

# Mobile Phone for deaf

Degree project (Stage 1)

Guide: Prof. G.G.Ray

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IXD | IDC



# Overview

- Introduction
- Methodology
- Understanding Users
- Ideation
- Concept development
- Final concept
- Scenario
- Acknowledgement
- References

# Introduction

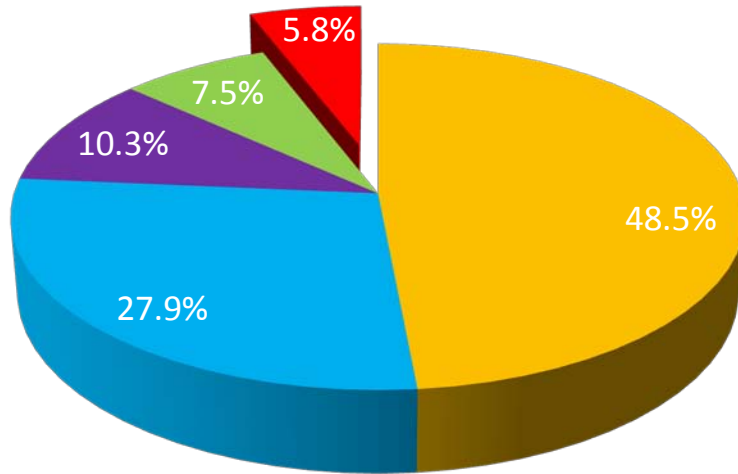
- One of the basic need of human being is to communicate with each other.
- Telephone is a technology which is not meant for deaf people.
- Mobile phone are getting popular among the deaf people for SMS.

Aim of project is

'To conceptualize a mobile phone which will help deaf users to communicate and also create the interface which will give a feel of communication.'

# Introduction

## Census of India 2001



Total disability

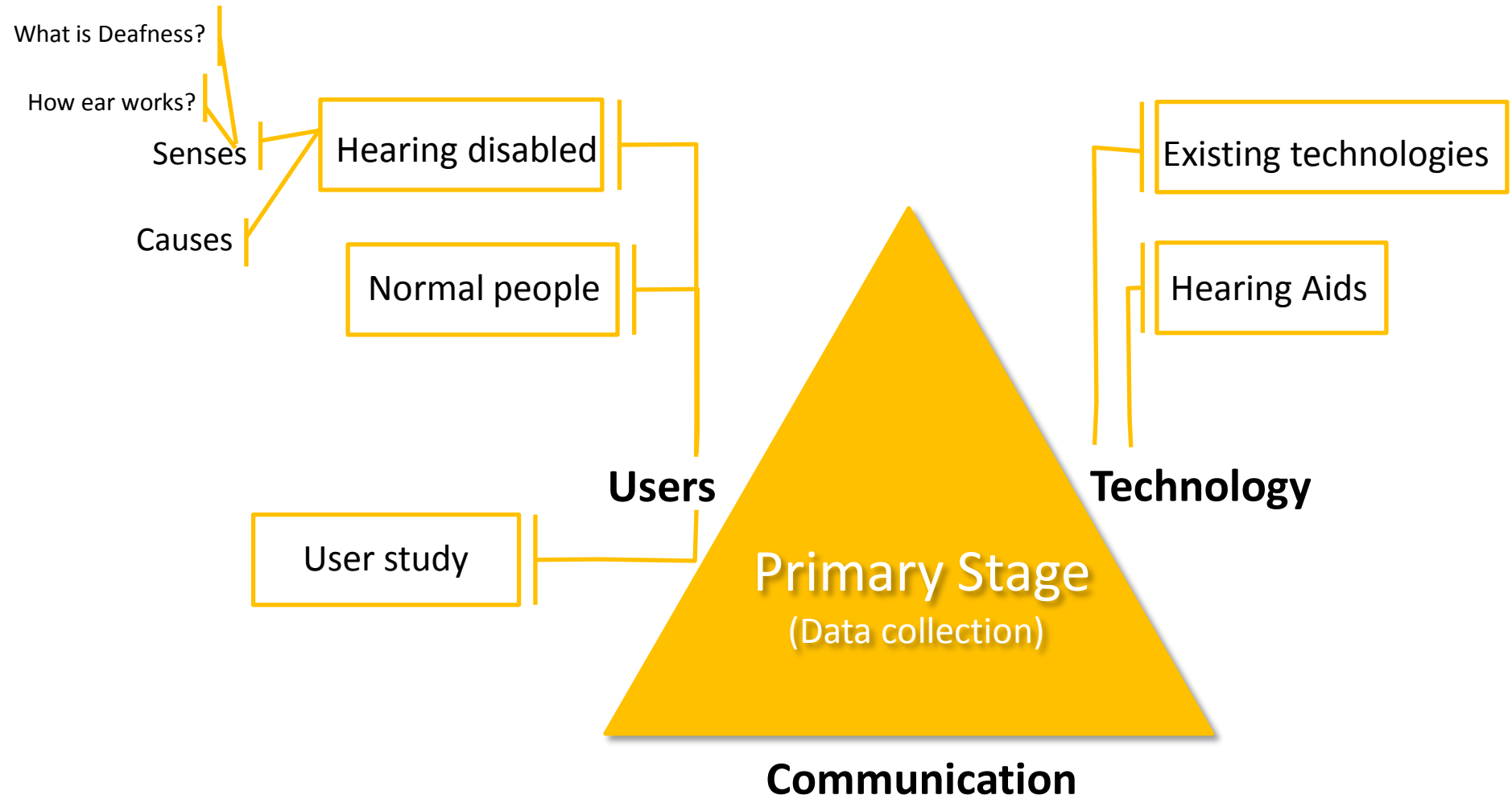
- Disability in seeing
- Disability in Movement
- Mental Disability
- Speech Disability
- Hearing Impaired

Total population	1,028,610,328
Total disabled population	21,906,769

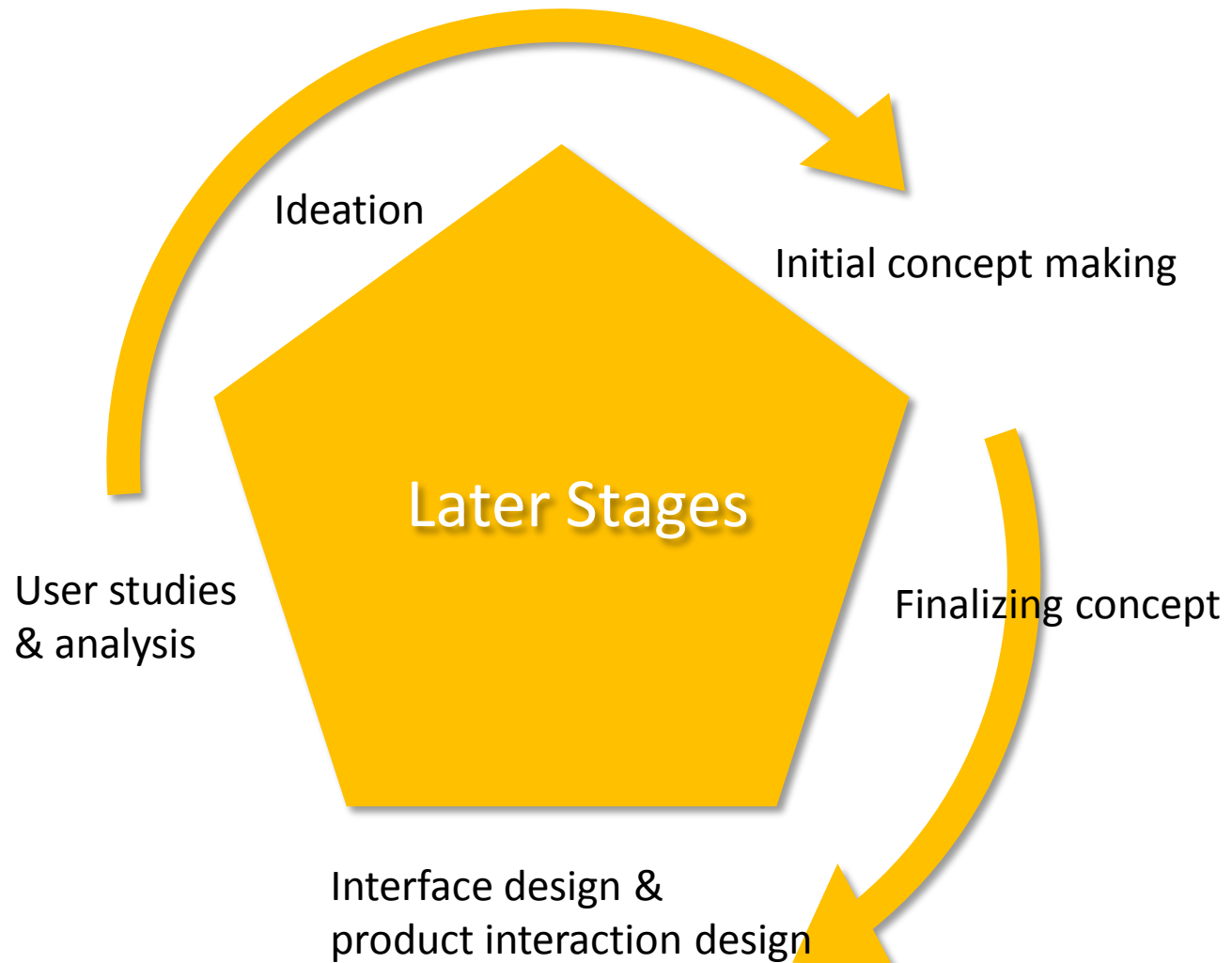
Disability in seeing	10,634,881
Disability in Movement	6,105,477
Mental Disability	2,263,821
Speech Disability	1,640,868
<b>Hearing Impaired</b>	<b>1,261,722</b>

# Methodology

# Methodology



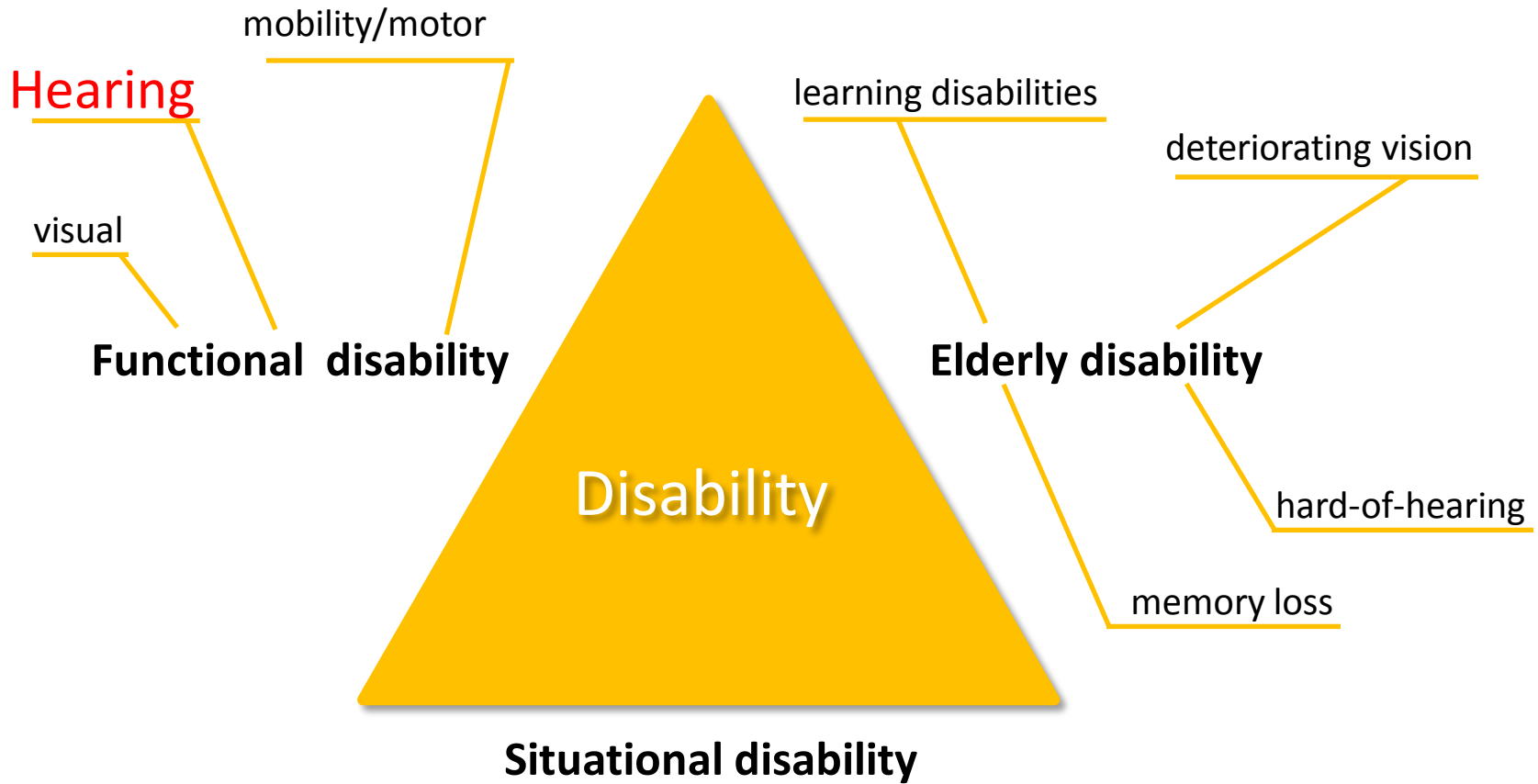
# Methodology



# Understanding users



# Understanding Users



# Understanding Users

A hearing impairment or hearing loss is a full or partial decrease in the ability to detect or understand sounds.

