GIST

GLASGOW INTERACTIVE SYSTEMS GROUP

AudioFeeds

A Mobile Auditory Display for Monitoring Online Activities

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Executive Summary

- AudioFeeds: an auditory display
- Retrieves news items (feeds) from

  Facebook Twitter RSS

- Sonifies feeds and places them around the user's head
- Creates a 3D spatialised soundscape
- Runs on the iPhone
- User study to get the design right

Agenda

- ✦ **Motivation**
- ✦ Related Work
- ✦ AudioFeeds: Design and Implementation
- ✦ User Study
- ✦ Discussion & Outlook
- ✦ Conclusion

Jon Kleinberg (2008):

"A rumor, a political message, or a link to an online video—these are all examples of information that can spread from person to person, contagiously, in the style of an epidemic."

User Participation and the News

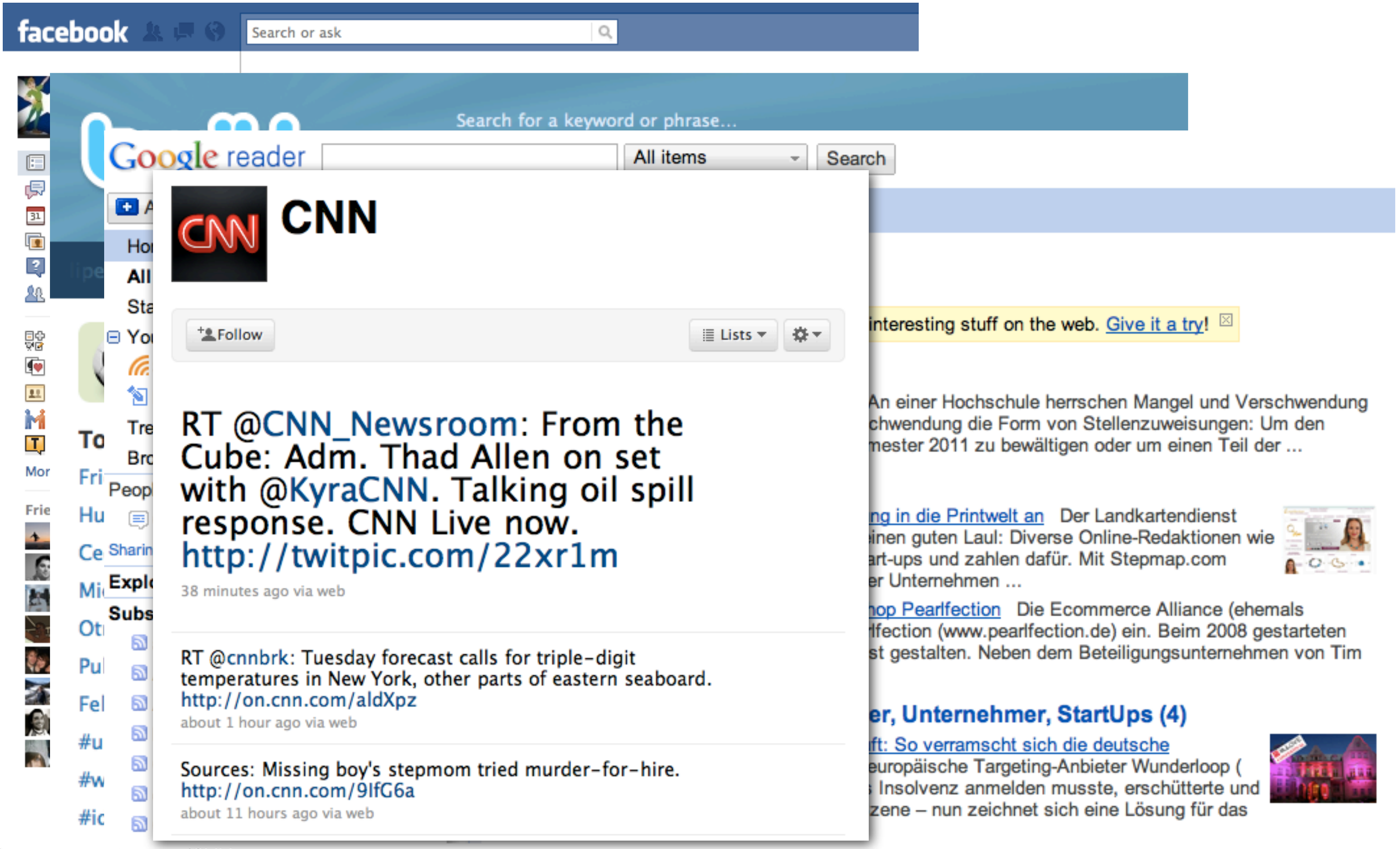
jkrums

Follow

http://twitpic.com/135xa – There's a plane in the Hudson. I'm on the ferry going to pick up the people. Crazy.

