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Social acquaintance based Routing Protocol (SARP) for reliable data delivery in Vehicular Social Networks Azizur Rahim



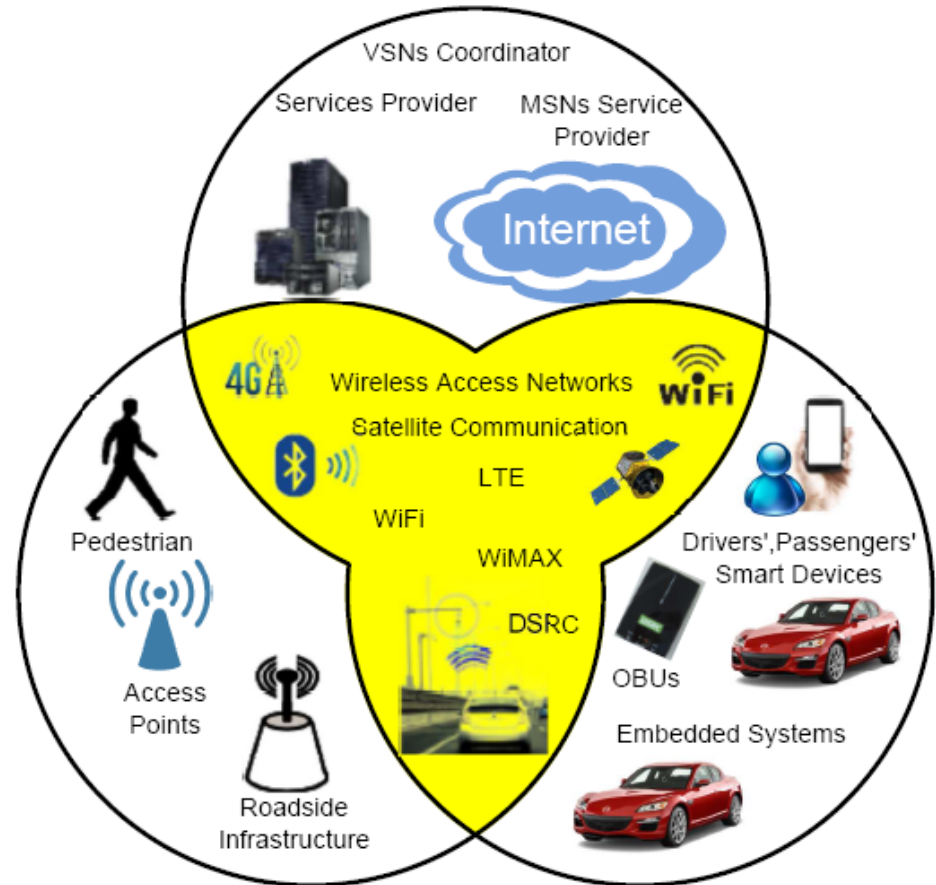
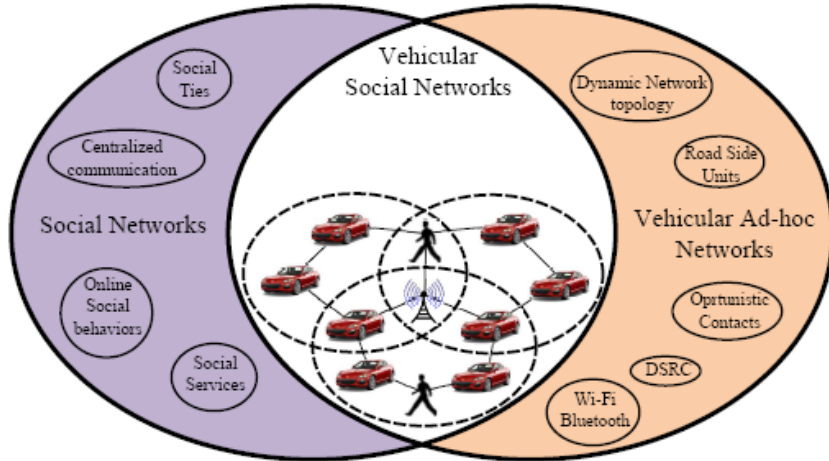


SARP



- Introduction
- Applications and Challenges
- Related work
- Social Acquaintance based Routing Protocol (SARP)
- Simulation and discussion
- Conclusion and Future Work
- References

Introduction





From HSN to VSN



Property	Human Social Networks	Vehicular Social Networks
Dynamic Nature	Mostly static and grows based on real life relationship.	Highly dynamic
Basis of Relation	Real life relations	Travel route, similar configuration
Social Interactions	Tweet, comment, like, share, chat, tagging, follow	Message exchange
Anonymity	Mostly not anonymous	Mostly anonymous
Trust	Social relationship grows through continuous interactions	Mostly anonymous
Topology	Mostly stable.	Highly dynamic
Activity Concentration	Most activities occur among real life close friends	Interactions occur mostly within anonymous neighbors.
Usage	Online social network is a virtual network	Overlay network on top of the physical vehicular network



Applications & Challenges



- Applications

- Safety-based applications

- » overtaking vehicles, emergency vehicles, pre-crash sensing, traffic conditions, signal violation, etc.

- Convenience-based Applications

- » traffic flow control, cooperative traffic management, congestion and route computations, etc.

- Comfort-based applications

- » parking payments, repair and maintenance records of vehicles, finding free space for parking, finding fuel stations, recreation centers etc.



