GeoNotes: Social and Navigational Aspects of Location-Based Information Systems

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UbiComp 2001

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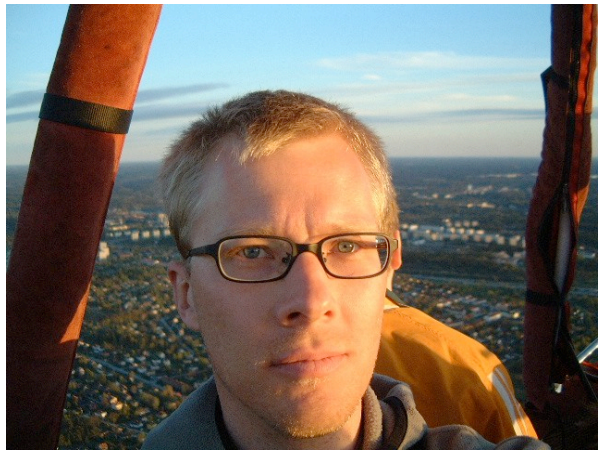

  - Researcher at Nokia Research Center, Helsinki
  - Social Computing, Social Navigation, Synthetic character, Believable Agents, Affective Computing.

Authors

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  - At SICS
  - Agents, Mobile services
- Elenor Cacciatore
  - Interaction Designer, SICS
  - Film, art, sculpturing, Interaction design

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  - SICS
  - Agent based systems, context based information systems, service user interaction

Concept of Context in Internet Services

- The context of modern day electronic devices is constantly changing
- Desktops have relatively fixed environment
- PDAs, Laptops, mobile phones all have a dynamic environment
- The most important environmental factor is LOCATION

Location Based Services

- Services offered based on the position of the user device
- Types
  - Location Based Information Systems
    - Information dependent on location is the service
  - Navigation and tracking
    - Information about location is the service
- Location Based Systems normally need to keep track of people

Examples of LBS

- Information about various artifacts in museum when you are near the artifact
- Billing of cell phone calls based on location
- Weather information based on cellphone location
- Traffic conditions ahead of you
- Location of your friend whom you want to meet in a hour's time
- Location of a book in the library (maybe off the shelf)

Location Based Information Systems (LBIS)

- Paper concentrates on LBIS
- Digital Information is connected to a specific location
- This information can then be accessed by people who come in the region.
- Positioning of Information is more important than positioning of people

Freedom of Information

- Who can put information in LBIS?
  - Professional Content Provider (PCP)
  - Common User
- Information provided by PCP tend to be dry, formal, official and impersonal
- Content is not updated often, hence information may be static
- What happens in the real world?

Real World Social Communication

- Takes place using
  - Post-it notes
  - Graffiti
  - Posters
- Post-its are short notes written and stuck to some object
  - They give information in “context” of that object

Real World Social Communication

- Graffiti are writings made on walls, floors and ceilings of public places
  - Intention is to express strong views
  - Prohibited in the real world at commercial places
- Signs and Posters are commercial / informative writings at public places

Freedom of Information

- Should we have post-it notes, graffiti and posters in the digital world?
- The authors do want it because
  - Information space expands with the users (not static)
  - Social awareness increases
  - Information will reflect real life, concerns and social reality

Examples

- You go to Sears to buy a television and you are confused
- You want to know the latest rumors in the neighborhood
- People are attending Scott Hall 123 for their first CS111 class and they are still confused on whether to take the course
- Down with cigarette smoking!!

