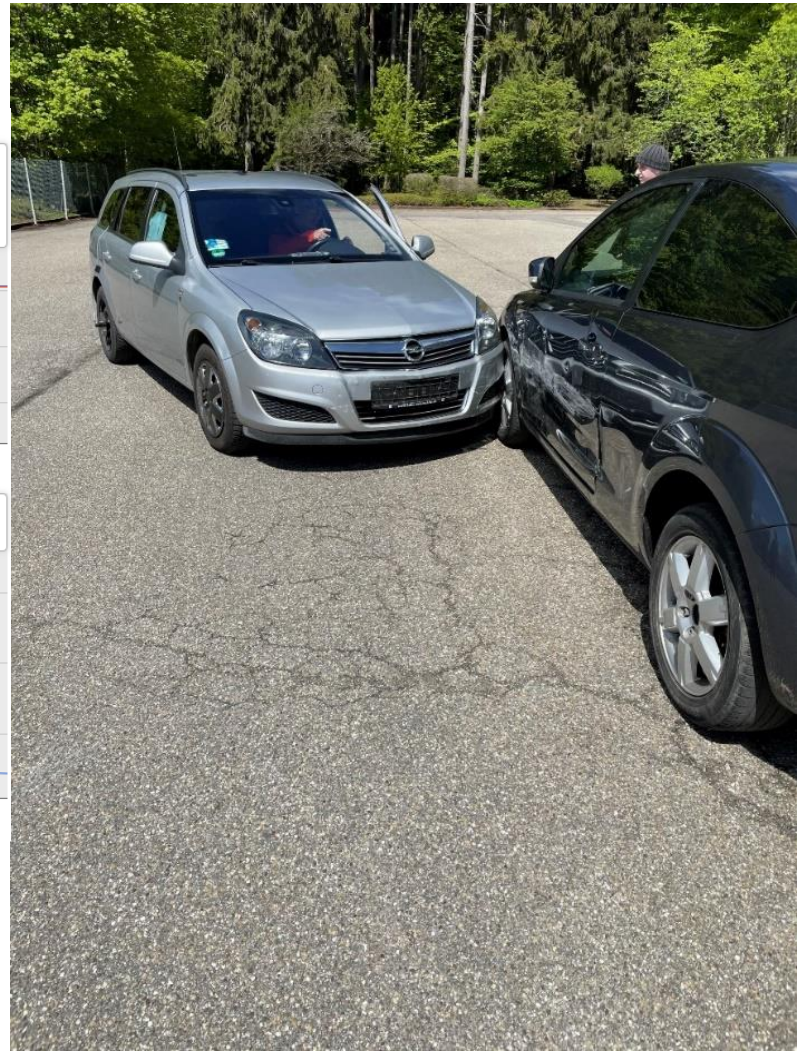
Automatic crash assistance service

HUK-COBURG

Data for training/validation of crash detection

Example for crash data: Lateral impact from 315° at 8 km/h





- First impact detection using telematics sensor in car
- Potential crash data (GPS and acceleration) transferred to data backend
- Machine learning model evaluates crash probability and severity of crash

HUK-COBURG

Automatic crash detection

Crash severity

Evaluation of severity based on telematics data and machine learning model

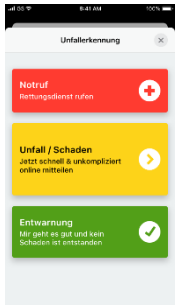
False alarm, no crash

Customer feedback via beta program

- Customers participating in Beta program are asked for feedback on detected events
- Feedback helps to continuously improve crash detection

Damage to bodywork of car

Push notifcation to smartphone



Option to choose between
- emergency
- initialization of claim
- all-clear signal

