User Interface Project - 2

Interactions for sound based virtual worlds

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“ I begin with an idea and then
it becomes something else ”

--Pablo Picasso

Virtual Around Me

Dreams

Online 3d Worlds

Virtual Reality

Cyberspace

Radio

Cinema

Fiction

Games

Understandings and Reflections

What can be virtual?

Don't we imitate the real?

What are Virtual Worlds?

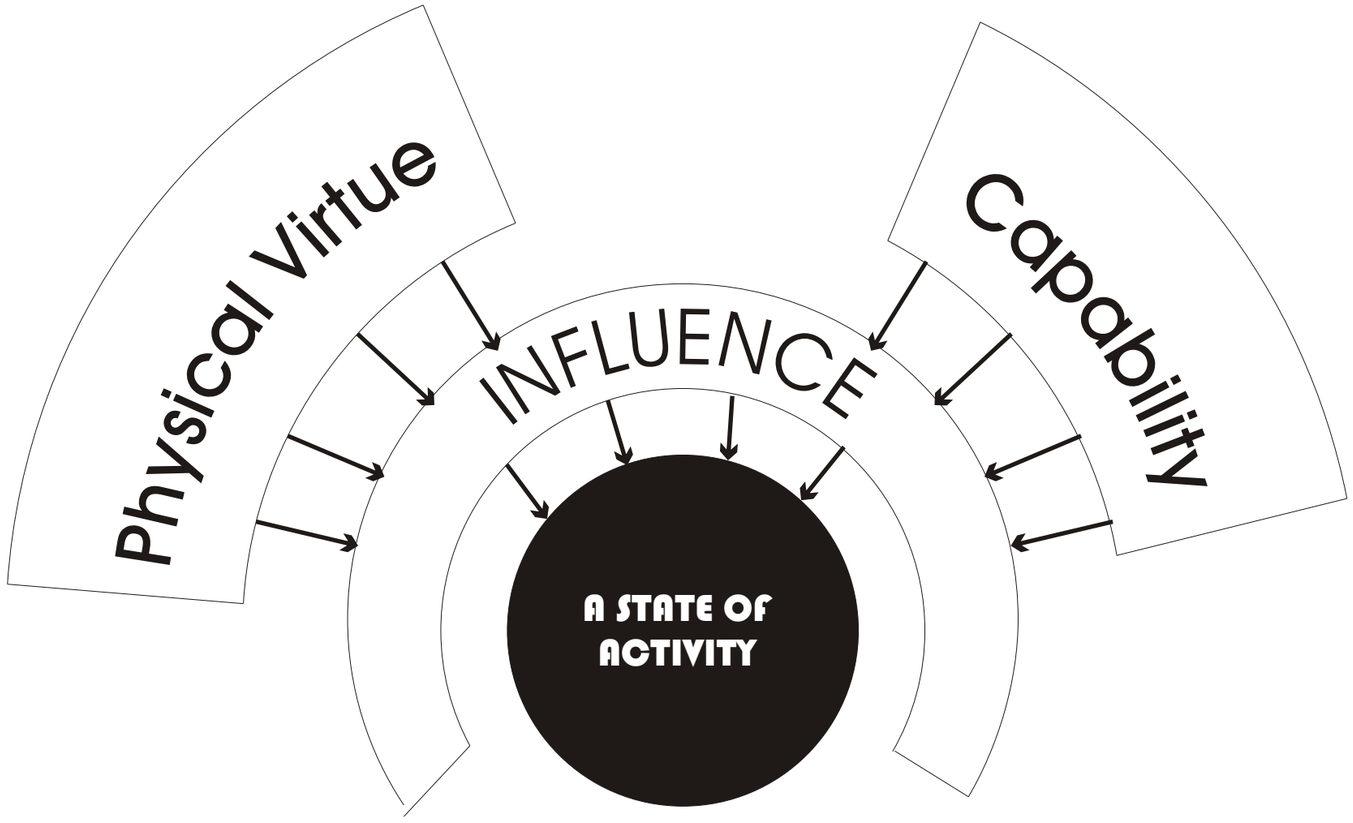
What is real?

What is 2D?

Does virtual have to be 3D?

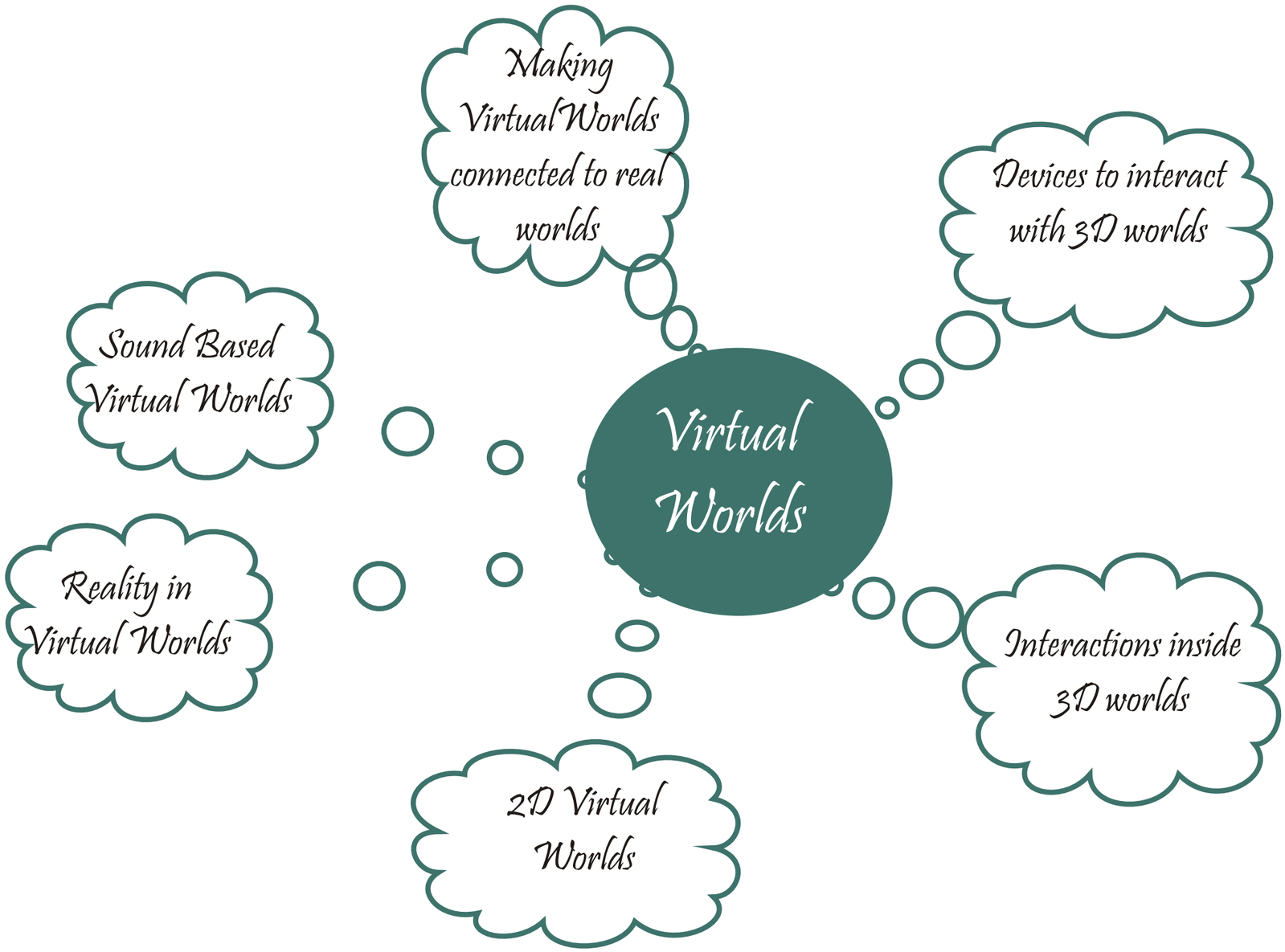
What is 3D?

What are virtual worlds?