Problems in a Social LBIS

- Any guesses?
  - •Information space becomes unstructured
  - •Relevant and timely information is not easy to get
  - •If information is “pushed” to the user, he may get disturbed

Thesis of the paper

- Allow users to participate in creating the information space
- Support navigation by collecting and aggregating users' usage of the system, and distribute this data to other users in some refined form

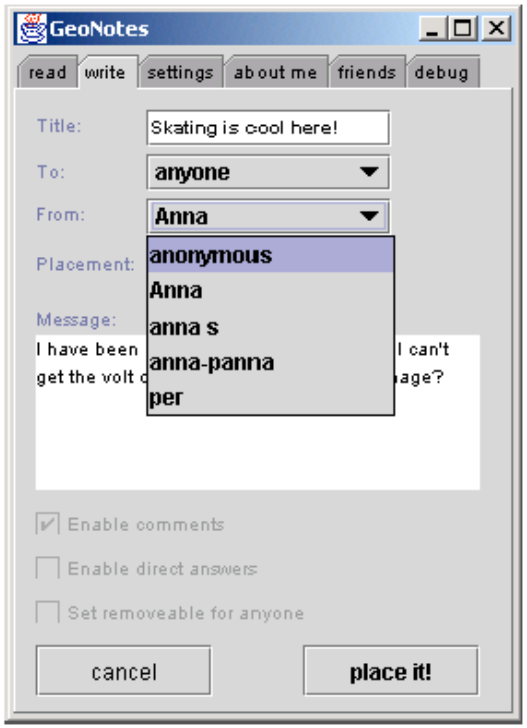
Interaction Requirements

- This paper only studies the use of digital post-it notes.
- A system called “GeoNotes” was created
- Design issues
  - What should a post-it note consist of?
  - How can post-it notes be accessed?
  - How can filtering be done to eliminate irrelevant post-it notes?

Digital Post-it note

- Attributes of a post-it note
  - Title
  - Recipient
  - Signature of creator
  - Place label

Digital Post-it Note



Place label

- Why is it needed? Use (lat, long)
  - Importance of place vs space (Harrison1996)
    - Places are named based on cultural, personality, situations, etc
  - Accuracy of location systems
- Social connotations of a place must be made known
- People should be able to choose and share place label
- Different people might give different labels

Place labels (cont.)

- This improves social awareness, however how many labels does a user has to see to reuse a label?
  - Sorting of labels by popularity
- Current version of GeoNotes does not support label sharing

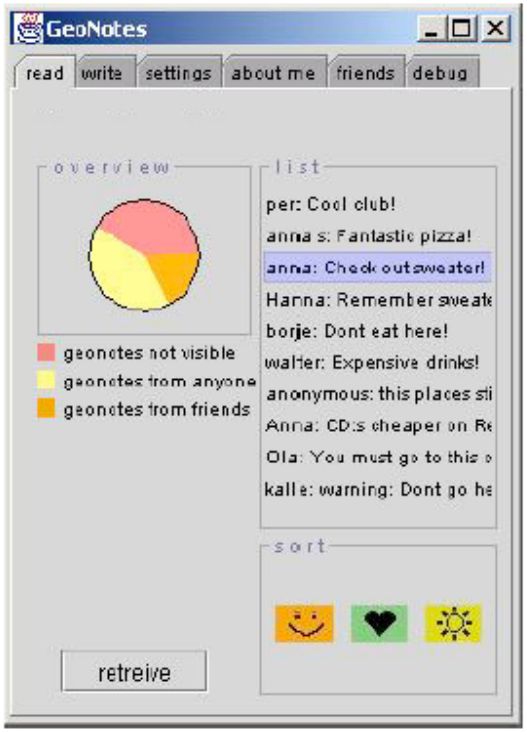
Accessing Notes

- Pull based approach
  - User searches for information
  - Search should be constrained by location
  - Word based search not implemented in GeoNotes
- Push based approach
  - User is notified of information
  - Balance between information and disturbance is needed