Initialization of damage claim via the app

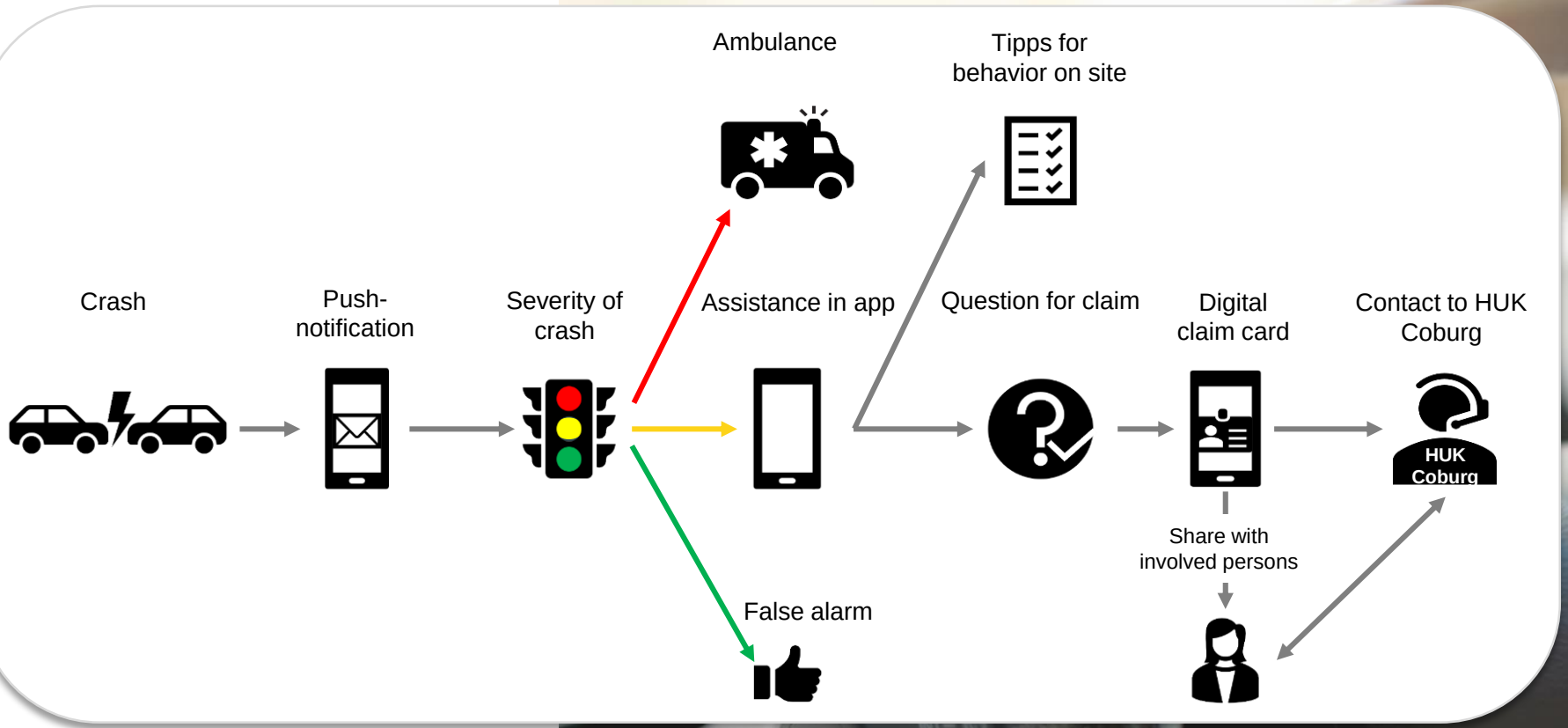
Emergency

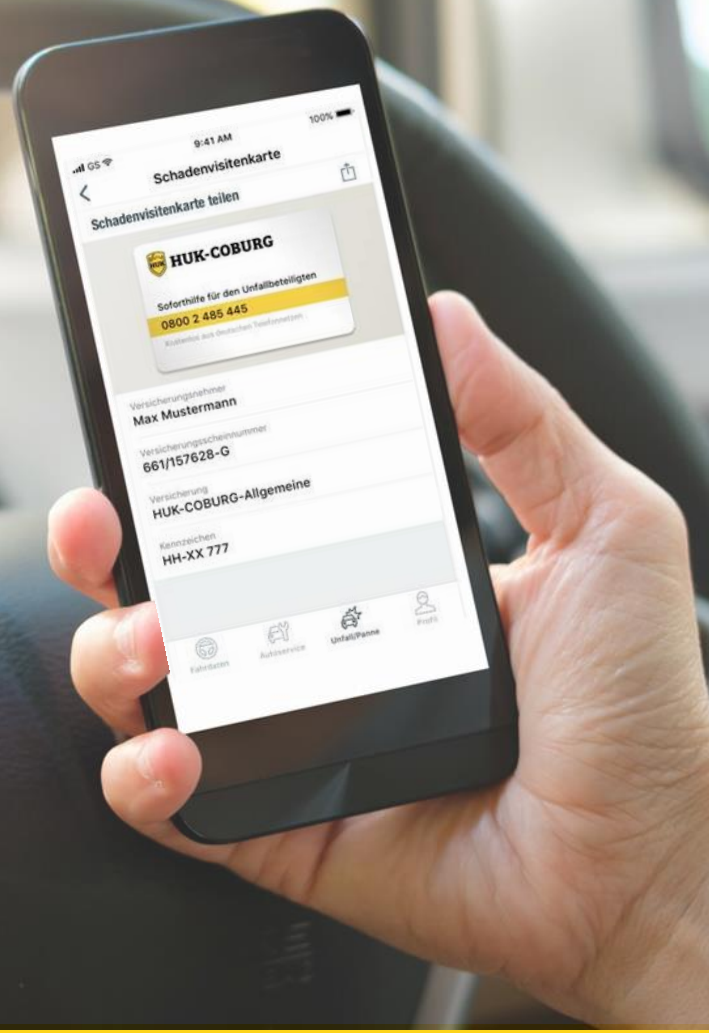
Real-time notification to service provider of GDV, who assists and sends ambulance if needed

- Contacts driver via telephone
- If no ambulance/assistance is needed, push notification is sent to customer for further steps

