Re-design of the interface for email messaging, retrieval and storage from a “Social Computing” point of view

Visual Comunication Project II

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Approval sheet

The project entitled "Redesign the interface for email messaging, retrieval and storage from a social computing point of view" by Rashmin Raj A.. is approved in partial fulfillment for the Masters Degree in Visual Communication course at Industrial Design Centre, Indian Institute of Technology, Bombay.

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Chairperson:.....

Internal Examiner:.....

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I acknowledge all the whole-hearted support of all my friends who encouraged and helped me keep the spirits up during this project.

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1.0 Problem statement

The aim of the project was to design an alternate email interface which would be visually driven, taking into consideration the social aspect of communication, the recent email trends and the technological advancements in electronic messaging.

2.0 Introduction

Computer has come a long way from its humble beginnings and now is a part of our every day walk of life. The coming of the internet was another major factor which made the computer one of the most important tool in the 21st century. The most widespread application on the internet is person-to-person communication. The electronic mail has revolutionized the way humans communicate, and thus brought about a new era of faster and more efficient communication. The amount of emails sent per year has grown leaps and bounds with time and so has the underlying technology. The email interface has not been able to keep pace with the advancement of technology. The electronic mail started as a text only communication but the scenario has changed with the advent of newer technologies and faster communication speeds. Even with the advancement in GUI and faster processing power, the basic structure of any email interface still remains the same.

The email system treats all mails equal, which is not true in real life. Letters have clues about their content, nature and the sender other than the address, which is totally absent in the case of email. Thus there is a need to look at the social aspects of communication.

Another major factor that calls for immediate attention is the problem of information overload. With the increased usage of email as the primary means of communication the number of mails handled per day has also increased. The current interfaces only manage to magnify the problem. Thus there is a need to think about an alternate email interface which utilizes the current technology and which would make system user centered thus putting the user back in control.

3.0 Related literature

3.1 Communication aspects

Communication can be defined as the art of transferring, transmitting or exchanging thoughts or information. Communication has been a fundamental human need and has served as a means to connect people.

Communication could be divided into verbal or non-verbal communication.

Verbal communication: Human vocalization includes highly evolved array of language, sounds, symbols, music, cries and laughter

Non verbal communication: This includes all communication which relies on gestures, signals, symbols, icons, gestures and proxemics. Non verbal communication supplements or replaces verbal communication.

Communication could be further divided into mass communication and interpersonal communication. The key theories of interpersonal communication are **social penetration**, **communicator style, uncertainty reduction** and **expectancy violations**. The theories which are relevant to the project are

3.2 Social penetration theory (Gerald Miller)

Relationships become more intimate over time when disclosure takes place. The theory tries to forecast the future of a relationship (is it worthwhile) on the basis of projected rewards and costs. The theory states that self-disclosure occurs in stages.
Five stages of disclosure (Altman and Taylor)
superficial
political
religious beliefs and attitudes
deeply held fears and fantasies
concept of self

According to the theory outer stages occur more rapidly than inner stages, self-disclosure is reciprocal.

3.3 Communicator style (Robert Norton [1983])

The theory states that Individuals have a predominant manner or style in which they communicate. People communicate on two levels, what they say, and how it is to be interpreted and responded to

Norton calls them style messages, delivered before, during or after the primary message, such as talking in an authoritative voice. Experience helps people identify the style messages and styles are not totally individual, cultures affect how people be-

(Littlejohn, Stephen. (1992). Theories of Human Communication (5th Ed.). California: Wadsworth Publishing.)

have and how they perceive others. Styles can be classified as

Open Style
Dramatic Style
Attentive Style

Each style is a combination of variables such as dominance, dramatic behavior, contentiousness, animation, impression leaving, relaxation, attentiveness, openness and friendliness.

Some go together, such as dramatic behavior and animation, attentiveness and friendliness.

People communicate through variety of means these include

face to face communication
Letters
Phone
Images
Video conference
Two way chat
Answering machine
Email
Letter
Fax

Each of the above mentioned mediums has its own advantages and disadvantages. The decision of which media to use in a particular context can be explained by the media richness theory.

3.4 Media Richness Theory:

The media richness theory was proposed by Daft & Lengel (1984). The theory refers to the ability of different media to

convey messages that communicate rich information. Richness is defined as the capacity of a media to share meaning. The media richness of a medium is the extent of the features such as feedback, multiple clues, language variety and personal focus are present. According the theory more complex the message is, the richer the medium need to be for effective communication.

According to this theory face to face is the richest communication medium in the hierarchy followed by telephone, email, letter, note, fax and so on.

3.5 Social Influence models: (Fulk, Schmitz & Steinfield 1990**)**

The social influence model predicts that the choice of an individual to use a particular communication medium is influenced by colleagues and other organizational considerations. Reichwald & Goecke (1994) in their study of air force managers says that there are three key factors that influence communication for managers: innovation and leaps in telecommunications, globalization of business and management processes, and mobilization of managers. All these influence corporation structures and the task –related use of telecommunication media.

3.6 Critical mass theory: (Kraut, Cool, Rice & Fish 1994**)**

The theory states that , individuals can only benefit from a communication medium if others in their communication network also choose to use the same medium. Cost and benefit of communication systems have a social component that is time dependent. Costs reduce and benefits increase with the growing number of people using the system.

The success of any new means of communication can be

(http://www.miv.t.u-tokyo.ac.jp/papers/helmut-swpc02.pdf)

predicted by the above-mentioned theories

3.7 Social computing:

Social Computing aims to support the tendency of humans to interact with computers as if they were real social actors. Technology that reinforces the bias toward social interaction by producing appropriate responses may improve the communication between humans and computational devices. Thus social computing aims to make human computer interaction more meaningful.

3.8 Social network:

(Digital Living — people-centered innovation and strategy
B Anderson, C Gale, A P Gower, E F France, M L R Jones, H V Lacohee, A McWilliam, K Tracey and M Trimby)

Social networks are seen all around us. Social networks are formed when people interact with information and with each other.

One of the social networks I studied was the " Kite network " developed by David Krakhardt. The centrality measures are degrees, betweenness and closeness.

Degree: degree of a node is the measure of the number of direct connections a node has.

Betweenness: a node with high betweenness connects two major segements of the network. The node has great influence over what flows in the network.

"Kite Network", first developed by David Krackhardt

Closeness: These nodes are those which have the shortest part of any point of the network , they are close to every one else. They have best visibility into what is happening in the network.

Network centralization: Individual network centralities provide insight into the individual's location in the network. The relationship between the centralities of all nodes can reveal much about the overall network structure. One or a few very central located nodes dominate a very centralized network. If these nodes are removed or damaged, the network quickly fragments into unconnected sub-networks.

3.9 History of electronic communication over the net

1971: Ray Tomlinson, a computer engineer working for Bolt Beranek and Newman in Cambridge, Massachusetts, developed a system for sending messages between computers that used the @ symbol to identify addresses.

Tomlinson's system gained popularity by linking up users on Arpanet, the US department of defense system that became the basis for the internet.

1972: Larry Roberts - also at work on Arpanet - writes the first email management program that develops the ability to list, select, forward, and respond to messages.

1976: Queen Elizabeth II sends an email message on Arpanet, becoming the first head of state to do so.

1988: Steve Dorner invents Eudora, an application that gave a

Ray Tomlinson, the man behind the **@**

popular face to email by providing a graphical user interface for email management.

1989: The first release of Lotus Notes email software. 35,000 copies are sold in the first year.

1996: Microsoft releases Internet Mail and News 1.0, a feature of its third release of Internet Explorer. This is later renamed Outlook.

1997: A few companies - including the fledgling Hotmail - begin to offer free, use-anywhere, internet email.

1997: About 10 million users world wide have free web mail accounts.

2000: Email celebrates its 30th anniversary with virtually every business in the developed world signed on.

3.10 Email has become so popular because of its
cost-effectiveness,
Speed
Ability to communicate over large distances,
Asynchronous nature
Ability to support multiple mediums
Easy to manage
Dependable
Multi functionality

3.11 Anatomy of an email:
An email has a header and a body

The header contains information of addressee, sender, subject, attachment details and time of arrival

The body contains the message

Email supports a wide variety of attachments, attachments are needed since regular email only allows transmission of simple text characters.

3.12 How email works:

Once the email is sent, it travels to the server where the server examines the address and routes the message via simple mail transfer protocol (SNTP). The email is routed through a number of servers, each server deciding the best way to transfer the email to its destination. The email finally reaches the destination server, where it is stored in an electronic mailbox on the mail server of the recipient's internet service provider.

The other servers used for mail transfer is the post office protocol (POP) and the Internet Mail Access Protocol.

3.13 Email services

POP mail services: These are local machine based software's which needs a user to install a particular software, then connect to a remote server and download the mail to his local machine. Services: **Outlook express, Talking email, lotus notes and Mozilla** Professionals mostly used pop mail services

Web based mail: web based mail services are usually free mail services which allows the user to access the mail using a web browser. The user logs on to the email provider site and ac-

cesses the particular account
Services: **Yahoo.com, rediff.com, hotmail.com**
This is the most widely used email service.

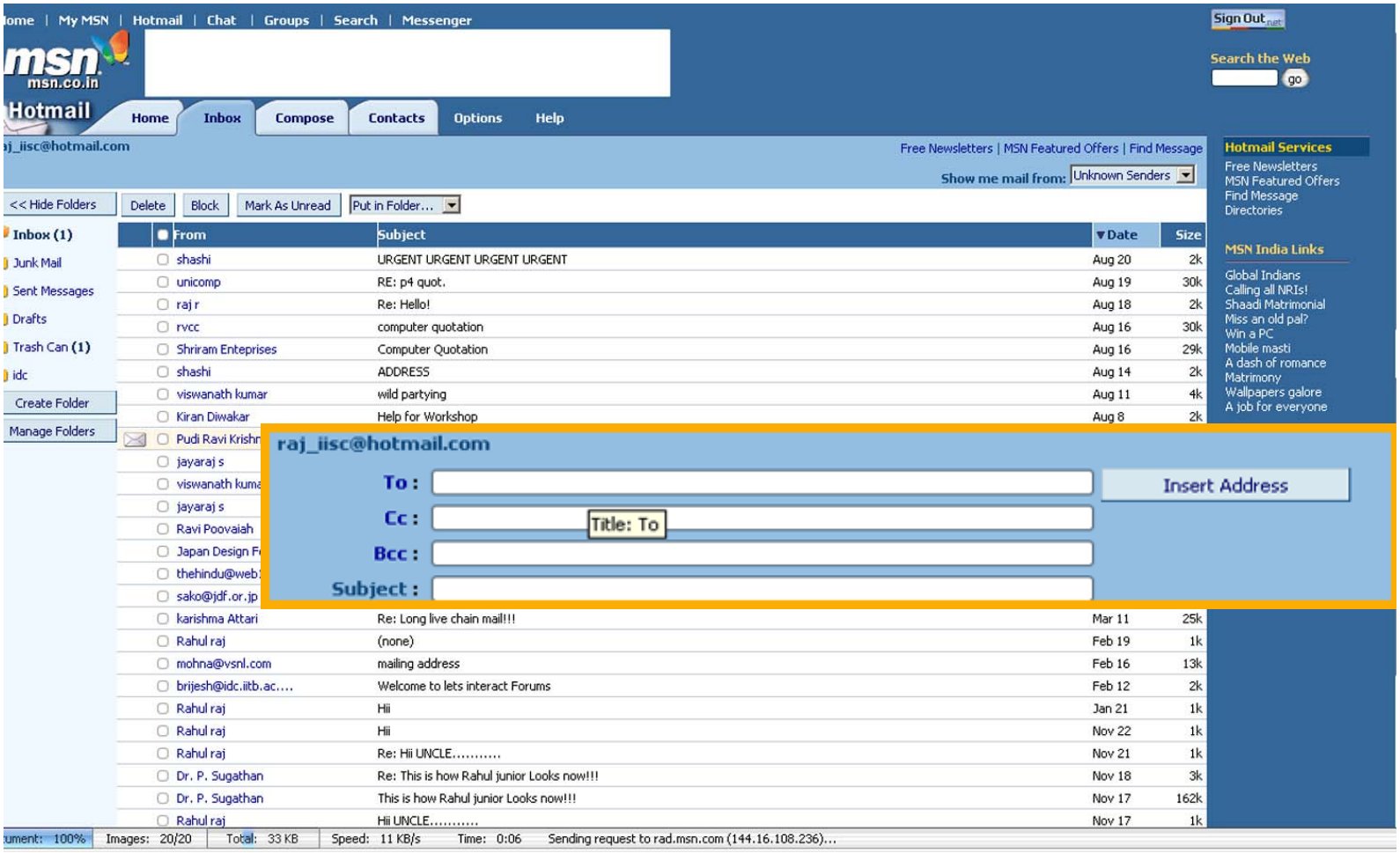
Unified messaging: these services support an array of messaging services from telephone calls to sms and fax to video mails thus offering a unified service.
Services: **ureach.com, Hotvoice.com, emailaddress.com**

Imap mail: these are similar to pop mail but they are more evolved and offer more control. They allow users to view mails before downloading then thus reducing download time and virus threats.
Services: **fastmail.fm, fusemail.com, myrealbox.com**

3.13 Interface study:

A number of interfaces were studied to find out the interface problems. This served as a means to generate questions for the detailed user study which followed earlier.

