Security, Privacy, and Fairness in Fog-Based Vehicular Crowdsensing[1]

Yin-Hong Hsu

03 02, 2018

Outline

Intorduction

Architecture

Challenges

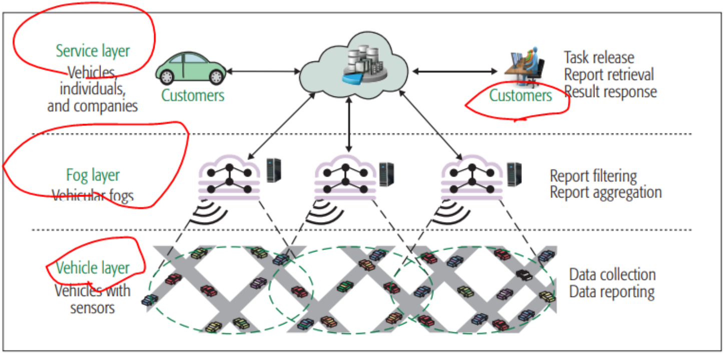
Solution

References

Intordduction

- A study of security, privacy, fairness requirements in fog-based vehicle crowdsensing
- And discuss the possible solutions
- Fog-based vehicle crowdsensing (FVCS) can provide local services (e.g., real-time nevigation, parking space reservation)

Architecture



Challenges - Security

- Malicious hacker might extract personal info from the intersaction of multiple crowdsensing report
- In authentication issue, the blacklist should be built to resist impersonation attacks and Sybil attacks

Challenges - Privacy

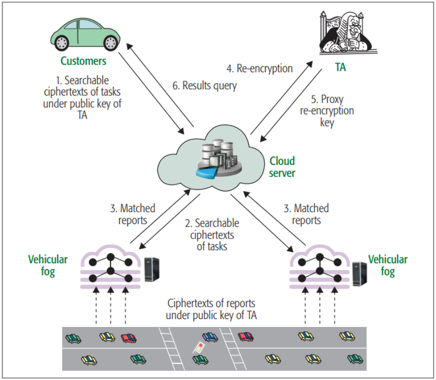
- The sensing data are related to people-centric information, also included where driver and passenger are goin or what place they frequently visit
- The more promising method to protect vehicles' privacy is to use anonymity technology (e.g., group signature, k-anonymity)

Challenges - Fairness

- How to guarantee the fairness of vehicles is dramatically critaical
- The data sensed from same position inevitably contain some duplicates, which may waste massive bandwidth and storage
- It is necessary to design a verifiable reward distribution mechanism for vehicles to ensure their fairness

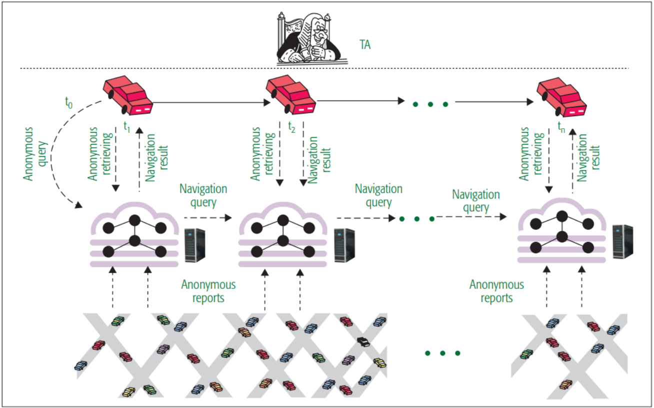
Solution - Security

- A Trusted Authority (TA) should be involved to achieve key management


Customers
1. Searchable ciphertexts of tasks under public key of TA
6. Results query
4. Re-encryption
TA
5. Proxy re-encryption key
Cloud server
3. Matched reports
2. Searchable ciphertexts of tasks
3. Matched reports
Vehicular fog
Vehicular fog
Ciphertexts of reports under public key of TA

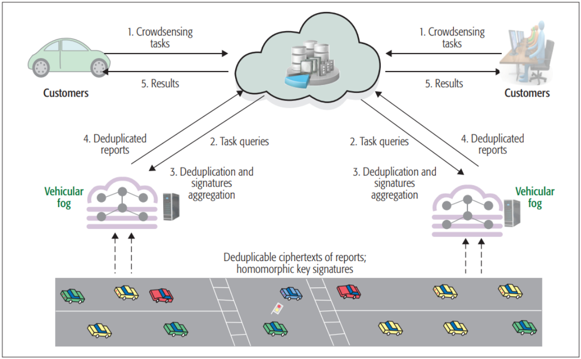
Solution - Privacy

- Use signature generated by TA to accomplish privacy requirement



Solution - Fairness

- The straightforward method is to discard the duplicate data; however, to disclose the sensing report will leak personal information



References

[1] J. Ni, A. Zhang, X. Lin, and X. S. Shen, “Security, privacy, and fairness in fog-based vehicular crowdsensing,” *IEEE Communications Magazine*, vol. 55, no. 6, pp. 146–152, 2017.

Thanks for Your Attentions