Crash assistance service in „Mein Auto“ App

Damage claim via app



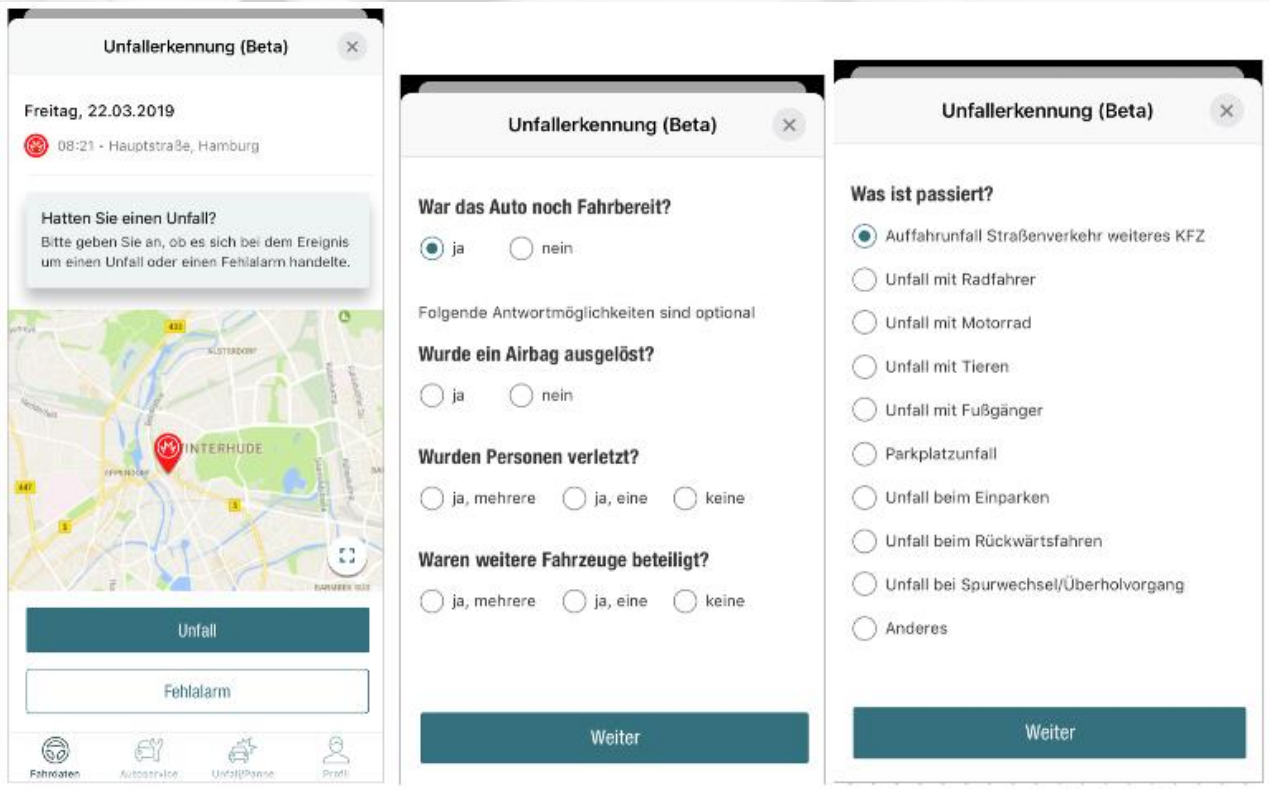


Evaluation of crash detection

	Prediction: Crash	Prediction: No crash
Label: crash	**True positives**	**False negatives**
Label: no crash	**False positives**	**True negatives**

False positives: False alarm (ambulance is being sent out)
False negatives: Missed crash detection (no help being sent)

Improvement of crash detection
With the system in production, we now get more and more crash data and feedback of customers to improve the crash detection algorithm.



Voluntary customer feedback for crash detection (Beta program)

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Crash detection in practice

Challenge:
Telematics sensors are not always mounted correctly. Incorrectly or non-mounted sensors often show false positive crash detection!

Different counter measures to prevent false positives

- Loose tag detection based on driving data of normal trips
  - ➢ Message to customer and deactivation of crash detection for tag
- Monitoring of crash detection and crash notification to identify conspicuous tags (frequent crash notifications)
  - ➢ Message to customer and deactivation of crash detection for tag
- Information of customers on functionality of crash detection and consequences of erroneous crash alarm
  - ➢ Information about crash detection, Simple-Show video, In-App onboarding,…

But: Counter measures cannot cover all possibilities.

Example: Customer mounted tag to passenger door

- ➢ Loose tag detection fails, because drivers seldomly brings passengers
- ➢ Driver brings passenger, stops at the side of the road, passenger leaves car and slams the door
- ➢ Severe crash detected by ML model

Conclusion: Despite all counter measures, an ML based solution will not always work perfectly!

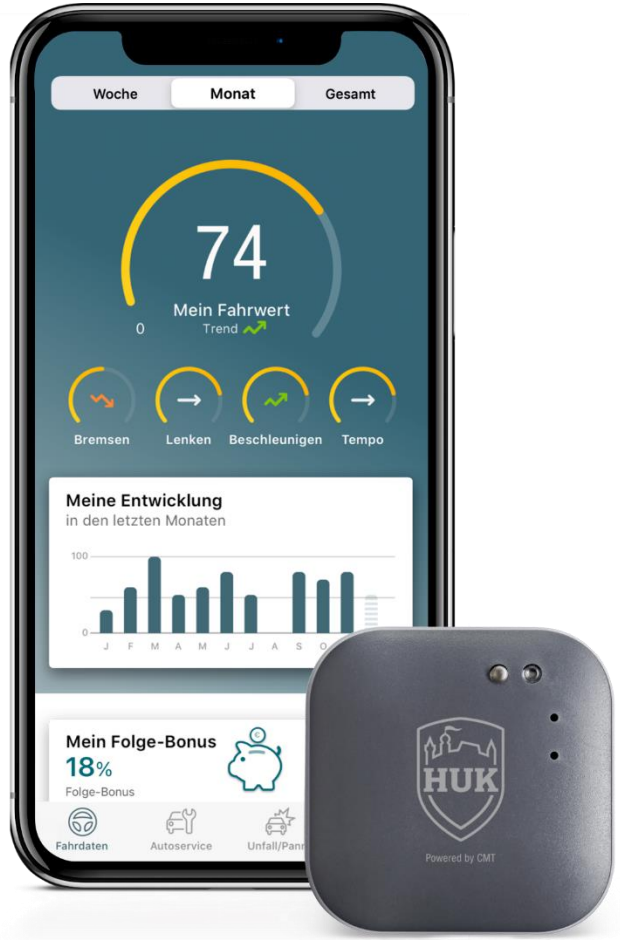
Windshield

Cupholder

Passenger door

Summary

- Innovations in our telematics program help us to meet demands of customers with respect to their ideal mobility concept
- Telematics score helps customers to drive more safely and safe money on their car insurance
- Eco Drive encourages sustainable driving behavior
- Automatic crash detection helps customers to feel more safe and in case of emergencies