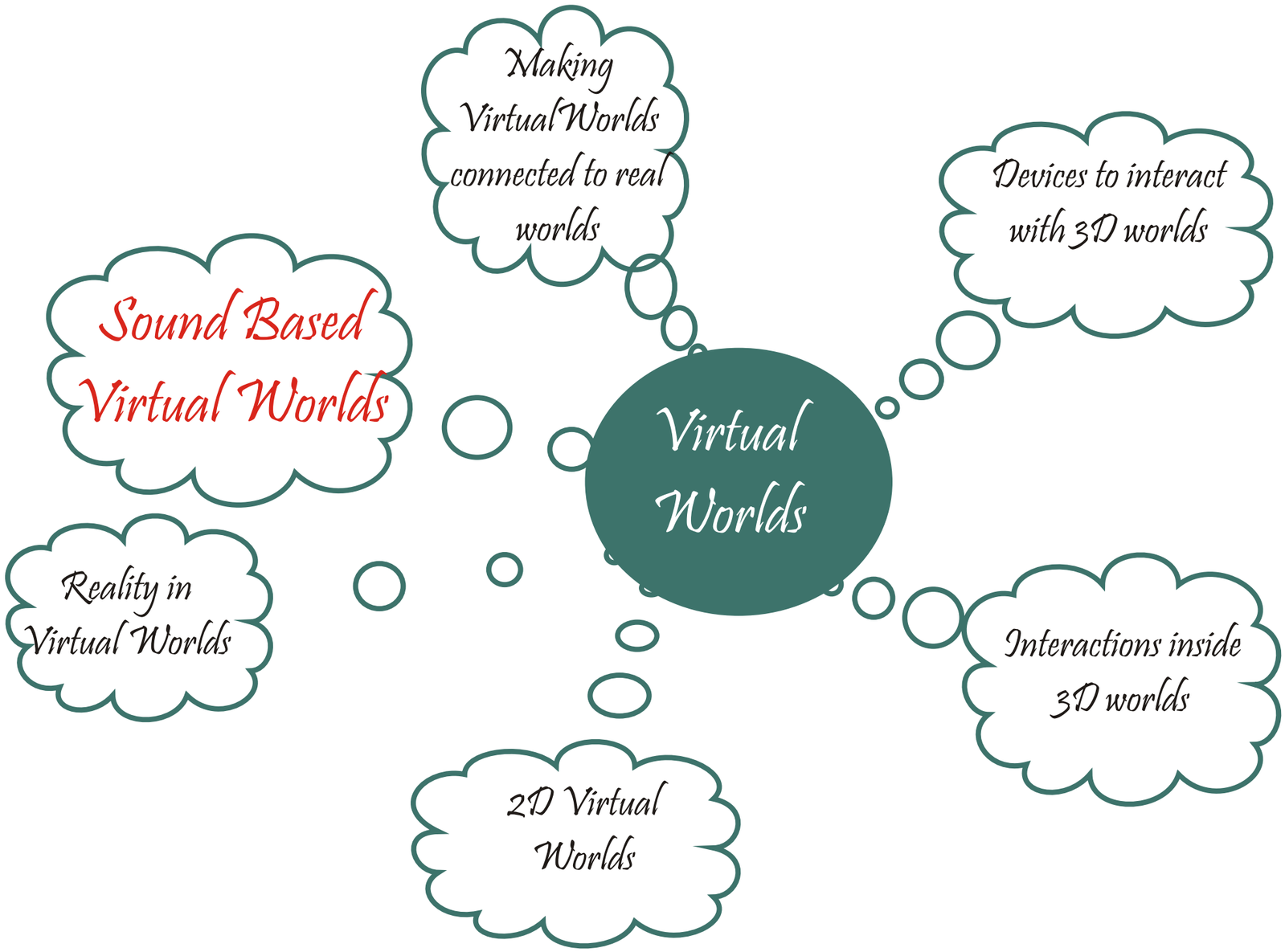
“Virtual worlds can be considered as a state of activity (In space or in infinity!!!!) that is formed by influences of physical virtues or capabilities”

