Towards a Human Trust Model for Mobile Ad-hoc Networks

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Outline

Mobile Systems
- Characteristics
- Requirements

Trust Management Model
- Trust Formation
- Trust Dissemination
- Trust Evolution

Future Work
Mobile Systems - Characteristics

1. Dynamic context
2. No central authority
3. Resource Constraints
Mobile Systems - Requirements

1. Decentralised
2. Selfish
3. Customisable
Trust Management Model

Trust Formation

- Local Trust Information \([a, b, l, s, c, k, t]\)
- Recommendations \([c, b, l, s, c, k, t]_{SK(c)}\)
- Local Tacit Information \([a, c, l, s, c, k, t]\)

Trust Formation Function

\[ \tau: \mathcal{O} \times \mathcal{P}(\mathcal{O}) \rightarrow \mathbb{E} \rightarrow [-1,1] \times [-1,1] \]
Trust Management Model

Trust Dissemination

Letters of Presentation

[c, b, l, s, c, k, t]_{SK}(c)
[d, b, l, s, c, k, t]_{SK}(d)
[e, b, l, s, c, k, t]_{SK}(e)
...

[a, b, l, s, c, k, t]_{SK}(a)
[b, a, l, s, c, k, t]_{SK}(b)
[f, b, l, s, c, k, t]_{SK}(f)
Trust Management Model

Trust Evolution

- Aggregation Function
  \[ \phi: [-1, 1] \times \mathcal{P}(\mathcal{O}) \rightarrow \mathcal{E} \rightarrow \mathcal{E} \]

- Extraction Function
  \[ \psi: [-1, 1] \times \mathcal{P}(\mathcal{O}) \rightarrow \mathcal{E} \rightarrow \mathcal{E} \]

- Malicious Agents Detection
  - Fake bad recommendations
  - Fake good recommendations
Ongoing and Future Work

What we are doing:
- Simulation
- Integration with event-based middleware

What we plan to do:
- Run-time monitoring of transactions
- Incentives to cooperate
- Coalition formation
- Analysis of context

Long-term plan:
- Integration of trust, risks and QoS