Laurel & Hardy Testing of in car voice control Laura

Automation of voice control tests

Voice control has been available in Škoda cars for a long time, initially allowing users to dial a contact's phone number. Currently, it can control most user functions of the car, from phone calls and radio tuning to setting the air conditioning and seat heating. The voice assistant Laura is connected to artificial intelligence systems, enabling it to respond to general requests and simple communication, similar to what Google and Apple assistants provide today.

With the increasing complexity of the voice assistant comes the need for its testing. This includes system tests during development, which help calibrate individual system components (microphone, speakers, etc.), and verifying that the given request was correctly understood and that the voice control Laura in the car made the relevant settings.

The Laurel & Hardy solution can automatically and repeatedly conduct voice control tests, evaluating their success both at the level of understanding by the in-car system Laura (Trace Log or voice response) and verifying subsequent processing (CAN message).

The system allows testing not only recorded voice commands but also converting written text commands to speech using various user profiles (male, female, etc.) and tracking their processing success. Additionally, it can automatically translate commands into multiple languages and test multilingual support without the need for testers to speak the tested languages.

Furthermore, all phrases can be mixed with background noise, such as rain, snow, side wind, etc., to test the Laura voice control under adverse real-world conditions.

Management of test scenarios, test phrases, test settings, their scheduling, execution, and subsequent evaluation can be done directly in the Hardy system or via cloud API in an external system. Currently, this API has been validated by Škoda's EZ-LOG quality system, which is expected to use the Laurel & Hardy solution for static user voice control tests.

Key features of the product or service:

- Automated solution for testing Škoda in car voice control
- Validation of Voice control from the user perspective
- Supporting technical development of System Microphone calibration, Output level test, SPL startup check and auto-level correction
- Written test phrases converted to speech
- Automatic multilanguage translation
- Mixing with background noise
- Possibility to manage, execute and evaluate the tests from the Škoda EZ-Log quality system

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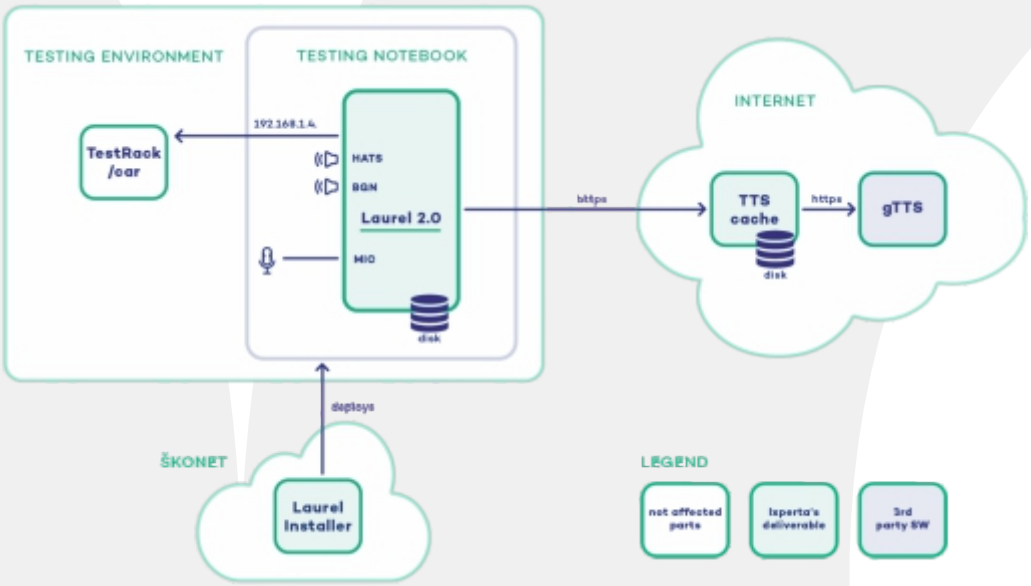
Product or service advantages

- Automated testing 24x7
- Reduction of human labor
- Repeatability of tests
- Comprehensive solution for automating voice control tests



Technical specifications and product details

- Tests are run from a test computer that is connected to the cloud via the internet.
- The computer is also connected via Ethernet to the USB port of the infotainment system through a USB to ETH converter.
- The infotainment system must be set in developer mode and have Trace protocol output enabled on the USB port.
- Laurel plays test phrases using a speaker.
- **Phrases can be:**
  - Pre-prepared files with voice commands
  - Text commands in the given language, which are converted to voice commands using a Text to Speech module
  - Text commands in the tester's native language, which are translated into the appropriate language using artificial intelligence and then converted to voice as in the previous case
  - Voice commands can also be mixed with background noise (high speed, rain, gusty wind, etc.)
- Laurel uses a microphone to recognize the reactions of the Laura infotainment voice assistant and simultaneously evaluates the internal Trace Log of the infotainment system.
- If the voice assistant correctly recognized the voice command (voice response + trace log), the test is marked as successful. Otherwise, it is marked as unsuccessful.
- The test also measures response speed and whether the processing of the voice command took place at the local level of the infotainment system or in the Škoda cloud.
- When processing the output, a CAN analyzer can be connected to evaluate whether the infotainment system responded with a relevant CAN message to execute the desired command.