A review of AI-based trust management in smart cities

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1. Introduction

- Smart cities as evolving dynamic hubs
- Artificial intelligence (AI)
  - Technological enabler, reshapes urban interactions and governance structures
- Target: Exploration of trust landscape
  - Addressing research challenges introduced by AI integration

2. Applied methodology

- Usage of databases such as Google Scholar, PubMed, and IEEE Xplore
- Search for keywords: Trust management, smart cities, healthcare, and AI
- Available sources in English or German language
- Utilization of precision techniques such as Boolean operations
- Relevance check based on most recent investigations

3. Trust management in smart cities

- Critical dimensions of trust management: five frequently mentioned aspects

Table 1. Overview of content coverage for selected trust management indicators

	Security and privacy	Transparency	Authenticity	Communication	Reliability
[4]	◒	◔	○	◔	○
[5]	●	○	●	●	◔
[6]	●	○	○	◒	◔
[7]	◕	◔	○	○	◒
[8]	◒	◔	○	○	◒
[9]	○	◒	○	◒	◒
[10]	●	○	●	○	◔
[11]	◒	●	○	●	○
[12]	◔	○	●	○	◒

4. Research challenges

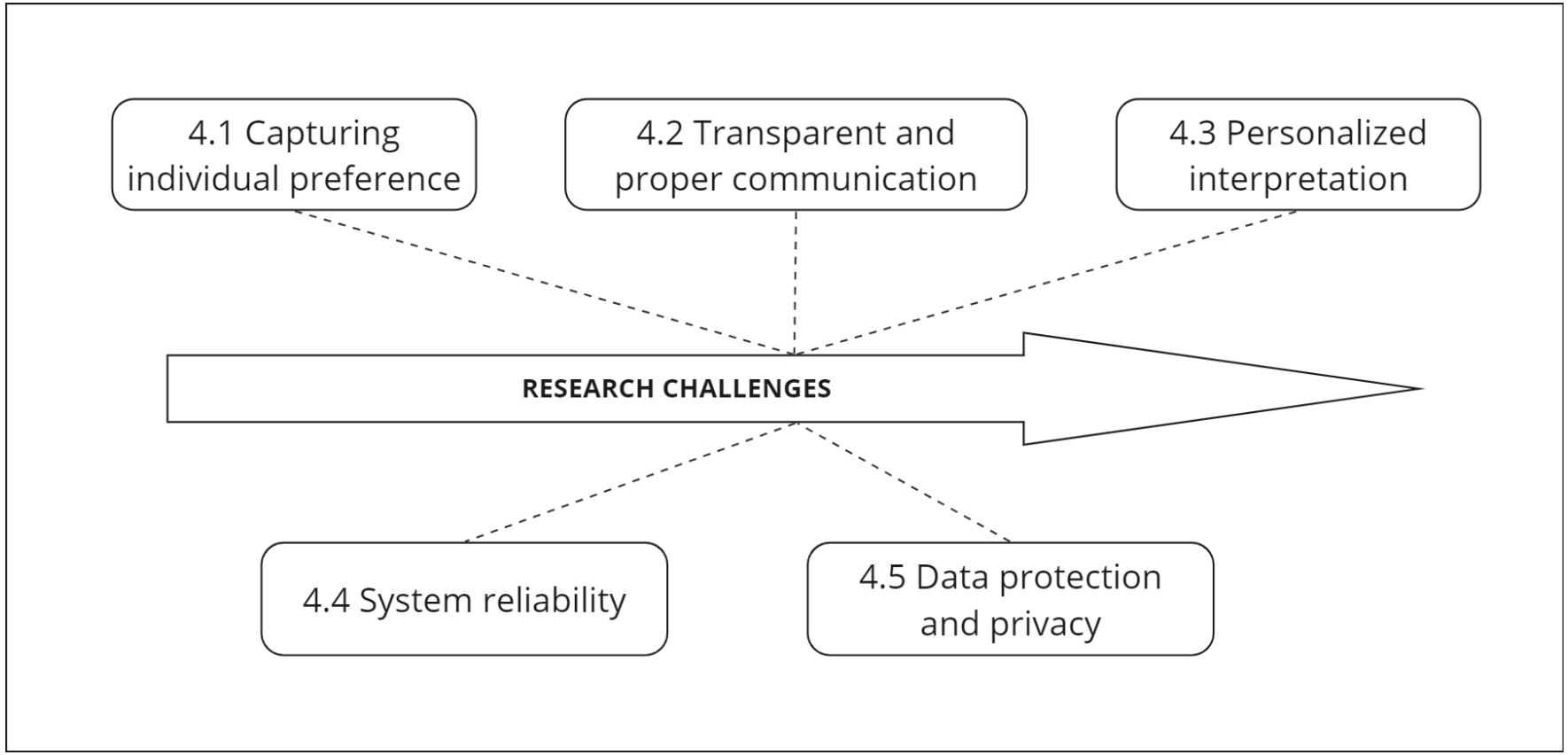

Figure 1: Research challenges (own visualization)

4. Research challenges

- 4.1 Capturing individual preference:
  - Absence of the human factor, individuals prioritization of human interaction over smart systems
  - Potential of non-adoption and avoidance of one-size-fits-all approach
- 4.2 Transparent and proper communication:
  - Clear and user-friendly communication practices
  - Avoidance of uninformedness about data management
- 4.3 Personalized interpretation:
  - Indirect trust (recommendations) over direct trust
  - Need for investigations into end-users interactions, combining individuals preferences and experiences

4. Research challenges

- 4.4 System reliability:
  - Challenge in managing the system´s utility without compromising limited resources
  - Crucial balance for the trust system effectiveness and sustainability
  - Seamless interactions and enhancement of stakeholders' confidence
- 4.5 Data protection and privacy:
  - Protection of the integrity of data used within intelligent systems
  - Prevention of data breaches and unauthorized data usage

4. Research challenges

4.6 Research synergy:

- Need for personalized trust mechanisms, transparent communication and efficient resource usage of trust systems in smart cities
- „How to leverage the human factor with techniques and machines in smart cities?”
  - Importance of individual preference in gaining and maintaining trust
- Address challenges by developing improved communication systems for individuals

5. Conclusion

- Complex trust management landscape with critical dimensions: Security and privacy, transparency, authenticity, communication, and reliability
- Research challenges: Individual preference, transparent communication, personalized interpretation, system reliability, and data protection
- Trust management: Base for successful AI integration
  - Further need for personalized and context-aware trust management approaches
- Crucial exploration of innovative strategies for trustworthy AI implementation in urban environments