Source: http://www.businessinsider.com/2009/1/us-airways-crash-rescue-picture-citizen-jouralism-twitter-at-work

The Power of Social Feeds



Source: www.twitter.com/CNN

Social Feeds

- News items, rumours, links,...
- Shared **online** via **Social Media Platforms**
  - Disseminating information in **Real-Time**
  - Used for
    - Personal communication, sharing
    - Organizing large groups of people
      - Propagating conference schedules
      - During catastrophic desasters

Source: www.twitter.com/LATimesfires

The Challenge: Too Much.

- How can we monitor social feed activity effectively?
  - Maintain an **overview**
  - and spot **Peaks of Activity**
    - remarkable activity levels caused by extraordinary events

Need for a tool that runs in the background and conveys activity levels without major disruption

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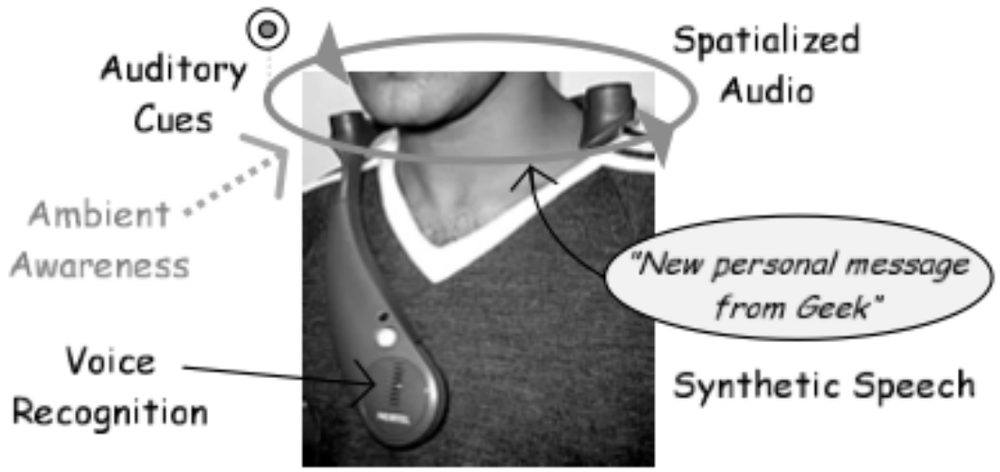
Inspirations and Relations

- Auditory Displays
  - Guidelines for sound integration: Brewster *et al*. [1]
  - Guidelines for design of auditory cues: Garzonis *et al*. [3]
- Nitin Sawhney, Chris Schmandt [4]: Nomadic Radio
- Andreas Butz, Ralf Jung [2]: Seamless User Notification
- Psychoacoustics
- Ambient displays



Source: Sawhney and Schmandt [4]

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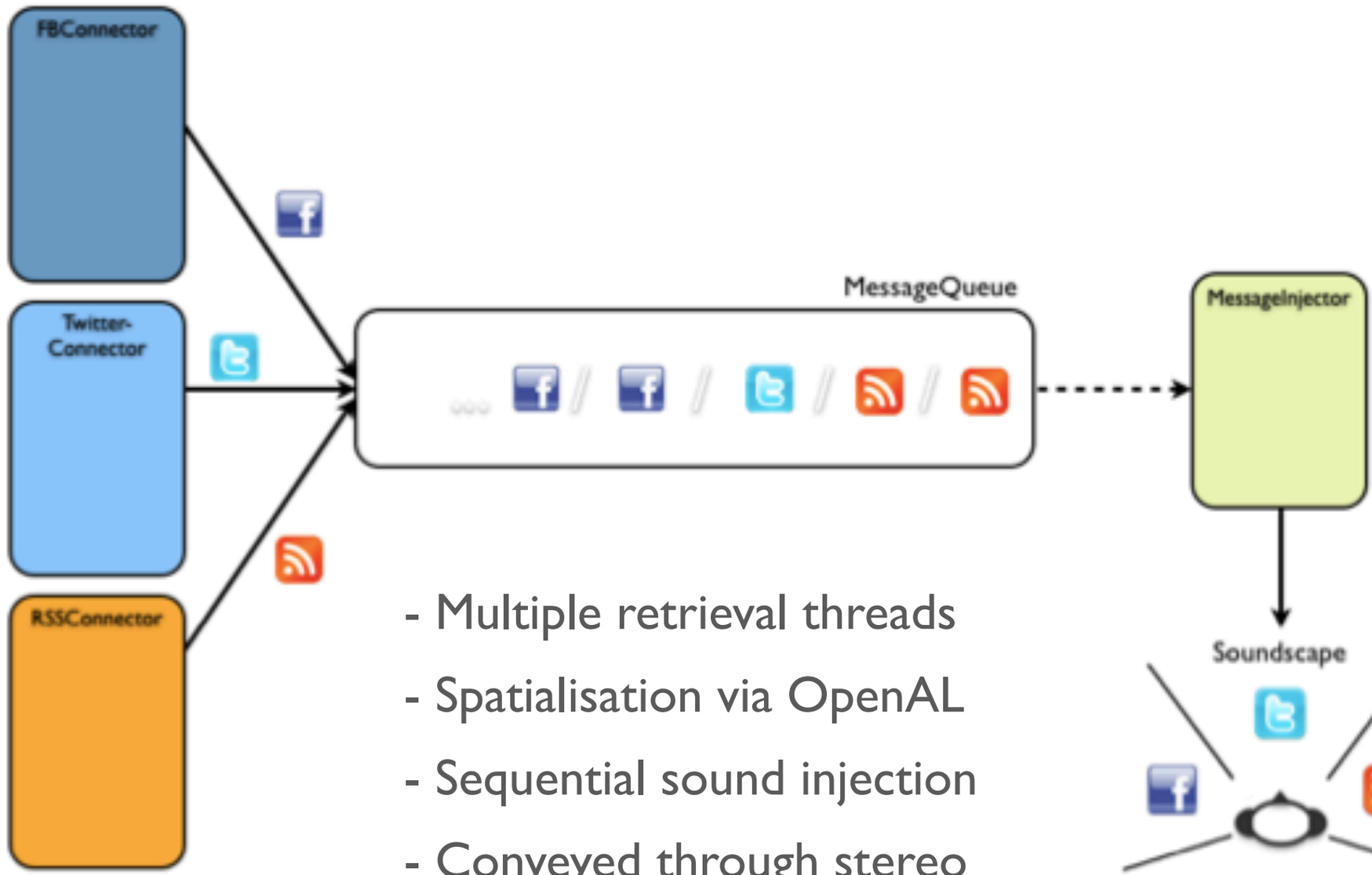
Real-Time Data from Social Platforms