Hearing is limited to frequencies between about 20 Hz - 20,000 Hz (20 kHz), with the upper limit generally decreasing with age.

Degree of deafness	Deafness level (dB)
Mild	- For children: between <b>20- 40 dB</b>
	- For Adult: between <b>25- 40 dB</b>
Moderate	between <b>41- 55 dB</b>
Moderately severe	between <b>56- 70 dB</b>
Severe	between <b>71- 90 dB</b>
Profound	<b>90 dB or Higher</b>

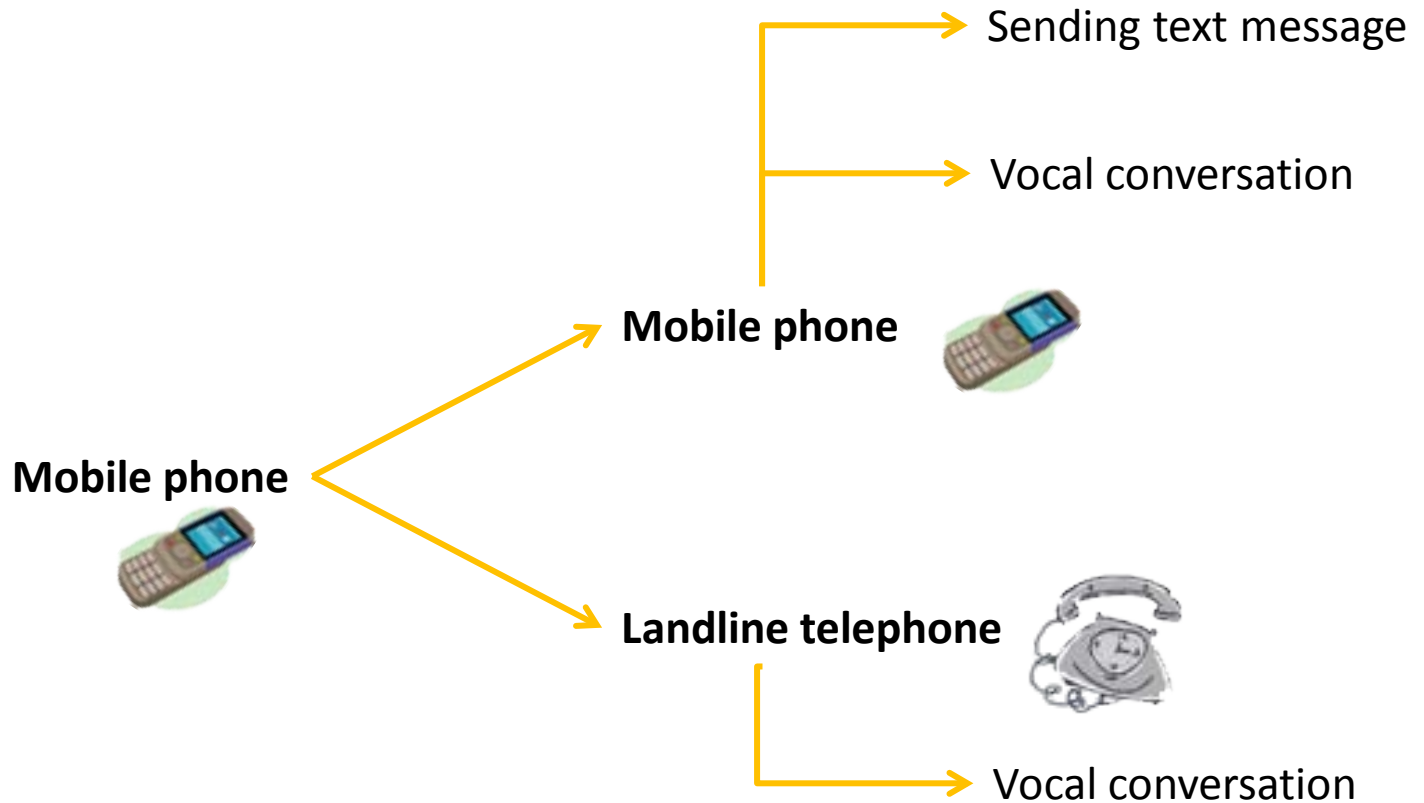
# User studies

## Vikas Vidyalaya For the Hearing Handicapped Dadar(W), Mumbai- 400028



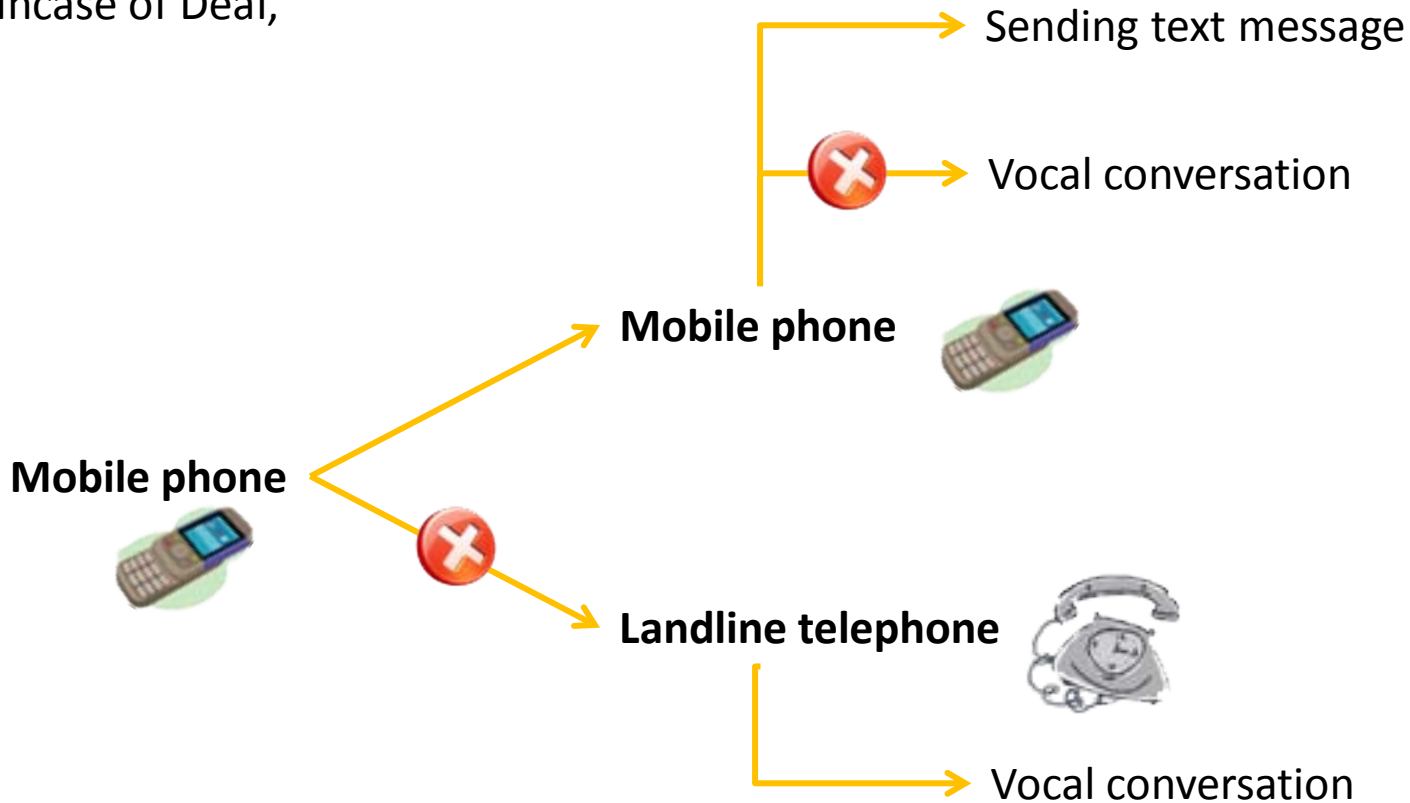
# Data collection

# Current telecommunication scenario

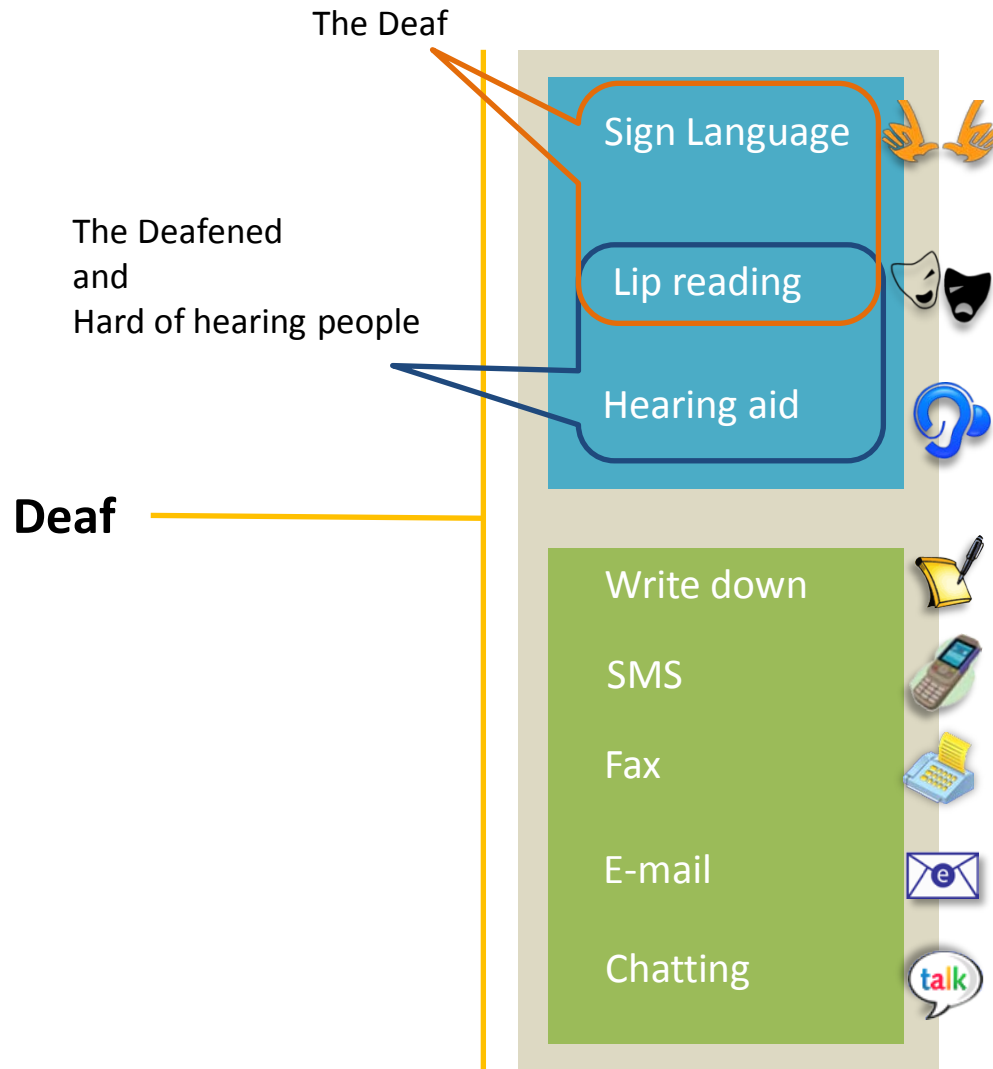


# Current telecommunication scenario

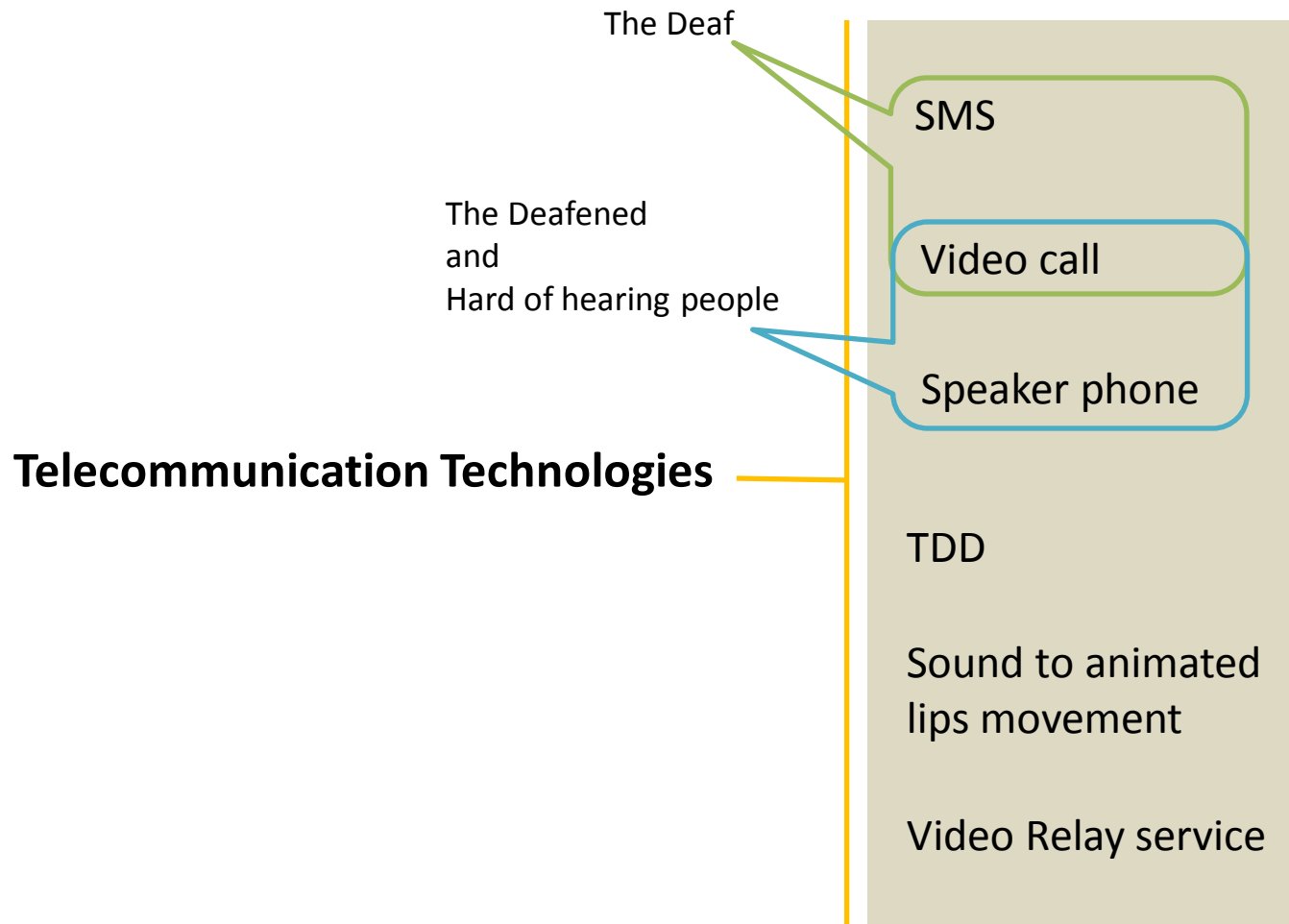
Incase of Deaf,



# Ways of communication



# Telecommunication technologies





# Telecommunication technologies

## Telecommunications device for the deaf (TDD)

It is an electronic device for text communication via a telephone line, used when one or more of the parties has hearing or speech difficulties.

### Telephone typewriter



# Telecommunication technologies

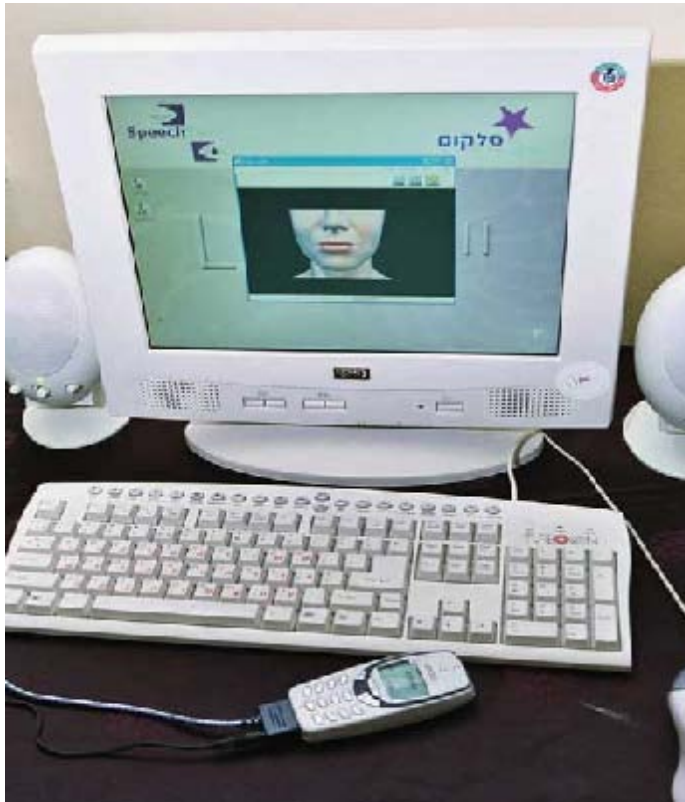
## LipCcell

### Sound to animated lips movement

Israel's largest mobile phone operator Cellcom and Israeli start-up SpeechView have launched a worldwide patented software that will allow the deaf and hard of hearing to communicate through mobile phones.

The software is language-independent and the user can choose to switch to slang, mixed words, or a mix of languages at any time.

