Design the next-gen user experience with Simulink and Qt Design Studio

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Next gen Automotive (CASE)

› Connected
› Autonomous
› Shared
› Electric
Industry trend for next gen UX in Automotive

› Digital cockpits.
› HMI / Voice are an integral part of modern cars.
› Cars are becoming more connected.
› Automakers are competing to bring the best UX to their cars’ HMIs.
› In-car systems that are as effective and user-centric as a consumer’s mobile device.
› Automotive UX influence buying decision as much as safety, comfort, ...etc.
Example automotive application built with Qt
Harman
Mercedes-Benz’ MBUX
Rimac concept Supercar
Qt Design Studio

› A unique design tool that allows designers to import designs into Qt world, and turn them into QML code.
› Designers can edit QML visually.
› Developers can collaborate seamlessly on editing the same QML code.
› Live preview on the target hardware.
› Rapid prototyping and fast iterations.
› Open Source / Commercial licenses.
Qt Design Studio Key features

› Visual 2D Editor.
› 3D Scene Editor.
› Code Editor.
› Timeline Animations.
› Libraries of presets of UI components.
› And much more (States, Transition Editor, Connection Editor, Binding Editor, …).
› Simulink Support.
Simulink for HMI development

› Rich sets of Simulink blocks to design and simulate complex HMI logics using blocks and connections.
› Abstract complex logic by converting it to a Subsystem.
› Stateflow charts to design state machines and flow charts.
Simulink Qt blockset

> Contains all the Simulink blocks needed to establish a bi-directional data transfer between a Simulink model and a Qt Design Studio application.

> Requires an existing Simulink installation. The blockset installer can be downloaded from this repo: https://git.qt.io/qt-design-studio/simulink-plugin-dependencies
Simulink – Qt Design Studio workflow
Simulink side

› Open the Qt blockset.
› Add Client, IP and Port blocks.
› Add send and/or receive blocks for each data that needs to be sent to QML.
› Give the send and receive blocks names matching the properties names in QML side.
› Connect the blocks like in the picture.
Qt Design Studio side

› Qt Design Studio 1.6+ (commercial version) comes with Simulink connectivity built-in.
› Add SimulinkConnector module to the project.
› Create properties on the QML root object, matching the properties on Simulink side that will to be sent/received to/from Qt Design Studio.
› Bind the created properties to the desired QML components properties.
Demo
Deployment on hardware

- Simulink can export a model as C/C++ code using **Embedded Coder**. Embedded Coder generates fast and optimized code that is efficient for running on embedded processors. The generated code can be integrated both with a Qt Quick based HMI as well as a Qt Quick Ultralite based HMI.
Benefits for customers

› Leverage the power of Qt and QML to build advanced UI mixing 2D and 3D designs.
› Easily connect Simulink simulation model to QML UI.
› Simple and intuitive workflow.
› Quick iteration cycles: easy to test modifications both in the simulation or UI sides.
› Collaborative workflow where designers and developers can work together more productively.
MathWorks – Qt collaboration

› MathWorks developed the underlying interface for Simulink – Qt communication.
› MathWorks Consulting is helping Qt to extend the workflow, extending it to code generation.
Thank you