Autonomous Secure Framework for Autoinfotainment Systems

Pratik Satam and Salim Hariri

Sponsor: MITSUBISHI
Project Overview

End Users / Applications

Services

Communications

End Devices

Applications

Users

Fog / Cloud Services

INTERNAL NETWORK: CAN, I2C, MOST, Bluetooth

EXTERNAL NETWORK: Wi-Fi, Satellite, Cellular, Car to Car

CONTROLLERS:
Transmission, engine, brakes, airbag

SENSORS:
Illumination, tire pressure, speed, distance.

ACTUATORS:
Brakes, lights, gas pump

ENTERTAINMENT:
(radio, video, etc)
Project Overview
Team and Leverage

- **Team**
  - Mitsubishi
    - Mohammad Horani
  - UA Faculty
    - Salim Hariri
  - UA Graduate Student
    - Pratik Satam

- **Leverage**
  - Anomaly Behavior Analysis (ABA) methodology.
Current infrastructure of the network does not support secure and trustworthy deployment of services to smart cars.

The goal of the project is to develop a Highly Secure Framework to continuous monitor supply trustworthy services to smart cars. Moreover, this framework will also be able to support continuous monitoring of the smart cars thus being able to secure the car against cyber attacks.
Project Tasks: Overview

- **Task 1**: Development of the ASDF threat model/framework.
  - This step involves developing a secure framework for smart cars.

- **Task 2**: Development of ABA-IDS for each service.
  - This step involves developing behavior models to design IDS’s for each service.

- **Task 3**: Integrate the IDS into the Qualcomm S820am automotive development platform.
Task 1: Development of the ASDF threat model
Task 2: Development of ABA-Models

- Work Progress:
  - Built IDS for the Wi-Fi Protocol
  - Built IDS for the Bluetooth protocol.
  - Developing protocol for the camera.
Task 3: Integrate the IDS into the Qualcomm S820am automotive development platform.

- Issues faced with integration of the IDS:
  - Lack of proper board documentation.
  - No support from board supplier or the manufacturer.
In this project, multiple software tools and modules will be developed in order to build the proposed capabilities for the Autonomous Secure Framework for Autoinfotainment Systems.
Deliverables and benefits

- **Deliverables**
  - Midterm and final reports documenting research methods, progress, results, and analysis
  - One or two scholarly conference and/or journal publications

- **Benefits**
  - Direct access to models used to detect analyze attacks on Smart Cars.
  - Receive software tools developed to detect vulnerability and attacks on smart cars
  - Adapt the software tools developed to the member software environment for evaluation and testing.
  - Access to research results from system deployment, experimental benchmarking, and related deliverables