# Telecommunication technologies



[www.vocesenelsilencio.org.ar](http://www.vocesenelsilencio.org.ar)

<http://www.ynet.co.il/articles/1,7340,L-2275035,00.html>

<http://www.geek.com/lipcell-allowing-deaf-people-to-use-cellphones/>

[http://www.cellular.co.za/news\\_2003/052203-israeli\\_software\\_enables\\_deaf\\_to.htm](http://www.cellular.co.za/news_2003/052203-israeli_software_enables_deaf_to.htm)

# Telecommunication technologies

## Video relay service

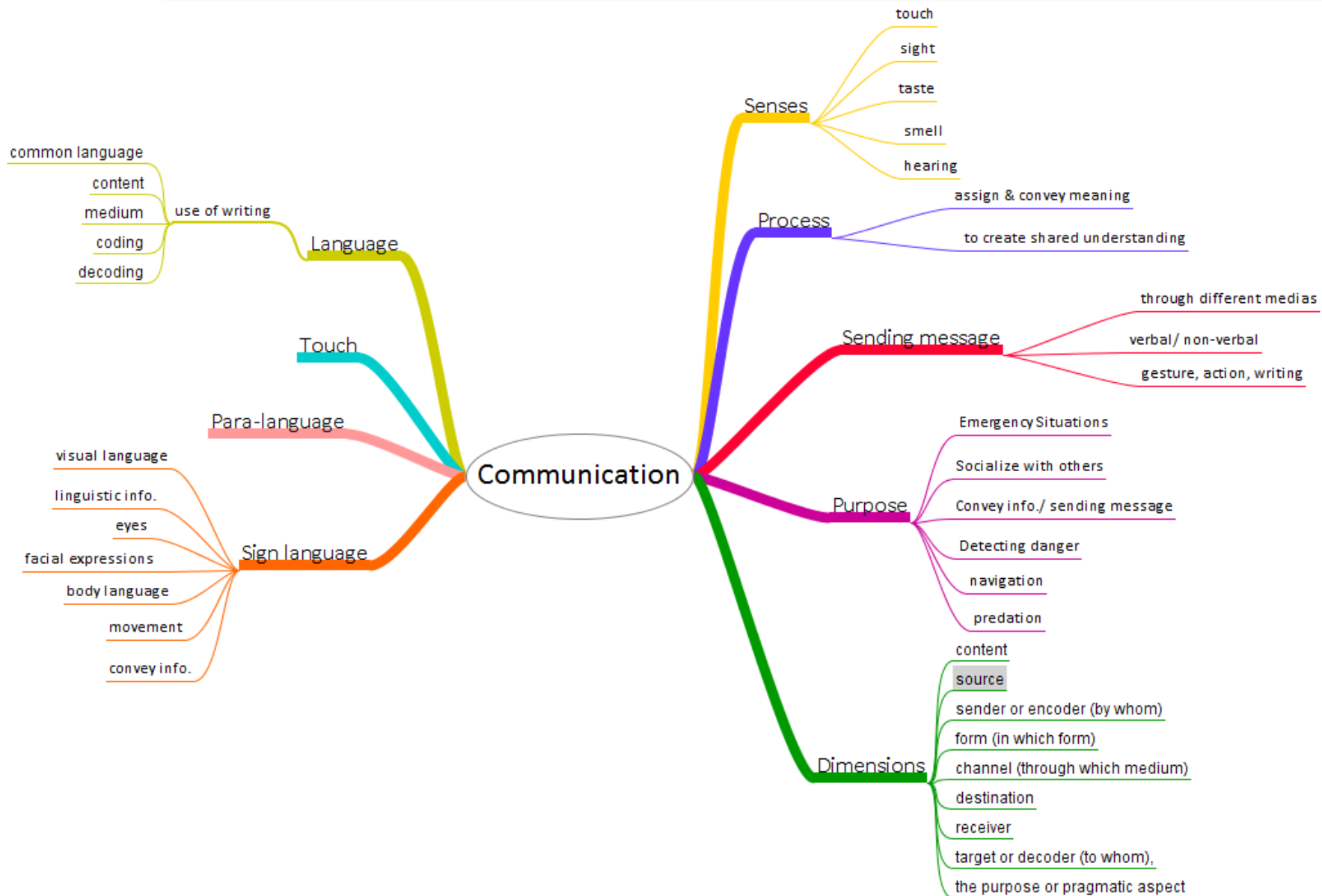
The Deaf person sitting in front of a PC which is connected to a webcam and internet connection, will make a phone call through a relay operator which then connects to the desired hearing person who is using the similar setup.

The deaf person use sign language and relay operator will decode them for hearing person and when hearing person speaks that will be converted into sign language by the relay operator for the deaf user.



Ideation

# Ideation



# Analysis

There are two main groups of audibly impaired,

Those who are born deaf: The deaf

Those who lose hearing in later life : Deafened and Hard of hearing people

# Analysis

There are two main groups of audibly impaired,

Those who are born deaf: The deaf + **mute**

Those who lose hearing in later life : Deafened and Hard of hearing people



# Analysis

Making a Phone call

Thought process

# Analysis

Making a Phone call

Search and select

# Analysis

Making a Phone call



Dial the phone no.

