Towards the COSCA framework for "COnseptualing Secure CArs"
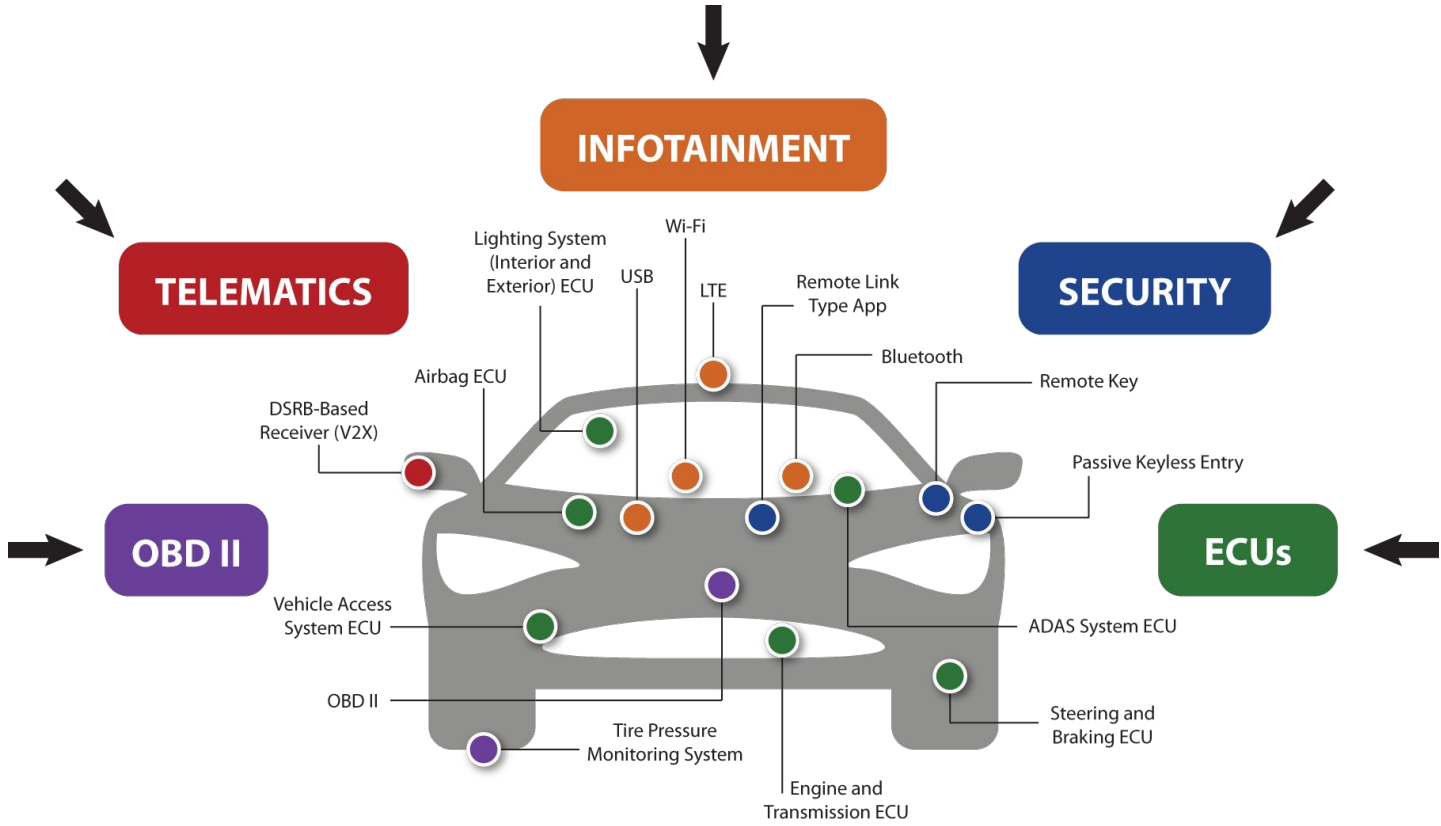
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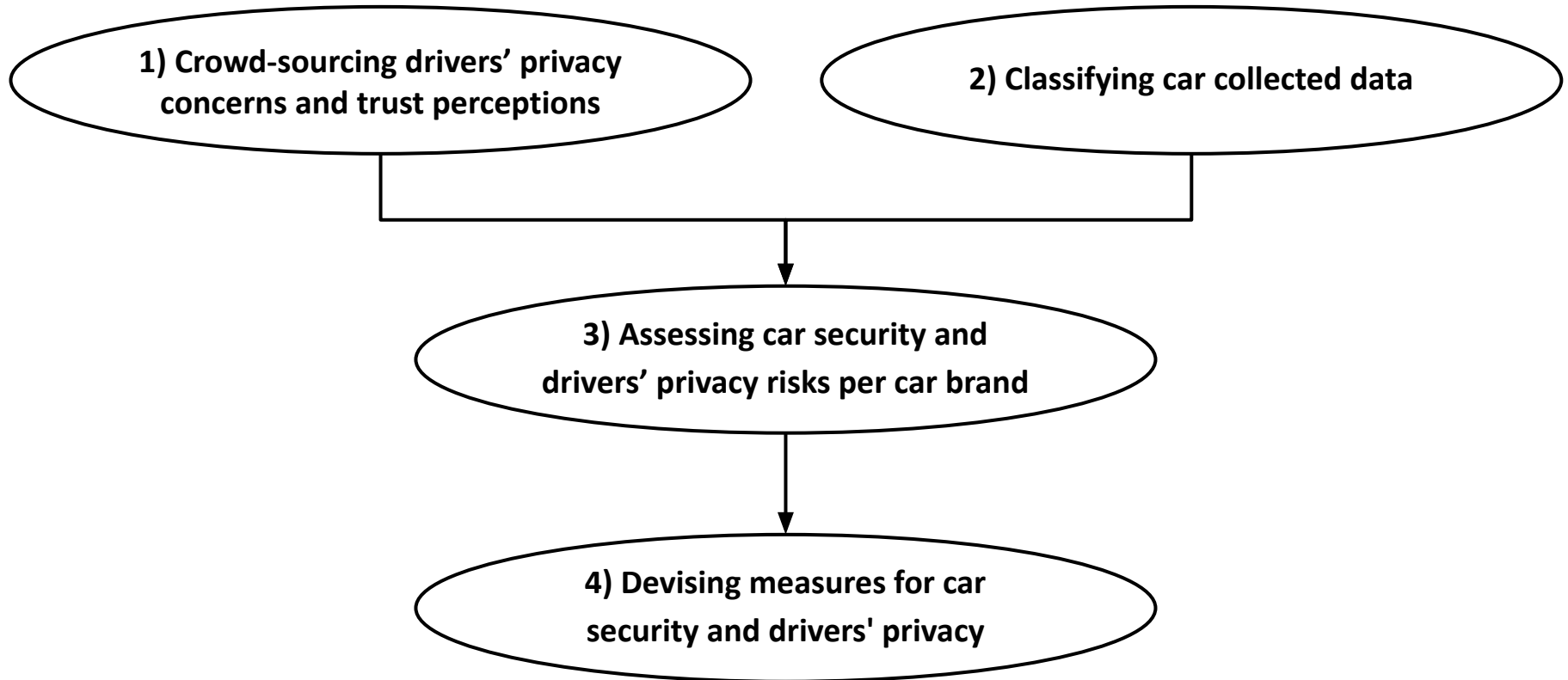✦ Istituto di Informatica e Telematica,Consiglio Nazionale delle Ricerche, Pisa, Italy