Hotmail

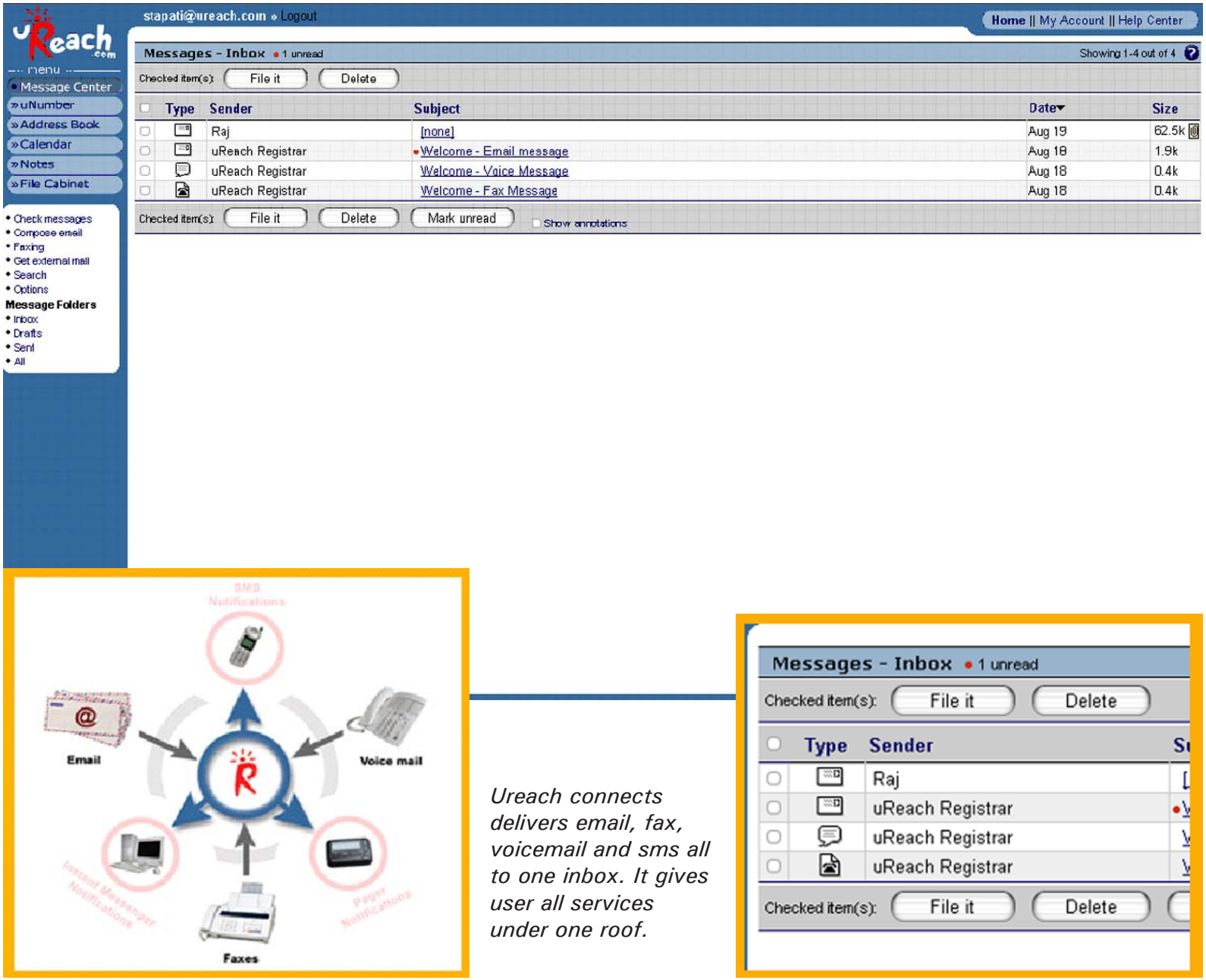


Address book function is user friendly

The mail sort function takes people I know as people in the address book

Separate toolbar for support functions

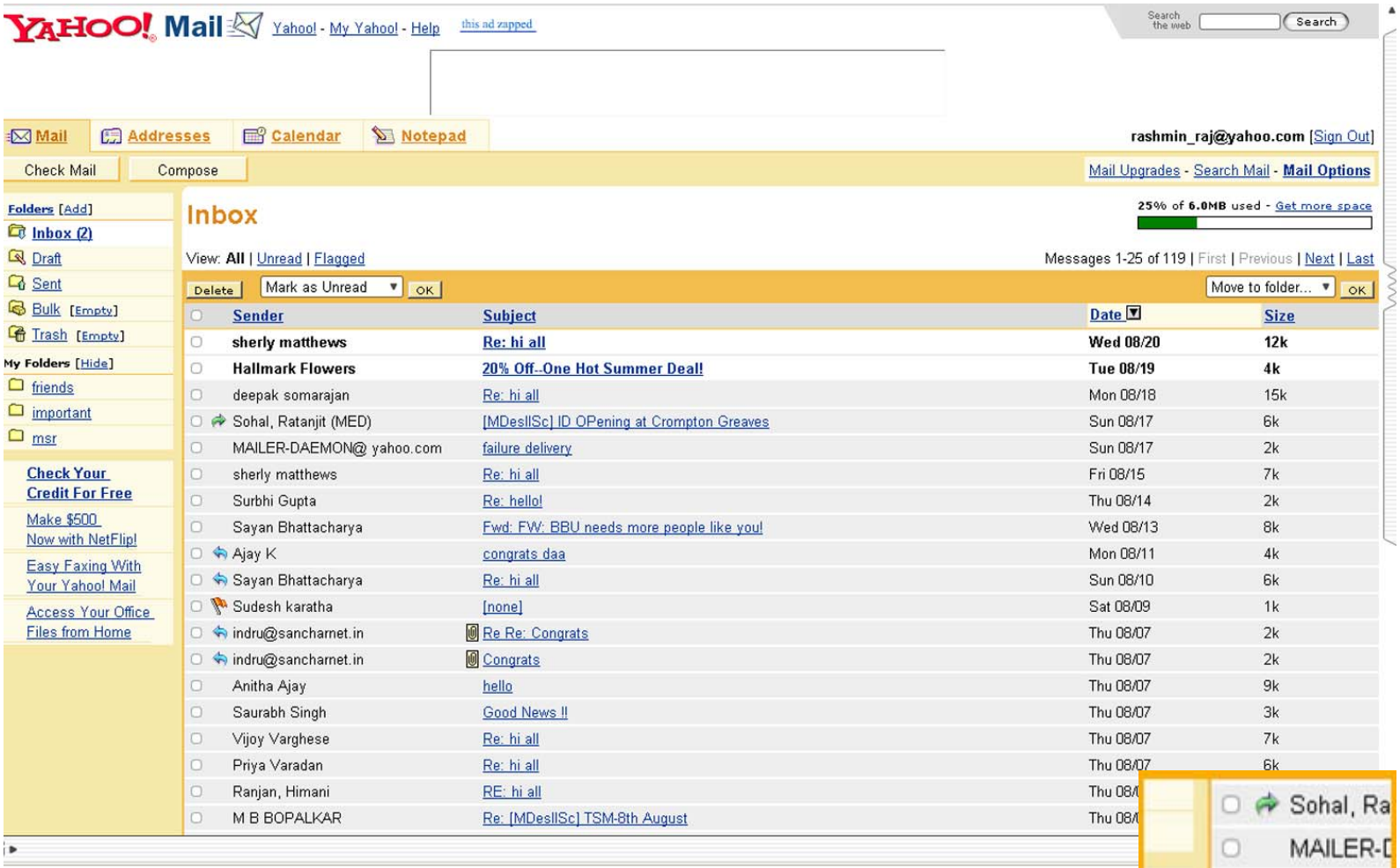
UreachHotmail



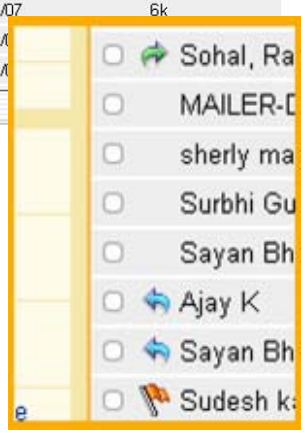
Ureach connects delivers email, fax, voicemail and sms all to one inbox. It gives user all services under one roof.

Ureach is a unified messaging service, The listing clearly shows nature of each attachment, the terms used for buttons are terms that user can easily refer to.

