

LBS Research Agenda: Key Problems (Draft)

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ICA Commission on Location-Based Services (<http://lbs.icaci.org/>)

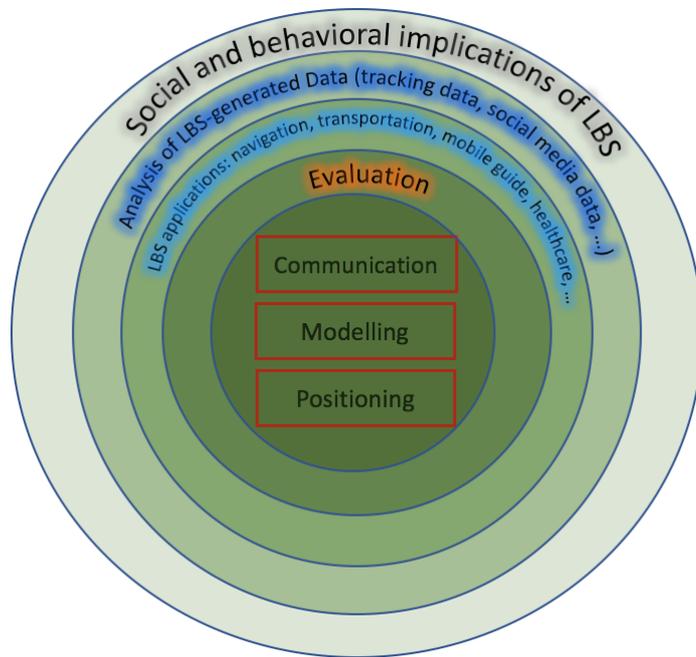


Figure 1 The research domains of LBS

- The inner represents the core of LBS (“how to make it work”).
- “Evaluation” is important to ensure that a developed LBS meets users’ needs.
- “Analysis of LBS-generated data” helps to better understand people’s behaviors at various environments (e.g., for transport, urban planning, smart city), which can be also used to further improve LBS applications.
- Beyond these, “social and behavioral implications of LBS” raises as LBS enter into people’s daily life.

0. Definition

- What is LBS? Do we need to revise the current definition (e.g., the one at JLBS, 1(1), 2007)?
- What are the extent of LBS as a research domain?
- Which application domains (e.g., mobility, entertainment, healthcare) can LBS play a role?

1. Ubiquitous Positioning

- Can guidelines on the levels of accuracy and reliability needed for various LBS application domains be developed?
- How can we determine an object’s position in indoor environments and adverse GNSS conditions? Can sensor fusion help? Can cooperative positioning help?
- Can we “standardize” the service interface (i.e., “input”/“output”) of indoor positioning solutions (like GPS for outdoor, or OGC’s WMS, WFS and WPS, which standardize the input/output of geospatial data and processing services)?
- How can seamless positioning for indoor/outdoor be provided in LBS?

2. Modelling

- Location modelling: How can the environments be modelled to support effective LBS applications?

- User modelling: In which ways can users and their preferences, skills, cognition, and tasks be modeled and used in LBS?
- Context modelling: What are context information in LBS? In which ways can context and its dynamics be modeled and used in LBS?
- Can a generic framework be developed for various LBS applications, integrating user modelling, context modelling and location modelling, as well as the dynamics of these aspects?
- How can the principles of Linked Data be applied in LBS?
- How can relevance be modelled in LBS? How can personalization and context-awareness be provided in LBS?
- How can we design LBS to support collective actions and activities (LBS for group users)?

3. Communication (Interface and Interaction)

- How can effective, efficient and satisfying interfaces be provided in LBS?
- How can we employ newly emerging mobile devices (e.g., smart watches, smart glasses) for LBS applications? Can we predict what design patterns/principles will work for future emerging devices?
- How can visual, sound, and tactile methods be meaningfully integrated to effectively communicate spatial information in LBS?
- Can we find a balance between autonomy and automation (human-in-the-loop) in LBS applications?

4. Evaluation Methodology

- How can a comprehensive framework (beyond usability) for evaluating LBS applications be developed, considering UI, user properties and skills, cognition, device and service properties, environmental factors, and social aspects?
- What is the usability of user research techniques and methods (longstanding and emerging) in LBS research (in laboratory and in the field)?

5. Analysis of LBS-Generated Data (e.g., tracking data, social media data)

- Theories and data models of location-based social media data and tracking (outdoor and indoor)
- Analysis and visual analytics for social media data and tracking data
- How can results of the analysis be used to further improve LBS applications?

6. Social and Behavioral Implications of LBS

- What is privacy in LBS? How can we best address users' privacy in LBS?
- How do LBS influence/change our understanding of privacy, as well as our responses toward privacy?
- How do LBS (e.g., navigation systems) influence people's spatial knowledge acquisition, spatial awareness and spatial ability? Why it happens?
- How can we design LBS that facilitate people's activities and decision-making without harming their spatial abilities?
- How do LBS influence the way people interact with each other and their behaviors at different environments?
- What are the legal, social, and ethical implications of LBS? How do LBS challenge people's understanding of legal, social and ethical principles?

Based on the one-paragraph proposals at <http://lbs.icaci.org/wp-content/uploads/2016/05/one-paragraph-proposals.pdf>, as well as the research agenda workshop at the LBS 2016 conference.

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