Facebook	Twitter	RSS
Inbox Message (Splash)	Friend Feed (Chirping)	CNN (Didgeridoo)
News Feed (Bubbles)	Direct Message (Crow)	BBC (Zither)
Notification (Pouring)	Reference (Junglefowl)	TechCrunch (Wind Chime)
Friend Request (Drops)	Hashtag (Canary)	University News (Pan FLute)
Water	Forest	Abstract Instruments

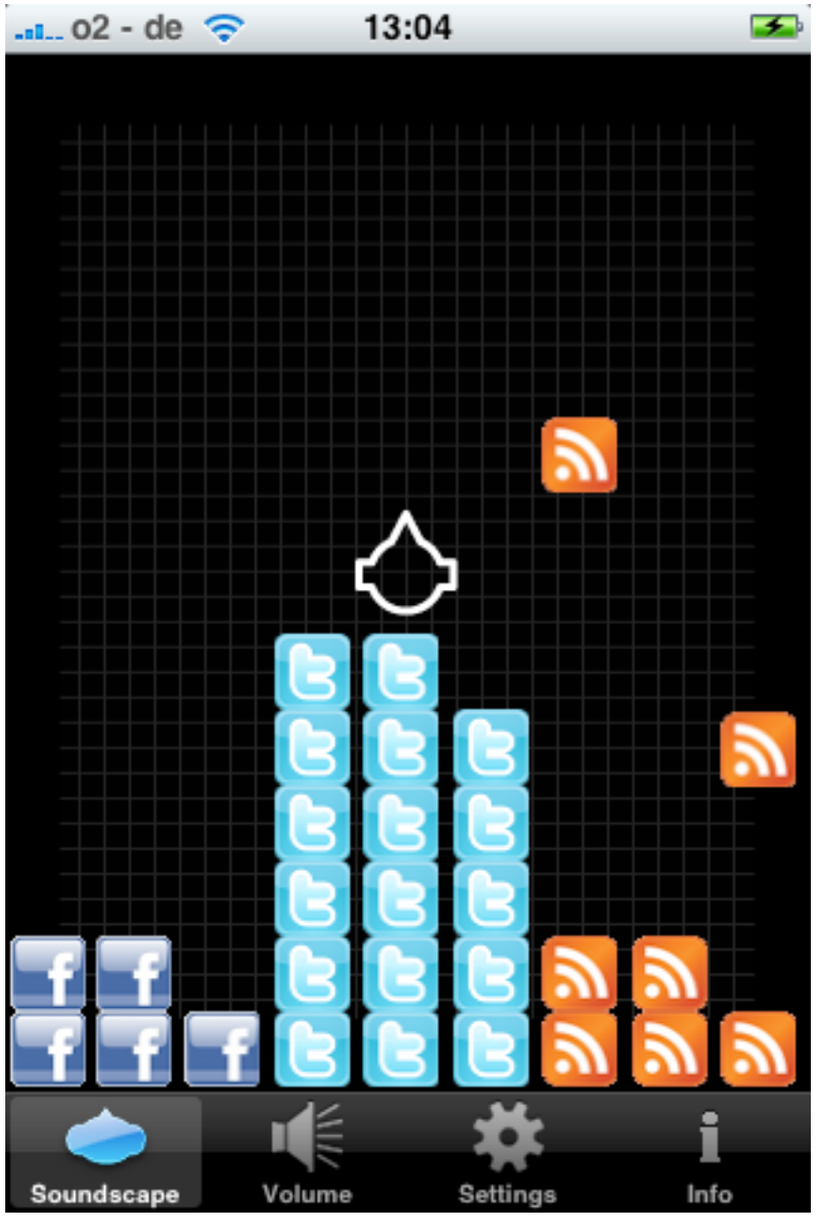
Soundscape made up of Auditory Icons

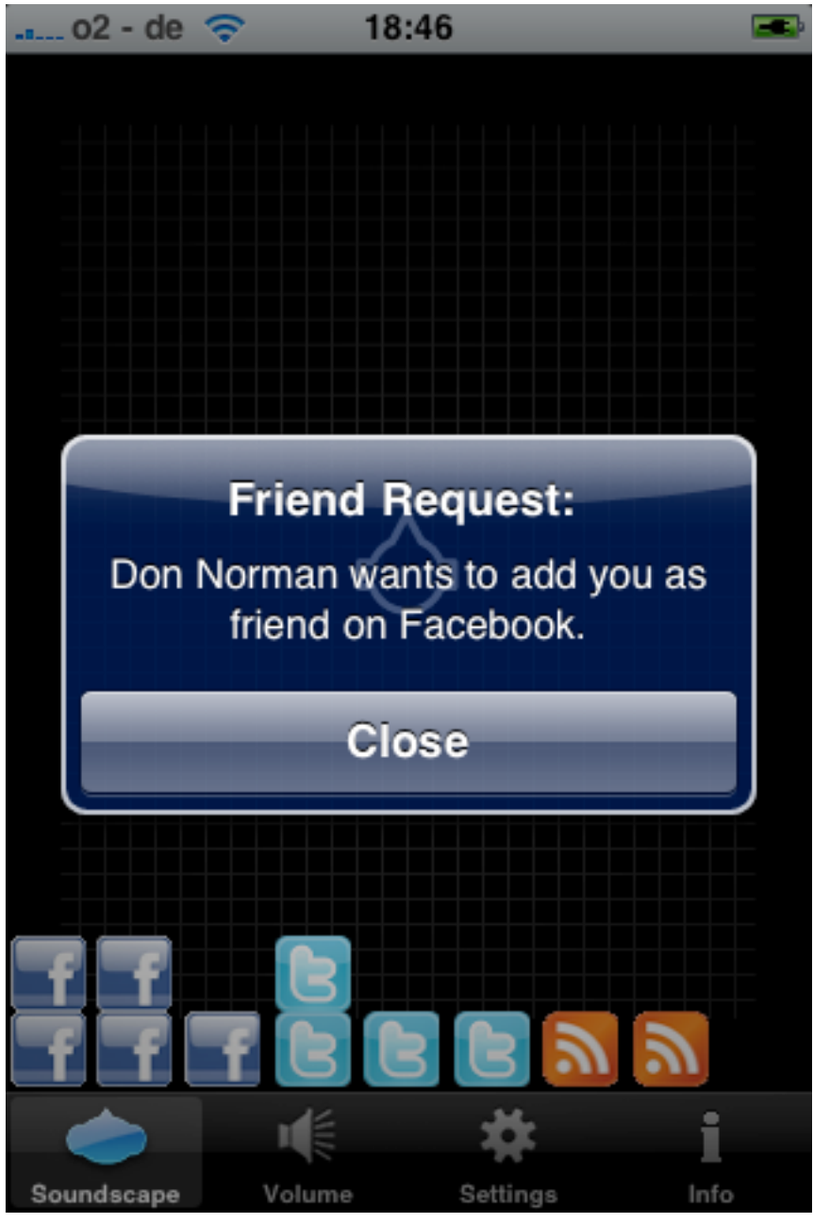
Message Flow: From Platform into Headphones



- Multiple retrieval threads
- Spatialisation via OpenAL
- Sequential sound injection
- Conveyed through stereo headphones