YahooHotmail

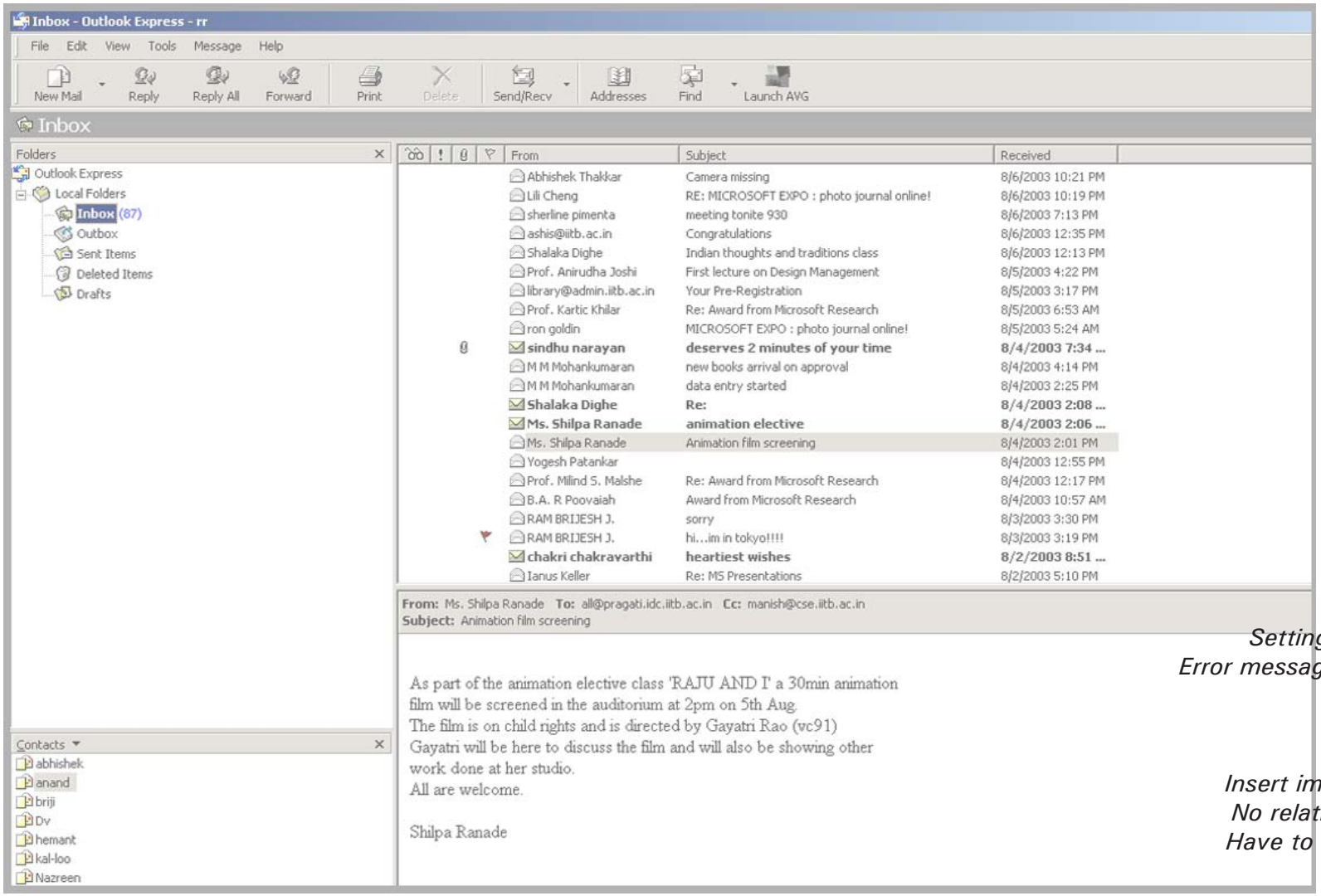


Yahoo offers hot keys which is of help for expert users



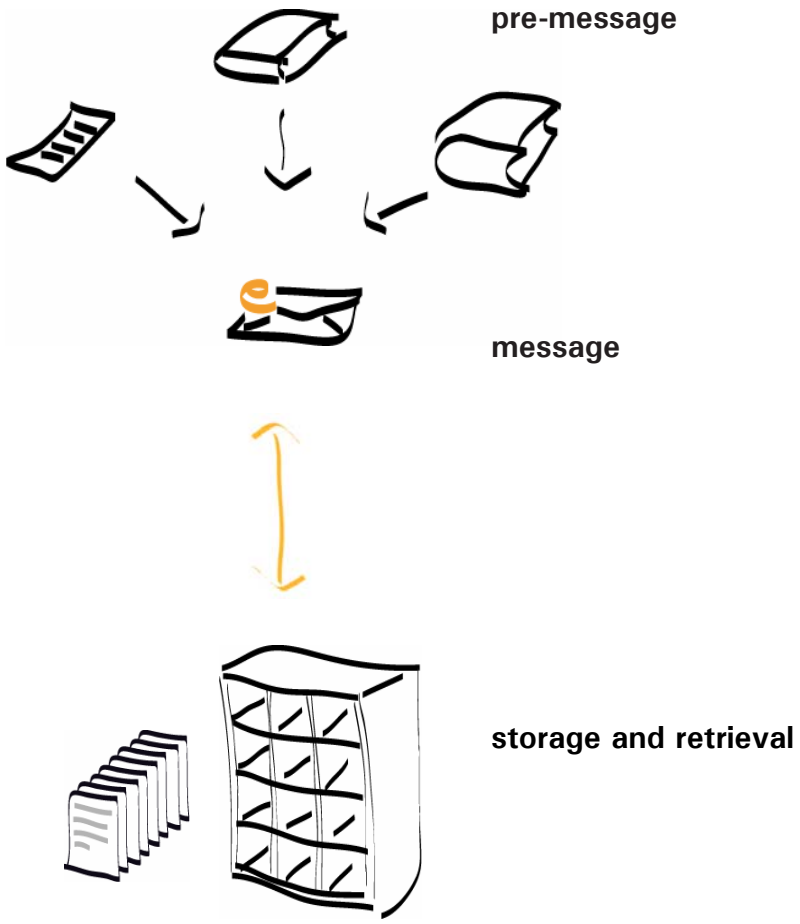
Yahoo users markers to show replied mail, forwarded mail and pending mail (flags user can set)

Yahoo is one of the most popular net based email service. It has multiple ways of accessing the inbox.



Outlook

Setting up account is difficult
Error messages doesn't make sense
Virus prone interface
Difficult to configure
Emoticons are absent
Insert images directly into mails
No relationships between mails
Have to scroll through message



4.0 User study

Target user: The target user was in the age group of 20 to 30 years, educated and employed or pursuing higher education. The user had a personal computer and at times at work shared the computer with others.

Of the 22 people included in the study group 16 were post graduate design students, four were professionals and two were house wife's

The user study started with an activity analysis of email usage. Email procedure can be divided into three stages namely, the pre-message stage , message stage and the storage and retrieval phase.

4.1 A typical email usage sequence is detailed out below.

- Open browser
- Log on to email service
- Read message
- Compose message
  - Choose compose
  - Reply to message
- Type message
  - Type in browser
  - Compose in MS word
- Spell check
  - Spell check in browser
  - Copy and paste to word for spell check

- Type address
  - Select from address book
  - Replying to earlier mail
  - Type address from memory
- Attachments
- Select to file
- send

The user study involved interviews where the users were asked the following questions

Which email service does the user use
How many email accounts does the user use?
How does the user manage email communication?
How many mails does the user receive per day?

Observations
Flow: *As people are working on other tasks, they want to keep up with the flow of incoming messages as they arrive.*
Triage: *After people are away from their email for a period of time, they need to catch up and deal with all the email that accumulated during his absence.*
Task management: *People often use email to remind them what they need to do, and to help them get tasks done.*
Archive: *People store email so they can refer to it later.*
Retrieve: *After archiving messages*

Whose mail is more important?
What's makes the user save a particular email?
What all features does the user use?
What all are the interface problems?
What's the wish list for a new mail interface?

After the interview, the users were asked to login to their accounts and their habits and preferences were observed. Care was taken to find out their strategies for organization, retrival and navigation.

4.1 Observations:

The following observations were made about the usage of email,
users don't much use folders since

People used mail for personal archiving and task management

Users use more than one email address in most cases this is because of the need for larger storage space and a need to have a alternate email id

Segmentation of mail add based on category (like personal and professional)

Older mails are deleted since inbox becomes difficult crowded

Emails were left in inbox as a means to remember email address

People used reply to function more often than composing a new message and addressing it

Address book is not fully utilized

Users at time compose mails in word

Spell check takes time (this justifies use of msword)

Some mails are more important than others

Mail search function was not much used

4.2 Alternate uses of email

Email as a means to remind of pending tasks
Use inbox as a means of file sharing, as a remote storage.
Use a particular address just to save important emails

4.3 Email problems

Mail box gets crowded with all sorts of mails important and junk

This gets severe in the case of user logging in after a break.

Mailbox lists all the mails, both old and new.

Need to show the emotional aspects of mails

Why cant inbox be more dynamic in nature like a flash page

Difficulty in browsing through new mails

Finding older mails is difficult

Folders are difficult to use

POP mail services are difficult to configure

Pop mail service cannot be used in shared machines

Setting filters is always confusing

Important mails gets unnoticed because of a over crowded inbox

Searching for particular mail is a time consuming process

There is no way of knowing the entire contact list

Folders often make viewing all mails at once, and thus has to browsed page by page

Viewing of attachments is difficult

If number of email is high then lot of time is wasted in browsing through the entire list

Finding the earlier mail that user sent is difficult

Loosing out on the conversation (mail history) since threading is not there

Pending mails are forgotten

No way to remind of pending mail

Users remember friends when they check older mail

These were then grouped based on their similarity and the root need was identified

4.4 Problems with mail listing:
Mail box gets crowded
Difficulty in browsing through new mails
Finding older mails is difficult
Important mails gets unnoticed because of a over crowded inbox
If number of email is high then lot of time is wasted in browsing through the entire list
Loosing out on the conversation since threading is not there
Pending mails are forgotten

Problem regarding pending tasks
Users remember friends when they check older mail
Pending mails are forgotten
No way to remind of pending mail
Email as a means to remind of pending tasks

Mail search issues
Searching for particular mail is a time consuming process
If number of email is high then search is difficult
Finding the earlier mail that user sent is difficult

Inbox management issues
Mailbox gets crowded
Mailbox lists all the mails, both old and new.
Finding older mails is difficult

Folders are difficult to use
Setting filters is always confusing
There is no way of knowing the entire contact list
Loosing out on the conversation since threading is not there
Old mails are deleted since maintaining inbox becomes difficult

The perceived needs were analyzed and a list of features that the new interface has to solve was developed.

4.5 Feature list

The inbox has to be visually rich

The mail listing and hierarchy had to be developed to make the process of finding the important email much faster

The size of email and type of email attachment has to be made more apparent

The process of searching for email should be easy and intuitive

The interface should display the mail history (email threads)

The process of composing new mail should be reworked on

The process of address book must be automated

The email should support reminders

The interface should help the use manage pending tasks

The interface should display the social network of the user

From the feature list it became clear that the problems with the

Current email system cannot just be solved by just coming up with a interface which is just a skin on the existing email system. The whole system has to be redesigned starting from the way the system filters incoming mail to the way the mails are grouped and the hierarchy is built. It became very clear from the study that the importance of an incoming mail is very subjective. Each user has a different mail hierarchy, for some family is more important while for some friends are important, while importance of a particular mail is also situation dependent.
A person who is on lookout for a job would be more eager to know which all are mails from prospective employers.

What I propose is an intelligent email system which needs minimum user input but learns from the user habits, building up a model of his needs and predilection based on which the inbox is customized for each person. So the mails have to be first identified in terms of nature of communication . The next task is to chunk all the similar mails and then in a particular chunk a hierarchy needs to be developed. This hierarchy has to be dynamic since user preferences vary depending on context, so the system has to closely watch the user likes and change its model to suit the new scenario.

Based on the project objectives a detailed study was done on existing and emerging technologies and system for developing a efficient email system.

5.0 Technology study

Topics covered

Filtering
Data mining
Semantic analysis
Ranking
Data visualization

5.1 Filtering: Filtering is a method of defining rules for how to prioritize, sort and delete emails. It was the result of the problem of unsolicited emails or spasm flooding inboxes.

Filtering can be either user defined or automatic. User defined filtering allows user to filter mails based on address, subject, headers etc. This is a time consuming process and is more of experience driven.

. (http://www.parallab.uib.no/SGI_bookshelves/SGI_EndUser/books/MineSet_T/sgi_html/ch01.html)

Other ways of prioritizing and finding relationships between mails are, data mining and semantic analysis

5.2 Data mining:

The purpose of data mining is to discover patterns in data so that this knowledge can be applied to problem solving. Analytical data mining integrated with powerful visualizations present new pathways to knowledge discovery. The data mining system can automatically find and show you new patterns that will lead to fresh insight

The difference between ordinary database queries and data mining is that in the case of data mining the system can discover unseen and unknown relationships in the data where as in ordinary data base query the user must specify the relationship he is searching.

5.3 Data mining methods: various software's are available for data mining.

Central to the Data Mining process is the Data Mining model, a virtual structure that represents the grouping and predictive analysis of relational or multidimensional data. In many ways, the structure of a Data Mining model resembles the structure of a database table. However, while a database table represents a collection of records, or a record set, a Data Mining model represents an interpretation of records as rules and patterns, composed of statistical information, referred to as cases.

Data mining algorithms are used to determine how the cases are analyzed by the model. These algorithms also provide the decision-making capabilities needed to classify, segment,

(http://www.kairon.com/refdm.htm)

associate and analyze the data to provide predictive, variance, or probability information about the case set.

They can be categorized by the data mining methods they use. Few of them are

The decision trees: The classification is shown in a tree like structure in which a node in the tree structure represents each question that is used to further classify the data. As a result of applying this method to a training set, a hierarchical structure of classifying rules of the type "IF...THEN..." is created. An advantage of this method is that this form of representation of rules is intuitive and easily understood by a human.

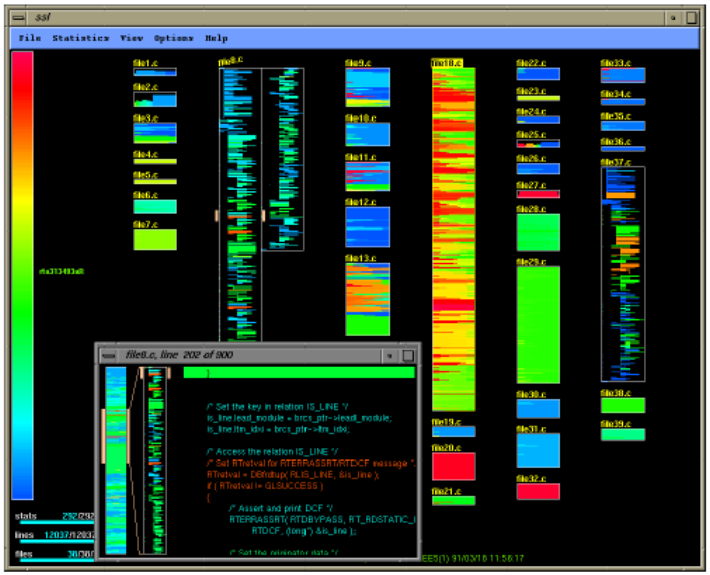
Evolutionary programming : in this method the system formulates hypothesis about dependence of the target variable on other variables.

Memory based reasoning: It forecasts outcomes by finding the adjacent similar scenario that occurred in the past and it selects the one where the forecast was extremely accurate.

Data Visualization

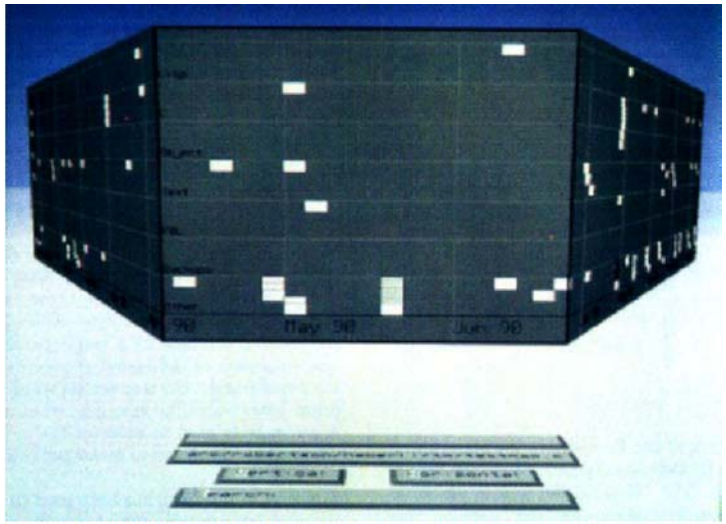
Visualization is a process of transforming data, information or knowledge into visual form making use of human's natural visual capabilities. Data visualization helps us interact with large volume of data rapidly and effectively to discover hidden characteristics, patterns and trends. Text based database are more difficult to understand since they require cognative effort to understand their information content.