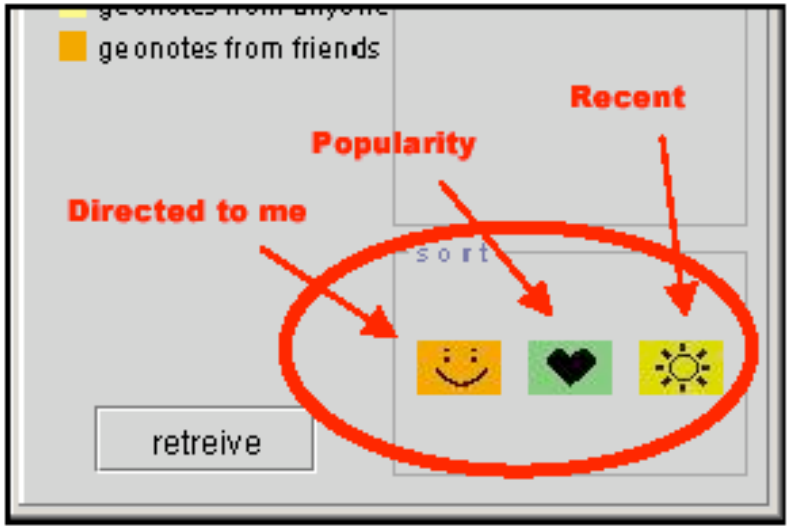
Accessing Notes

- Mixed Push / Pull Approach
  - User not able to express information needs in words
  - User explores possibilities and then refines on what he wants
  - The notes should be classified and presented to the user
    - Sender
    - Popularity
    - Freshness

Mixed Access Example



Sorting Pushed Notes



Saving / Ignoring Notes

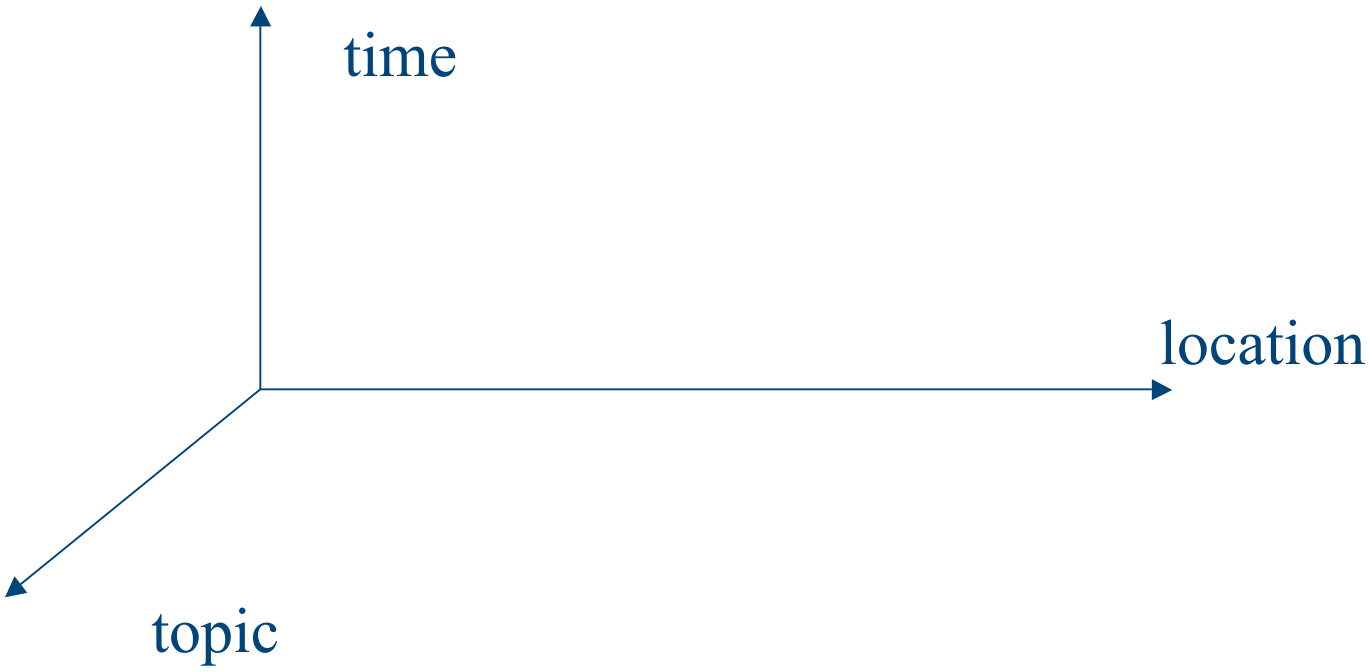
Filtering Notes

- Needed for “push” based systems
- GeoNotes to be used in Leisure oriented settings (???)
- Filtering Criteria
  - Content
    - Combinatorial and boolean search
    - Not implemented in GeoNotes
  - Usage

