

## GeoDeliberation

Geodeliberation is an advanced form of public participation where community members engage in deliberative dialogue to express concerns, generate alternative solutions, and construct action plans for addressing geographical defined problems with significant controversy among stakeholders. Examples are urban planning, pipeline routing, and public service delivery [3].



## Research Objectives

This dissertation focuses on the design of visual-computational facilitators and enablers that help address two fundamental problems that impede the practice of effective, large-scale geodeliberation [2, 5]:

- Cognitive barrier.** Deliberation requires the skills of critical thinking and logical reasoning that are qualitatively different from human everyday thinking, which often dominates over more reflective thought. How could technology help lessen the cognitive demand when making critical thinking and reasoned argument?
- Information barrier.** Information in deliberation may include the problem, constraints of the problem, participants' opinions, perspective by which opinions are evaluated, facts, and participants' evaluation of opinions. The large amount of information and the complex relationships among information in large-scale deliberation is often beyond the limit of memory and attention sources of human cognition.

## Research Plan

Extending GeoDeliberator platform with information and analytic support that helps the participants in expressing concerns and making judgment.



## GeoDeliberator: Challenges and Preliminary Design Features

### 1) Briefing and Introduction

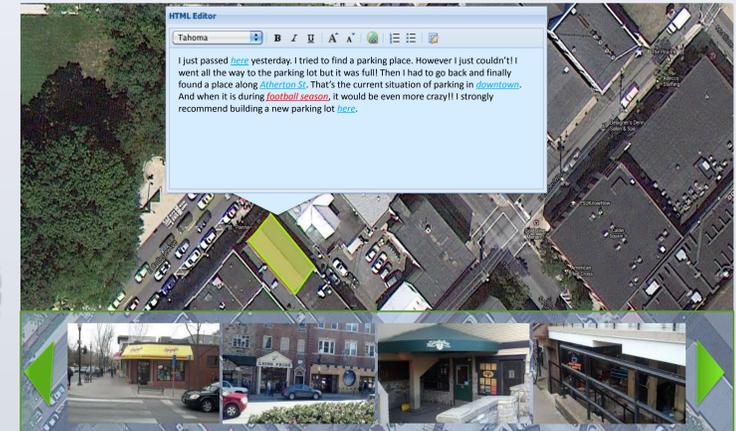
- What's the "good" practice of briefing (i.e. objective, brief, comprehensive, etc. to effectively set up initial common ground) and what tools could help?
  - Timeline to initiate and maintain common ground
  - Geographic annotations to provide spatial context
- Who should contribute to and maintain problem briefing and how can computational methods help?
  - Role-based visualization



- How to relate prior knowledge (existing documents, external online resources, etc.) to the current issue?
  - Use hyperlinks to refer to geographic features and external resources

### 2) Issue-based storytelling

- How to help participants recall their past experience? How visualization methods and spatial analysis methods can help relate the current issue with personal concerns?
  - Multimedia (maps, photos, videos) helps users recognize and recall past experience
- How to assist people in expressing and conveying their (spatial) mental model?
  - Enabling users to freely draw and attach annotations to geographic features helps storytelling



**1) Briefing and Introduction**  
Nature of the problem, background, objectives, resources, constraints

**2) Issue-based storytelling**  
Contribute personal knowledge, experiences, and stories. Gather ideas from individuals and associate them with issues

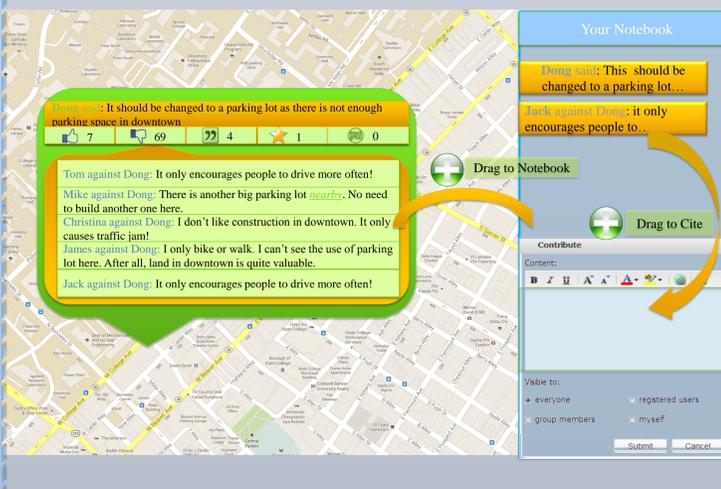
**3) Reasoned claims and arguments**  
Participants express their opinions and arguments justified by logical analyses of evidences rooted in personal and scientific knowledge

**4) Public judgment and Common ground**  
Develop mutual understanding, consolidating ideas, link private ideas and interests to from public judgment and shared values

**5) Collective action and Choices**  
Generate alternative courses of actions together with evaluation

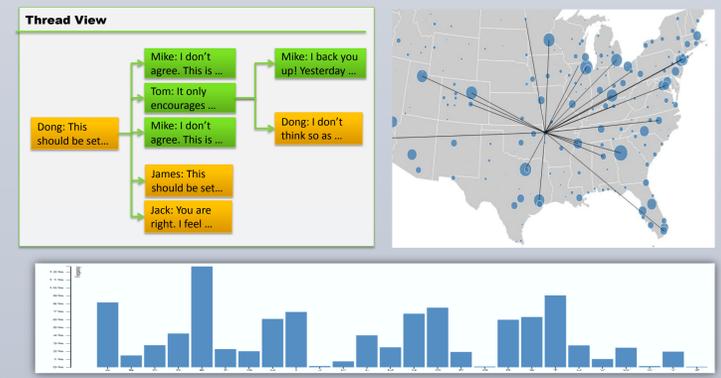
### 3) Reasoned claims and arguments

- How to encourage people to make rational arguments?
  - Build an award system by marking users' posts
- How to facilitate reasoned arguments under the limit of memory?
  - Drag other's opinion for citation, without paraphrasing.
  - Personal information pool to store temporary references to arguments and external resources
- How can geospatial analytical tools help people make reasoned spatial decision-making?
  - Visualization of relationships among geographic features mentioned in deliberation
- How to expose various (opposing) opinions to participants? [6]
  - Search engine to find opposing opinions and recommendation system to push them to participants



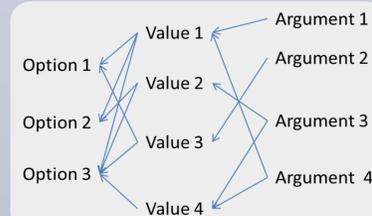
### 4) Public judgment and Common ground

- How to develop the sense of community and activity awareness [4]? We apply Tree-based visualization of arguments helps structure internal information
  - Timeline provides an overview of the evolution of deliberation
- How to extract alternative solutions to the issue from argument pool?
  - Topic modeling and opinion mining techniques help categorize solution options



### 5) Collective action and Choices

- How to weigh various alternatives against people's values explicitly?
- How can visualization and spatial analysis tools help make collective decision?
- Is there anything the system can do to track and evaluate the action to be implemented?



## References

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