A study was done on main data visualization models for hierachical data.



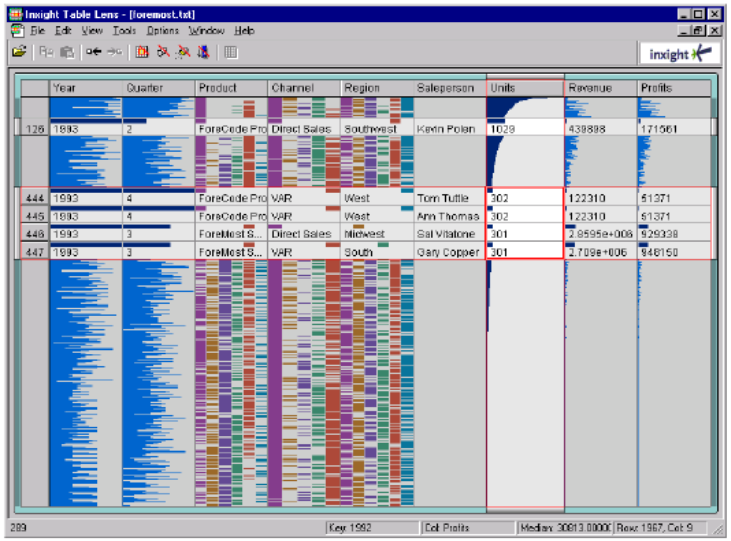
Seesoft visualising software consisting of 38 files comprising 12037 lines of code. The newest lines are shown in red, the oldest in blue, with a rainbow colour scale in between.

(NAHUM GERSHON, STEPHEN G. EICK AND STUART CARD – interactions 98)



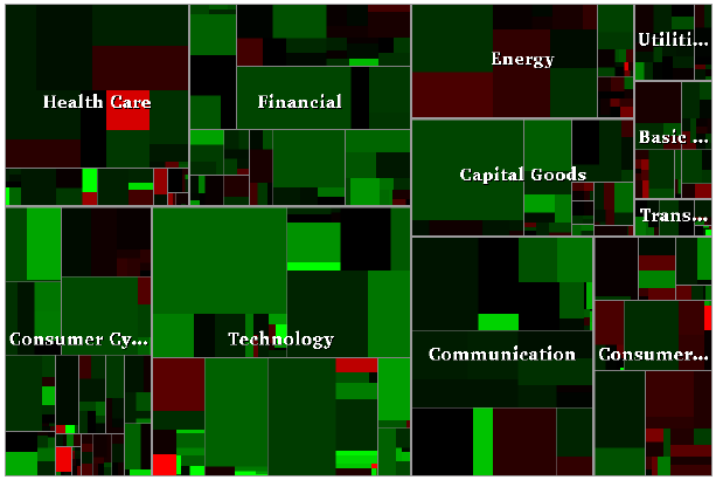
The perspective wall spreads linearly structured information across a wall from left to right.

Developed by Xerox parc in 1990, The wall spreads linearly structured information across a wall from left to right. 3d perspective provides focus on the central segment



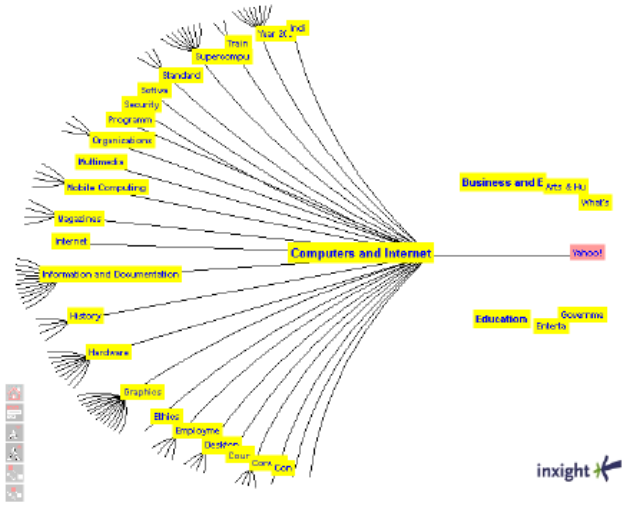
The table lens represents rows of a table as rows of pixels.

Developed by Xerox parc in 1984 by Ramana Rao . Rows and columns are squeezed down to pixel and sub pixel zones . The movable lens provide the ability to zoom into a particular section of data without loosing the surrounding text.



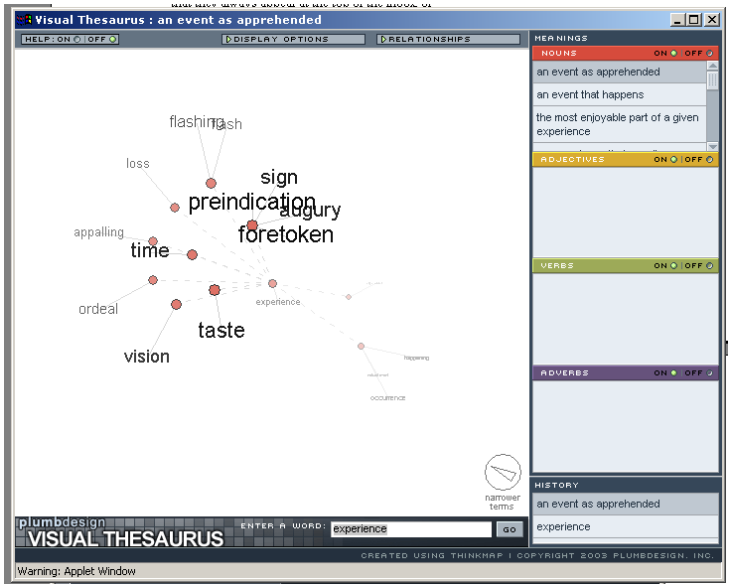
A market map of US stocks generated on 17th September 1999.

Market map was developed by martin Wallenberg it is an extension of tree map and it avoids the excessive narrow strips. It was developed for stock market visualization. The sections are color coded.



The hyperbolic browser always displays the entire hierarchy.

Hyperboloc browser was developed at Xeroc parc by Lamping and Rao (1994-95) It uses hyperbolic coordinates to visualize hierarchies. The hierarchy is laid out on a hyperbolic plane which is then mapped to the unit disk. Each child places its children in a wedge of space. The hyperbolic browser always displays the entire hierarchy.



Visual theasaurus

*(Using Information Visualization to Manage Messages **Todd Miller**)*

6.0 DESIGN PRINCIPLES

Based upon an analysis of the current email client capabilities, and ethnographic research about email in the workplace, Todd Miller proposed the following five design principles to assist in the creation of messaging tools that provide better support for accomplishing time, task, and information management tasks.

Support a variety of message markings

Several studies indicate that people rely upon the ability to give a message more importance as a way to signify a task that needs to be done or important decision that was made. Thus it is important to provide the user with a rich set of visual markings that can be applied to a message.

Support a reminder system

People commonly rely upon seeing a message again in their inbox as a means to remind them of the need to handle a task.
Rather than relying upon this to occur, it would better suit the needs of the user to have messages which need to be acted upon given more prominence in the display, such that a quick scan of a small area would summarize all pending tasks.

Maximize contextual information

Presentingcontextual information to the user gives them the ability to recall portions of a conversation. By allowing the user to easily locate and utilize this information, we can reduce the amount of information the user is required to remember and increase their ability to perform efficiently. This can be applied for mail history and mail search.

Support operations on conversations
With email, a message is commonly considered to be the basic unit. However, as the third principle implies, single messages are generally fragments of a greater conversation. The email system should provide a means for users to get a clear idea of the ongoing conversation.

Reduce barriers to message management
Users are unlikely to file messages because they are concerned about losing sight of an important message, especially those that require a follow-up. This leads to a cluttered inbox, messages. A means must be provided for the user to keep track of pending messages.

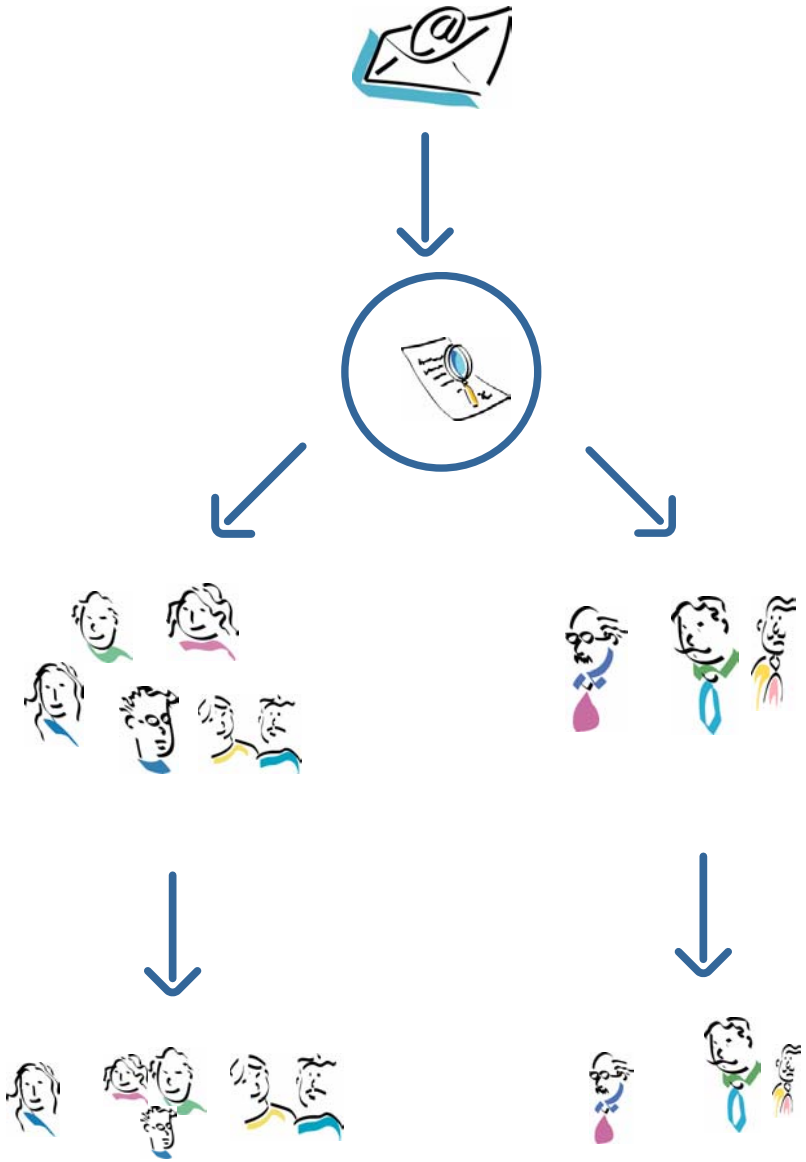
The email world for a user

7.0 Mail system design

After the technology study a proposal was made for an intelligent email system. The system would first filter and sort incoming mail into chunks and then build an hierarchy for each of these chunks.

The system scans incoming mails and classifies them into personal mails, professional mails and Spam. This is done based on header scan and the nature content search. In the first stage spam mails are filtered out after which the structure of the mails is checked and they classified into professional and personal mails.

In general, personal mails are very informal mails containing smiles and symbols, slang's etc on the other hand the professional letters are identified based on structure and keyword search. (job application , resume, sir, regards etc) . The mails are then further classified into family, friends and group mails based on content and semantic analysis.



Group mails: group mails are identified from their address. (x@yahoogroups.com)

The system also scans out going mail and does semantic analysis to find out the relationship with the sender. In case of family the frequency of occurrence of keywords like mother, dad, mum, amma, atta etc is high this is identified and the mails are identified as belonging to family. Thus the system continuously monitors both incoming and out going mails.

The system also keeps track of subject line and the reference to another mail as a means to understand the ongoing conversation. This is important in the case of egroup discussions (serves as a means for chunking based on conversation) The chunks thus formed are then taken into the next stage for hierarchy analysis.

Hierarchy is a representation of the relative importance of a particular correspondent for the user.