Initial Mind Mapping



Possible areas for design opportunities

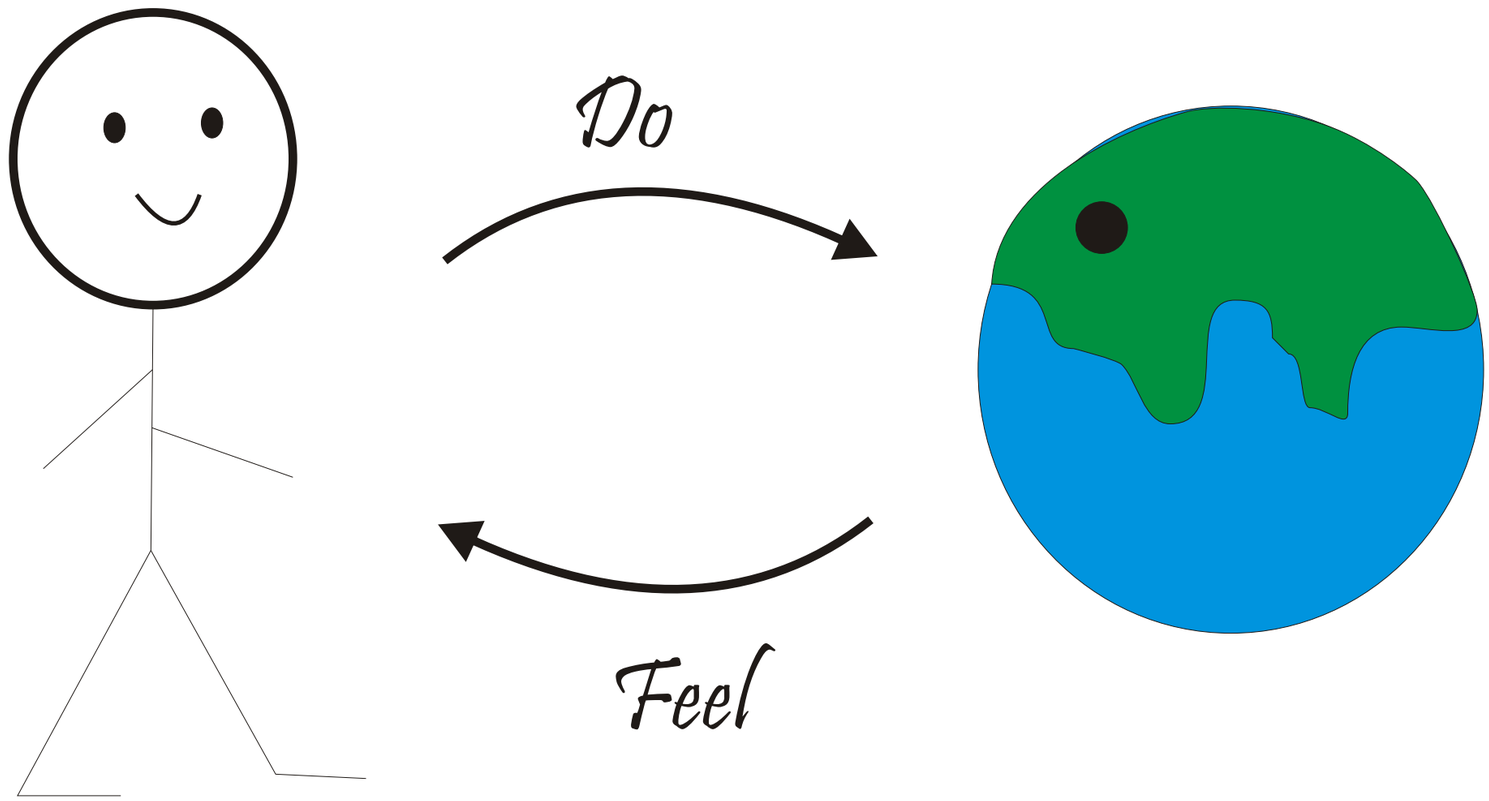
Initial Mind Mapping



Possible areas for design opportunities

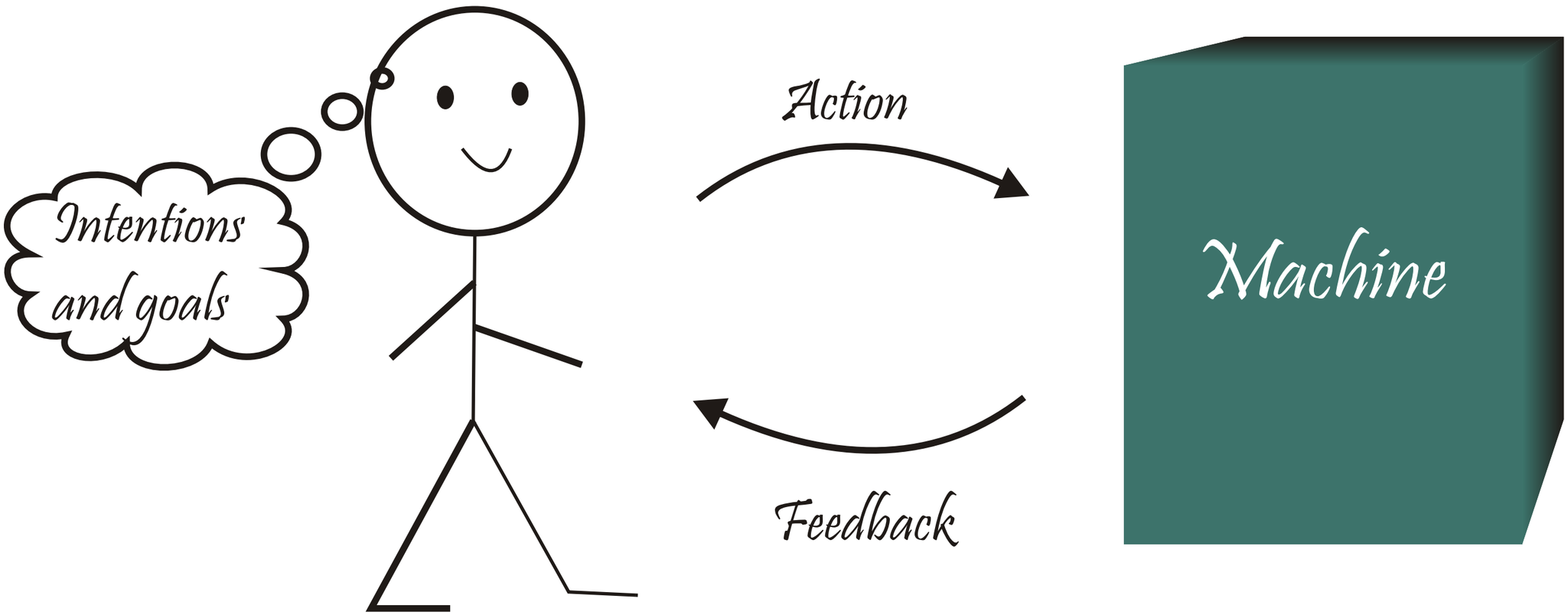
Interaction Design

Basic



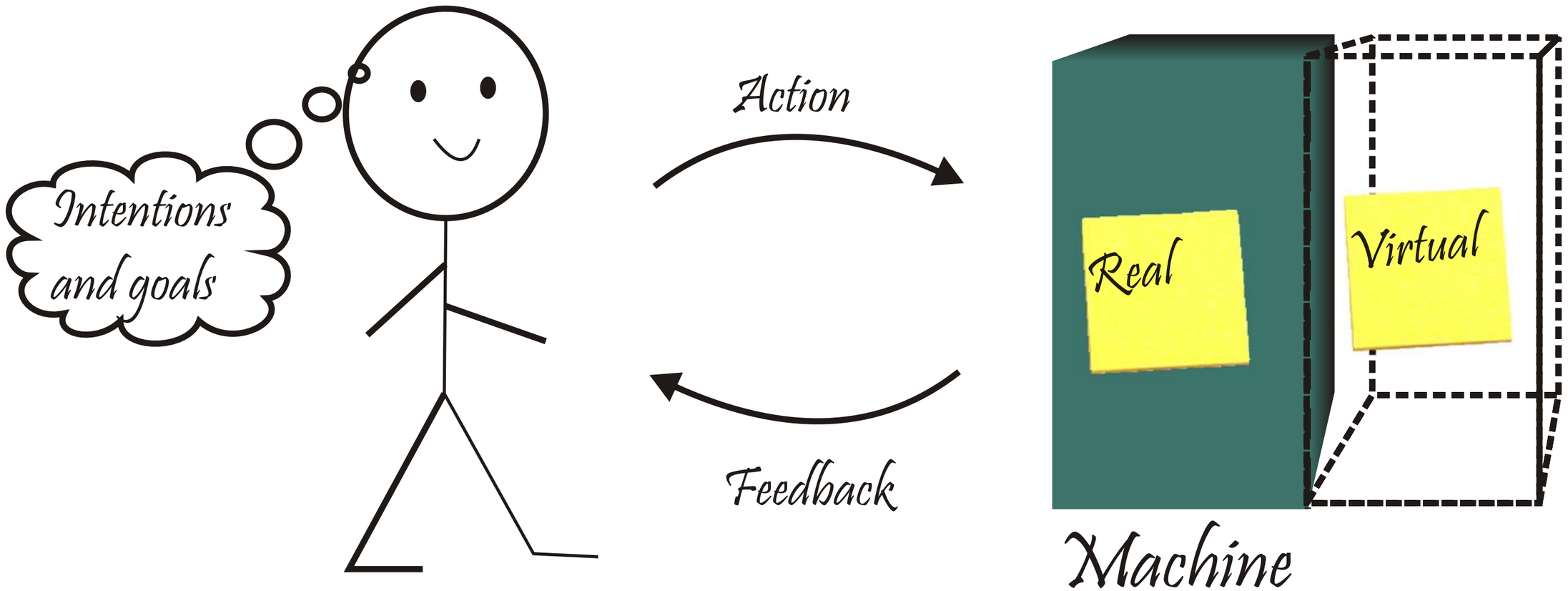
Interaction Design

Human Machine Interaction



Interaction Design

Human Virtual Interaction

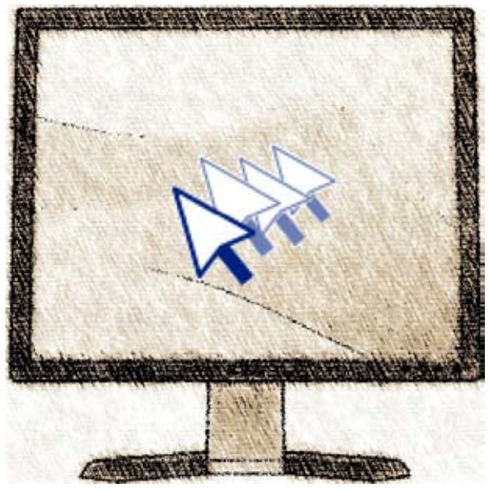


Interaction Design

Human Virtual Interaction for eg.

Gesture

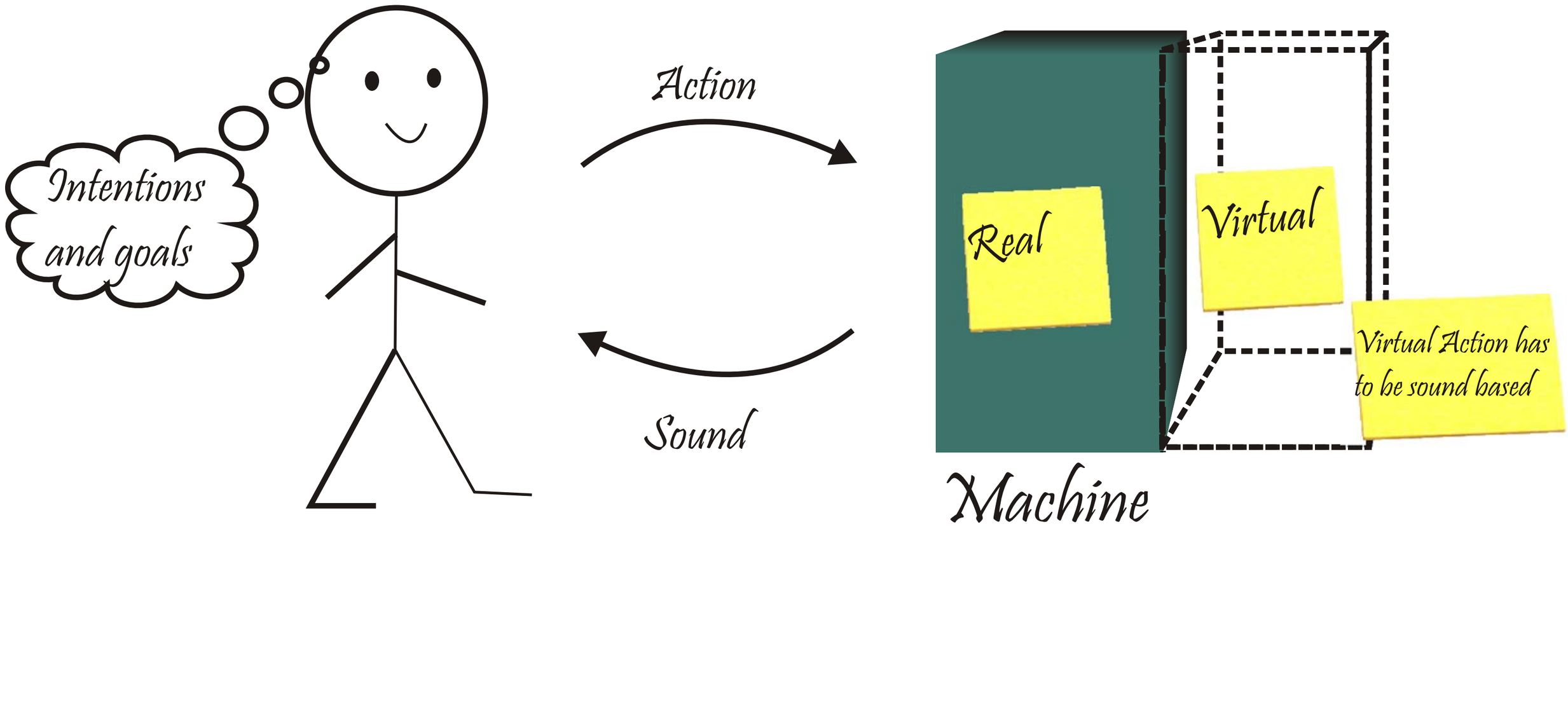
Real



Virtual

Interaction Design

Human Virtual Interaction with sound based virtual worlds

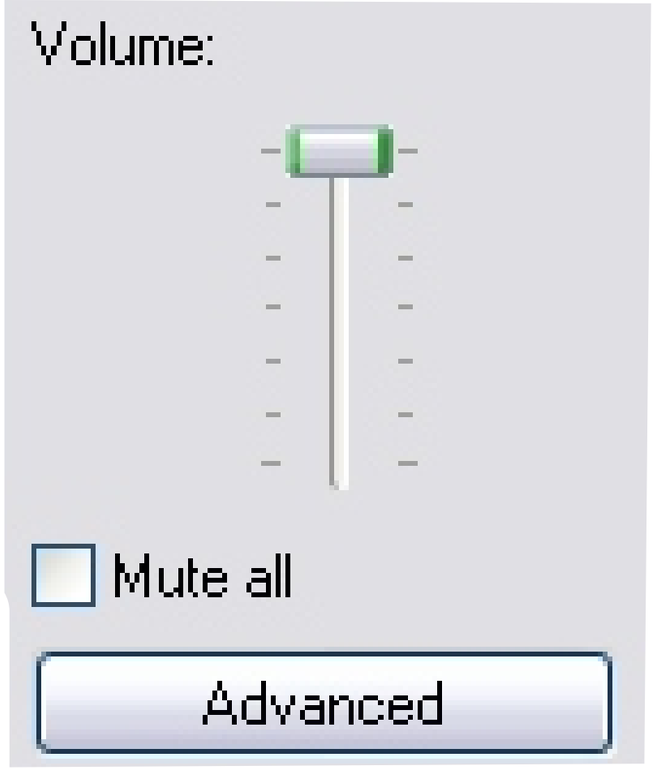


Interaction Design

Human Virtual Sound Interaction for eg.

Gesture

Real



Virtual

Understandings and Reflections

What is sound?

How is sound produced?

How and when do we Act?