# Analysis

## Making a Phone call



Wait for the ring

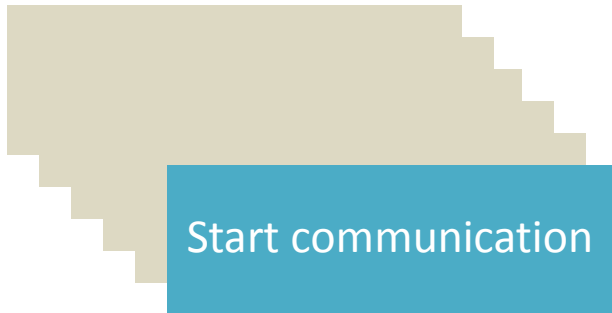
Audio & visual feedback

# Analysis

Making a Phone call



Making a Phone call



Making a Phone call



Making a Phone call





# Analysis

Receiving a Phone call



Listen or feel

Audio & touch feedback

Receiving a Phone call



Receive the call

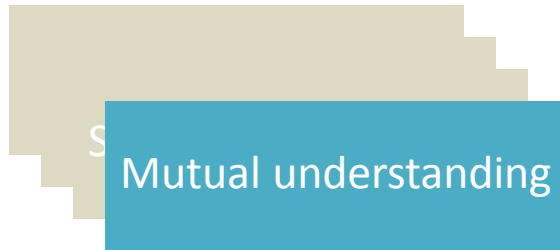
Receiving a Phone call



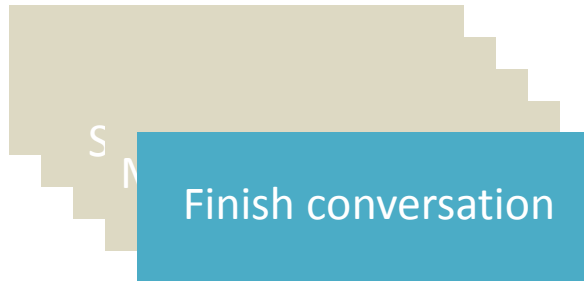
Start communication

# Analysis

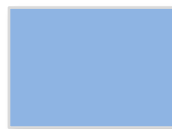
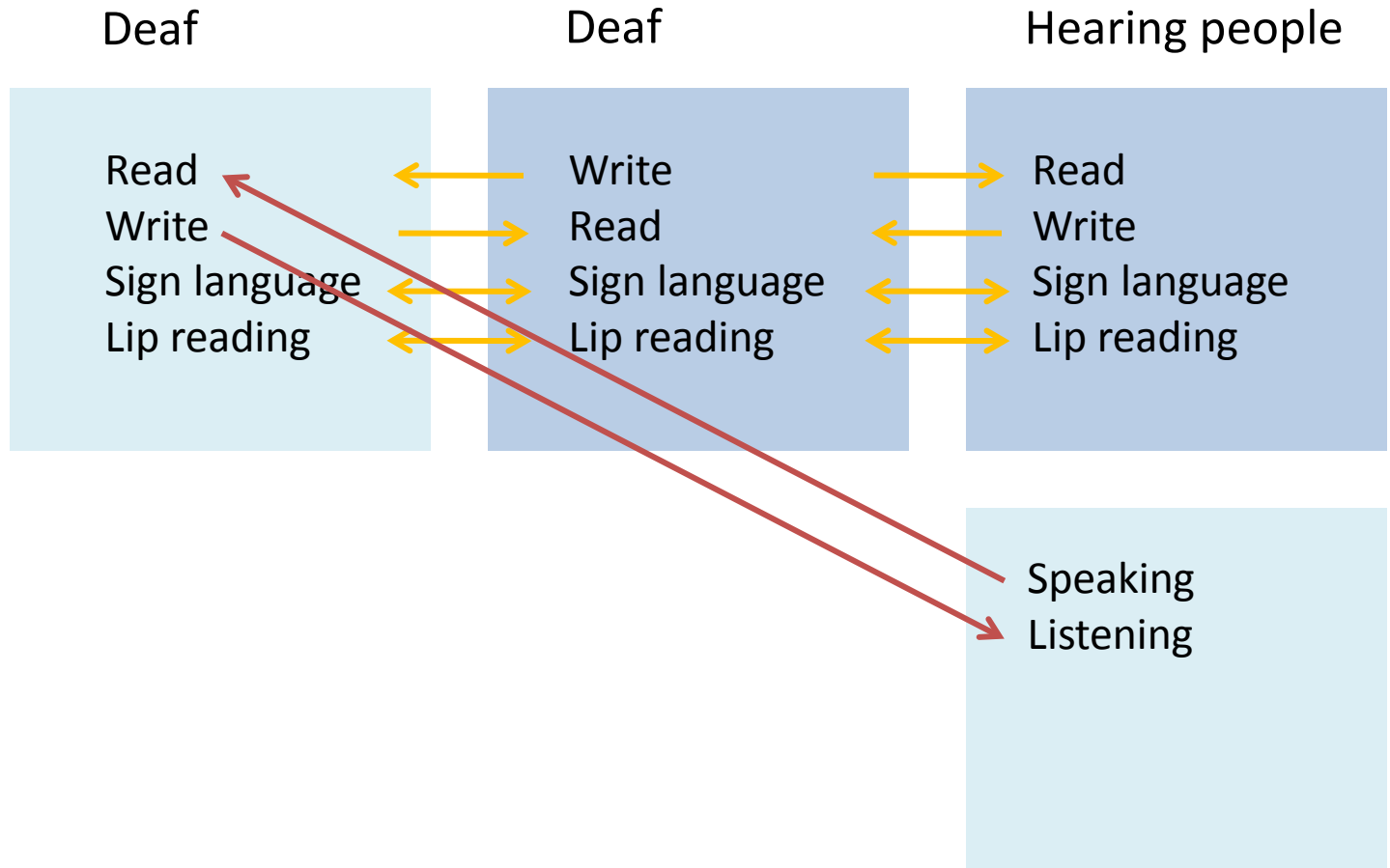
Receiving a Phone call



Receiving a Phone call



# User limitations



Known people



Unknown people

# Problem identification

Basic problems

solutions

Listening and speaking

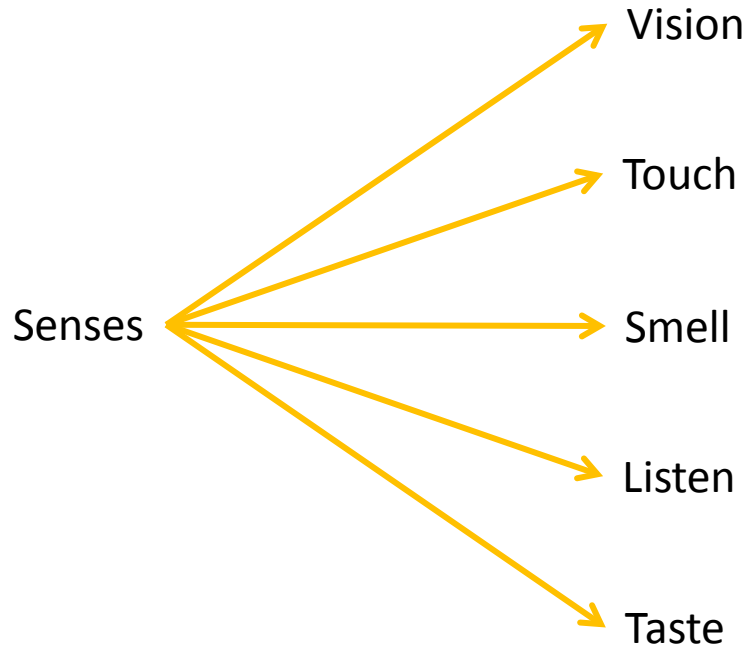


Text to speech/Speech to text

# Concept development

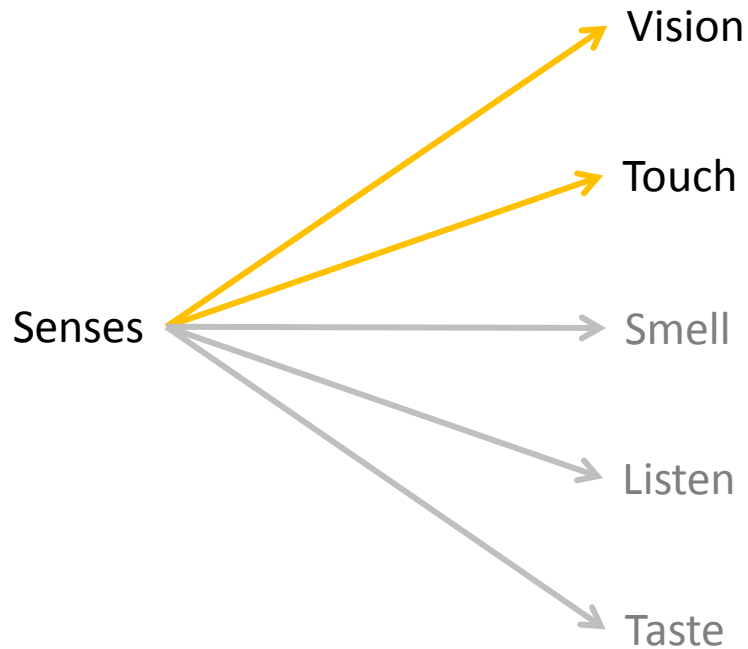


# Feedback limitation



# Feedback limitation

For designing mobile phone for deaf ,



Final concept

# Basic technology



# Basic technology

## Existing technology:



Ben cook typing on phone



Man using Nuance dictation software

A company called Nuance come up with technology called mobile dictation system.

It uses software called 'Dragon Naturally Speaking 9'.

It is very efficient for data input. In which you can create SMS and E-mail through your voice.

It is quite fast as compare to any other data input method. It is nearly 10 characters per second.

Round	World's Fastest Text Messenger	Nuance Mobile Dictation
1	:16	:08
2	1:17	:18
3	:48	:16

# Basic technology

## Existing technology:

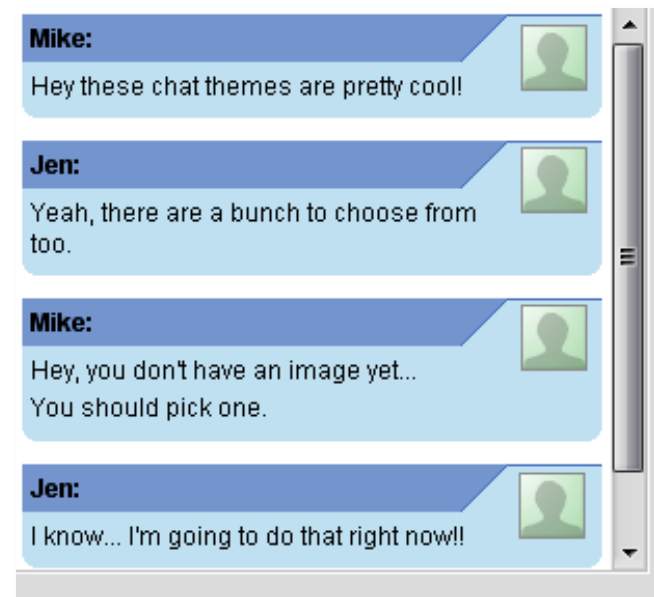
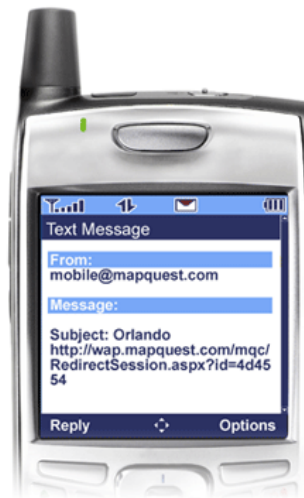
There are many well known software companies like IBM-CDAC, Telisma, Onmobile and IIT-HP labs who come up with the Indian language speech recognition software.

TeliSpeech is now available in 10 Indian languages which is nearly 85% of official languages.

- Indian English
- Hindi
- Indo-Aryan family: Gujarati, Marathi, Punjabi and Bengali
- Dravidian family: Kannada, Telugu, Tamil and Malayalam

# Basic interface

The interface will be like chat window, which will give a feel of continuous communication.



# Basic interface

## Sharing of emotions:



For visual representation of expressions through Typography,

- Bold, black font - showing strong voice or loudness in voice
- Medium - showing normal voice
- Light - showing whispering, small voice
- Italics - showing lazy, weak, ill person's voice

- If somebody is speaking slow - extended font, more line spacing
- If somebody is speaking fast - condensed font, close or overlapping lines
- For clear and strong voice - bold font



# Basic interface

## Sharing of emotions:



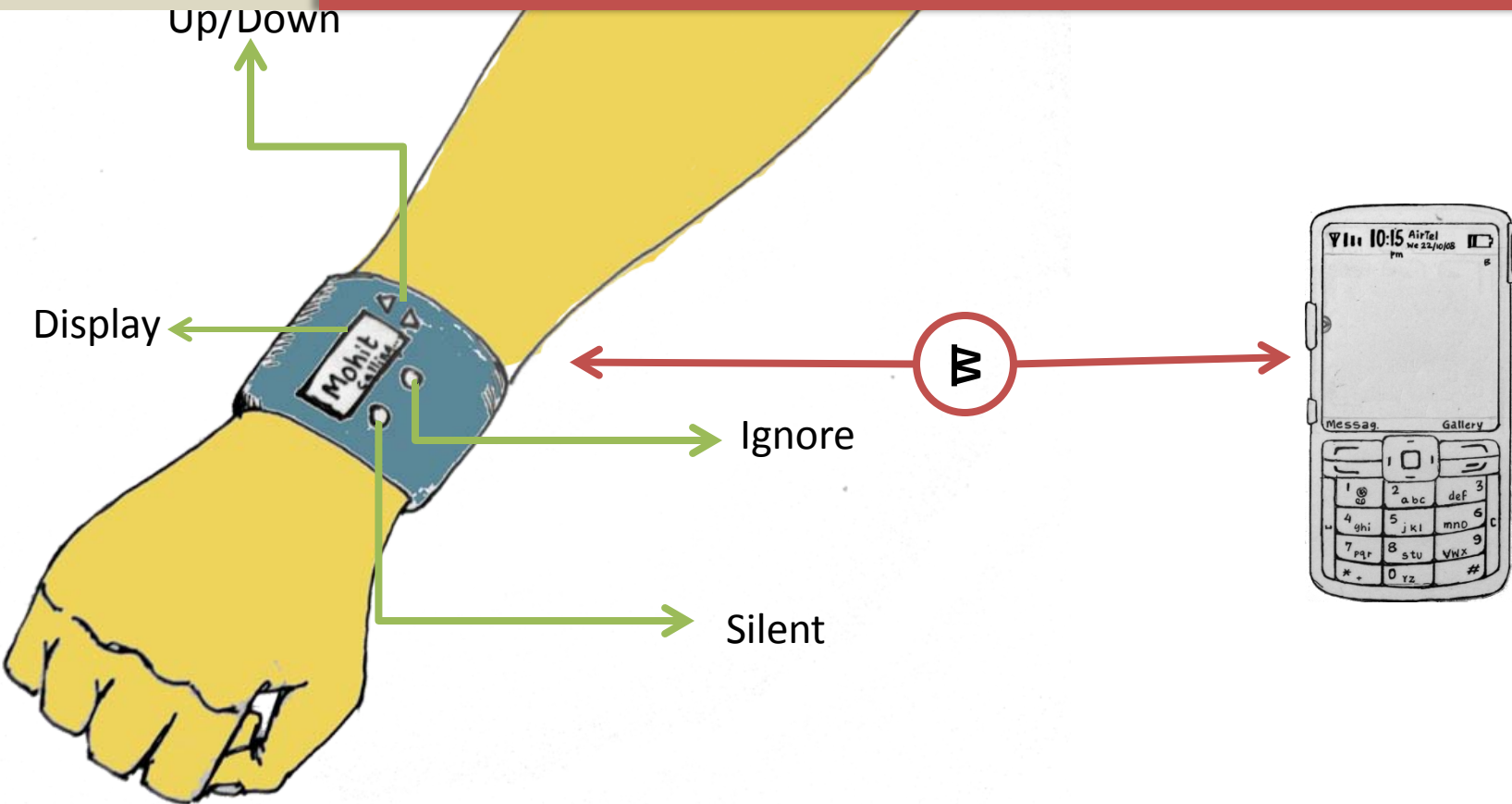
Deaf user can also share his feelings with the other users by,

Adding expressions at the end of sentence or by selecting particular text like,

- Happy
- Excited
- Sad
- Angry
- Whispering

Then the hearing person can listen that voice with that particular expression.