The system assigns same ranking for all members in a chunk in the initial stage. All new additions to a chunk is given a starting score of 1 unit. When the user makes a preference to read a particular mail that member gets its rank changed by one unit. If that member is not the highest ranking member in that chunk then the new rank is the highest rank + 1. Thus the ranking system is a true reflection of the user preferences. Thus a hierarchy is built which is used for email visualization. The other factors which could be used for hierarchy building according to the importance are

Frequency of communication with a particular person

The number of times a particular mail is read

Which sender's mails get filed the most

The promptness in replying

7.2 Retrieval:

People search for mails on basis of arrival time, address, subject, attachment type and size, so a search where one of the following query is used might generate a lot of results which is only a partial solution.

Thus what I propose is a search model which is dynamic and uses a multiple query based search. Queries are applied one by one where by the search result cluster becomes smaller and smaller (shown through animation) this feedback prompts the user to apply more queries because the results of his actions are shown dynamically. The queries are also terms which the user can associate with. In the case of the date the user would remember it as today, yesterday this week, this month and so on, this was found to be more efficient than a date
based search.

7.3 Social network manager:

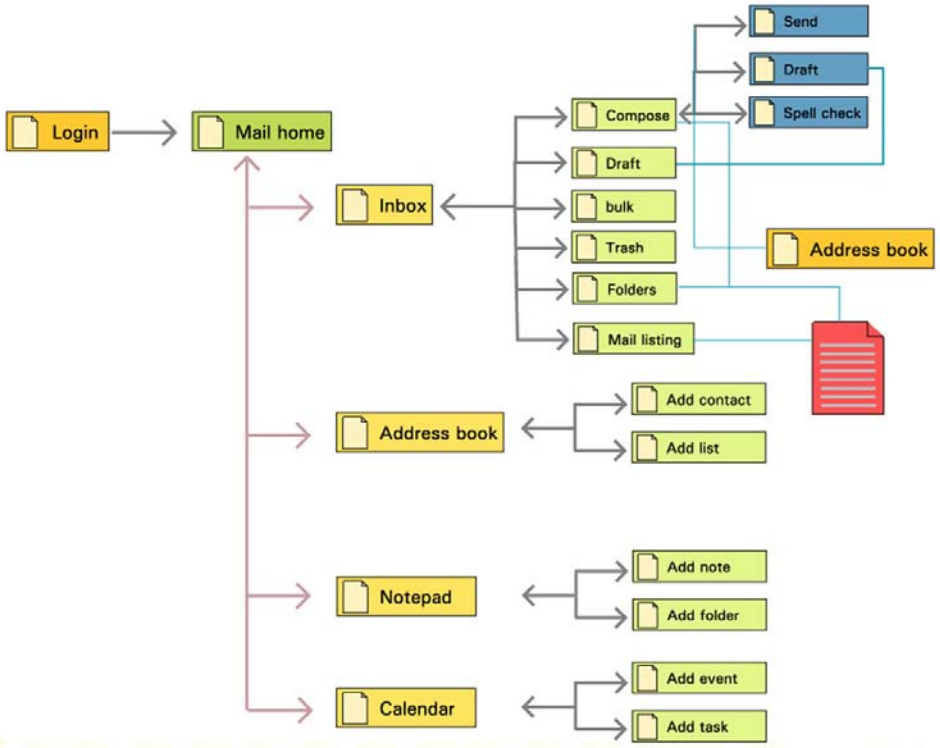
The main issue faced by email users was the problem of pending mails. Users leave emails in their inbox as a reminder. but this system breaks down when the inbox gets filled, thus the user forgets certain the tasks. This creates two issues one is actually finding the mail and the other the degradation of relationship. Thus there is a need to provide information regarding the pending tasks and also taking mail as a primary means of communication how close you are to a particular person. The social network is a visual representation of the contact list of the user. It tells him the status of his social network.

Thus the social network manager visually describes how close the user is with each other member in the contact list taking email as a primary means of communication. It also gives

information about the ongoing conversation in terms of number of mails and replies. It opens up the history window so that the user can access the mails pertaining to that particular person. The network manager viewed through time can show changes in relationships.

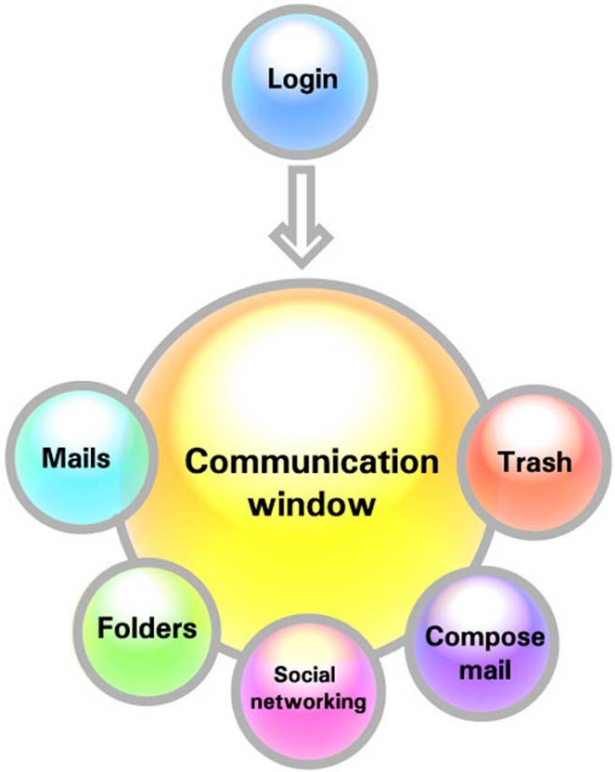
7.4 History window:

It became clear from the user analysis that mails cant be see in isolation each mail is part of a ongoing conversation. This is solved to a certain extent in certain mail programs by threading. What I propose is a visual representation of the ongoing conversation giving user a overall idea about the same. The attributes that needs to be shown here are time, size, relative importance (some mails would have been read more than once, which is an indicator about the importance of that mail) mails and replies.

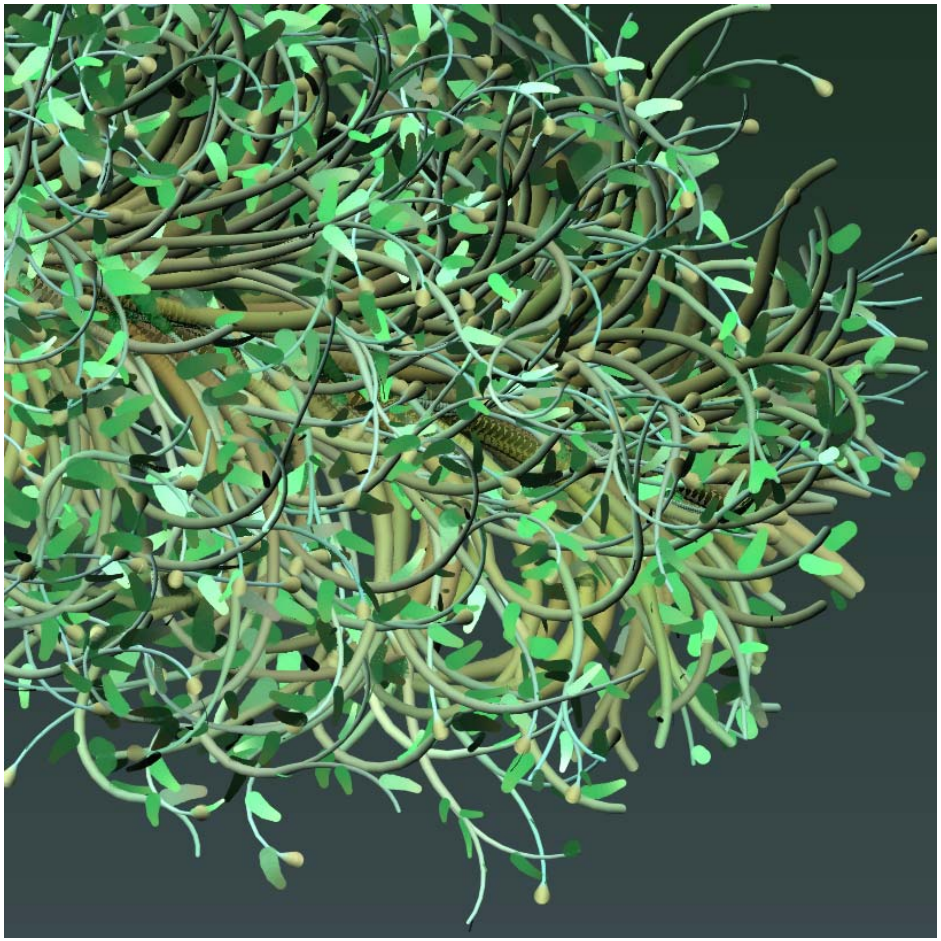


Web based mail conceptual map.