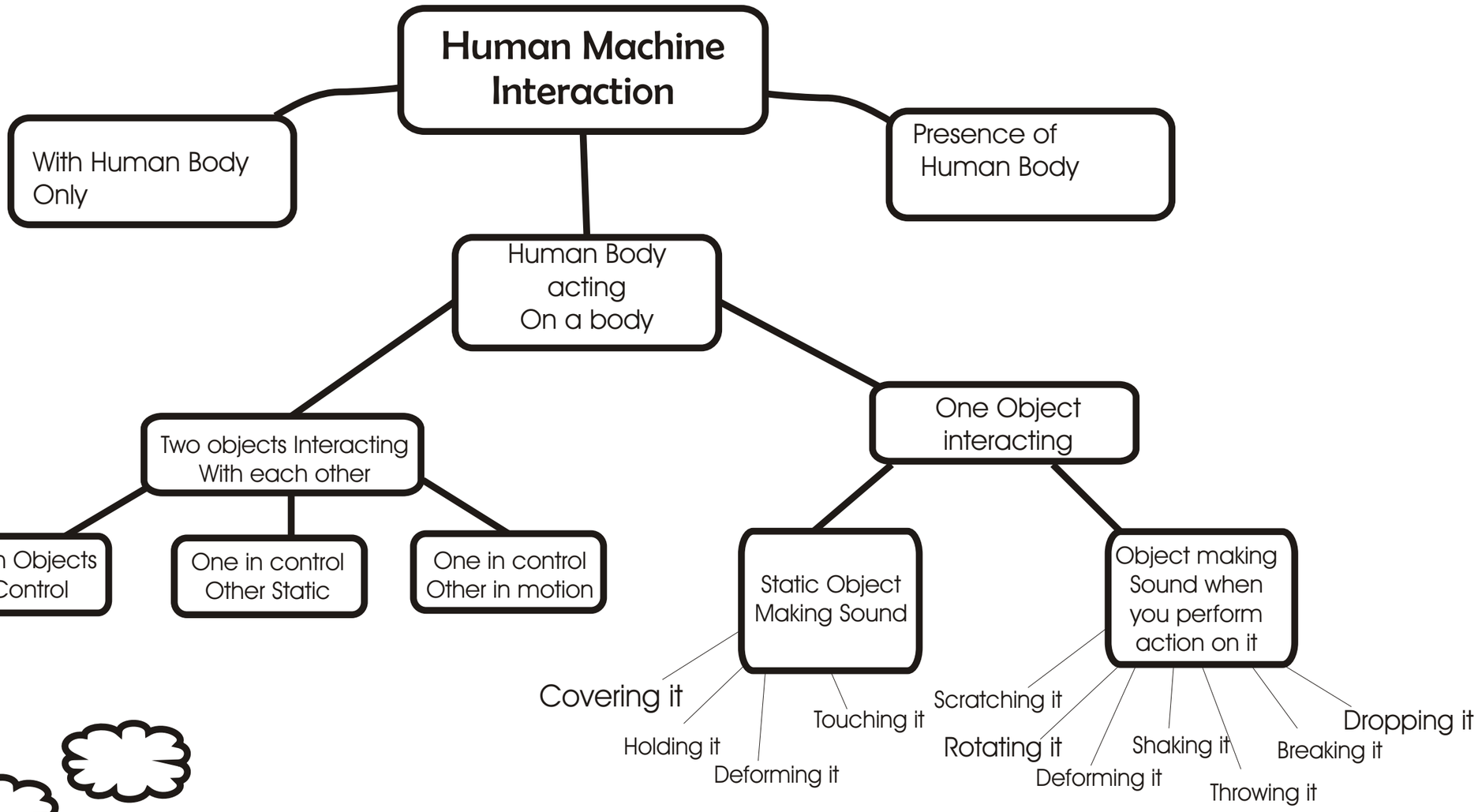
Possible Interactions with sound?

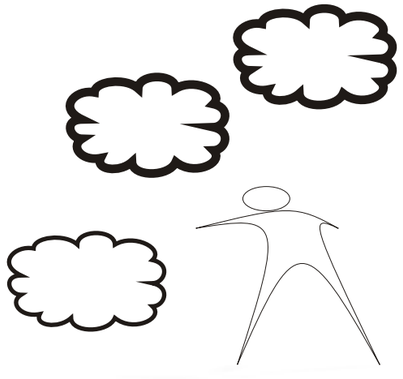
Body gestures to produceSound

Intention- Action- Identification

How do we produce sound as humans?

How do people interact with sound?





Sound based Human Interactions

Observing People and places

At Blind School

Role of Sound in their Life

Touch and Smell very important

Computer is not a visual device its just a virtual sound world

Sound of Silence, Proximity of sound, motion sensing.

Sitting on the road side

Difference between artificial sound and real sound

Honks, ambient sound, mixed sounds

Focus of attention on one in presence of others

Bunch of Kids Playing Blind Mans Buff

How a Blind Folded person behaves with sound

The game needs tactile plus sound input.

Concepts of Virtual Sound Spaces

Generated concepts for virtual sound worlds

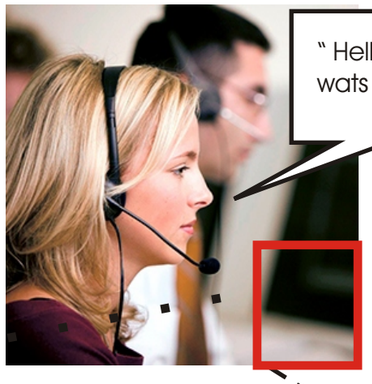
Selected 6 Concepts

1. Spatial Sound Based Chat Rooms
2. Audio based games using spatial
3. Action - O- Sound
4. Play with Virtual Sound Ball
5. Material -O- Sound
6. Ambient Sounds

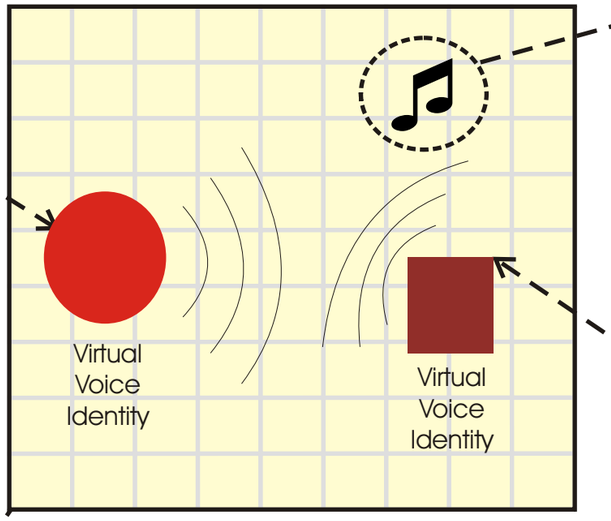
Virtual Sound based Spacial Chat rooms

Navigation

Arrow Keys of computer can be used for navigating the Virtual space



Virtual Sound Space with multiple dimensions

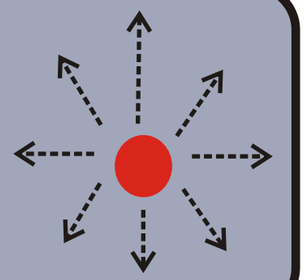


Place sound markers

Users can place Sound markers spacially to navigate through the space.

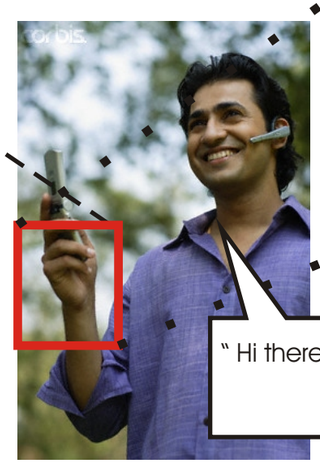
Navigation

The user can move around in 3D space virtually



Navigation

Direction Keys of phone can be used for navigating the Virtual space

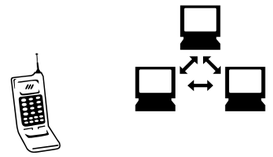


Custom Ambience

Different Ambience can be selected for eg. Indoors or outdoors to create ambient sounds.

Chat based dating

Using predefined ambient sounds an atmosphere can be created to have voice chats with Spatial feeling.



Cross Media Integration

Audio based games using spatial sounds

The Game Challenges

Time

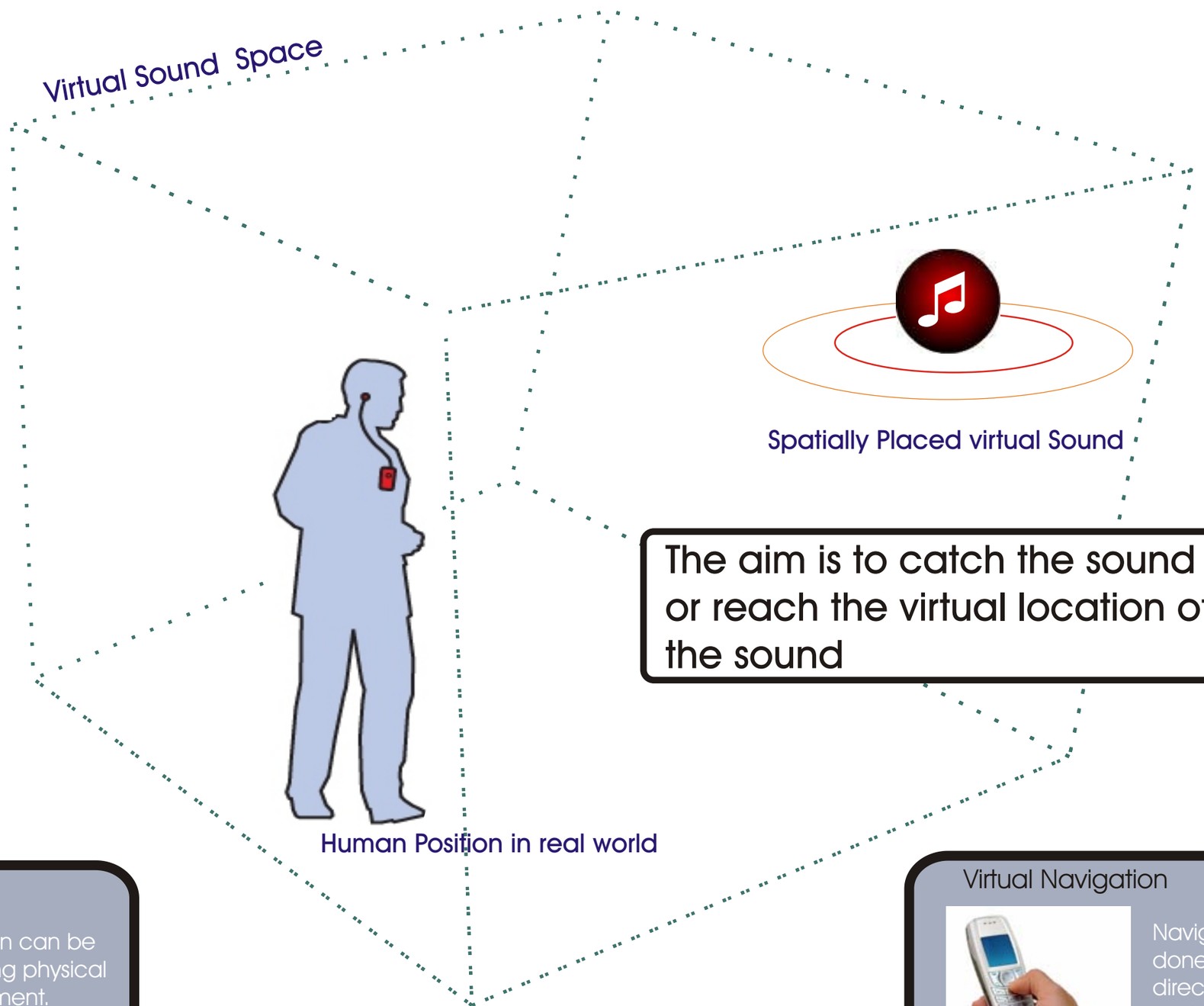
The act of reaching the sound has to be done within specific time or in fastest time

Number of Sounds

More no. Of sounds to be identified among the existing.