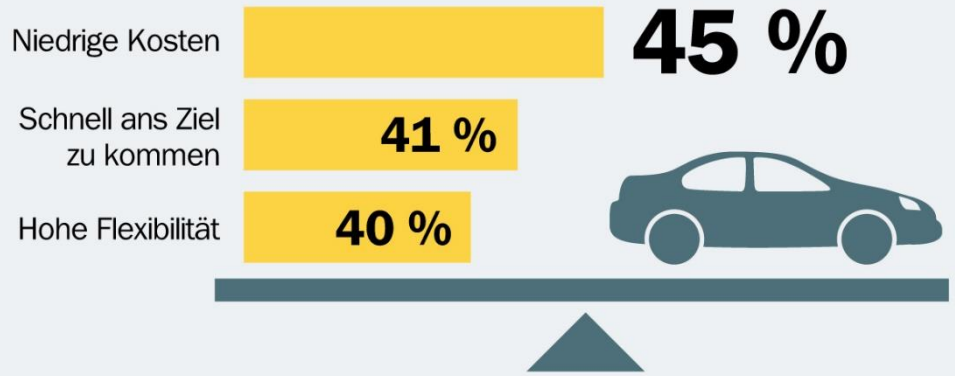
Thank your for your attention? Questions?

#Studie

Mobilitätskonzept der Zukunft:
Was die Deutschen wirklich wollen

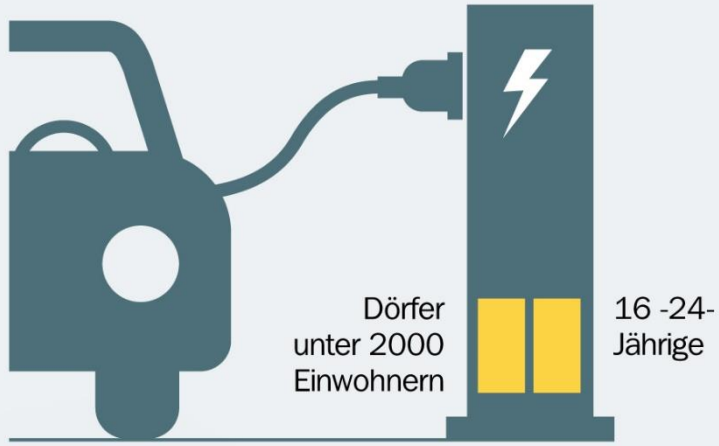
Niedrige Kosten, Schnelligkeit und Flexibilität

Welche Aspekte sind für die Wahl des Fortbewegungsmittels besonders wichtig (TOP-3-Nennungen)?



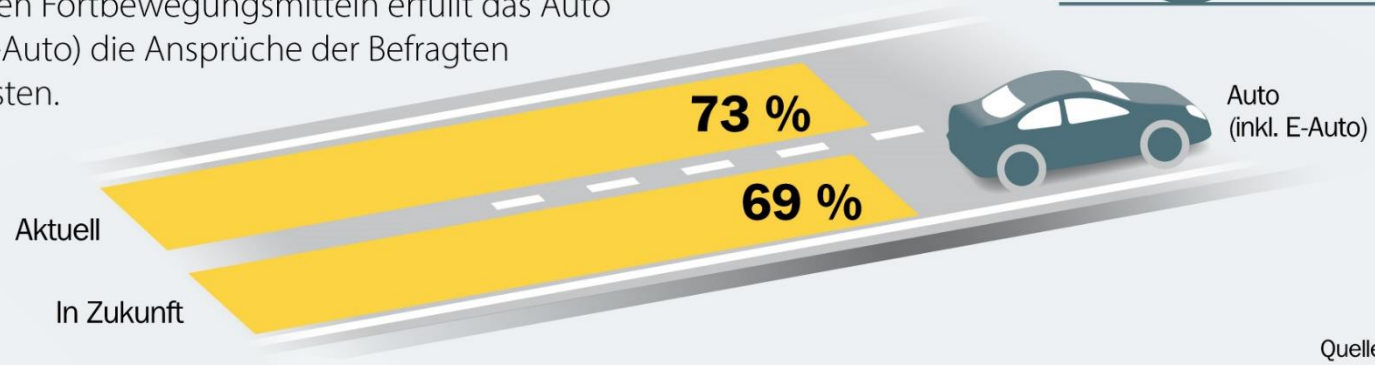
E-Auto wird immer attraktiver

Unter jungen Leuten und auf dem Land nennt fast jeder Vierte das E-Auto als das ideale Verkehrsmittel der Zukunft.



Deutsche setzen auch künftig auf das Auto

Von allen Fortbewegungsmitteln erfüllt das Auto (inkl. E-Auto) die Ansprüche der Befragten am besten.