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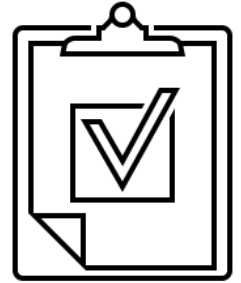
Activities

1) Crowd-sourcing drivers' privacy concerns and trust perceptions

2) Classifying car collected data

3) Assessing car security and drivers' privacy risks per car brand

4) Devising measures for car security and drivers' privacy

Questionnaire design:
- Basic information
- Capturing concerns on privacy
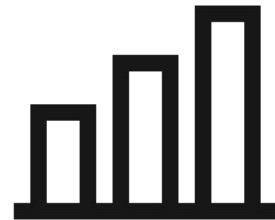- Capturing perceptions of trust

Crowdsourcing
- Choice of the platform
- Choice of the subjects
- Sample of 1101 respondents

Study of statistical correlation
Correlation coefficients allow us to establish whether there are any relationships between different data sets.

- Most of the participants agree that the systems and technologies implemented in modern cars are increasingly similar to modern computers

- Most drivers do not agree that it is necessary for their car to collect their personal data, because they believe that such collection is not necessary for the full functioning of the car.

- A large part of the sample thinks that their data is analysed and studied by the vehicle systems to evaluate some personal aspects

- We collected twelve privacy policy documents
  - Ten from top-selling carmaker in 2019
  - Plus two carmakers, Tesla and Kia Motors

- Privacy policy documents are related to the carmaker mobile app
  - We retrieved the document from the Android app itself
  - We double-checked the documents by contacting the carmaker support:
    - website
    - social networks

- Metrics regarding privacy policies: level of readability, defining taxonomies based on keywords or noting correlations between car manufacturers

Data Category			
Category	**Keywords**	**Category**	**Keywords**
PII	• Name • Address • Date of birth • Mobile number • Email address • License plate number	**Geolocation**	• Position • GPS time • Speed • Directions • Traffic • Departure and destination name • Estimated travel time • Point-of-interest searching (POI)
Driver's Phone	• IP address • MAC address • OS version • Browser Information	**Purchasing**	• Customer ID • Credit card number • Financial data for payments • Fuel costs

- Risk Management

- Risk Assessment

  - Risk Identification

  - Risk Estimation

    - Asset-oriented (e.g. ISO/IEC 27005:2018)

    - Threat-Oriented (e.g. STRIDE)

  - Risk Evaluation

- Risk Treatment

Main finding: The analysis showed that the components that most endanger the privacy of drivers are the infotainment systems. Furthermore, Tesla is the brand that collects the most data and, consequently, is also the most at risk.

4.1- Conceptual development of techniques for car security and drivers' privacy
Technologies for prevention, detection and reaction to cyber attacks, applicable to ECUs, in-vehicle networks and communication with external entities

4.2 - Conceptual development of human-to-technology interfaces for car security and drivers' privacy
We are studying the best options for realizing user interfaces that will:
- be usable on a typical car LCD
- allow drivers to easily select and update their privacy and security preferences
- deliver relevant and clear information to the driver on the current privacy and security settings

COSCA framework: conceptualizes safe and privacy-preserving cars by performing four main tasks

- It deals with studying whether drivers care about privacy and whether they trust the manufacturers of the cars they drive to treat their personal data

- This data is to be understood comparatively among a number of relevant manufacturers in light of GDPR

- The activities continue with a risk assessment exercise aimed at evaluating the cybersecurity of cars from a traditional IT perspective, as well as the privacy of drivers from a GDPR perspective

- The final activity covers socio-technical measures that are motivated by the risk assessment and then covers the design of interfaces that enable drivers.

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Thank you for your attention

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