Speech

Identify a person by his speech.



The aim is to catch the sound or reach the virtual location of the sound

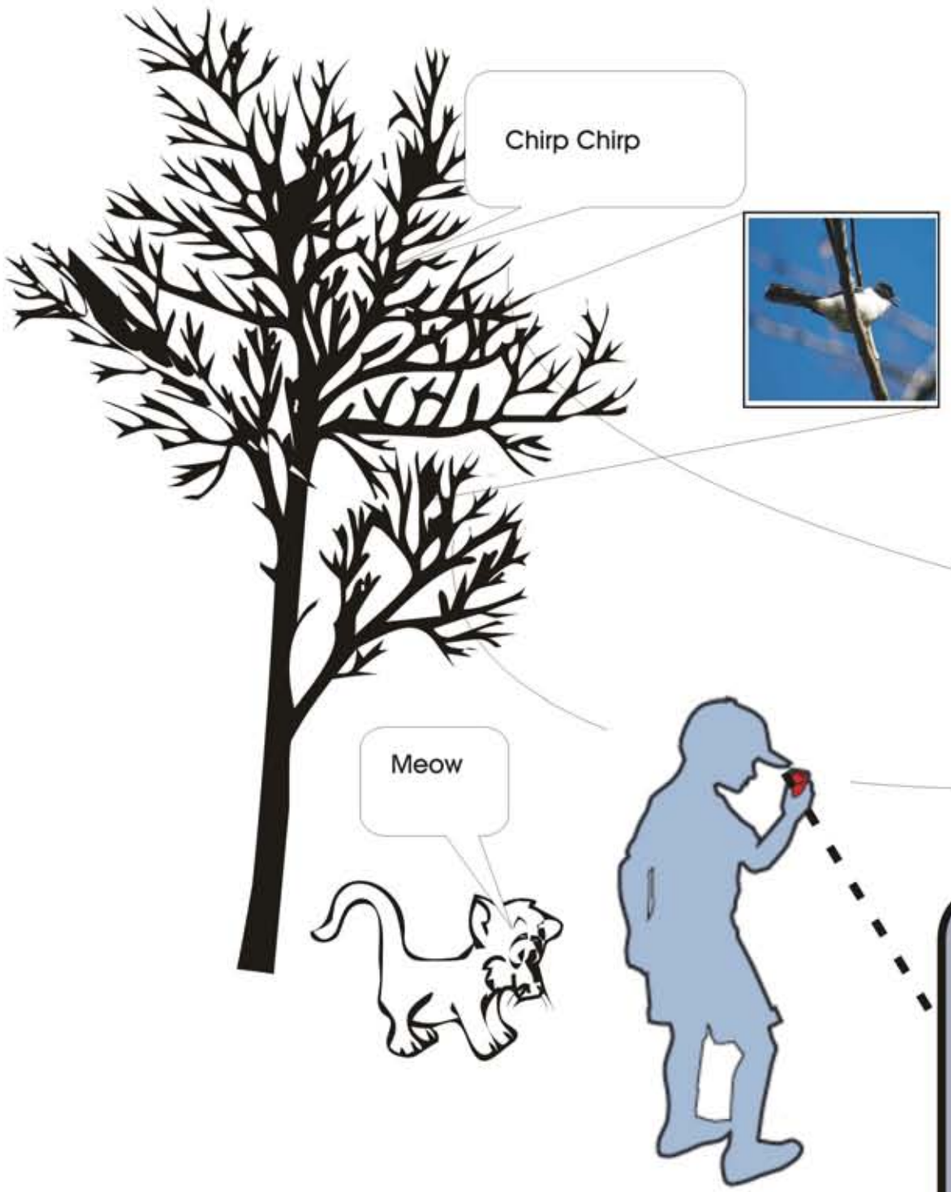
Manual Navigation

Navigation can be done using physical displacement.

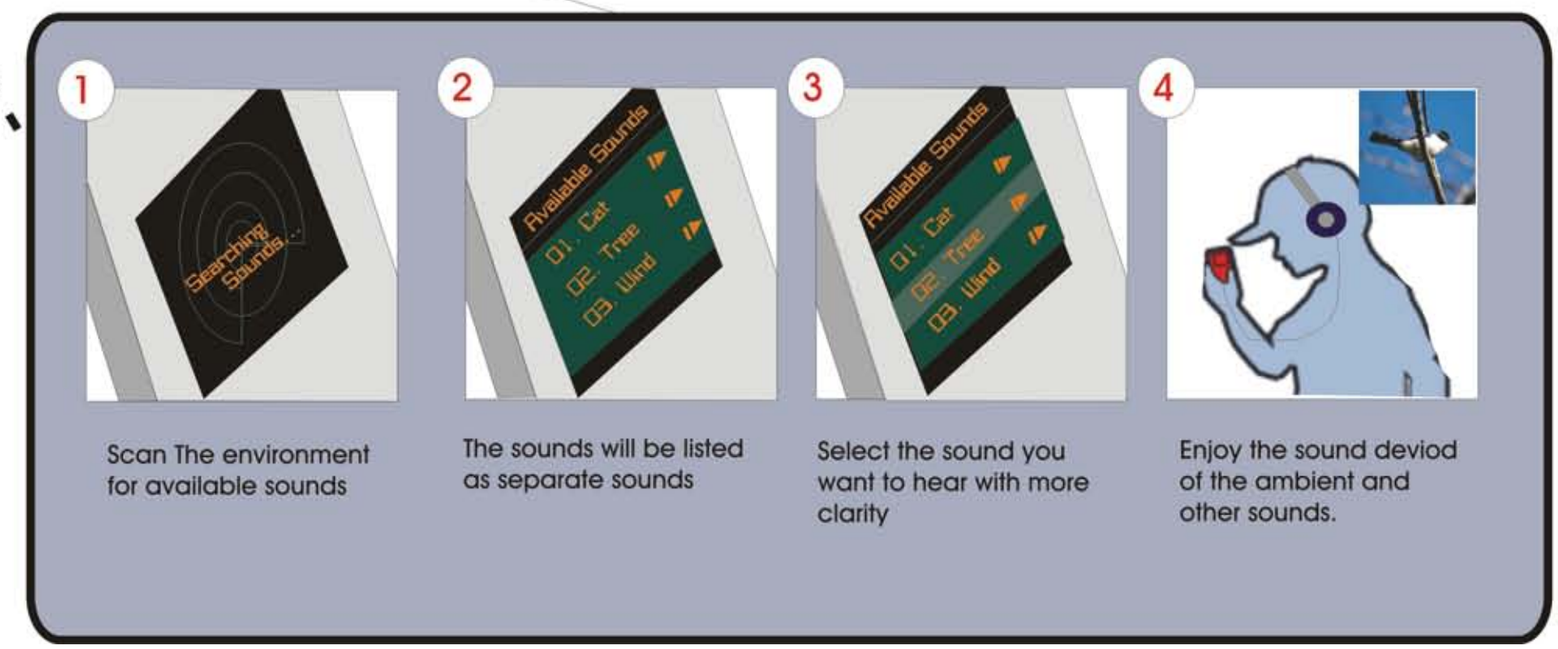
Virtual Navigation

Navigation can be done using direction key gestures

Ambient Sound Enhance



Environment has many sounds mixed together in a complex manner



Scan The environment for available sounds

The sounds will be listed as separate sounds

Select the sound you want to hear with more clarity

Enjoy the sound deviod of the ambient and other sounds.