Quelle: HUK-COBURG Mobilitätsstudie 2021

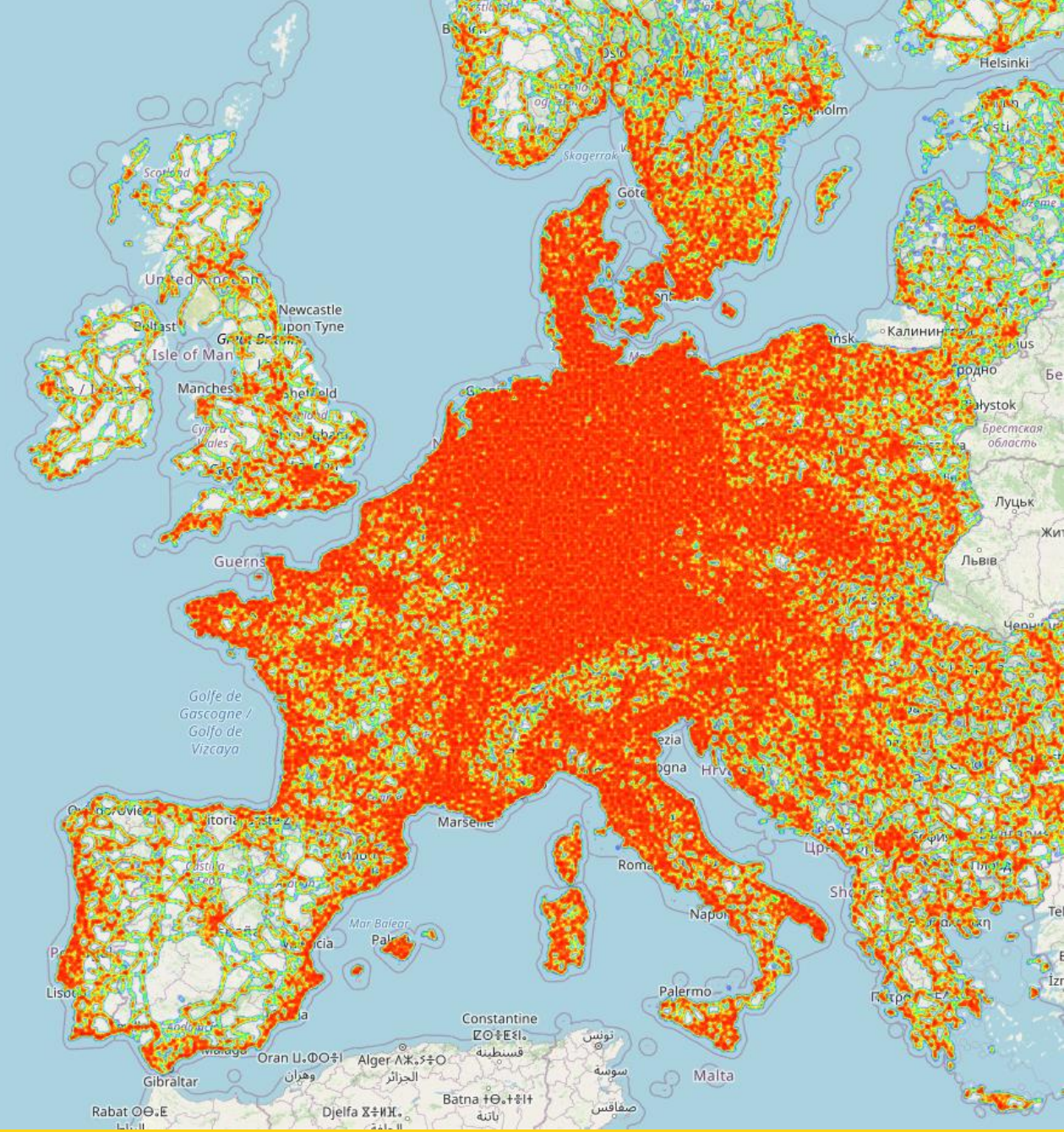
Telematics is Big Data

~ 450.000
Vehicles

> 530 Mill.
Trips

> 150 Mill.
Hours of driving

> 7.5 Bn.
Driven km



Data acquisition and processing

Discount between 0 and 30 % on insurance policy

HUK24
DIE ONLINE-VERSICHERUNG

Raw data (GPS, acceleration)

Score between 0 and 100

CAMBRIDGE
MOBILE TELEMATICS

Enrichment of data

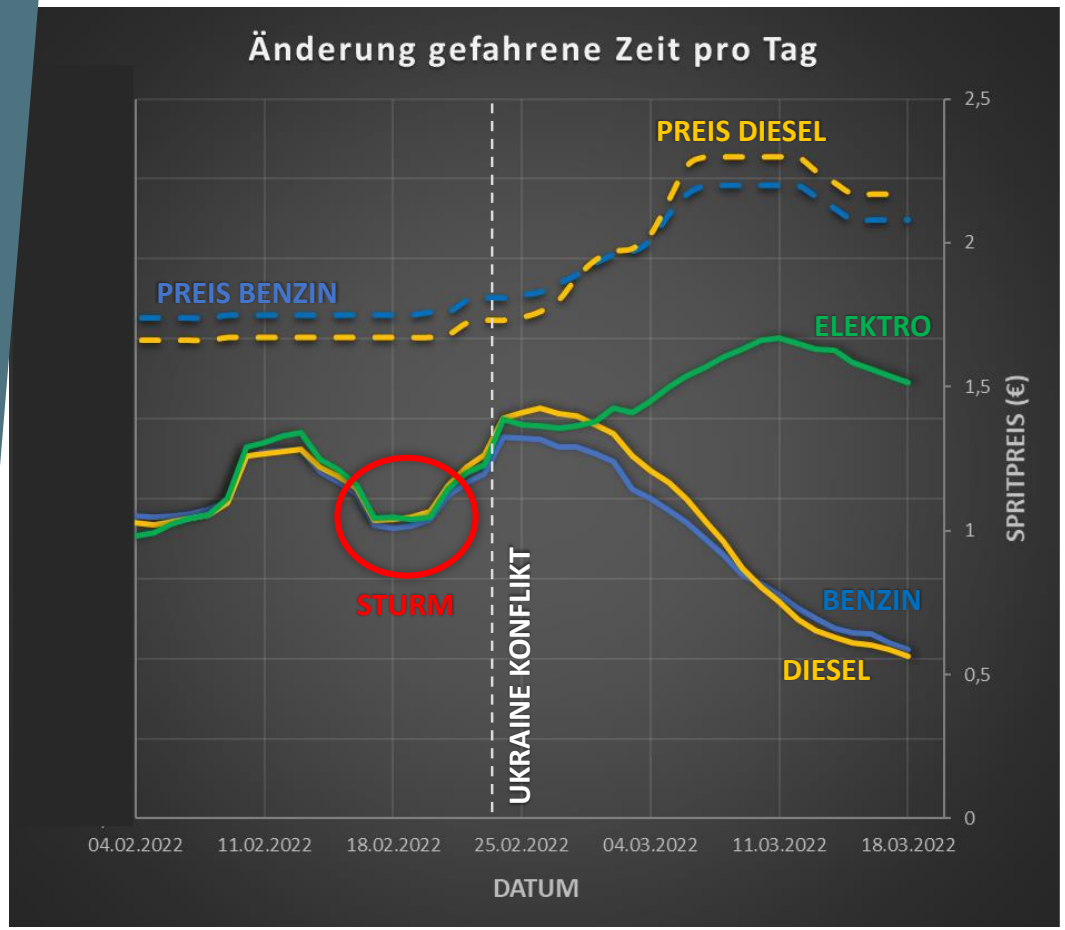
HUK-COBURG
Datenservice und Dienstleistungen GmbH