AudioFeeds' GUI





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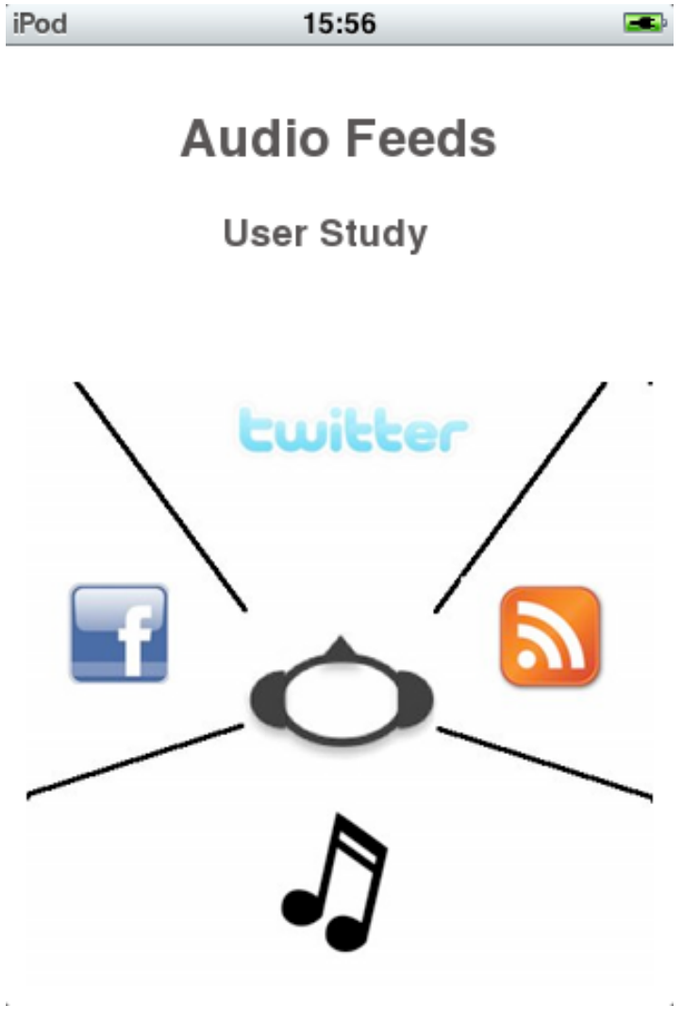
Goals of the User Study



- Getting the design right...
  - Learnability
  - Recognition
  - Allocation
  - Density of soundscapes
  - Sound injection
  - Effectiveness, Appropriateness, aesthetics and subtleness of sound cues

User Study in 3 Phases

- 15 participants
  - 10 men, 5 women
  - between the ages of 20 - 31

- 3 Phases:
  - Learnability of sound cues
  - Activity monitoring
  - Peak recognition

Results: Learnability Study

- ✦ On average 2.2 (SD 1.3) training sessions needed
- ✦ 94% overall correct platform assignment
- ✦ Confusion matrix

	FB: Inbox	FB: News Feed	FB: Notification	FB: Friend Request	TW: Friend Feed	TW: Direct Message	TW: Reference	TW: Hashtag	RSS: CNN	RSS: BBC	RSS: TechCrunch	RSS: Uni News
FB: Inbox	90,625	12,5	9,375	9,375	0	0	0	0	0	0	3,125	0
FB: News Feed	0	81,25	6,25	15,625	0	0	0	0	0	6,25	0	0
FB: Notification	6,25	6,25	75	3,125	0	0	0	0	0	0	0	0
FB: Friend Request	0	0	9,375	71,875	6,25	0	0	0	0	0	3,125	0
TW: Friend Feed	0	0	0	0	65,625	3,125	0	43,75	0	3,125	6,25	0
TW: Direct Message	3,125	0	0	0	3,125	78,125	15,625	0	0	0	0	0
TW: Reference	0	0	0	0	0	9,375	59,375	9,375	3,125	0	0	6,25
TW: Hashtag	0	0	0	0	18,75	6,25	9,375	43,75	0	0	0	0
RSS: CNN	0	0	0	0	3,125	0	3,125	0	93,75	0	0	31,25
RSS: BBC	0	0	0	0	0	3,125	3,125	3,125	0	84,375	0	12,5
RSS: TechCrunch	0	0	0	0	0	0	0	0	0	3,125	87,5	3,125
RSS: Uni News	0	0	0	0	3,125	0	9,375	0	3,125	3,125	0	46,875