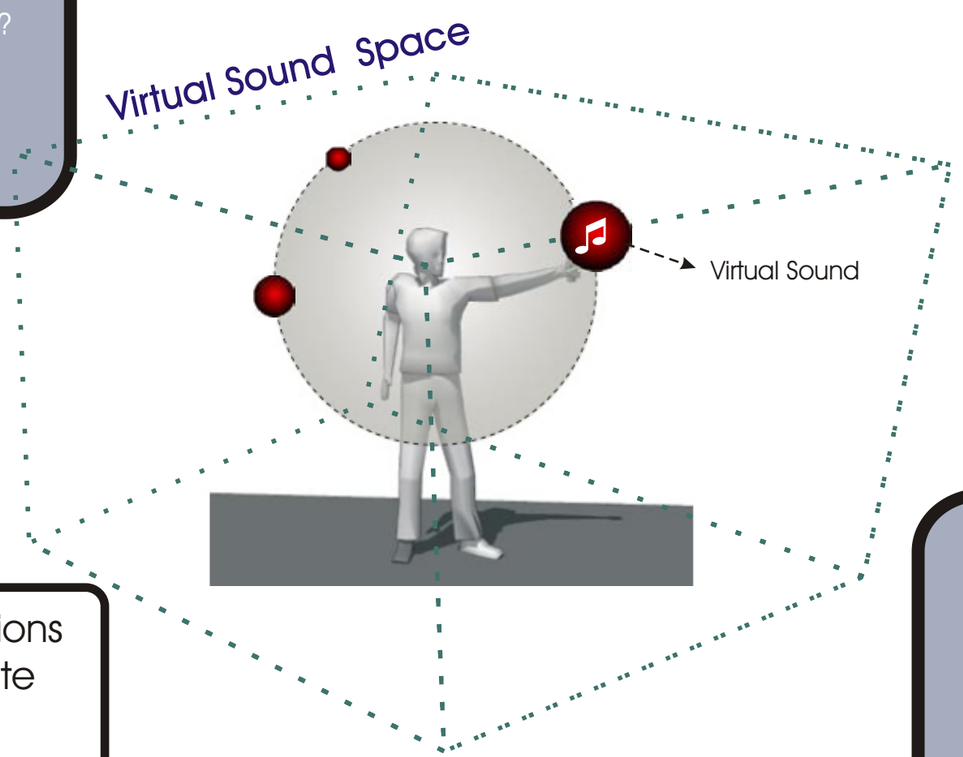
Action - o - sound

Based on or actions in the real world sound could be produced in different co-ordinates of the virtual world. We can activate existing sounds or place new sounds

Dance - O - Music

We generally dance to the music.
How about making music as we dance?

Spatial Co-ordinates in the real 3D space will be mapped in the virtual space and hence the sound will be accordingly produced as per our actions.



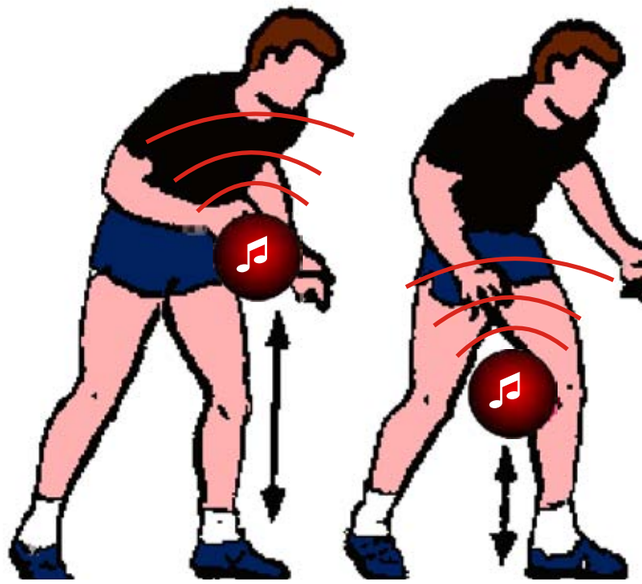
Human Body can have multiple actions on the basis of which we can activate existing sounds. This can be pre programmed or may be dynamic.

Orchestra Mode

We can have ab orchestra mode where a pointing device can be held in our hands to play music as we want like a tenor in an orchestra.

Play with virtual sound ball

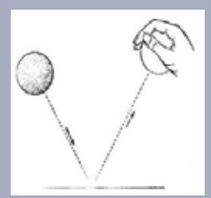
An Imaginary sound ball which does not exist in the real world



The sound can change as per distance and the bounce.

The Sound ball can be played with anywhere anytime

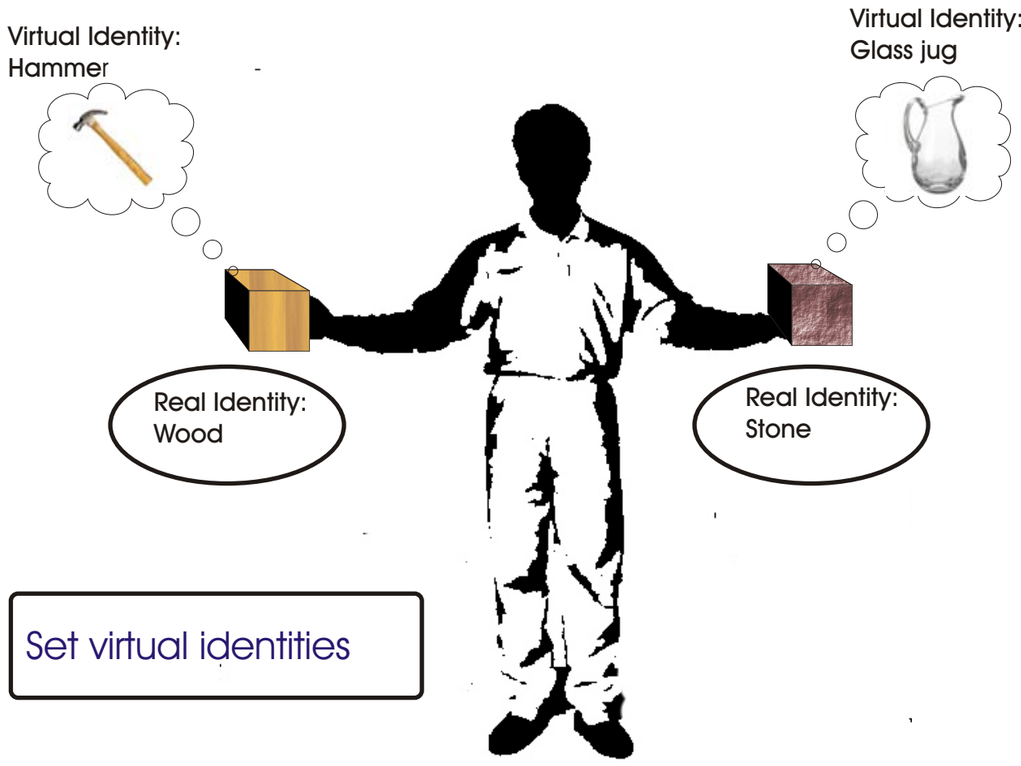
You can juggle with Multiple sound balls



The sound will be as per the material the ball bounces on

Material- O- Sound

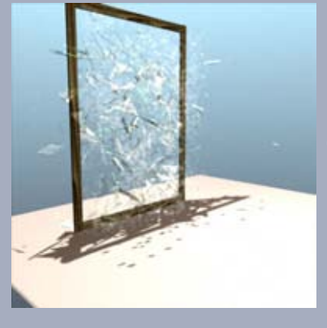
Two Objects of the real world will sound as another set of objects in the virtual world.



Set virtual identities

Hear Virtual collision sounds as real

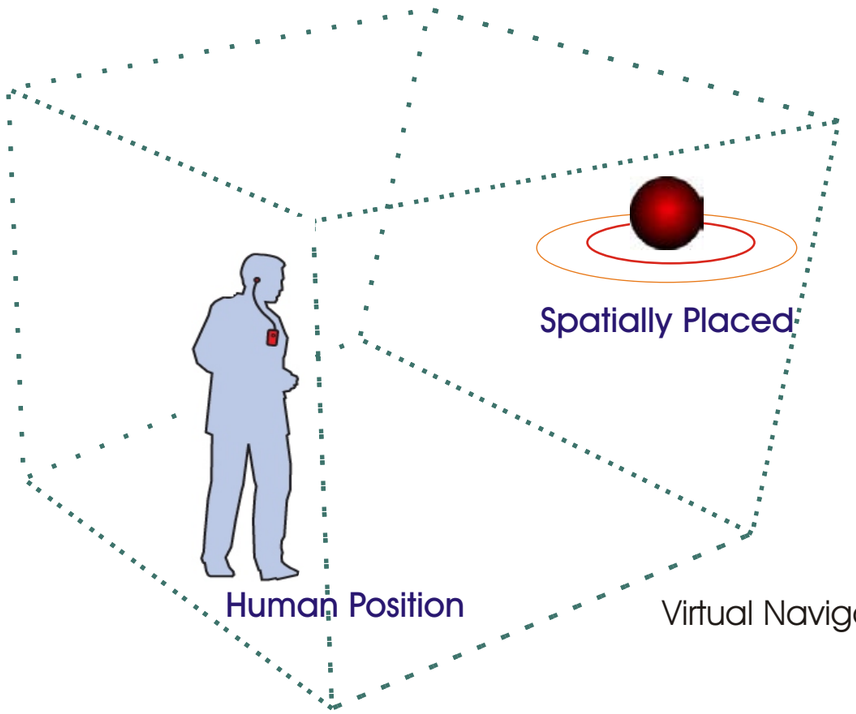
You can also Directly set your hands as objects and hear the sound on clapping



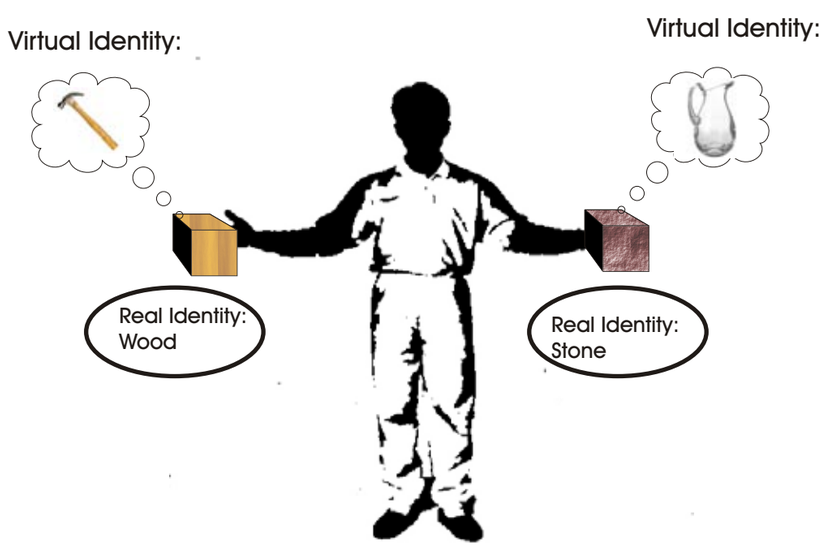
Every object has a sound depending on the material which they are made up of. When objects collide against each other they collide to produce distinct sounds.