HUK-COBURG

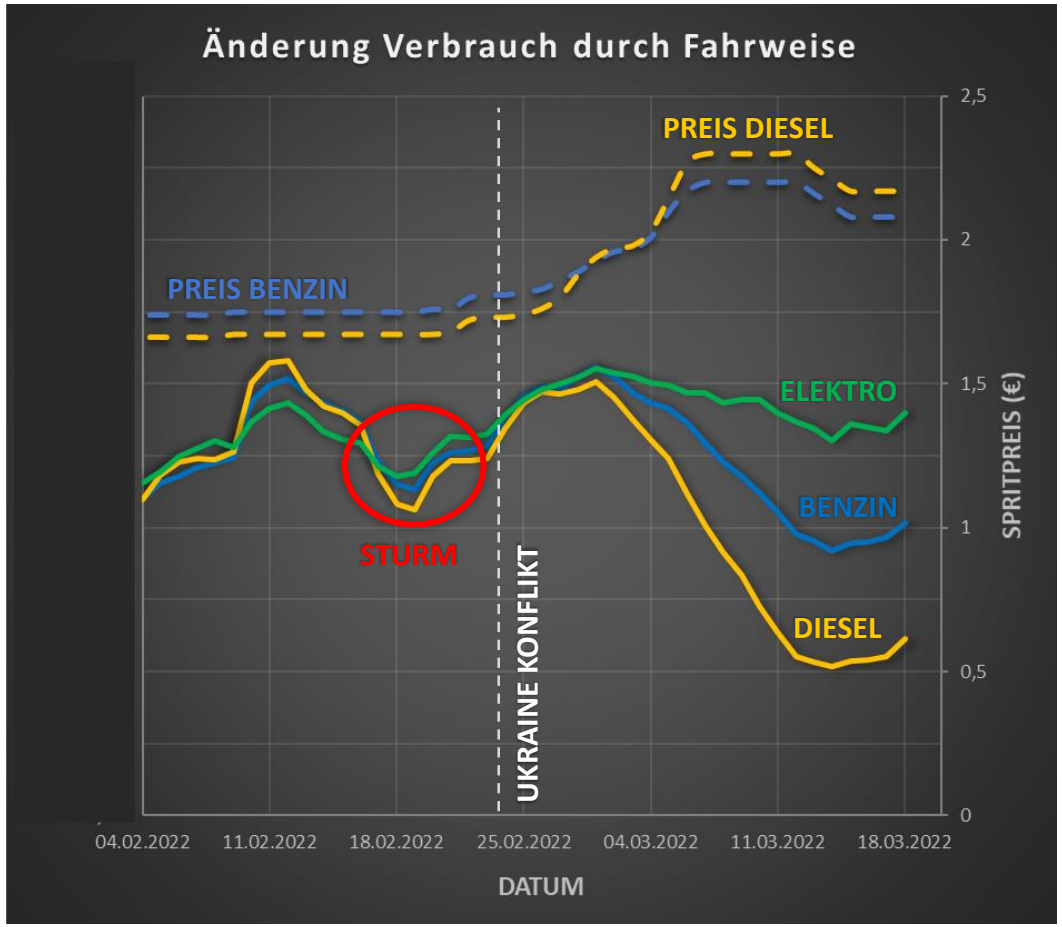
Insight s

Eco Drive

Telematics and Eco Drive provide insights into changes in driving behavior



7-day moving average of driving duration per day, normalized by weekday and aggregated by drive technology



7-day moving average of Eco Ration (fuel consumption of driver/fuel consumption of eco friendly simulated driver) per day, normalized by weekday and aggregated by drive technology

The automatic crash detection process

simplified

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In Deutschland

CAMBRIDGE MOBILE TELEMATICS

Notification: severe crashes which might require ambulance

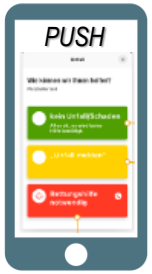
If necessary, phone call to customer and notifcation of ambulance

GDV Dienstleistungs-GmbH

Notification: Less severe crash („body damage“)

Push notification if crash was not severe („body damage“)

Daily Feedback from GDV service provider to HUK



- Check, whether body damage is covered in insurance policy
- Collection of additional crash relevant data
- Generation of digital „damage card“ (can be shared with involved persons)
- Display of all registered and potential crashed (+ 30 days)

Automatic initialization of claim incl. involved persons

Seperation of insurance and driving data

Claims data

HUK-COBURG and HUK24

- Receives aggregated score for calculation of discount on insurance policy
- Provides HDD with pseudonomized crash data for research on crashes and optization of scoring algorithm
- No access to driving data of HDD