7.5 Proposed email conceptual map



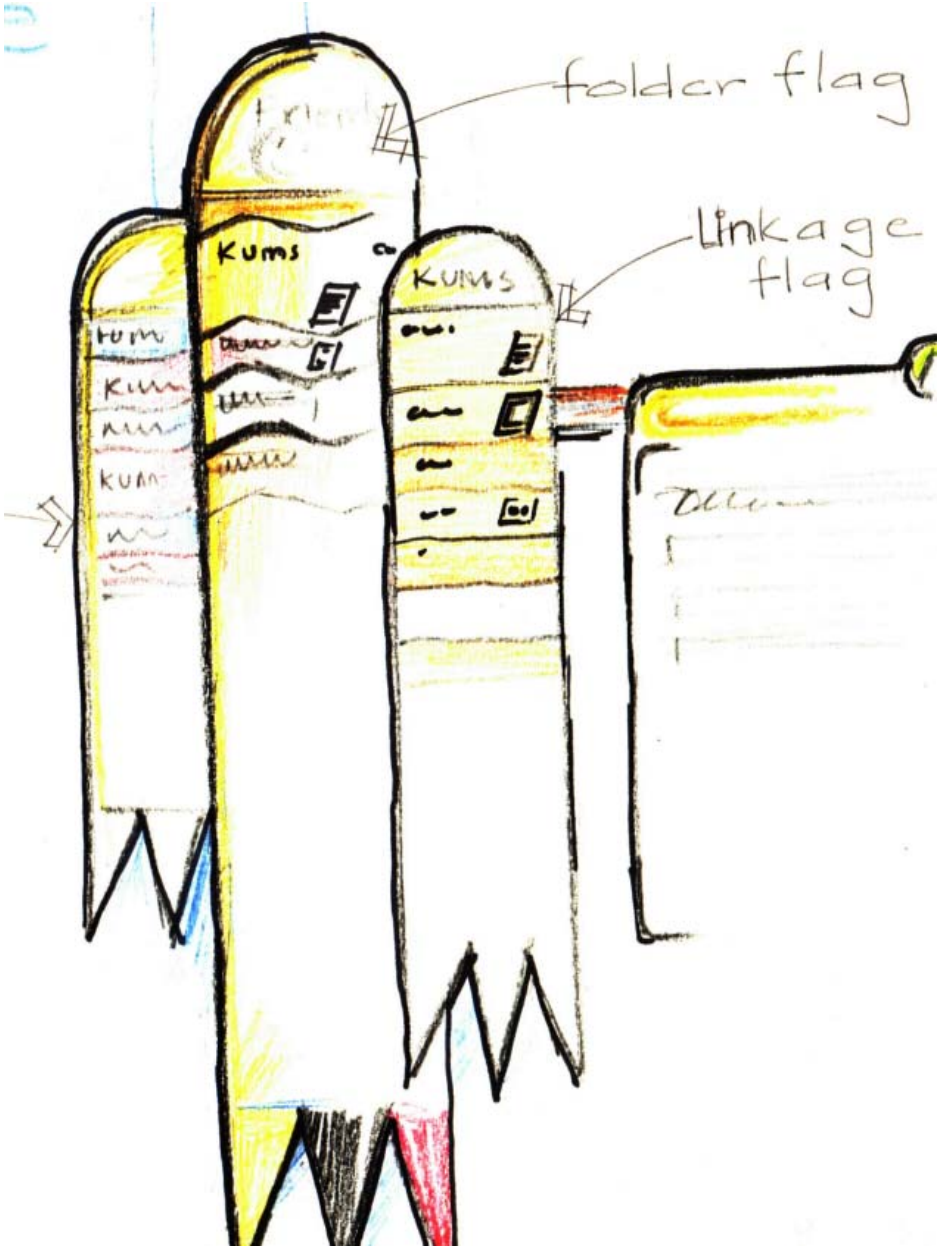
Proposed conceptual map



8.0 Concept1

8.1 Mail creepers

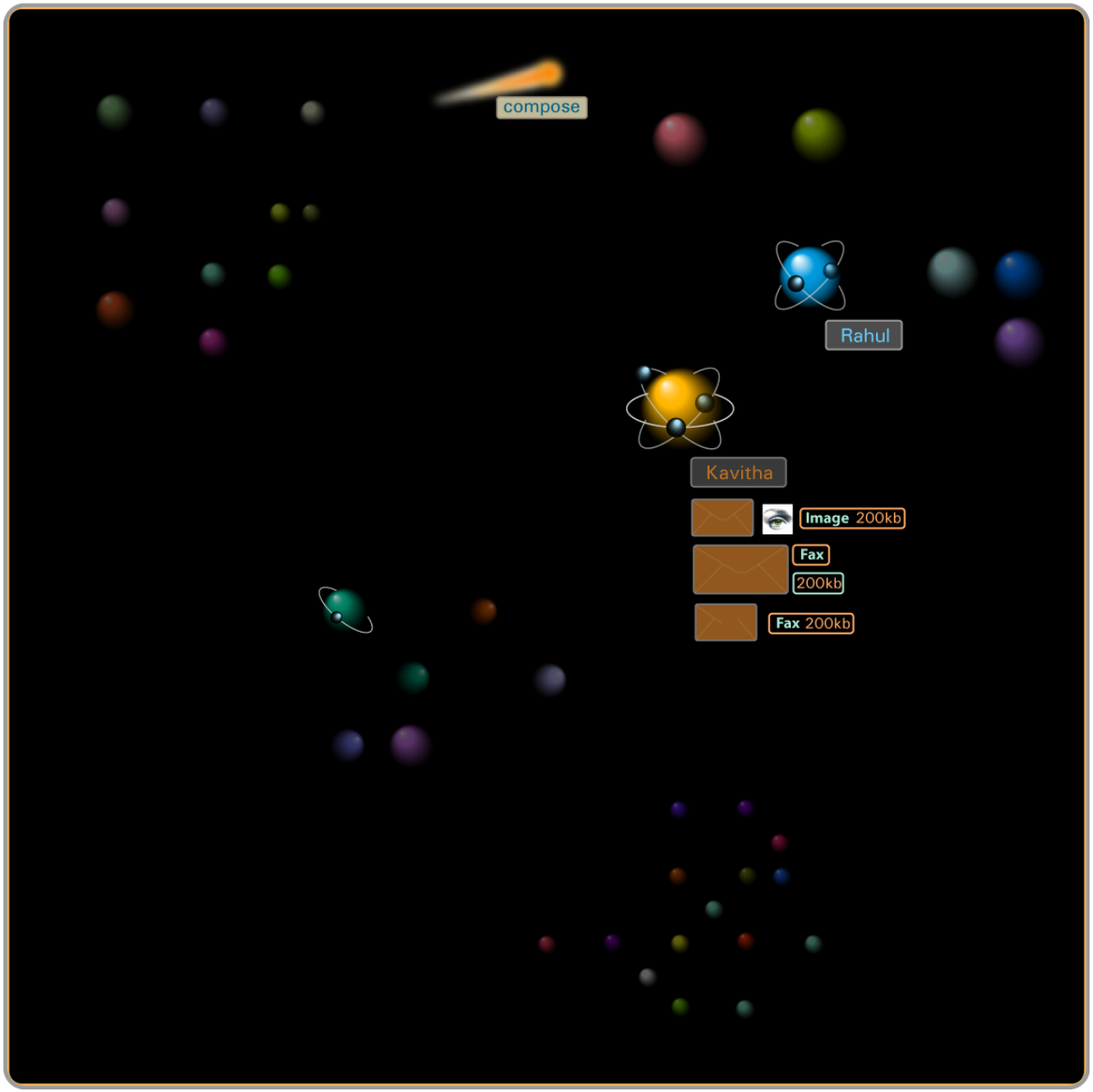
Here the mails are represented as leafs on creepers. Each cluster is shown as a creeper growing outwards new mail gets added along the periphery. The size shows the importance of particular mail.



Concept2

8.2 Mail flags

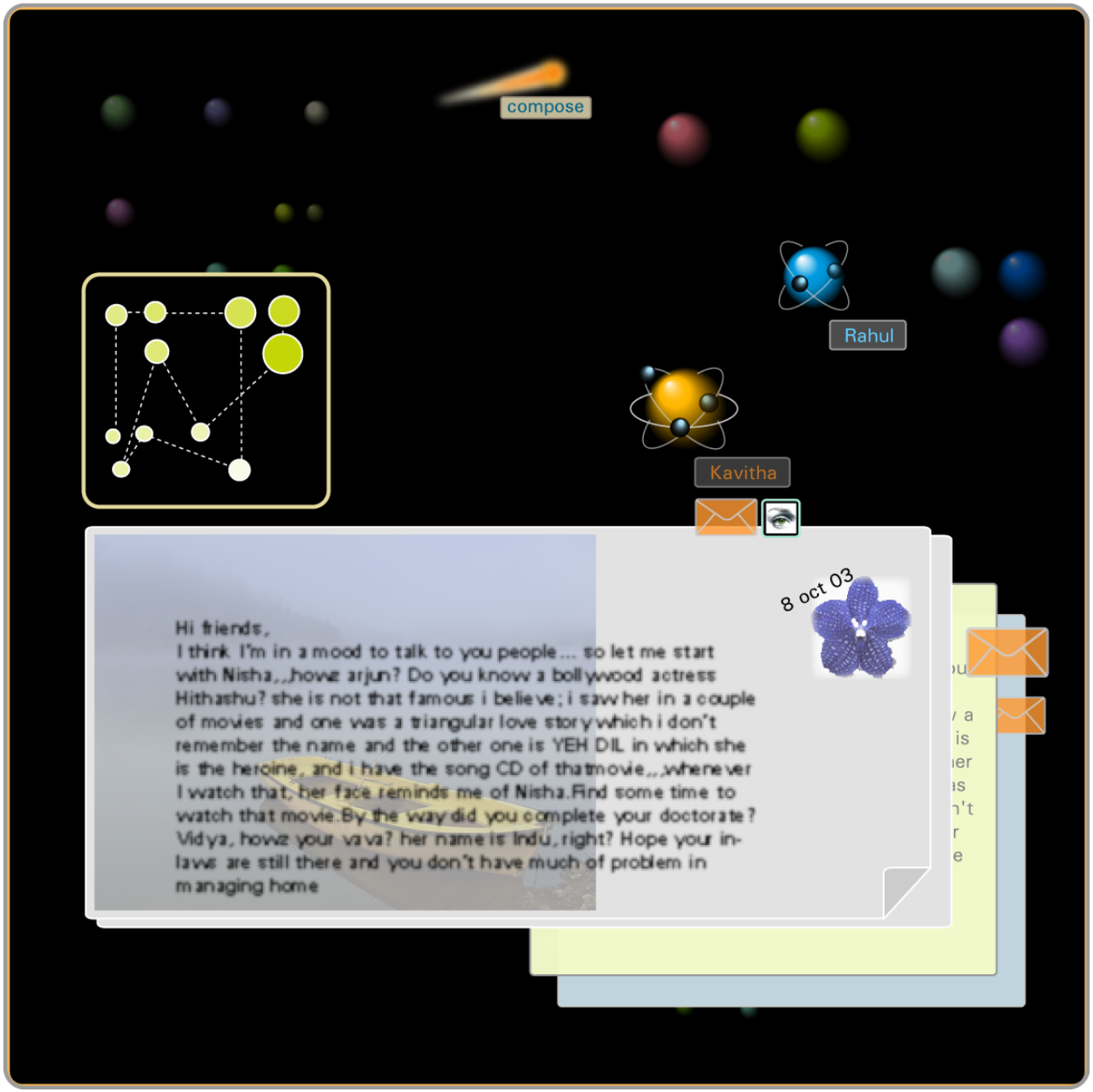
During festivals at temples in Kerala, special flags are used as a means to announce the coming of the festive season. Each temple has a unique design and motifs and length change to convey the scale of the temple and festivities. The flag metaphor is used to visualize clusters. Each cluster is represented by a flag, depth clue is given to show the hierarchy of clusters. Her email is arranged sequentially.



9.1 E-universe

The inbox shows users as planets, mails are shown as satellites circling the planets. The number of satellites corresponds to the number of mails. Clusters are formed and important clusters are placed on top and the others down. Size serves as a means to show important clusters.

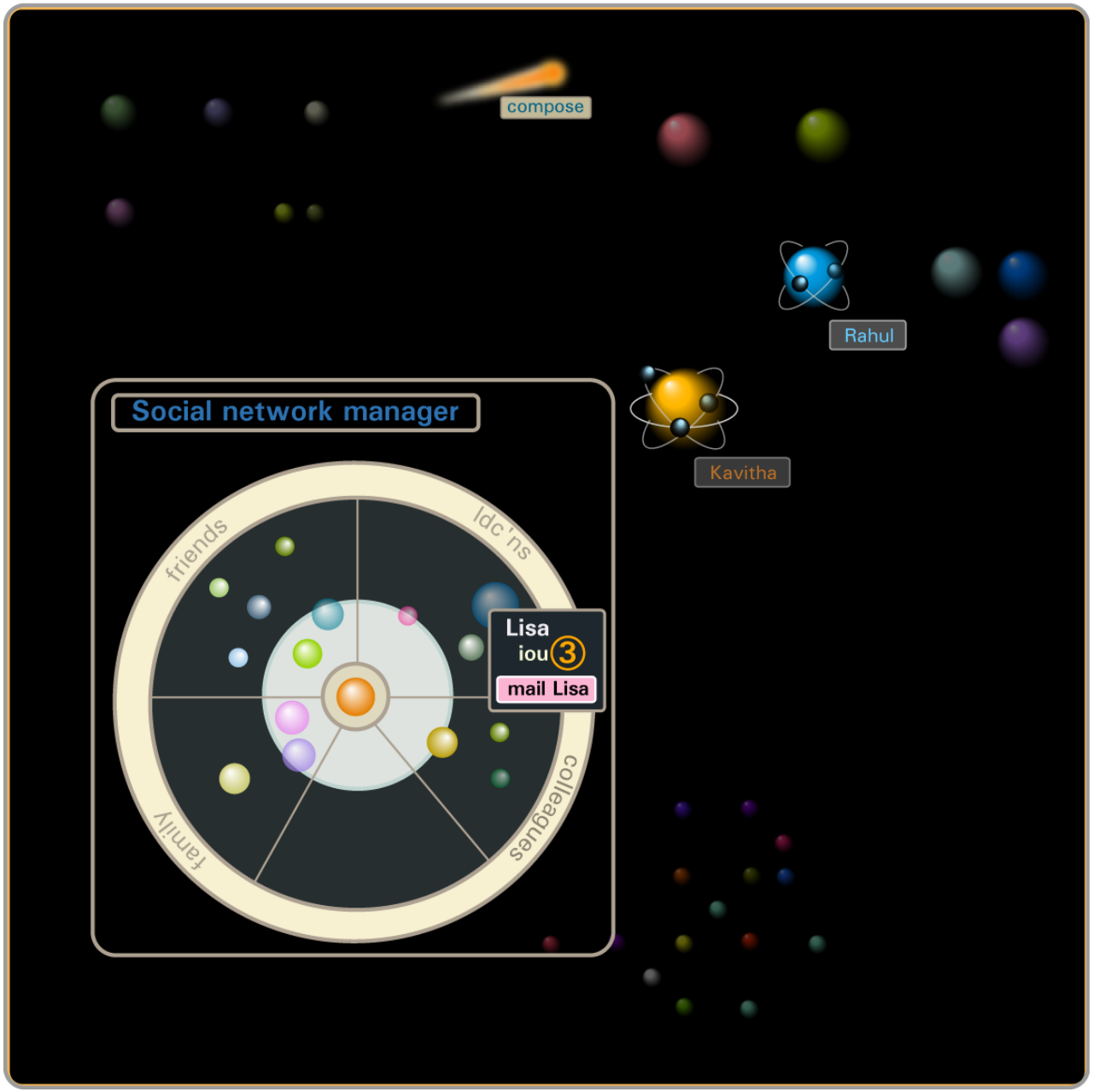
In a cluster, size is again used to show importance. Only users who have sent mail are active, the rest of the planets are shows as faded out. Name tags are shown next to active users. The tags displays name subject and attachment details.