Selected Concepts

Spatial Audio based games



Material Sound



Understandings and Reflections

Connection of space and Sound

What is 3D sound?

How is 3D sound Produced?

How do Materials produce sounds?

History of artificial sound

People using sounds for mending things

3D Sound Recordings

Binaural Holophonics

Generated Scenarios

Application areas with Scenarios.

Interactive Spatial Sound

- Search the Sound ....A Game
- Virtual Blind Mans Buff.... A Game
- Library Search Navigation... Application
- Virtual Sound Trails... Application

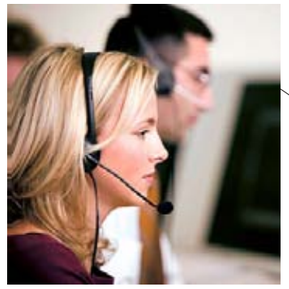
Material- O-Sound

- Virtual Material Sounds for Prototyping
- Making Clay objects real

The Final Concept

Virtual Blind Mans Buff

Concept Sketch



Access can be using different mediums

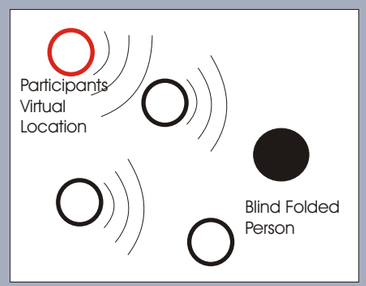
Virtual Sound Space

I am Standing here

SHHHH!!!!!

Can u hear me dumbo..hehe

The display of other participants



Virtual position of participants

Can naviagte in different directions either virtually or spacially

Click can be one gesture by which The virtually blind folded person can Try to check if he has reached the location.

Cross Media Integration

Studying The "Real" Game

Two types of players:

1. The Blindfolded Person.:

The blindfolded person whose turn it is.

2. The Participant

Person to be caught

Their Roles

1. The Blindfolded Person:

Listen to the people around
Navigate to the people to be caught
Check if he has reached the person and catch

1. The Participant:

To get attention of the participant
To move around and try not to get caught

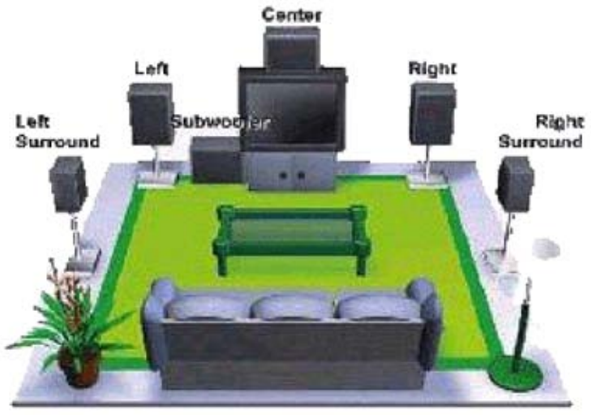
Understanding 3D -Sound

All Sounds that we experience in real world are 3D Sounds

Most recordings are not same as real...they are flat

Role of pinnae of ear

Surround Sound V/s 3D Sound



Research Started in Bell labs 1930

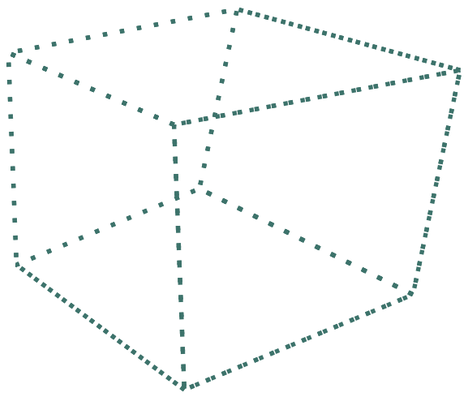
Reverberation

Azimuth vs Elevation

Head Related Transfer Function

Factors of Spatial Sound

We Perceive Spatial Sound Due to 2 reasons

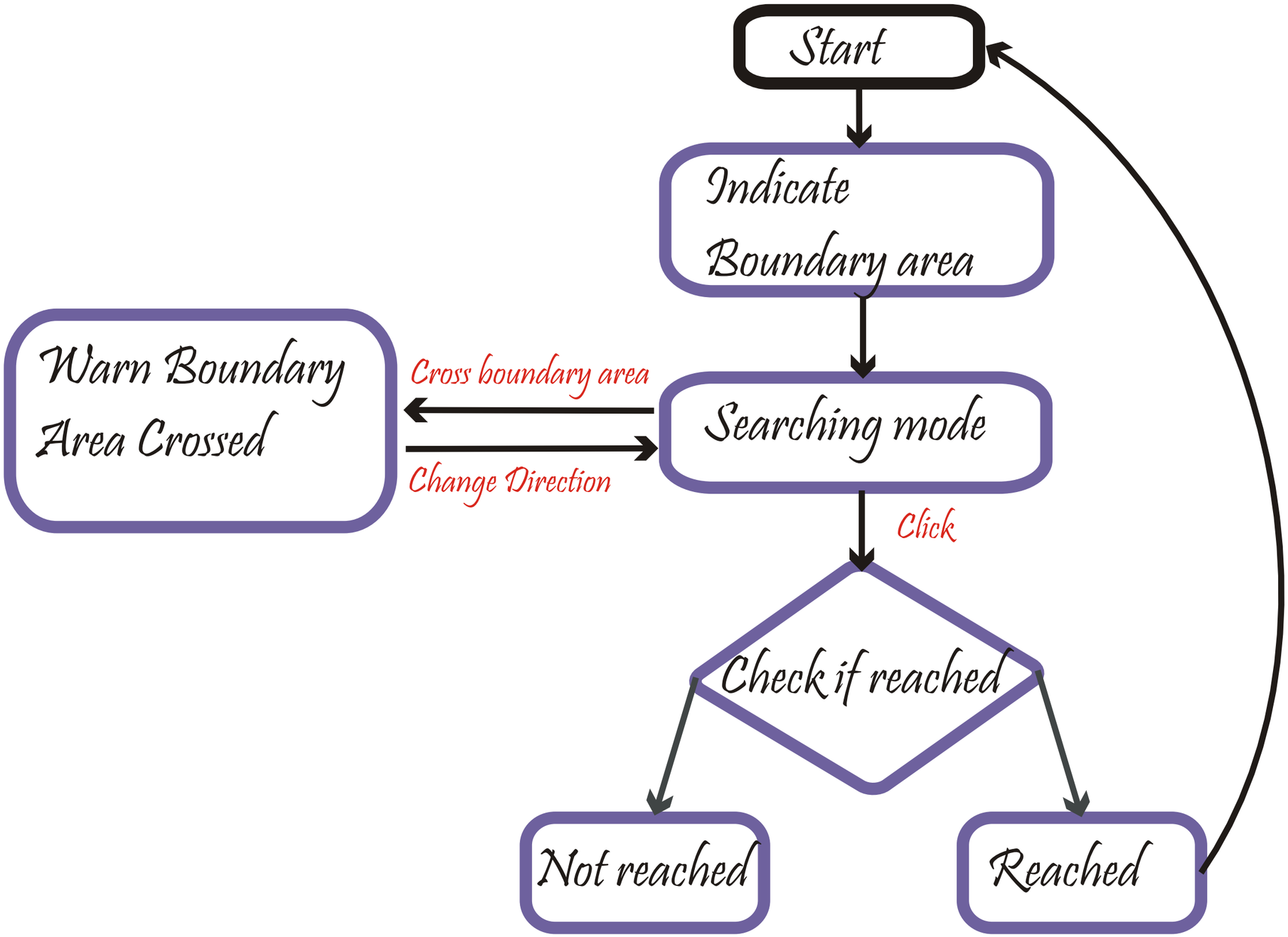


Realization of the surrounding space i.e.
Environment

Realization of the source of source of sound i.e.
Distance from source

Intensity/ Loudness ..... Spectral Content..... Reverbation Content..... Cognitive Familiarity