Score

Crash data

Driving data

HUK-COBURG Datenservice und Dienstleistungen (HDD)

- Processing of driving behavior, calculation of score and driving events
- No information on name, age, gender, license plate, vehicle identifier or other details about customer or vehicle
- Uses pseudonomized crash data of Huk and HUK24 for research on crashes and improvement of scoring

Scores & Events

App Usage

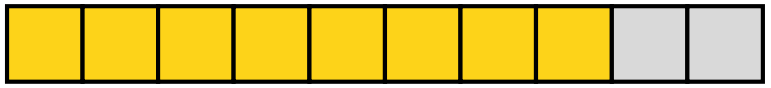
App usage data

„ Mein Auto“ App

- Receives driving data, scores and events from HDD
- Defined roles of drivers within app to show correct, personal data
- Policy holder sees aggregated score for all trips of vehicle, but not necessarily all trips

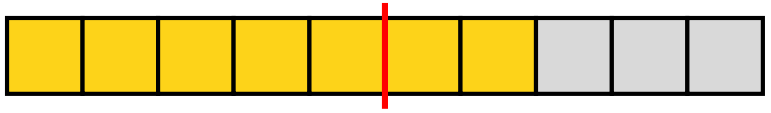
Which score do our customers expect?

Question 1: How would you rate your driving behavior in a score range between 0 (bad) and 100 (very good)?



80 | 100

Question 2: How would you rate your driving behavior in a score range between 0 (risky) and 100 (very good) if you knew the average driver has a score of 50?



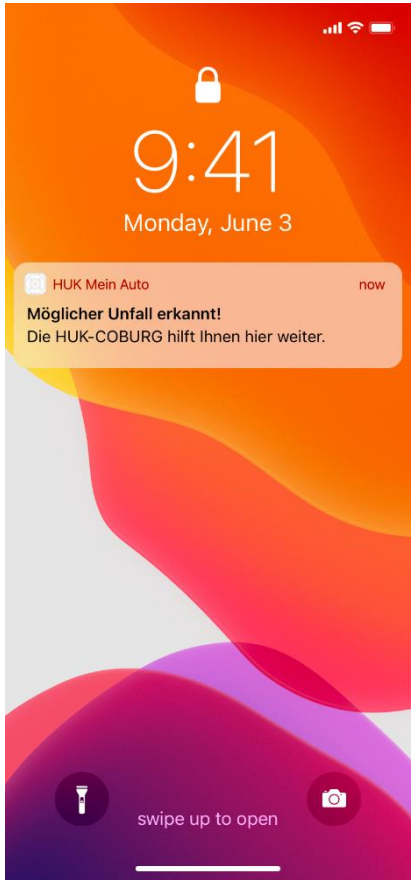
70 | 100

Conclusion:

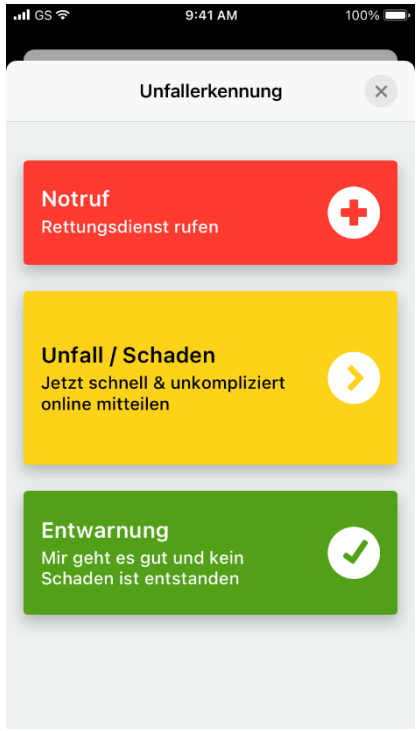
Honest feedback is important, but also difficult