Applications & Challenges



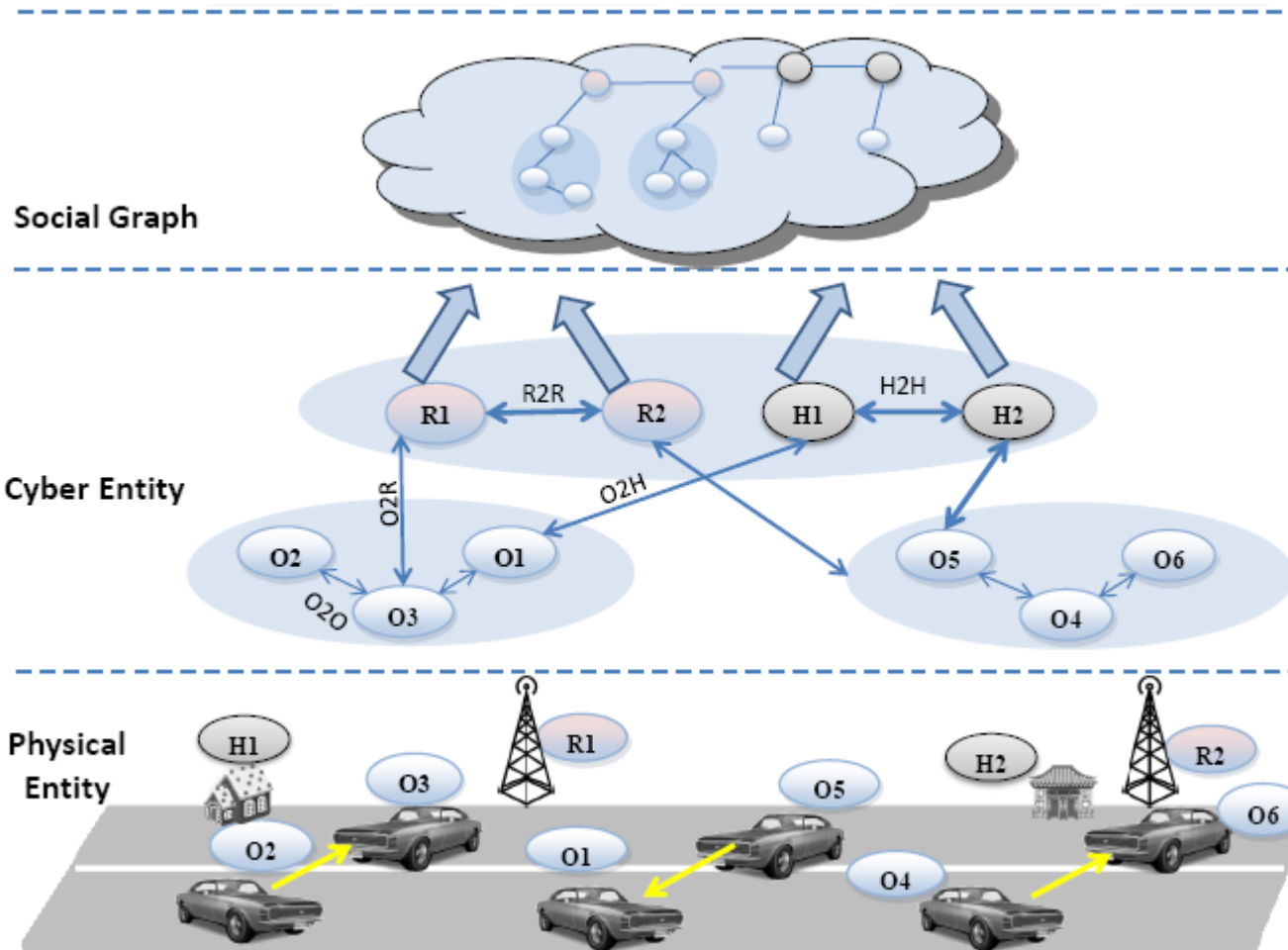
- Socially-aware architectures and applications in vehicular environment
 - » short range transmission, self-organization, low bandwidth, and self-management
- Opportunistic user connectivity
 - » vehicular mobility leads to unreliability of wireless links
- Privacy and security
- Data dissemination
 - » highly dynamic nature and intermittent connectivity



Related work

- Cluster-based protocol design
 - » Nodes are divided into different clusters
- Broadcasting-based protocol design
 - » weather information, traffic condition, advertisement, emergency messages, advertisement, and road conditions
- Position-Based protocol design
 - » Position based routing protocols for VSNs face different challenges in urban scenarios
- Socially-aware protocol design

3 layer Archi of VSNs





SARP



- Social acquaintance based Routing Protocol
 - Social centrality
 - Social activeness
 - Community acquaintance



Centrality



- Quantification of the relative importance of node
- Degree centrality

$$C_{n_i}(t) = \sum_{k=1}^N a_{n_i, n_k}(t)$$



Activeness

- Dynamic topology
- Number of contacts varies with time

$$Act_{n_i} = 1 - \frac{|N_{n_i}(t) \cap N_{n_i}(t - \Delta t)|}{|N_{n_i}(t) \cup N_{n_i}(t - \Delta t)|}$$



Community acquaintance



- Measure of global contact
- If source and destination are not in the same community
- Higher CA increases probability of data delivery

$$CA_{n_i}(t) = \sum_{k=1}^N C_{n_i, n_k}(t)$$

$$SARP = (1 - \alpha - \beta)CA_{n_i}(t) + (\alpha)C_{n_i}(t) + (\beta)Act_{n_i}(t)$$



Questions & Suggestions