Filtering Notes Based on Usage

- How to gauge relevance of information?
  - Two aspects
    - Opinion of the user
    - Opinion of the users been to that place
  - What does the user think of the sender or this note?
  - What did other people think?
  - How many people thought so?
  - What were the interests of the people who thought so?

The topic-time-location space



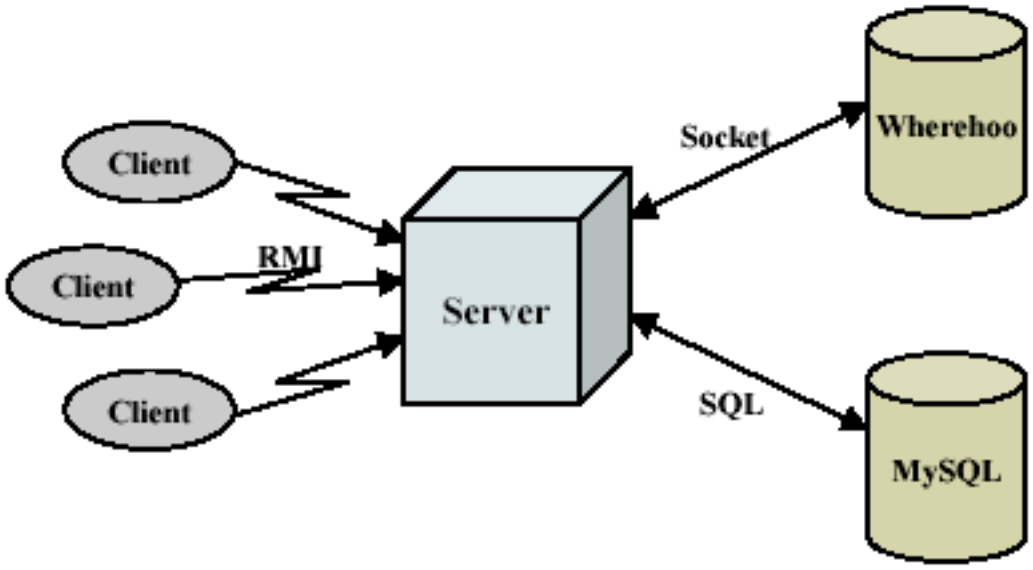
Usage based Filtering

- Simple
  - Most read notes, most saved notes
- Complex
  - Notes read by people with similar interests
  - Notes created by people I know
- It could be possible to keep track of note-creating activities. That would give a different account of the history.
- Can usage filtering be compared with websearch engines?

GeoNotes Implementation

- Client-Server Model
- Client has functionality to store and browse notes offline.
- Server maintains the notes and retrieves it based on a location query

GeoNotes Model



Client

- client using Java (HTML, WML also possible)
- Swing for GUI
- RMI used for client – server communication
- Assumes latitude and longitude will be pushed to the client
- GPS / GSM can be used if appropriate class available
- Simulations done using QuakeSim

Server

- Performs requests to insert notes, retrieve notes and to update a note
- Uses Wherehoo and MySQL databases
- Wherehoo is used for storing location dependent data in a client independent manner
- MySQL stores metadata about usage

Conclusion

- Social LBIS encourages play, expressiveness and personal identity
- GeoNotes does integration of physical and digital space and also enhances collaborative work
- No experiments performed / mentioned

Visit http://geonotes.sics.se/, software available for download