Digital notice of loss via app

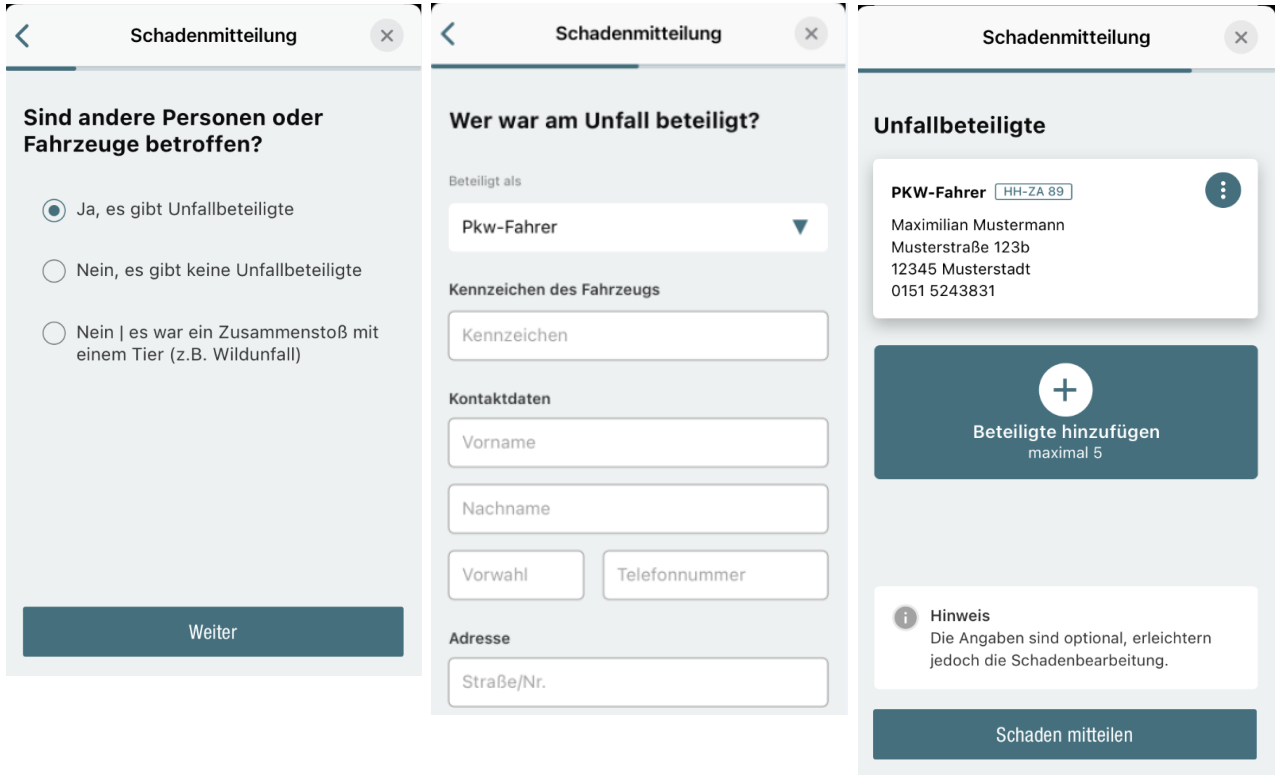
Push notification



Categorization of crash

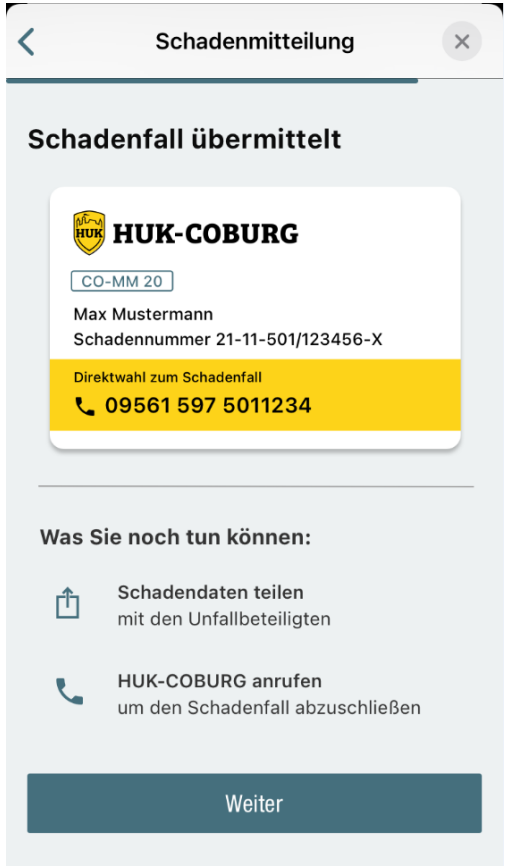


Information on damage claim and involved persons

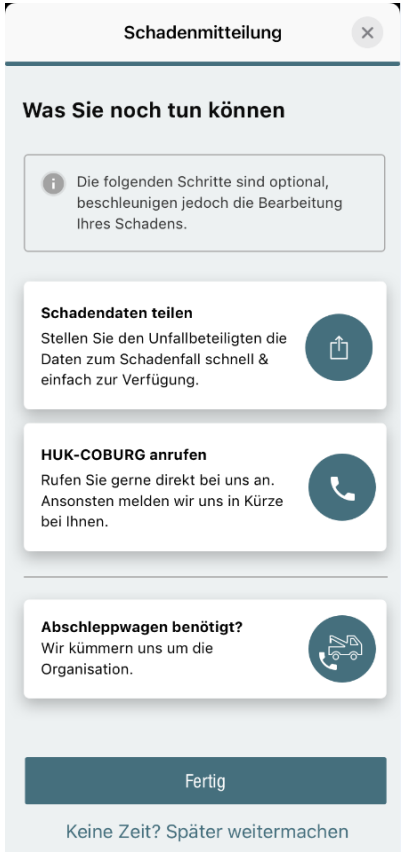


Digital notice of loss via app

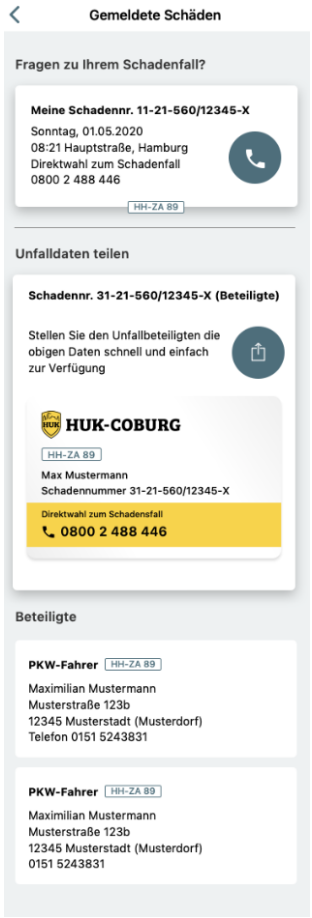
Digital claim card



Further options which help with claim



Overview of claims



HUK-COBURG

Verification of crash detection – Crash tests (partner Dekra)

Day 1
Tests for false positives

Loosely mounted sensors

Curbs

Other impacts (balls, slamming of doors,, …)

Hard breaking

…and a lot more

Day 2 & 3:
Bodywork damage

Lateral impacts with different speed

Rear-end collisions

Impacts by hitting obstacles with lower speeds

…and a lot more

Day 4:
Emergency crashes

50 km/h

70 km/h

90 km/h