# Feedback system



This device will give feedback of incoming phone call through **vibrations** and also it will do

- Display caller's name
- Send quick templates without touching mobile phone
- Silent or ignore the call

# Visibility issues

User might need to change the font size due to surrounding conditions or due to the situational disabilities.

## Some current mobile fonts, 16pt size:

Series 60 Sans - Nokia

The quick brown fox. **The quick brown fox.**

San-Serif - Sony Ericsson

The quick brown fox. **The quick brown fox.**

Segoe Condensed - WM 6

The quick brown fox. **The quick brown fox.**

SynergyBasic - Motorola

**The quick brown fox. The quick brown fox.**

Droid - Google Android

The quick brown fox. **The quick brown fox.**

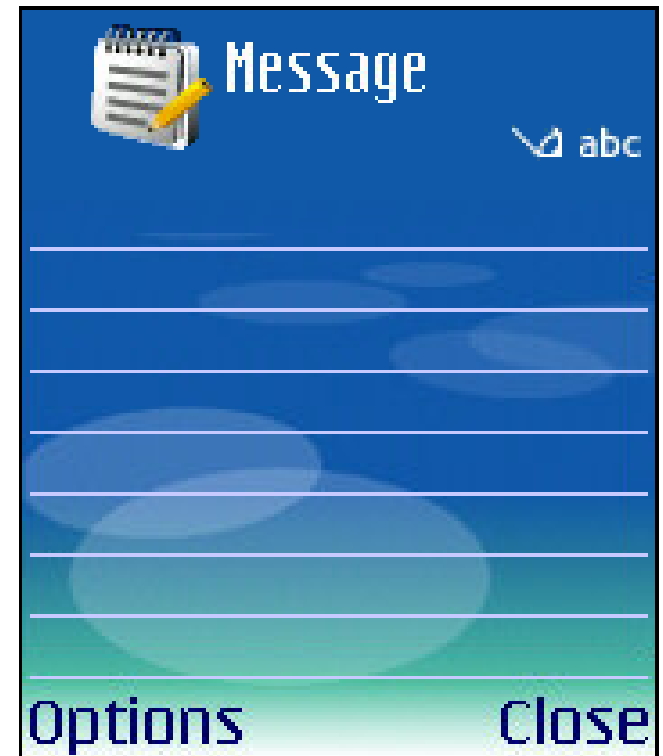
**The quick brown fox. The quick brown fox.**

The quick brown. The quick brown fox.

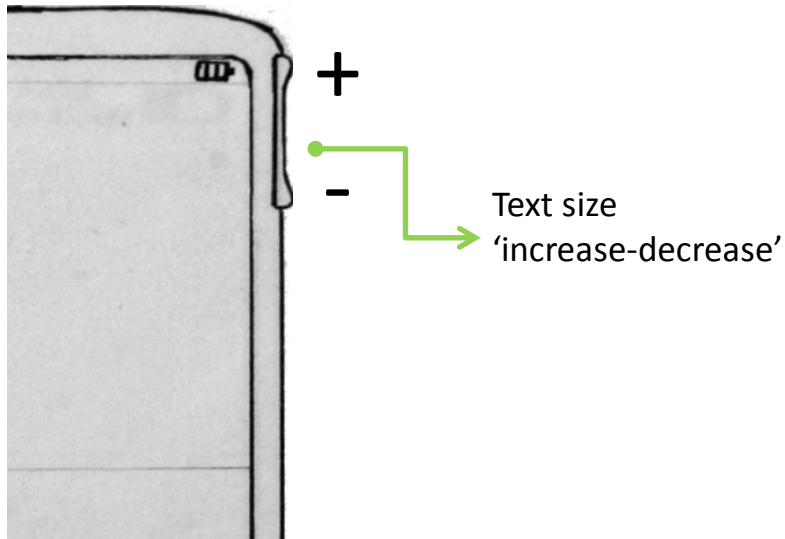
# Visibility issues

240x320 screen Series 40 phone uses font heights of 16, 20 and 24 pixels.

This equals a point size of 16, 21 and 25 in Photoshop.

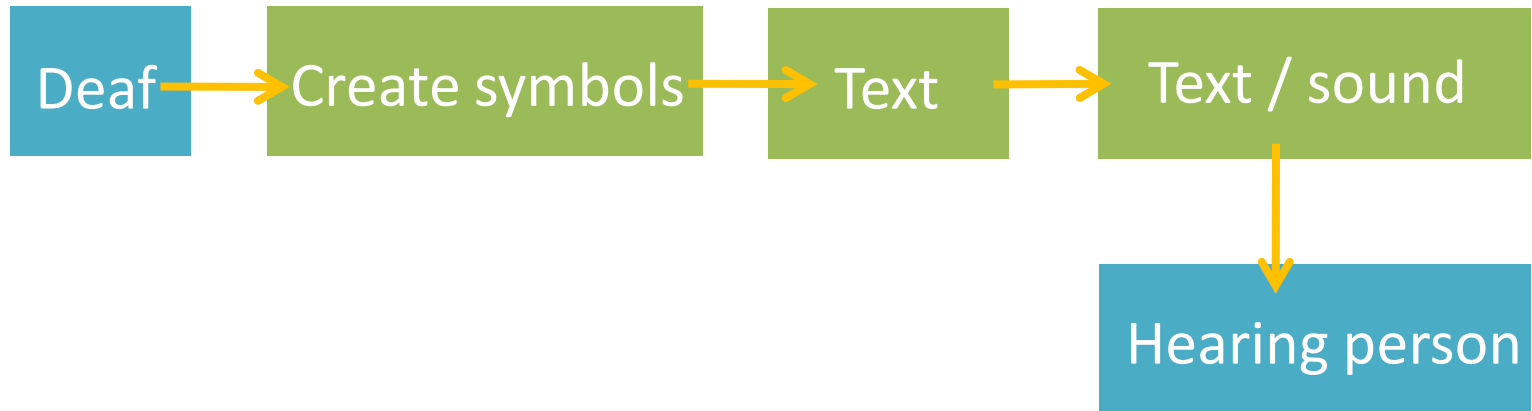


# Visibility issues





There will be a physical button on the mobile phone which will help user to easily change font size between 16-25 size on 240X320 resolution screens.


# Idea: Easy data i/p




Ex.

 Hi, how are you?

 Bye, Take care...

 I am in the class I will call you later...

 Start "Bluetooth"

# Idea: Easy data i/p

## Concept 1

Concept is that let user create their own language through symbols.

Symbols can created through finger gesture on the touch screen or on touchpad.

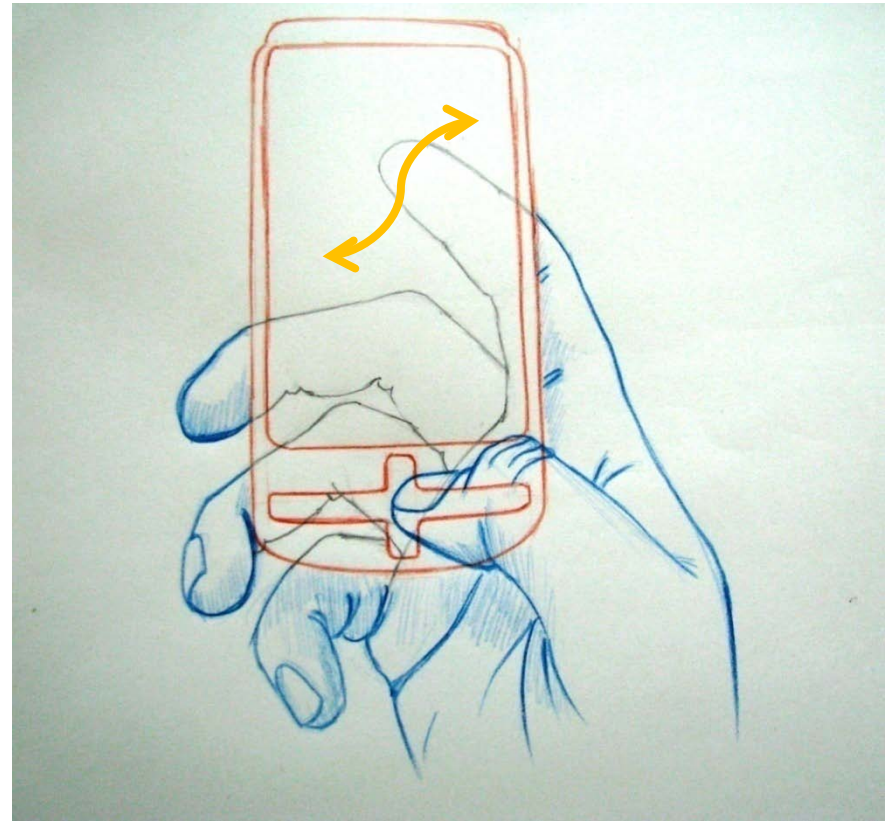
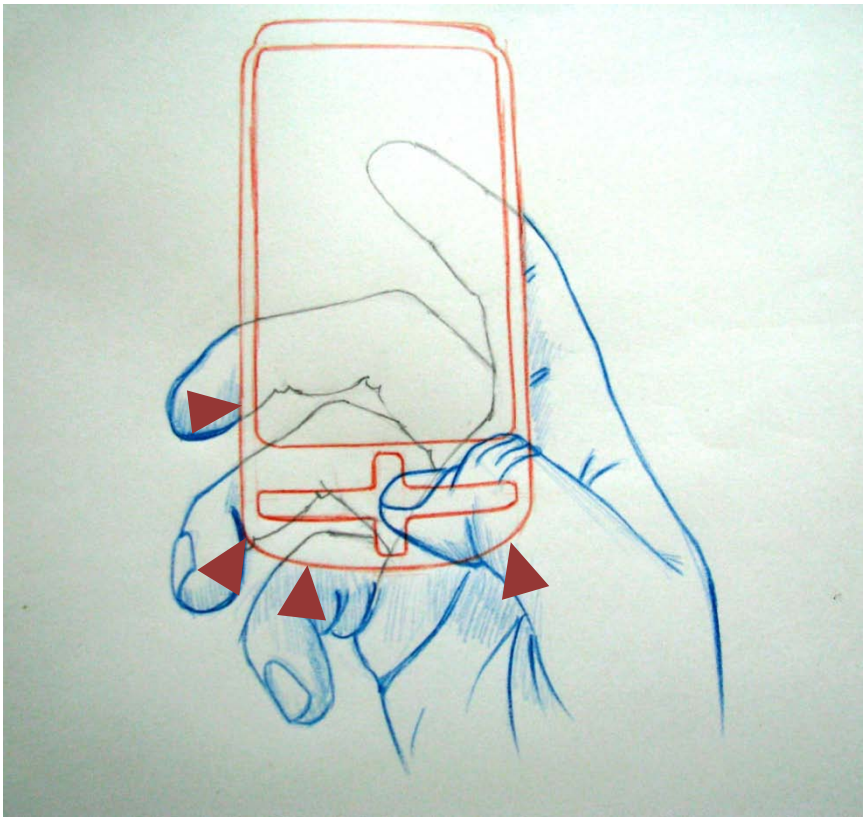
- Each user will create his own set of symbols.
- He needs to remember only his set of symbols.
- User can assign word, phrase or sentence to each symbol.