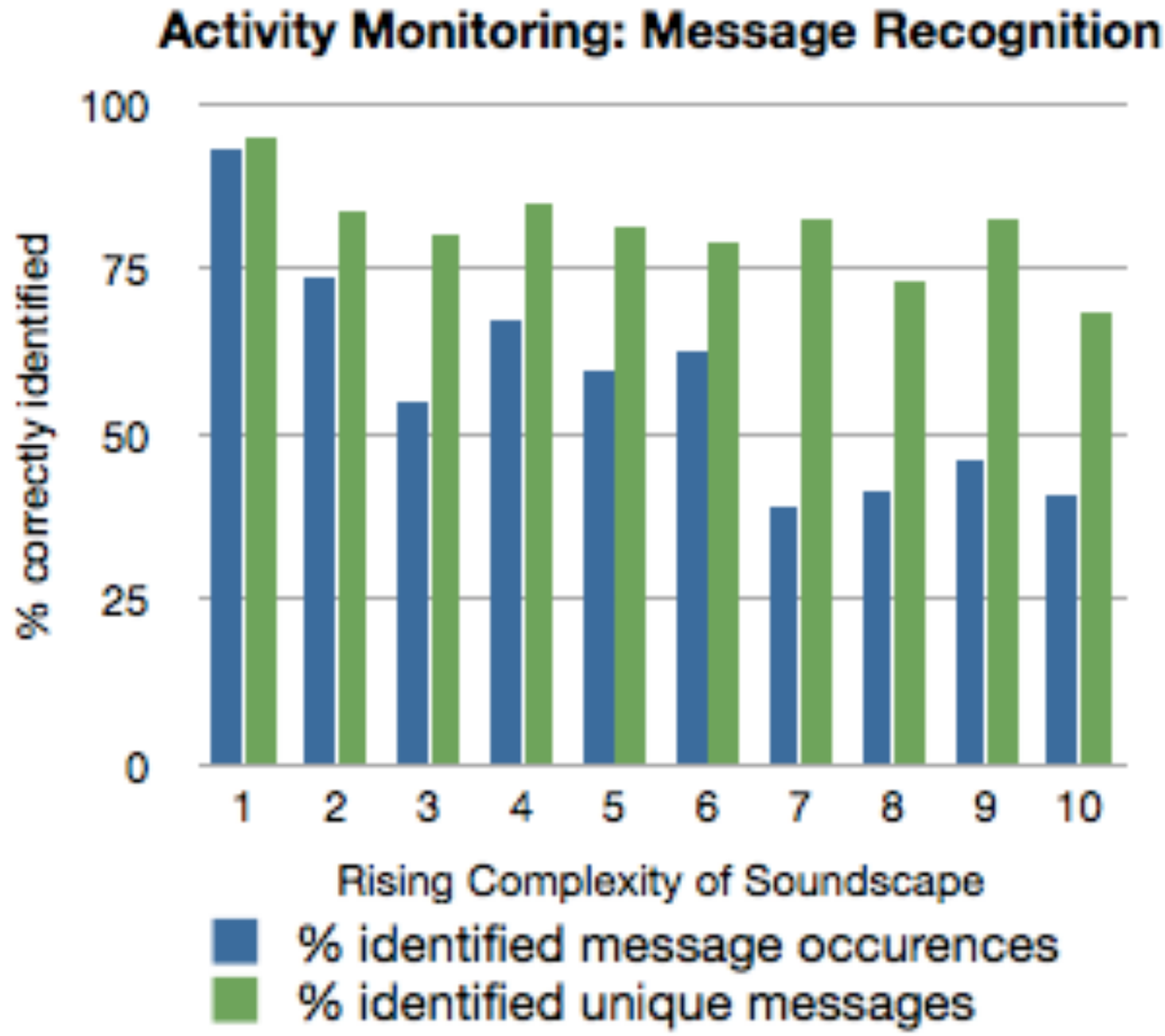
Frequencies of possible message assignments in %

Results: Active Activity Monitoring

- Soundscape complexity affected performance

- Easier to spot unique occurrences (81%)

- 99.8% correct platform allocations



AudioFeeds conveys not every single message, but gives a good overview of overall activity levels

