Real-time text chat via collaborative editing systems

by

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Online Text Chat

- Text chat systems are popular and widely used.
- Examples are IRC, ICQ, MSN Messenger, and AOL Instant Messenger.
- The functionalities of most chat systems are similar:
  - Users type messages into a *message input area*, and press “enter”.
  - The message is sent to all participants and displayed at the bottom of a *chat history area* (pushing previous messages up).
  - The name of the message author is displayed in front of the message content.
- The term “standard text chat systems” refers to text chat systems based on above functionalities.
Problems with standard text chat

Several problems with standard text chat systems have previously been identified:

- Lack of links between people and what they say
- No visibility of listening-in-progress
- Lack of visibility of turns in progress
- Lack of control over turn positioning
- High signal-to-noise ratio
- Difficult to correct mistakes
- Lack of useful chat history

Fred: when shall we meet?
Ray: what times does the movie start?
Richard: 6pm
Text chat with collaborative text editing systems

- Real-time collaborative text editing systems can also be (and have been) used for text chat.

- These two types of systems are very similar:
  - A copy of the shared document (or chat log) is maintained at all sites.
  - Operations are generated to edit the shared document (or chat log).

- With text chat systems, text can only be appended to the log.

- With editing systems, insert and delete operations can be applied to any part of the document.
Nature of editing and text chat

- Editing operations are more flexible and powerful than text chat operations.
- As the result, some problems with standard text chat systems can be resolved:
  - Visibility of turns in progress
  - Control over turn positioning
  - Able to separate signal and noise
  - Able to correct mistakes
  - Concise chat history
Locking and workspace awareness

The ability to edit any part of the document may introduce some problems:

- Users may edit other people’s messages (undesirable in some situations, especially for text chat).
- Difficult to tell where messages are inserted.

Additional mechanisms can be build on top of collaborative editing systems to resolve the above problems:

- Locking can be used to ensure users only edit their own messages (or insert new messages).
- Workspace awareness mechanism can be used to ensure users are informed of new messages being inserted in different part of the document.
Consistency properties

- Optimistic operation execution provides good system responsiveness and is used in both standard text chat and collaborative editing systems.
- With optimistic operation execution, special action need to be taken to maintain consistency.
- REDUCE (Real-time Distributed Unconstrained Collaborative Editing system) maintains three consistency properties: causality preservation, convergence, and intention preservation.
- Standard text chat systems maintain causality preservation, but NOT convergence and intention preservation.
Confusion caused by inconsistency

Q1: what times does the movie start?
Q2: when shall we meet?
A: 6pm

As seen by Richard
Ray: what times does the movie start?
Richard: 6pm
Fred: when shall we meet?

As seen by Ray
Ray: what times does the movie start?
Fred: when shall we meet?
Richard: 6pm

As seen by Fred
Fred: when shall we meet?
Ray: what times does the movie start?
Richard: 6pm
Comparison with new or experimental text chat

MSN Messenger

- MSN Messenger provides indication that an user is currently typing (but does not display the message as it is being typed at remote sites).

Threaded Chat

- Threaded Chat organize conversations into horizontal tree structure. Messages in the same thread have parent-child relationship.
- While a message is being typed, a space is reserved for it at all sites. The message is seen by others only after “enter” is pressed.
- Messages can be inserted anywhere in the tree and can be edited after it has been sent.
- The location of the message can be moved.
Threaded Chat

- Solves the same problem in standard text chat systems as collaborative editing systems.
- Maintains all three consistency properties.
- Use optimistic execution?
- Provides some support to indicate insertion of messages in different locations.
- Can be seen as a restricted collaborative editing system: users can edit their own message, and need to place their messages into a tree structure.
- Has lower user satisfaction level than standard text chat.
Conclusion

- Collaborative text editing systems can be used for text chat.
- There are a lot of similarities between text chat and collaborative editing.
- The less restricted nature of editing allows collaborative editing systems to overcome some of the problems faced by standard text chat systems.
- Other problems such as indication of listening in progress need to be solved by external systems, such as video conferencing systems.
- The violation of convergence and intention preservation may cause confusion in standard text chat systems.
Future work

- Develop a suitable workspace awareness mechanism to notify users of the insertion of new messages in different locations.
- Determine the best locking policy for text chat.
- Usability study on text chat with collaborative editing systems.
The End