Just create gesture input on the touch pad and it will create text output on the screen.

These symbols can also help in browsing the mobile phone or for opening particular application in menu (it's like shortcut).

# Idea: Easy data i/p

▲ Supporting force





# Idea: Easy data i/p

## Concept 2

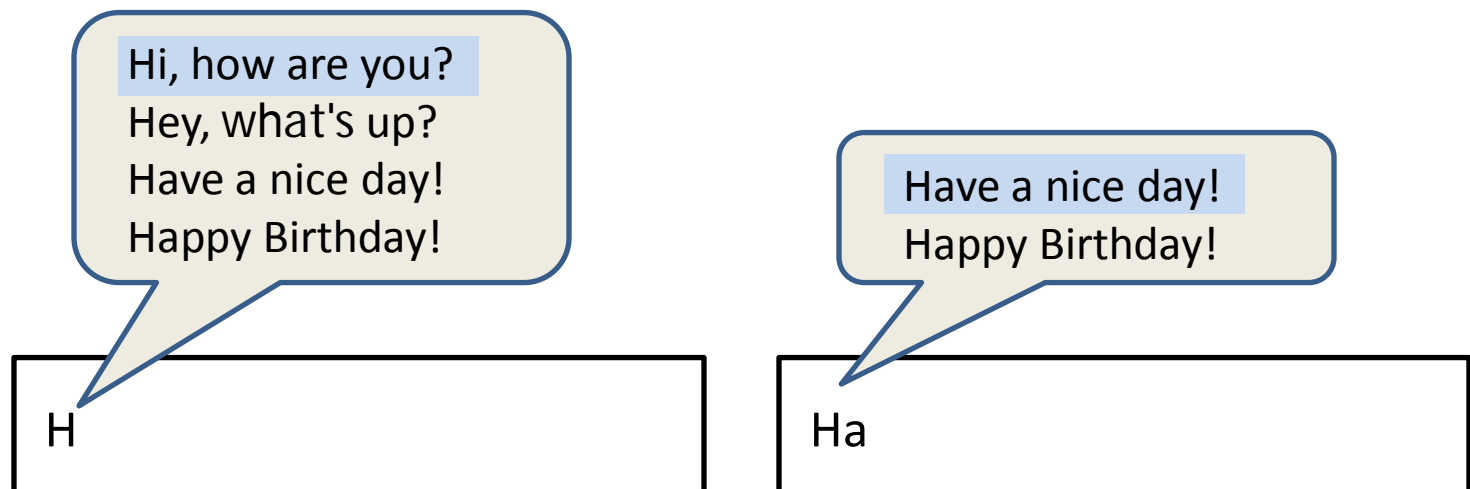
### For Fast data input,

The words or sentences which are frequently used by the user can be stored or

The words or sentences which are frequently used by the user in a particular conversation can be temporarily **AUTO** stored by the mobile device.

and when user will type the initial few letters, it will give the quick matches to the same.

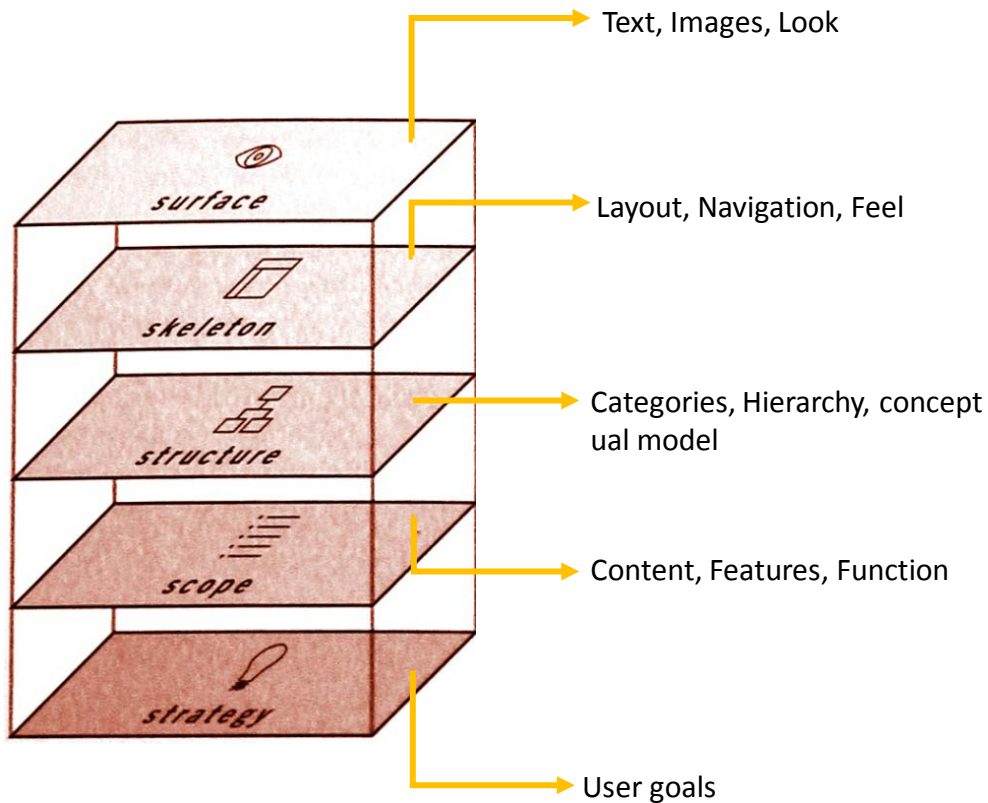
Ex.



# Interface design

# Interface design

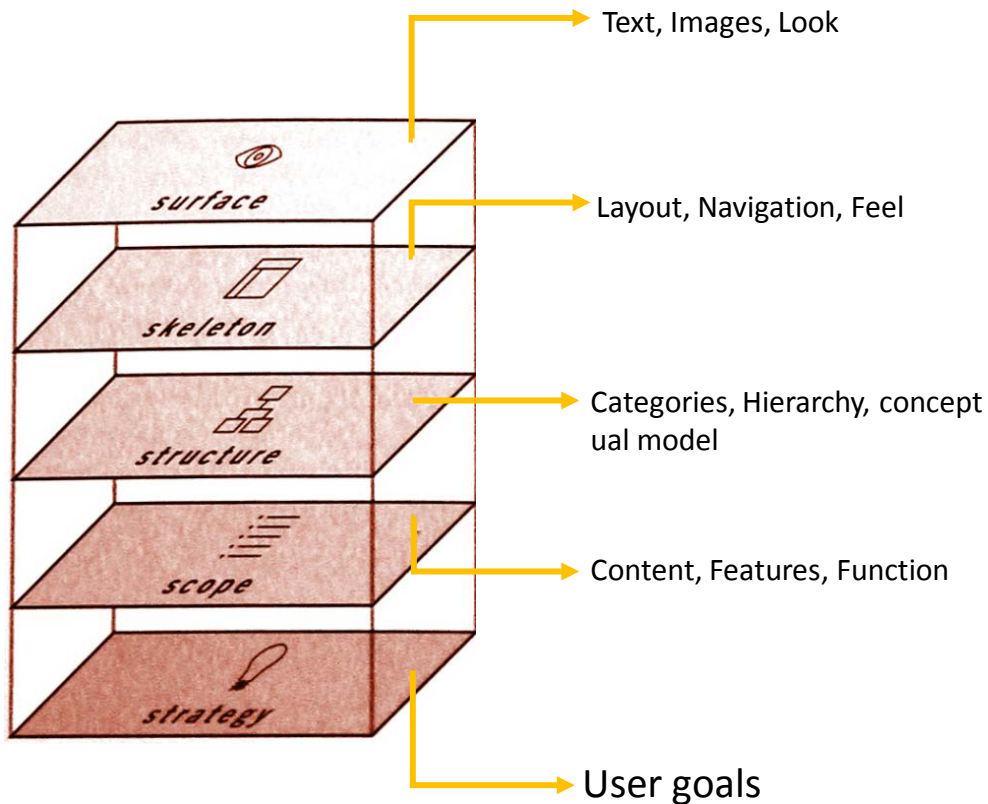
## Jesse James Garrett's method (Elements of user experience)



- Icons
- Colors
- Division of spaces on the screen
- Layout
- Affordance & Mapping
- Information architecture
- Feedback system
- The type of interface
- Applications like record call, alarm, reminder
- Communication
- Sharing of expressions

# Interface design

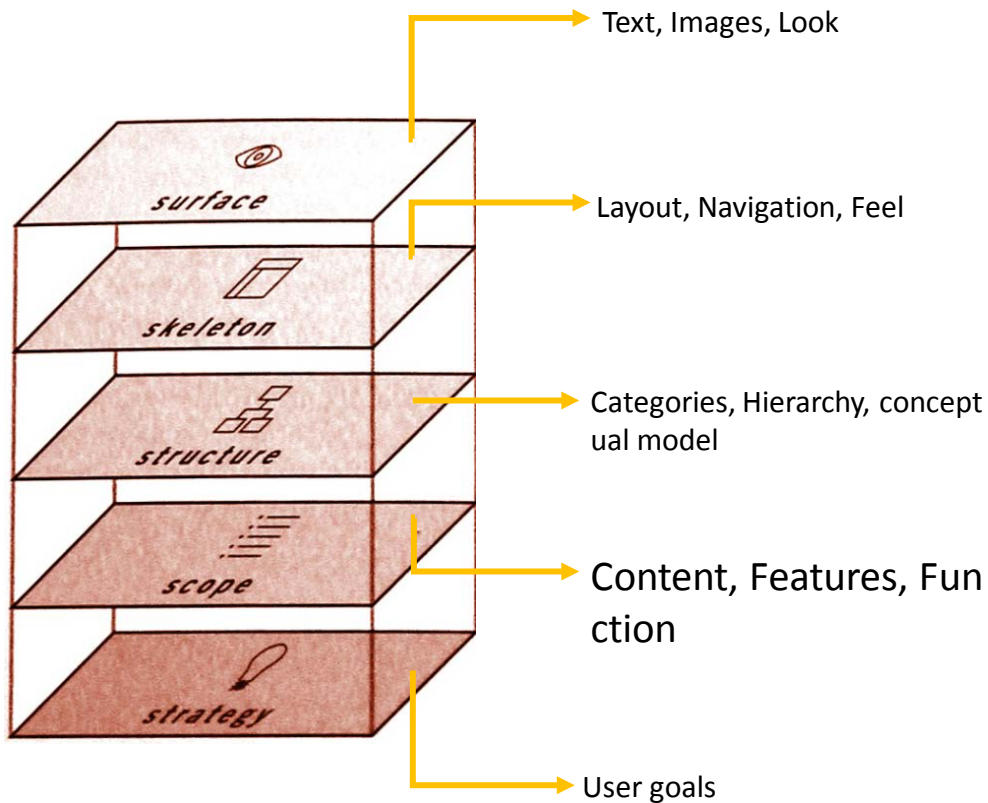
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# Interface design

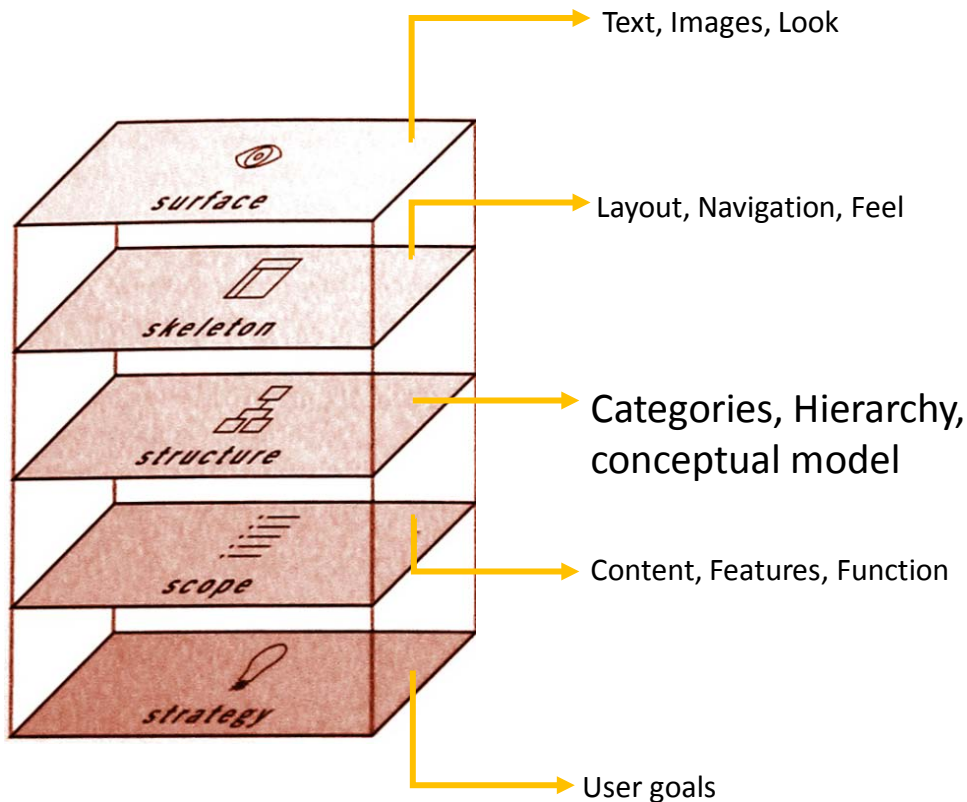
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- The type of interface
- Applications like record call, alarm, reminder
- Communication
- Sharing of expressions