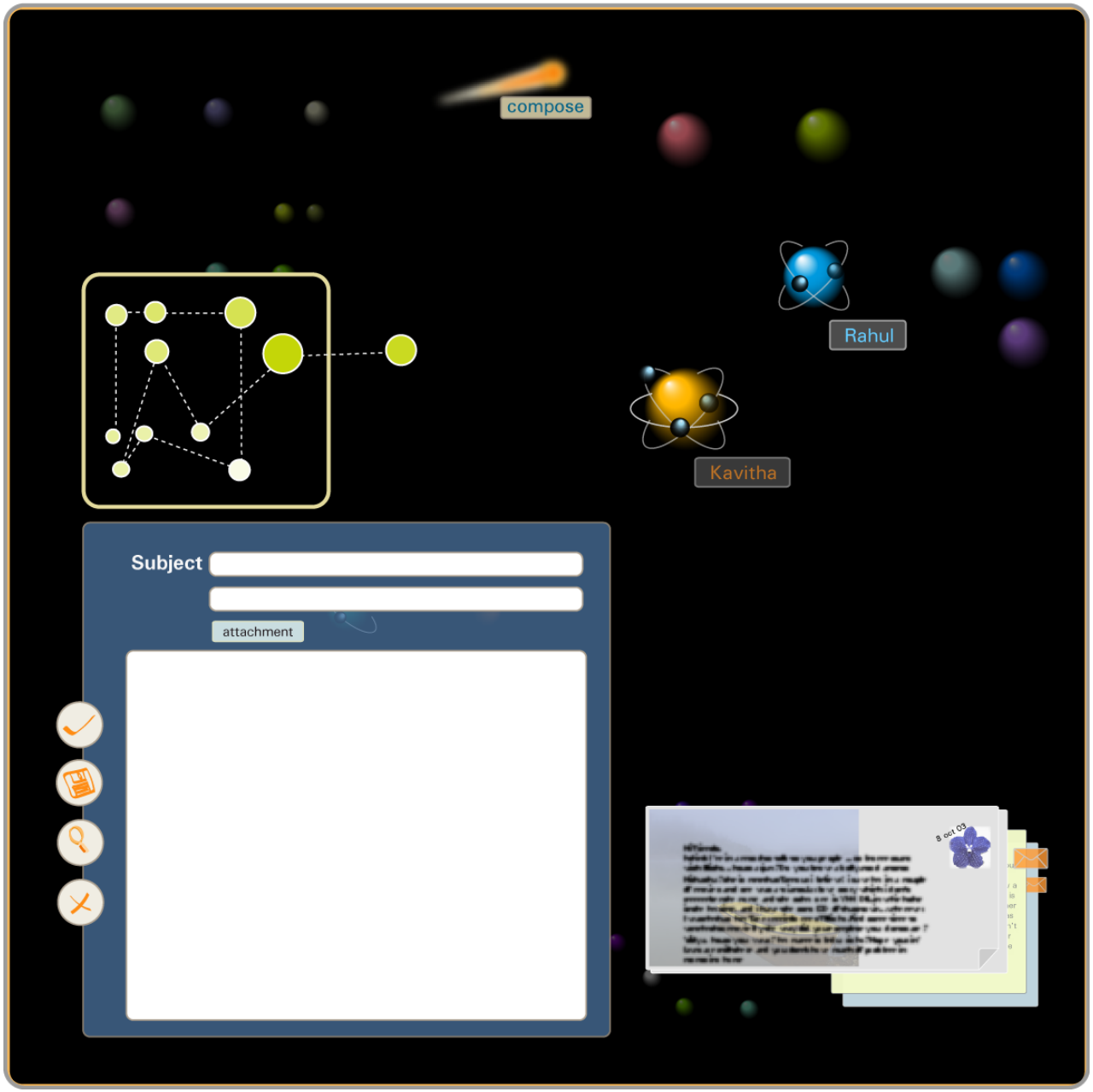


E-universe

When a particular mail planet is clicked it opens out the mail window. If there are more than one mail from a particular friend then those mails are arranged in a cascading form, allowing users to browse through them without going into the inbox view. Clicking anywhere in the inbox area takes the user to the initial stage, he can again start browsing other clusters. The mail view also opens out the mail history window.

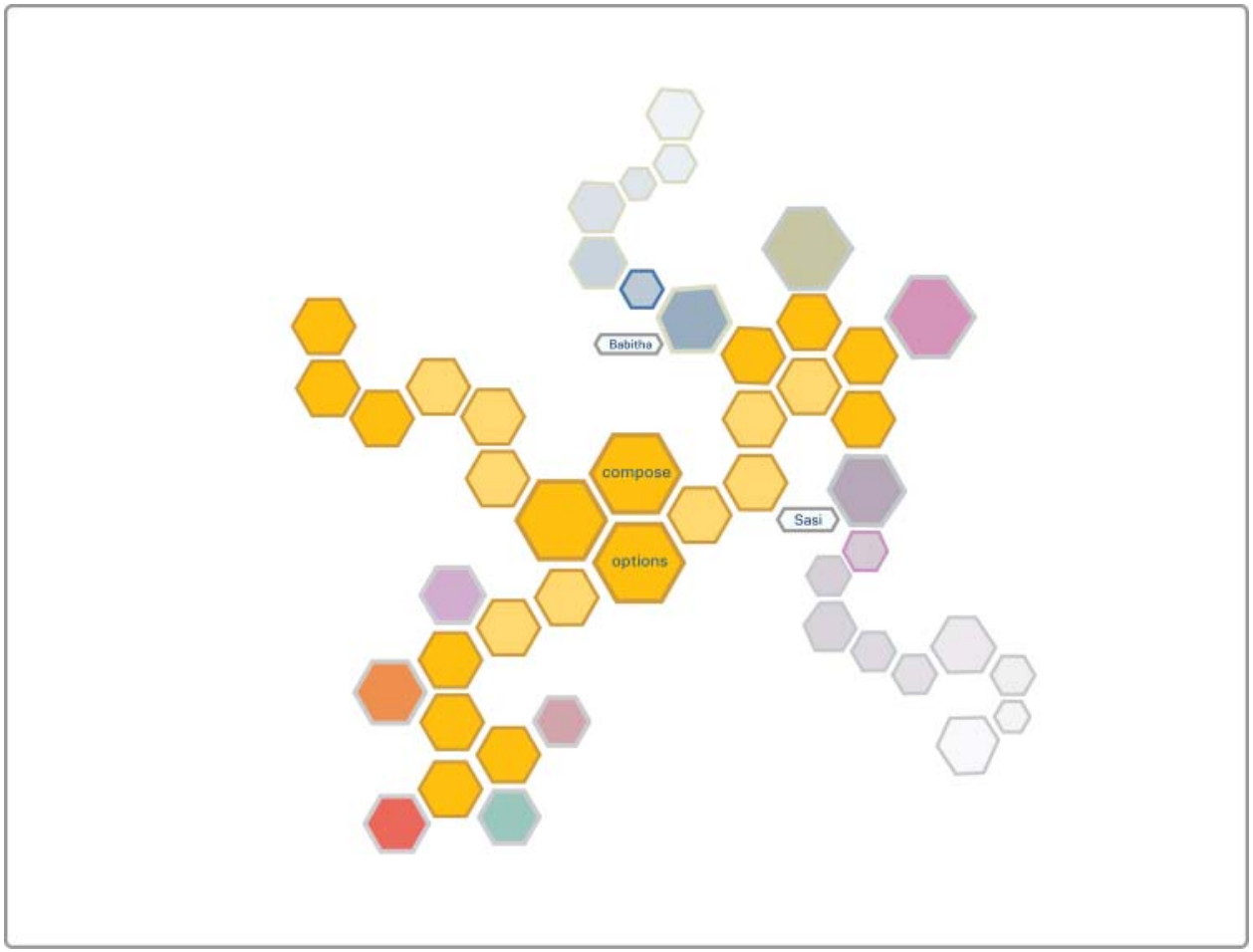
E-universe


compose
Rahul
Kavitha
Social network manager
friends
Idc 'ns
Lisa
iou 3
mail Lisa
colleagues
family



E-universe

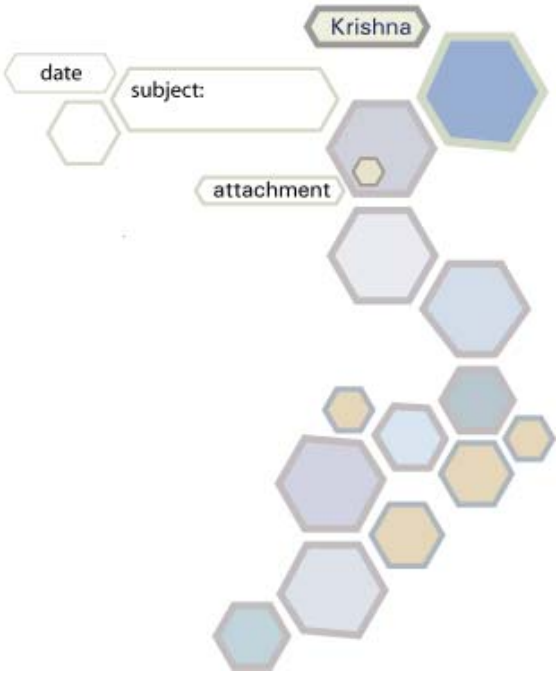
The difference between the compose mail and reply mail windows is that in the case of reply the original mail is minimized and stays in the window area so that at any time the user can refer to the same. The mail history window allows user o refer the earlier mails.



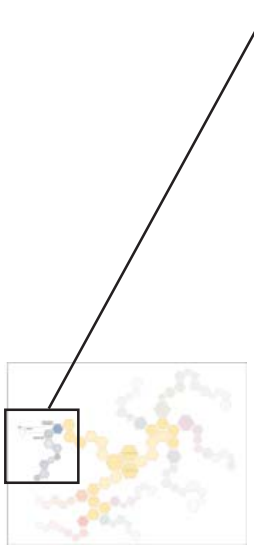
9.2 Cell mail

The cell mail shows clusters of users growing out from the centre.Those users who have sent mail are highlighted. Important clusters are differentiated using size. Size again is used to show importance within a group. The mouse over state opens the information tag which shows details such as name of sender, subject and attachment details

Cell mail



The mouse over state opens out the user branch. The user branch shows the mail history, with the latest mail placed at the root. Here size is used to show important mail within a mail history. Important mails are those which the user has read more than once, Replies are shown as hexagons attached to the main history branch and these are differentiated using color. Value is used to show the size of the mails.

