PRIVACY-AWARE INFORMATION BASE IN THE CONTEXT OF SMART CITIES

Sisay Chala
Otilia Kytola
INTRODUCTION AND OVERVIEW

• GOEASY project: What is it about?

• In smart city context, understanding mobility behavior of users is key to the optimization of public transportation services thereby reducing traffic, as well as impact on environment

• Challenge: to protect user privacy in geolocation data while providing dependable location-based services

• Our response: privacy-aware information base that utilizes Galileo authentication to enhance the security and reliability of location-based services
PRIVACY-AWARE INFORMATION BASE

- Privacy-aware information base for mass-market Location-based Services (LBS)
- User data including geolocation/routes is gathered for use by LBS providers as well as mobility managers
- User location data to track routes through the city and mobility modes
- Pollution condition modeling for healthy route selection

https://www.researchgate.net/figure/Public-bus-transportation-lines-consisting-of-multiple-routes_fig2_319171159
IMPLEMENTATION APPROACH (1)

• Ensuring privacy of data subject is an important issue for any data-intensive endeavors
• In order to ensure privacy of users, we have followed various implementation options
  – Detaching Personally Identifying Information (PII) from the data during collection, e.g., protecting device ID through local differential privacy
  – Data minimization when sharing data to third-party
  – Protection k-anonymity of user location through global differential privacy by pumping noise.
IMPLEMENTATION APPROACH (2)

- Tracked routes are sent to the GOEASY Platform and PII data such as device id are obfuscated before storage
- Time and space dimensions separated to reveal as little data as possible
- Differential privacy enabled location data collection, while reducing the risk of revealing the identity
CHALLENGES

- Privacy-preservation versus data usefulness.
- Enabling users to exercise their “right to be forgotten” (GDPR Article 17) so that they can delete their information whenever they want to.
- Lack of generalized methodology to measure compliance of privacy technique for geolocation data.
- How much noise to add and where: start, mid or end of the tracked routes.
This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 776261.