# Interface design

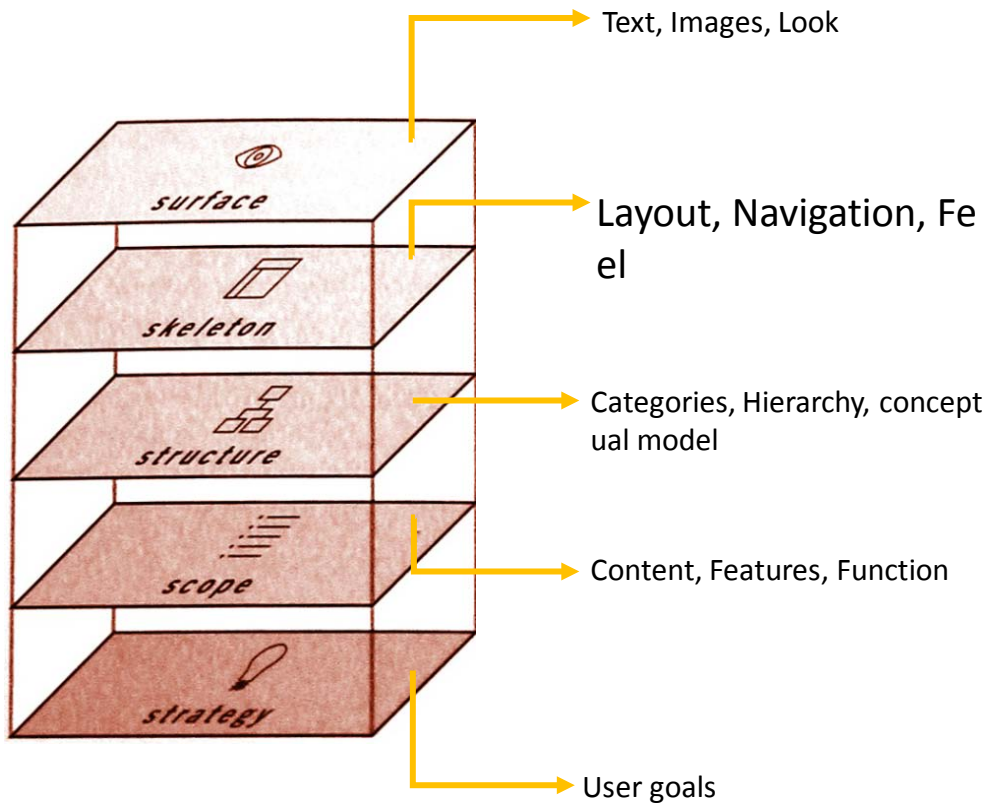
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- Icons
- Colors
- Division of spaces on the screen
- Layout
- Affordance & Mapping
- Information architecture
- Feedback system
- The type of interface
- Applications like record call, alarm, reminder
- Communication by reading and typing text
- Sharing of expressions

# Interface design

## Jesse James Garrett's method (Elements of user experience)



- Icons
- Colors

- Division of spaces on the screen
- Layout
- Affordance & Mapping

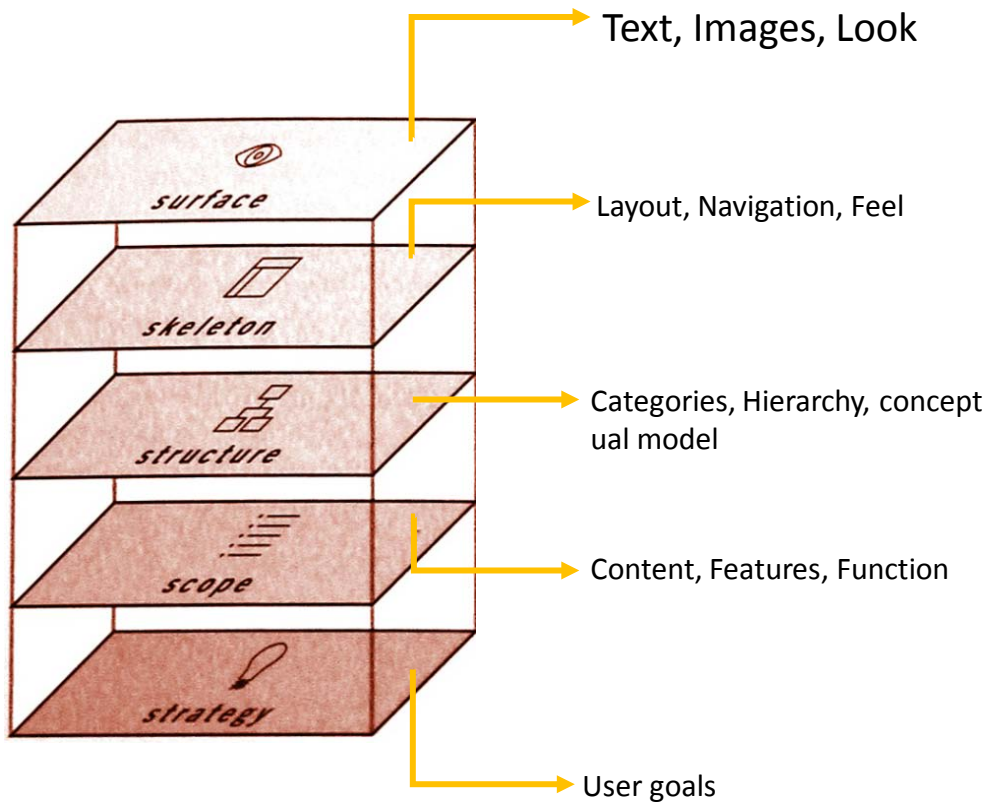
- Information architecture

- Feedback system
- The type of interface
- Applications like record call, alarm, reminder

- Communication
- Sharing of expressions

# Interface design

## Jesse James Garrett's method (Elements of user experience)



- Icons
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- Division of spaces on the screen
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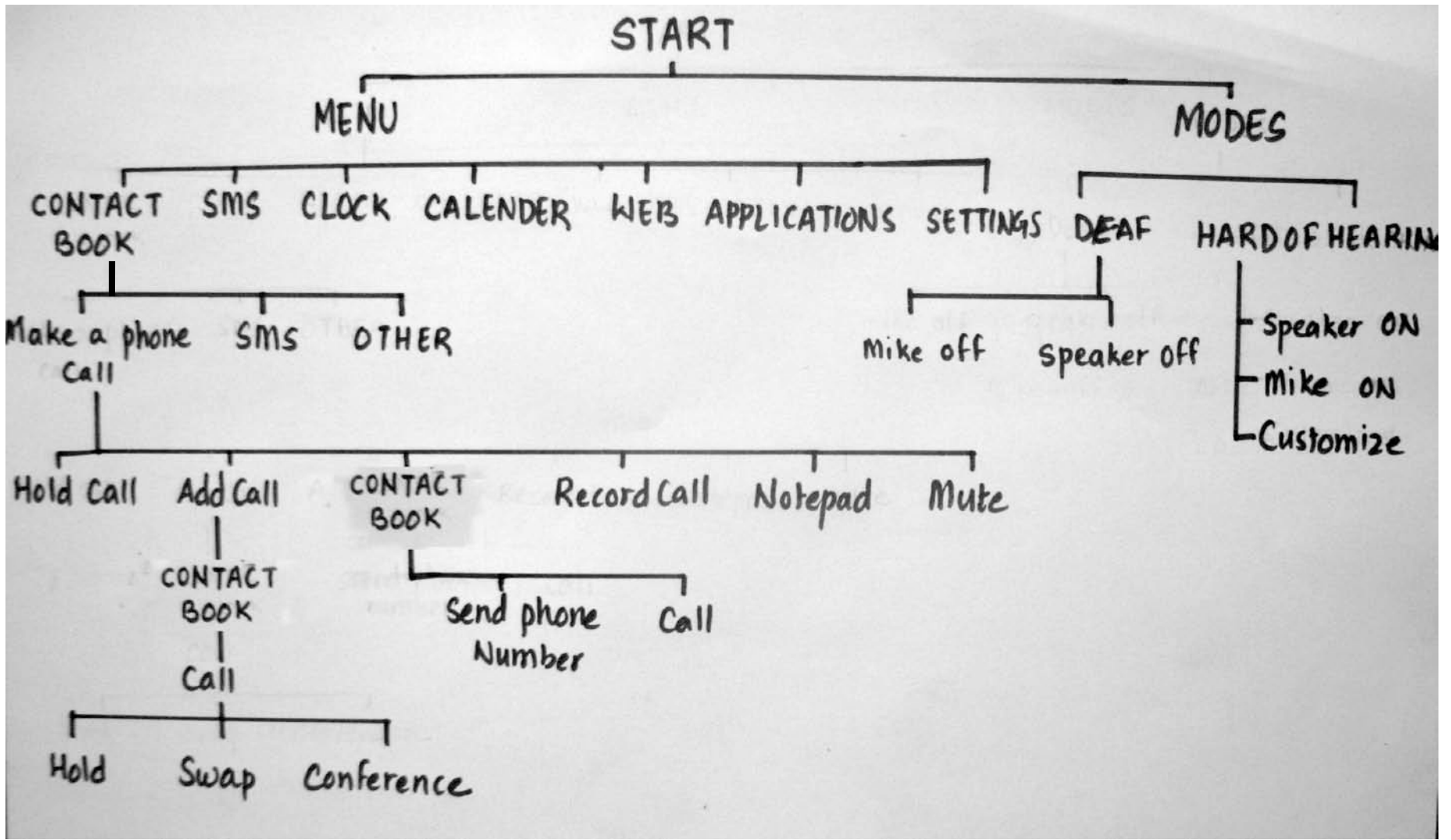
- Information architecture

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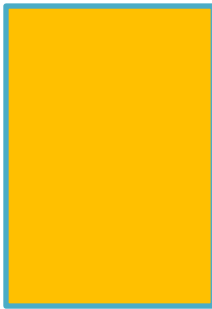


# Information architecture



# Interface design

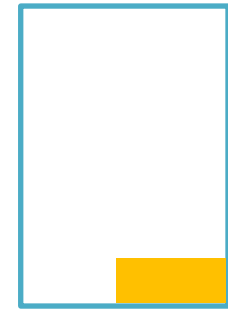
## Application Postures



Sovereign



Transient

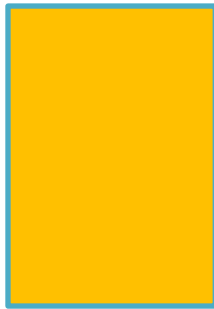


Daemonic

- programs takes over the entire screen

# Interface design

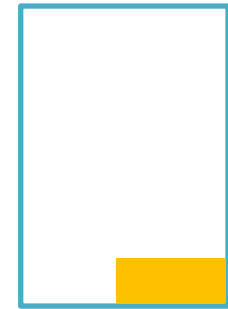
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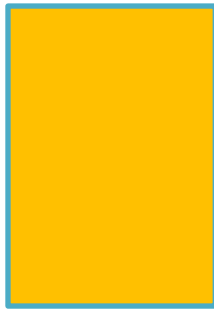
Daemonic