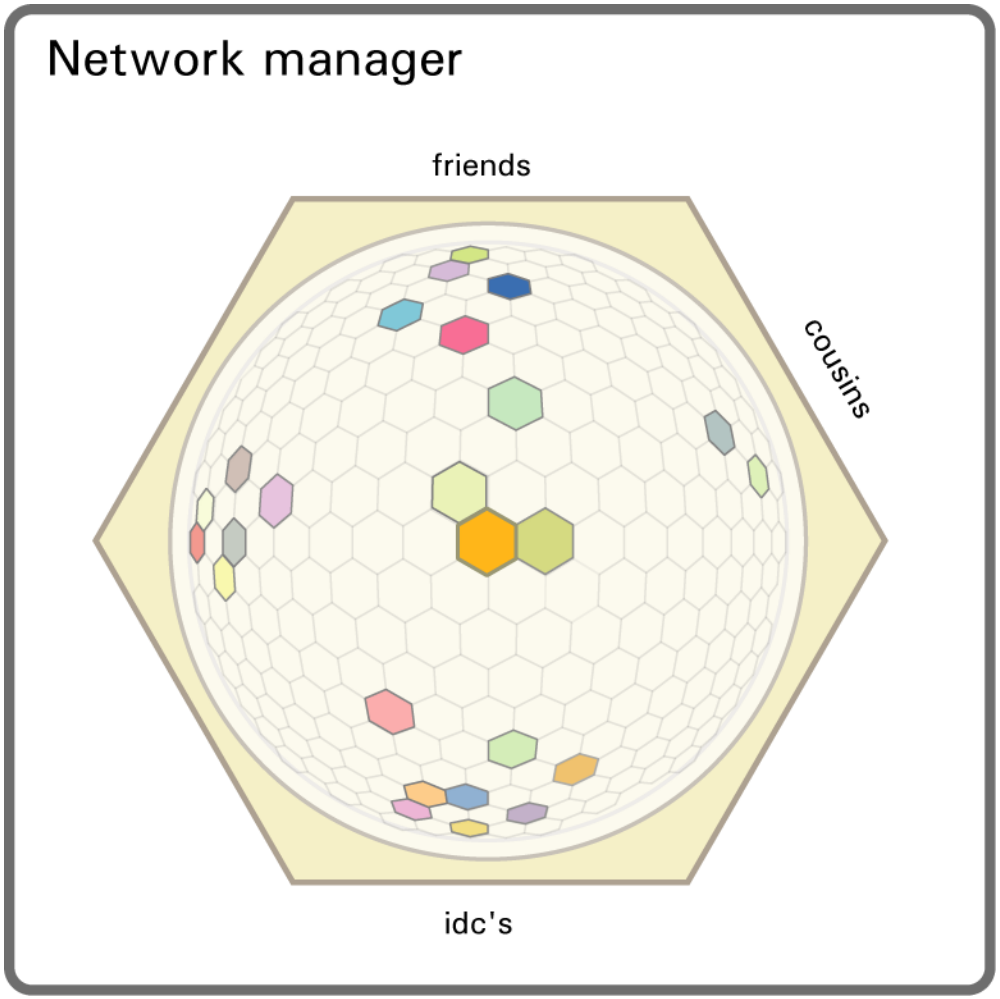


key screen

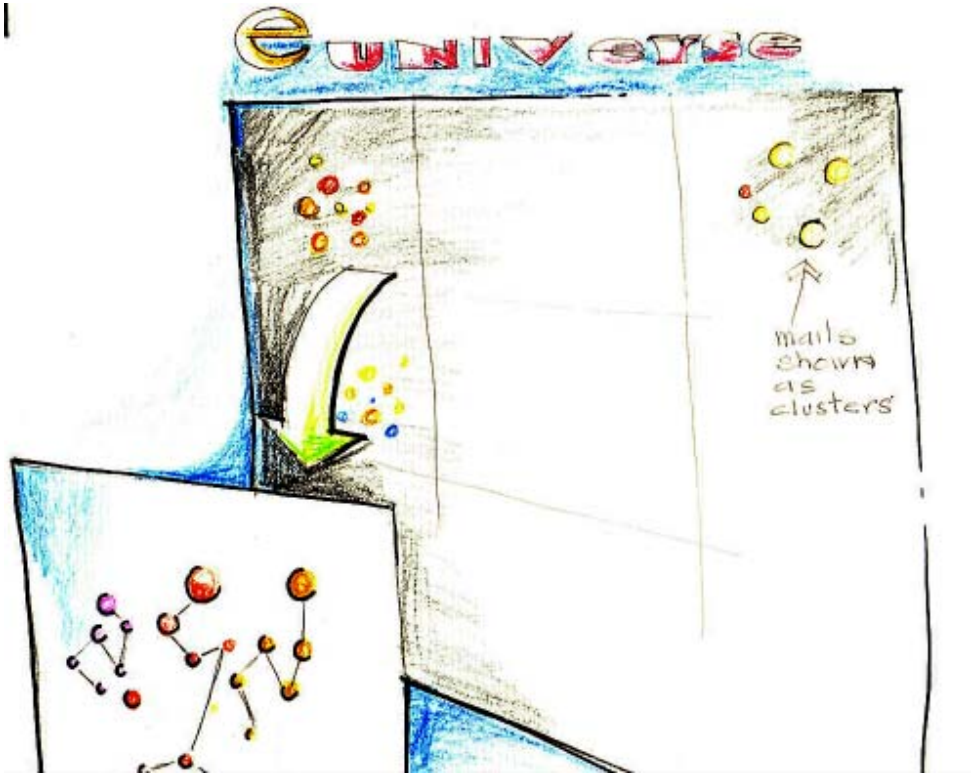
Clicking on any mail hexagon opens out the mail window . A preview of the attachment is also shown. The user can reply, delete or can put a note on the mail.

Cell mail

Pressing the reply window opens out the compose window which resizes the main mail window, this allows user to refer the original mail when replying.



Cell mail

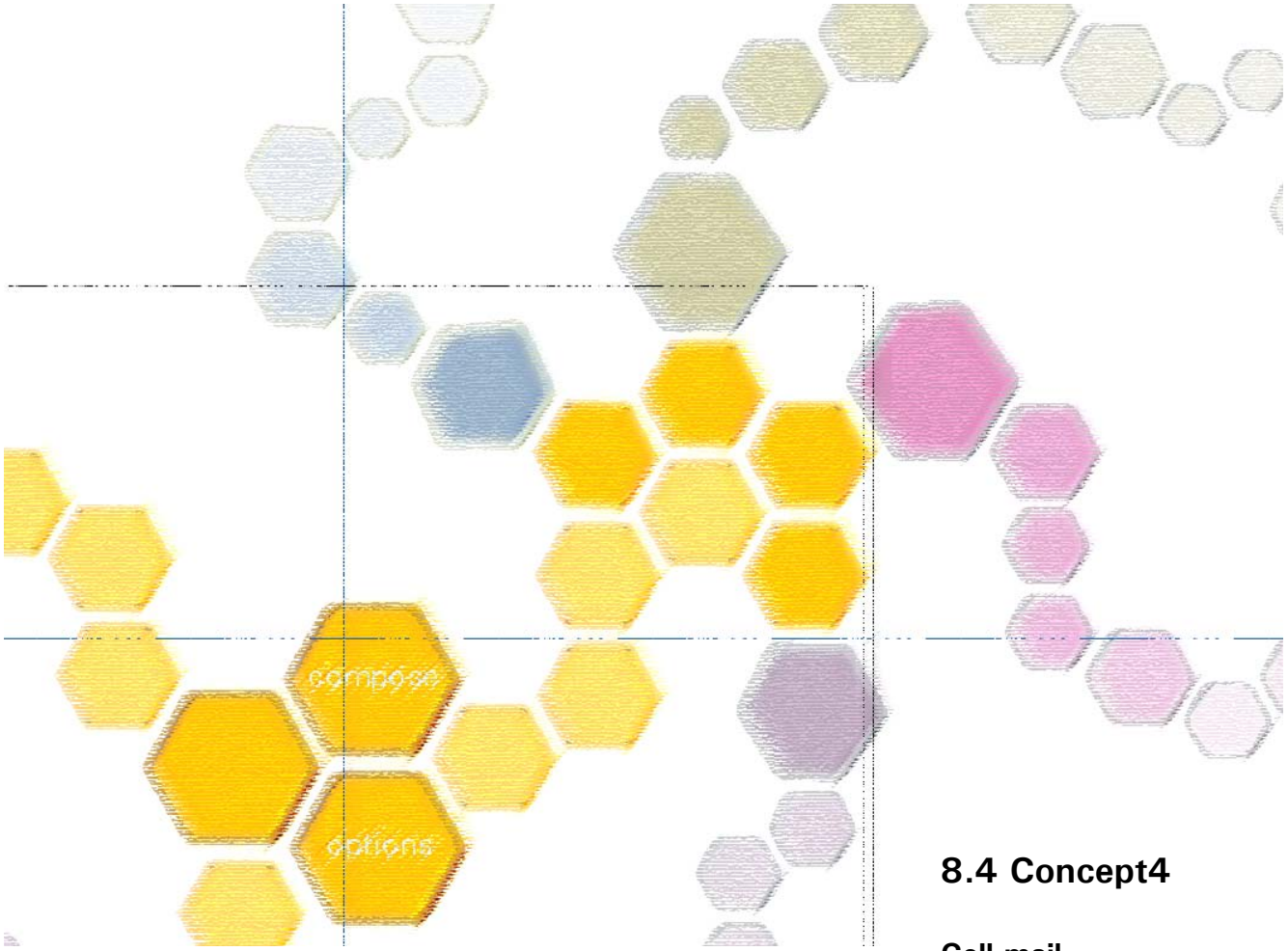


8.3 Concept 3

Mail universe

The star studded sky is always been a awesome sight to look at. If we look closer we can connect stars this generating the star signs, there is a sense of hierarchy, grouping, clustering which is what is needed in the case of email also.

Here people are represented as planets and mails as satellites, planets are grouped according to nature of mails. When ever a mail comes it is shown as satellites circling the planet.



8.4 Concept4

Cell mail

The beehive has been a marvel of nature. The beehive is a dynamic and growing web of hexagons. The aspects of grouping hierarchy can also be seen in case of beehives. In the cell concept each mail is represented by a beehive cell namely a hexagon. Clusters of mails are effectively represented.

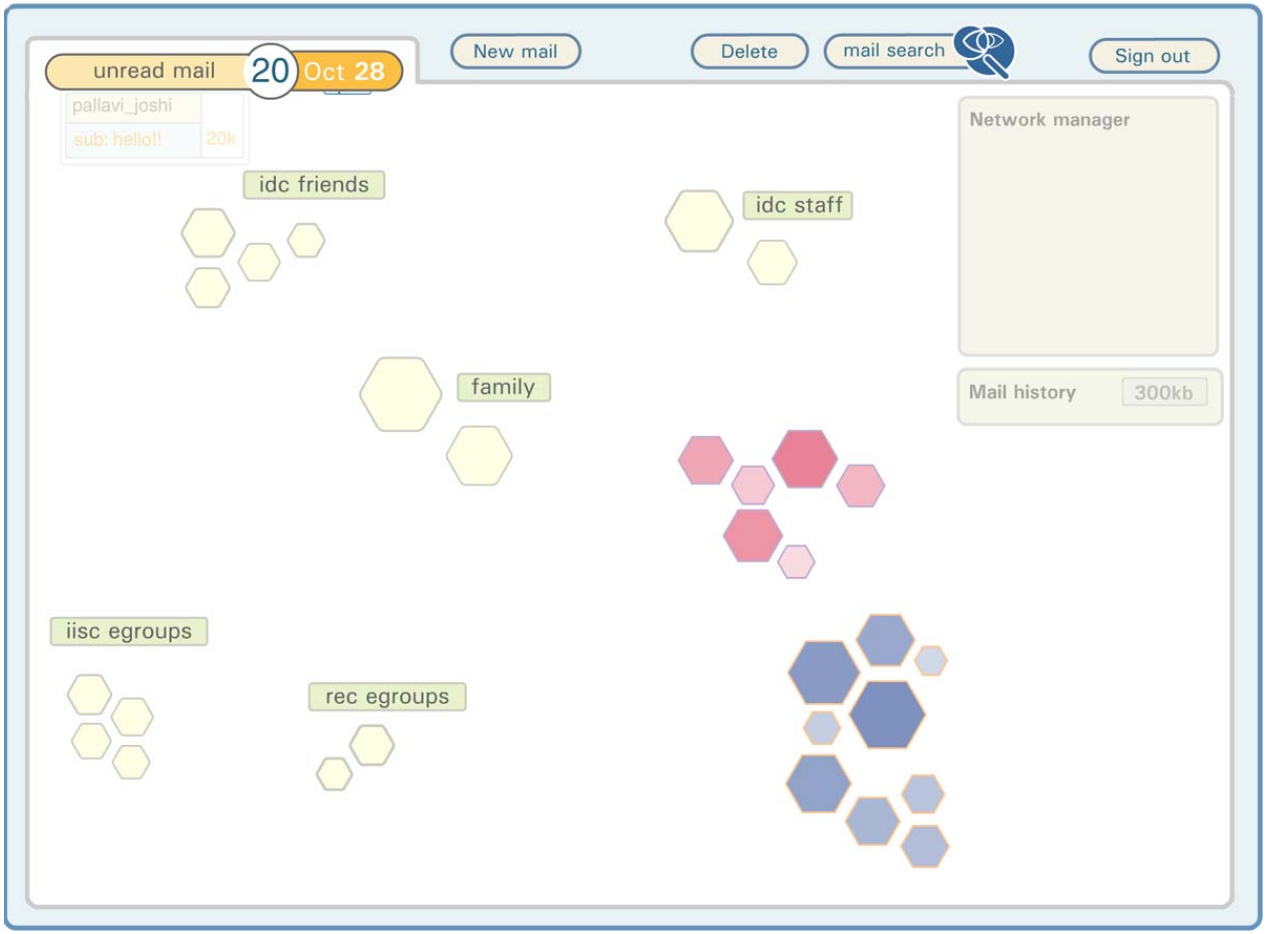
10.0 User feedback

After user feedback and analysis two concepts were taken for further development namely the Euniverse and Cell mail. These two concepts offered much possibilities in visual representation of mails and attributes.

10.0 User feedback

The two concepts were taken to the user for their feedback. The user found the interface much easier to use and found the process to finding important mails easier since they don't have to browse the entire list (as in the case of present interface). The history window was found to be very helpful in keeping track of the conversation. Users had problems with the cell mail since same device the hexagon was used to show the structure (branch) people and mails. The found it confusing and kept asking me what the structure meant. Users like the second concept more since they found the interface much more simple and easy to learn.

The fact that animation was used served as a means to help in adapting to the new interface. Users said that they found the concept of network manager very unique since it shows pending mails . Managing pending mails was one of the major problems they faced by most users. After the user feedback and analysis it was decided to pursue the cell mail. The euniverse had lots of points that the user found very helpful so final development was done incorporating the advantages of both interfaces.



11.0 Final design Cell mail

Interface being developed

The ecell concept was developed further, based on user feedback, the inbox shows clusters of mail and not users as was shown in the earlier version. Here the attributes that needed to be visualized were size of mail, time of arrival, media type, clusters, hierarchy, relationship, spam, new user, attachment and warnings. These were developed based s on inference from J. Bertins work titled *Semiology of graphics: Diagrams, networks, maps* . The various data representation techniques used to visualize the data were color, size, proximity, value, orientation, animation, texture and location. The four basic interfaces are being developed namely the inbox, social network, mail management and search window.

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