Rapidise's automotive expertise is demonstrated through several key validated case studies and product developments that showcase their full-stack capability, integrating custom hardware, advanced AI/ML algorithms, and software design to deliver measurable safety, performance, and commercial results.

Here are the key validated case studies and their delivered impacts:

1. Dual Display IVI System for a Truck OEM (Design to Production)

Case Study Focus: Development and implementation of a custom digital cockpit control system for Heavy Duty Trucks, culminating in a commercialized product delivery.

Area of Expertise	Deliverables & Technical Details	Measurable Impact & Outcome
Product Scope	Development of Human-Machine Interface (HMI) and service layers for both the **Head-Unit Cluster and Head-Up Display**. The system operates on **Android 10 or greater** and aims to enhance vehicle control, monitoring, and data visualization.	The project involved progressing from **Design Version 1.0** (PCB Schematic, Layout) through to a **Fully Commercialized Product (2000 Units)**. This represents successful OEM adoption and mass production capability.
Hardware & Firmware	The system is based on the **NXP iMX8** platform. The tech stack included **Android 10** (Linux Kernel: 5.4, Language: C). It required **Custom Driver Development** for sensors including Temperature, Accelerometer, and Gyrometer, alongside utilizing NXP's inbuilt drivers for CAN, USB, Wi-Fi/BLE, and Gigabit Ethernet.	Successful integration of critical sensor data (Temperature, Accelerometer, Gyrometer, Magnetometer, Light Sensor) into the HMI for monitoring and data visualization. The solution supports key connectivity features: Live GNSS, 4G LTE, USB, Wi-Fi/BLE, and Gigabit Ethernet.
HMI/UX	Focused on creating an **intuitive human-controlled interface** for monitoring and data visualization.	Delivered a customized **HMI and service layer** to meet the specific requirements of the Truck OEM.

2. Dashcam + LTE Edge AI Box for Japan Market

Case Study Focus: Development of an advanced, integrated edge computing box for vehicle safety and emergency call systems in the Japanese market.

Area of Expertise	Deliverables & Technical Details	Measurable Impact & Outcome
Product Scope	Aims to enhance vehicle safety in Japan by developing an advanced **emergency call system**.	The system automatically connects to an **emergency call-center** when a vehicular accident is detected, ensuring immediate support.
Hardware & Integration	The solution is a Dashcam + LTE Edge AI Box running **Android**. It integrates a **compact 2-camera unit** (front and in-cabin). It includes key components like **LTE (4G) Communication**, Wi-Fi, Bluetooth, Voice Call Functions (Microphone and Speaker), and a **Dedicated SOS Button**.	Enables **Video Data Transmission** and Comprehensive System Integration for emergency responders, improving post-accident response capability. This project highlights Rapidise's global reach, supporting customers in regions including Japan.

3. Edge AI Development: 2.5D Face Recognition (DMS/Digital Key)

Case Study Focus: Developing a secure, real-time facial recognition system for applications like secure access control and digital keys, combining DMS and security features.

Area of Expertise	Deliverables & Technical Details	Measurable Impact & Outcome
AI Performance	The solution is based on the **Qualcomm 8155** platform. The AI model architecture is a **Custom CNN model** inspired by the centernet architecture, designed to be **Light Weight for edge devices (less than 10 mb size)**.	Achieved superior real-time performance with an **inference time of less than 1 second**. The model's **Accuracy** details reached **96.2%**.
Security & Sensing	Combines a **Camera and Time-of-Flight sensor** to capture depth information alongside 2D imagery. This distinction is vital for **robust protection against spoofing attempts**.	The system requires only **2 frames to register a new face**. It enables facial authentication even in **low-light conditions**.

4. Telep ADAS & DMS AI Algorithms (Measurable Safety Impact)

Rapidise offers the **Telep ADAS & DMS AI Portfolio**, which contains ready-to-use computer vision algorithms. This portfolio demonstrates consistent high accuracy across critical safety functions:

Feature/Metric	Safety Impact & Measured Accuracy (%)
Predictive Crash Detection	Accuracy: **97%**. Real-time prediction and early warnings.
Pedestrian Alert	Accuracy: **98%**. Real-time pedestrian detection, efficient in high traffic areas.
Driver Fatigue (Eye Blink/Yawn)	Accurate Monitoring: **93%**. Provides instant alerts for prolonged yawns and rapid eye blink.
Mobile Distraction Detection	Accuracy: **95%**. Provides continuous monitoring and distraction analysis.
Driver Seat Belt Detection	Accuracy: **97%**. Provides real-time monitoring of fastening status.
Tailgating Warning	Accuracy: **94%**. Provides proactive alerting to maintain a safe distance.
Blind Spot Detection	Accuracy: **93%**. Provides real-time blind spot alerts, contributing to collision reduction.
Deer Detection & Warning	Accuracy: **91%**. Provides proactive alerts by measuring the distance from deer.

These validated cases illustrate Rapidise's capability to manage the full development cycle, from custom driver development and low-level hardware integration (NXP iMX8, custom sensors) to the deployment of optimized, high-accuracy AI models (Qualcomm 8155, Telep AI) and delivering substantial volumes of commercialized product (2000 units).