- programs takes over the entire screen

- programs come and go

# Interface design

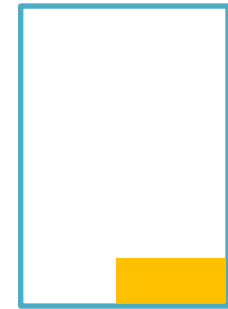
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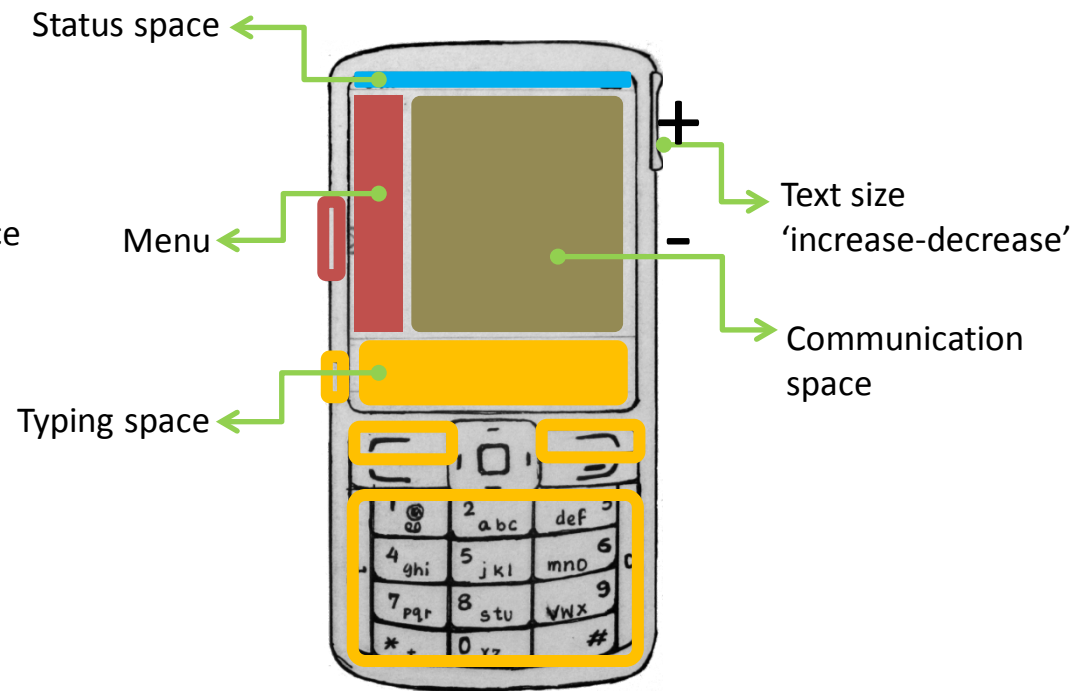
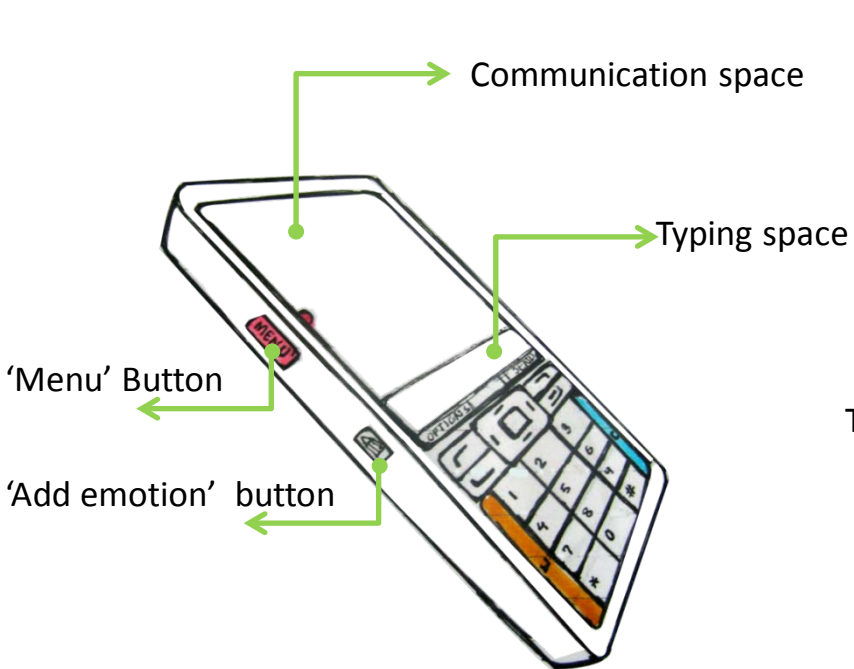
Daemonic

- programs takes over the entire screen

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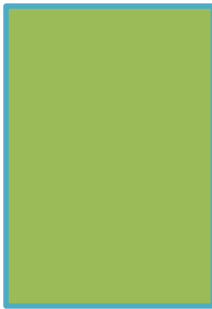
- mostly invisible
- doing its thing in the background

# Division of spaces



# Interface design

## Application Postures



Sovereign



Transient



Daemonic



Communication space

# Interface design

## Application Postures



Sovereign



Transient



Daemonic



Collapsible menu

# Interface design

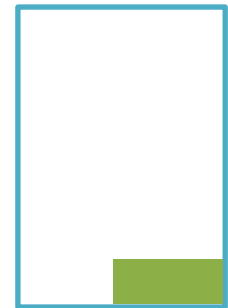
## Application Postures



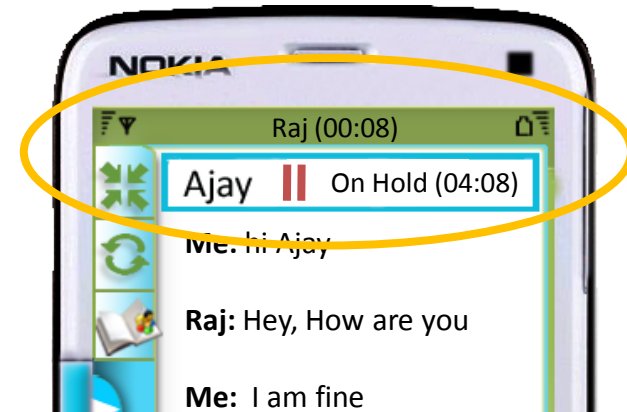
Sovereign



Transient



Daemonic



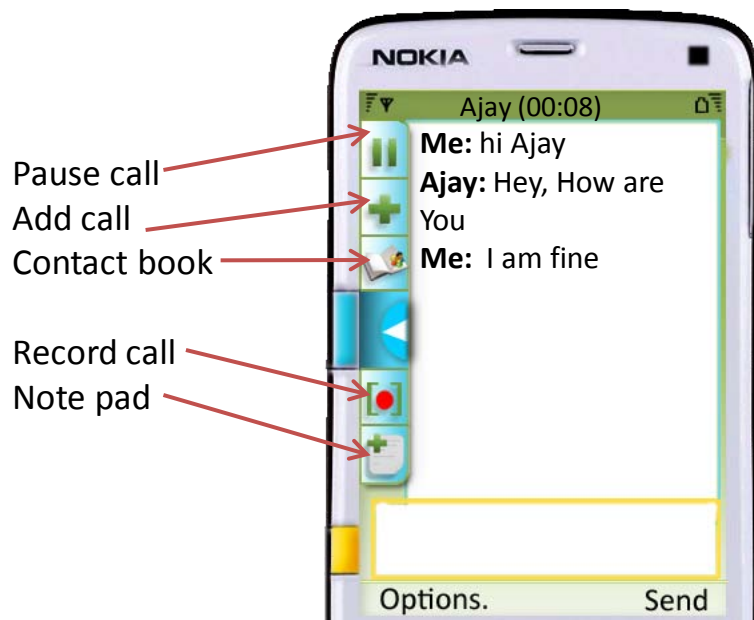
Status space



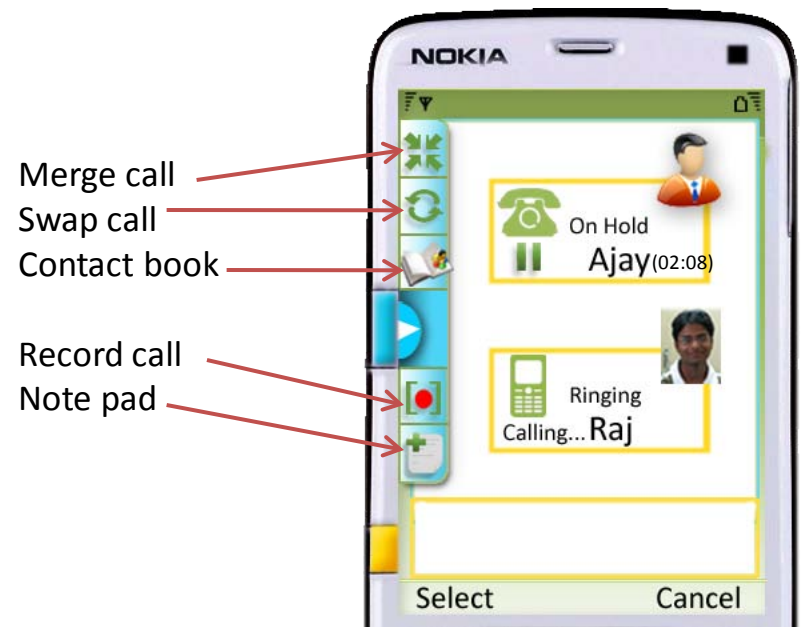
# Interface design

Only applications which are relevant to the particular operation will appear on the screen.

There should not be information overload on the screen, therefore the menu will be collapsible and customizable, showing relevant options.



Features during a conversation



Features during conference call

# Mapping & affordance

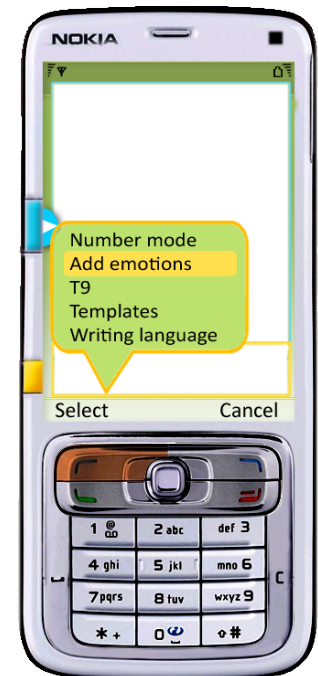
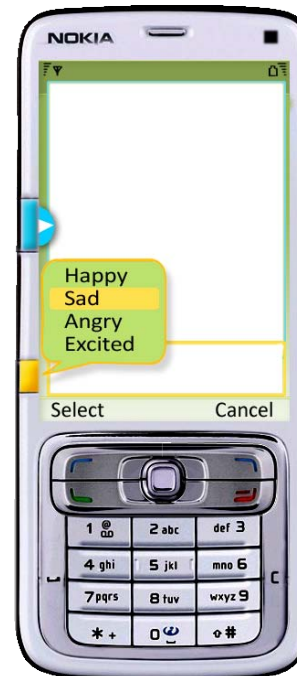
The placement of menu button and add emotions button mapped according to the software interface.

As well as, the color and the shape of the menu is choose in such a way that user can relate them.

Ex.

Blue color menu button is related to communication space

Yellow color button is related to typing space



# Feedback

While making the phone, mobile will give the feedback of ring through text as well as through the symbols and colors.



●●● Ringing

●●● Busy

●●● Connection error /Switch off

# Acknowledgement

**Vikas Vidyalaya For the Hearing Handicapped**

Dadar(W), Mumbai- 400028

**Mr. S.T. Mittal**

**Manisha Gupta**

VC, M.des

**Preet Shrimani**

VC, M.des

# References

‘Enhancement of close captioning for deafened people with interactive television’

\_Desmond P Boksan-Cullen (University of Brighton)

## **Need of project**

[http://www.censusindia.gov.in/Census\\_And\\_You/disabled\\_population.aspx](http://www.censusindia.gov.in/Census_And_You/disabled_population.aspx)> 24/07/2008, 01:19

## **Situational disability**

<http://barrierbreak.com/typesofdisabilities.php> 24/07/2008, 01:03

## **Understanding users**

<http://en.wikipedia.org/wiki/Deafness%20> 14/07/2008, 17:27

# References

## Existing technology

[http://en.wikipedia.org/wiki/Telecommunications\\_devices\\_for\\_the\\_deaf](http://en.wikipedia.org/wiki/Telecommunications_devices_for_the_deaf)>

12-09-2008, 12:44

<http://www.att.com/gen/general?pid=11094> 26-07-2008, 15:06

## Sound to animated lips movement

<http://www.geek.com/lipccell-allowing-deaf-people-to-use-cellphones/>

30-10-2008, 23:43

## Video relay

<http://news.bbc.co.uk/2/hi/technology/7327245.stm> 27/09/2208, 22:49

# References

## Speech to text

[www.smh.com.au/.../2006/10/26/1161749239715.html](http://www.smh.com.au/.../2006/10/26/1161749239715.html) 12-11-2008, 23:36

<http://in.youtube.com/watch?v=-L4Jk6GDud0>

<http://www.localisationlabs.com/Localisation%20News.aspx?storyid=070819005006020400> 02-10-2008, 20:18

<http://infitt.org/forum/index.php?topic=62.0>>

## Visibility issues

<http://en.wikipedia.org/wiki/Kindle>>14-10-2008, 17:13

[http://sender11.typepad.com/sender11/mobile\\_phone/](http://sender11.typepad.com/sender11/mobile_phone/)> 17-10-2008, 16:20

## Interface design

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Thank you