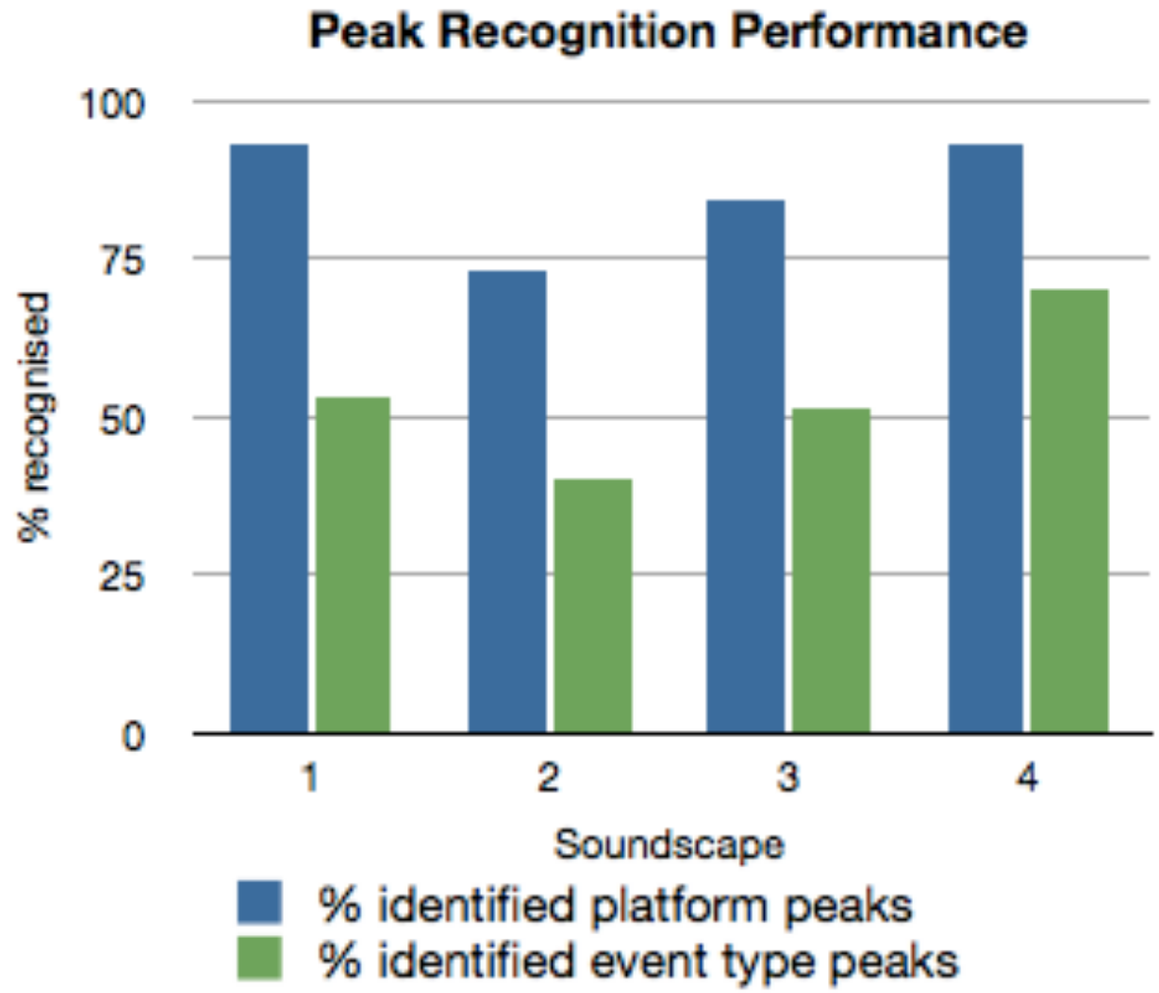
Results: Peak Recognition

- 86.1% peak recognition accuracy and correct platform assignment

- 53.6% correct event type assignments

- Mean unique event type recognition: 71%

- PPWS: 87.4% (SD 8.79)



Overall ability to identify unique message event types remained fairly good

User Study Implications

- Swapping of single sounds
  - e.g. Twitter: Reference
- Sound injection: sequential (adaptive)
- Lifespan: 20 seconds
- Extended volume control

User study results shaped both soundscape and application design

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Topics to Think About

- Relevance of social feed chatter
  - “intelligent” filtering
- Sounds and personal perception / preference
- Spreading out the sounds
- Model-based sonification of social feeds
- Long-term studies

Source: www.apple.com

Conclusion

- *AudioFeeds*:
  - Novel way of monitoring social feeds
  - For maintaining an overview of activity levels on Facebook, Twitter and in RSS feeds
  - User study showed effectiveness of approach
  - Enables users to make out interesting social feed activities

In case "the next disaster will be twittered" (Scott Beale), chances are good that it wil be picked up first by users of AudioFeeds.

Thanks!

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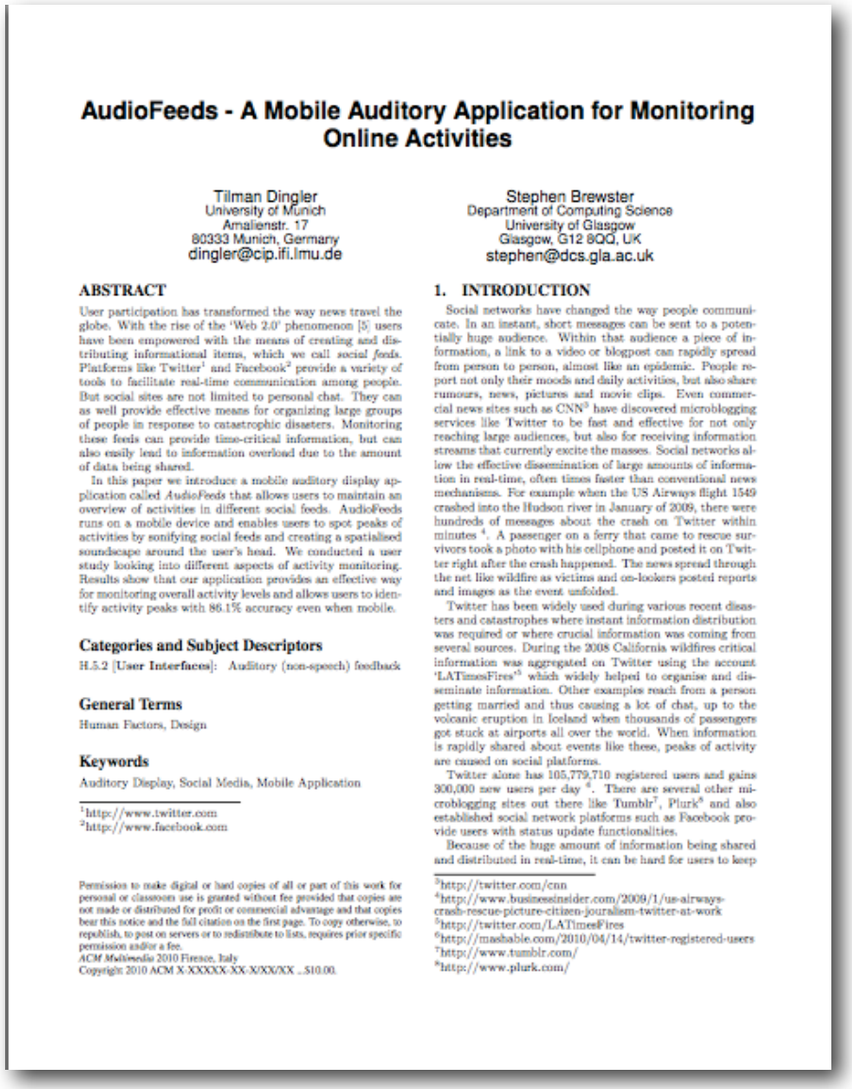

AudioFeeds - A Mobile Auditory Application for Monitoring Online Activities

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ABSTRACT

User participation has transformed the way news travel the globe. With the rise of the 'Web 2.0' phenomenon [5] users have been empowered with the means of creating and distributing informational items, which we call *social feeds*. Platforms like Twitter[1] and Facebook[2] provide a variety of tools to facilitate real-time communication among people. But social sites are not limited to personal chat. They can as well provide effective means for organizing large groups of people in response to catastrophic disasters. Monitoring these feeds can provide time-critical information, but can also easily lead to information overload due to the amount of data being shared.

In this paper we introduce a mobile auditory display application called *AudioFeeds* that allows users to maintain an overview of activities in different social feeds. AudioFeeds runs on a mobile device and enables users to spot peaks of activities by sonifying social feeds and creating a spatialised soundscape around the user's head. We conducted a user study looking into different aspects of activity monitoring. Results show that our application provides an effective way for monitoring overall activity levels and allows users to identify activity peaks with 86.1% accuracy even when mobile.

Categories and Subject Descriptors

H.5.2 [**User Interfaces**]: Auditory (non-speech) feedback

General Terms

Human Factors, Design

Keywords

Auditory Display, Social Media, Mobile Application

[1]http://www.twitter.com
[2]http://www.facebook.com

1. INTRODUCTION

Social networks have changed the way people communicate. In an instant, short messages can be sent to a potentially huge audience. Within that audience a piece of information, a link to a video or blogpost can rapidly spread from person to person, almost like an epidemic. People report not only their moods and daily activities, but also share rumours, news, pictures and movie clips. Even commercial news sites such as CNN[3] have discovered microblogging services like Twitter to be fast and effective for not only reaching large audiences, but also for receiving information streams that currently excite the masses. Social networks allow the effective dissemination of large amounts of information in real-time, often times faster than conventional news mechanisms. For example when the US Airways flight 1549 crashed into the Hudson river in January of 2009, there were hundreds of messages about the crash on Twitter within minutes [4]. A passenger on a ferry that came to rescue survivors took a photo with his cellphone and posted it on Twitter right after the crash happened. The news spread through the net like wildfire as victims and on-lookers posted reports and images as the event unfolded.

Twitter has been widely used during various recent disasters and catastrophes where instant information distribution was required or where crucial information was coming from several sources. During the 2008 California wildfires critical information was aggregated on Twitter using the account 'LATimesFires'[5] which widely helped to organise and disseminate information. Other examples reach from a person getting married and thus causing a lot of chat, up to the volcanic eruption in Iceland when thousands of passengers got stuck at airports all over the world. When information is rapidly shared about events like these, peaks of activity are caused on social platforms.

Twitter alone has 105,779,710 registered users and gains 300,000 new users per day [6]. There are several other microblogging sites out there like Tumblr[7], Plurk[8] and also established social network platforms such as Facebook provide users with status update functionalities.

Because of the huge amount of information being shared and distributed in real-time, it can be hard for users to keep

[3]http://twitter.com/cnn
[4]http://www.businessinsider.com/2009/1/us-airways-crash-rescue-picture-citizen-jouralism-twitter-at-work
[5]http://twitter.com/LATimesFires
[6]http://mashable.com/2010/04/14/twitter-registered-users
[7]http://www.tumblr.com/
[8]http://www.plurk.com/

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