Basic Modes for sound based search



Gestures for Modes

Navigation in SoundSpace

Manual Walk

Foot Tap

Hand Expression

Click

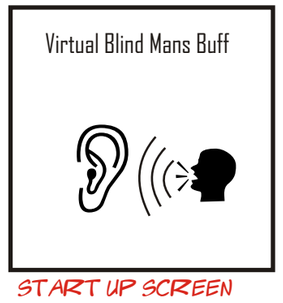
Checking if reached

Detailed Interactions

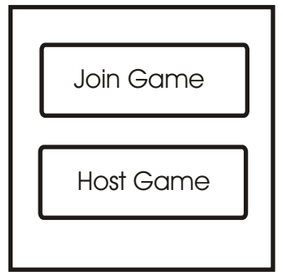
Game Initiation

Blind Folded persons Interaction

Other participants Interaction

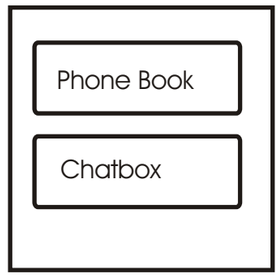


START UP SCREEN



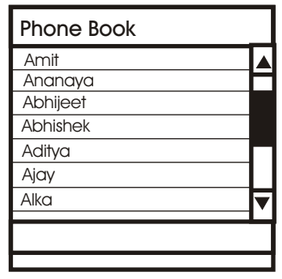
SELECT OPTION

HOST GAME



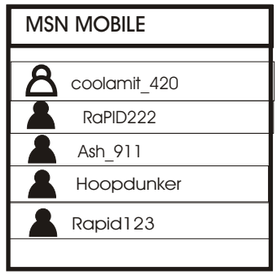
INVITE PEOPLE

PHONEBOOK

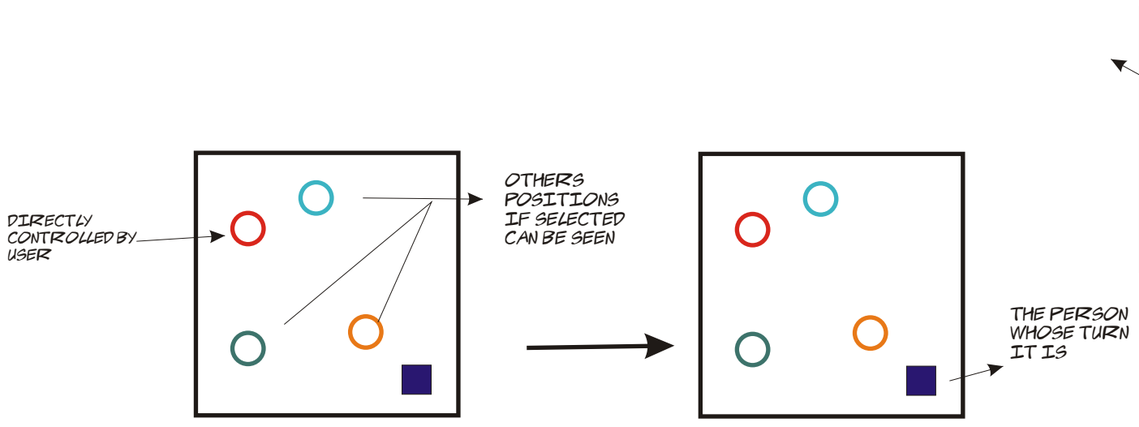


SELECT NAME FROM PHONE BOOK

CHATBOX



SELECT PERSON FROM CHAT LIST

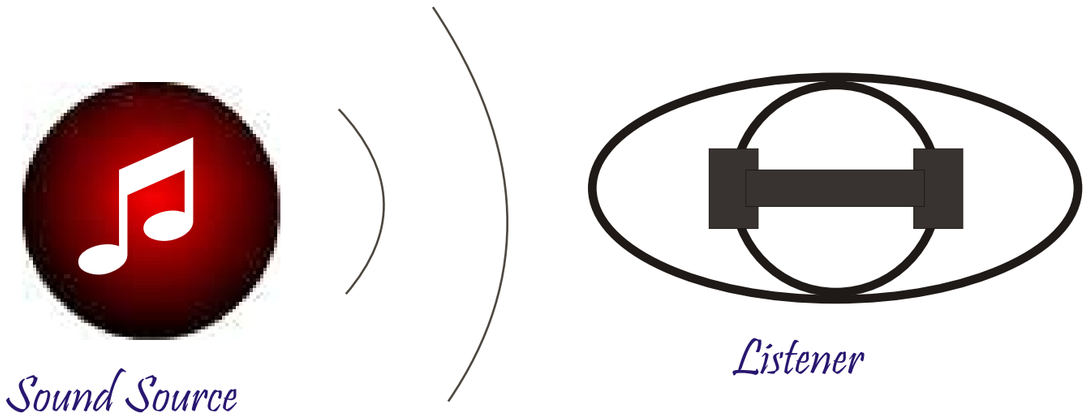


SELECT INITAL POSITION IN THE VIRTUAL SPACE.

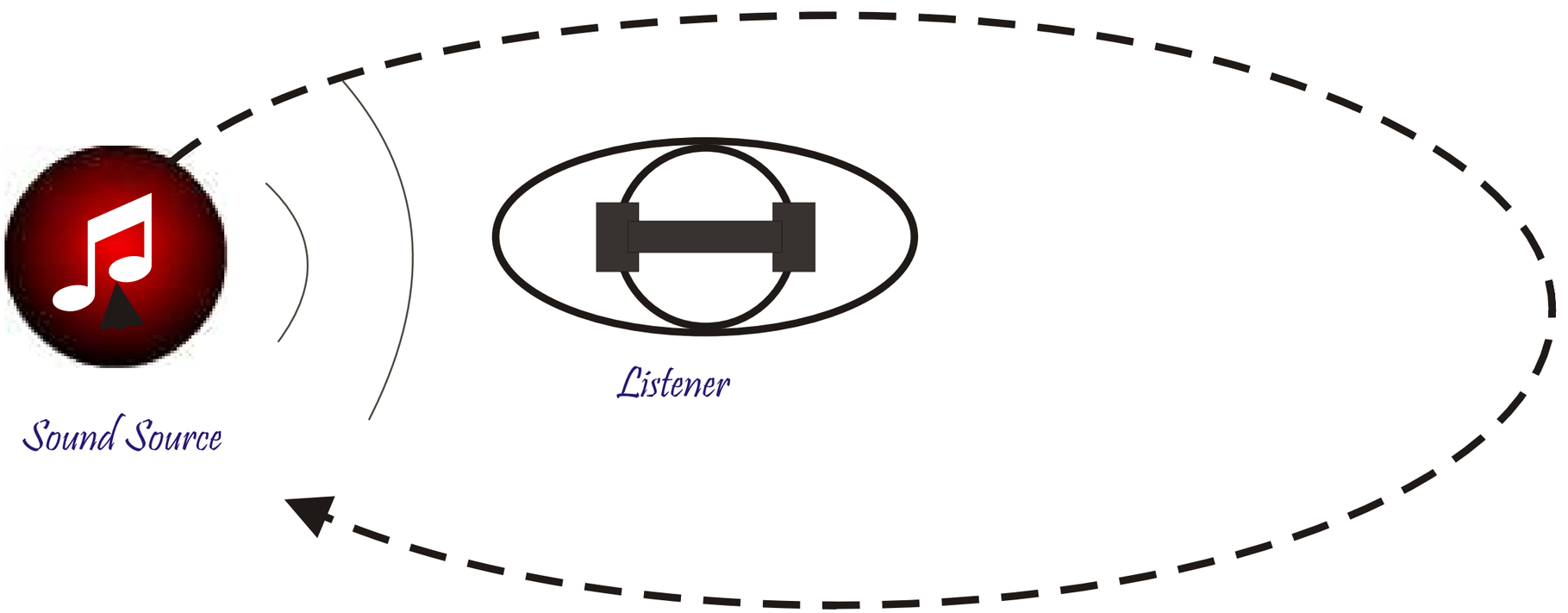
THE PERSON WHOSE TURN IT IS CAN ALSO BE SEEN IN THE DISPLAY.

3D Sound based Interactions

1. Sound source and listener constant.

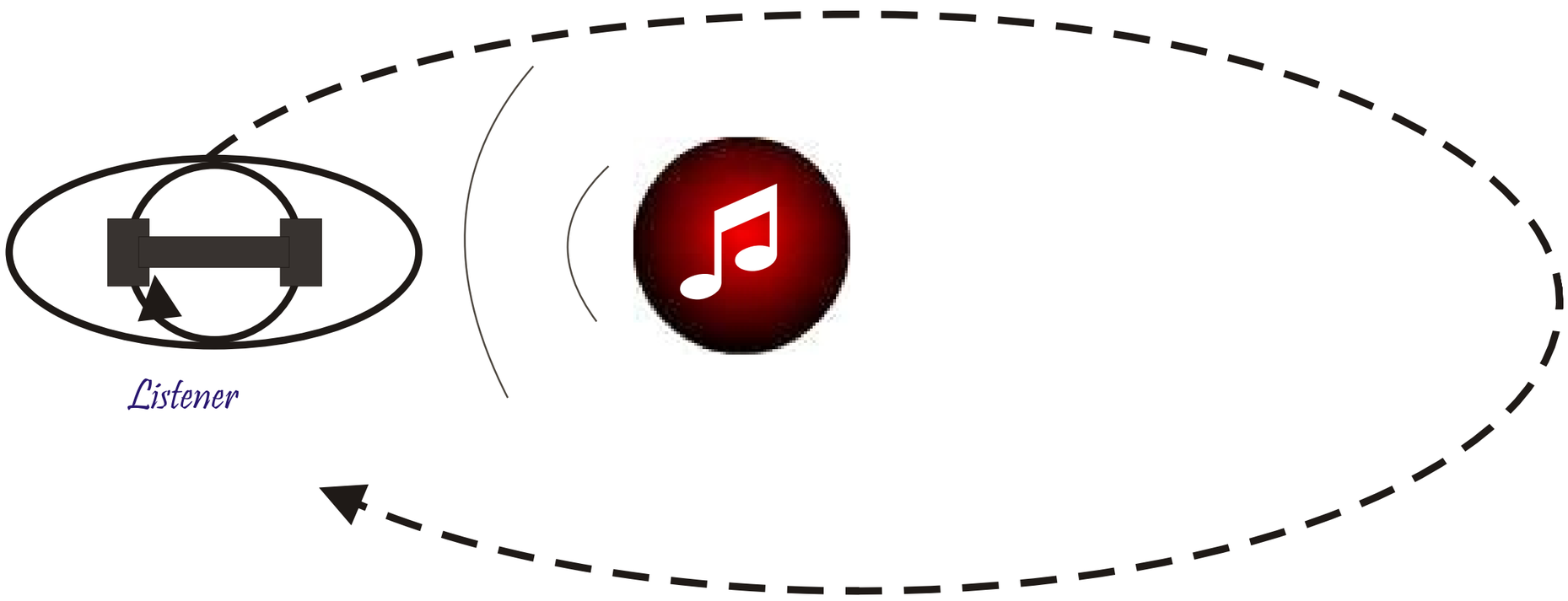


2. Sound source moving and listener constant.



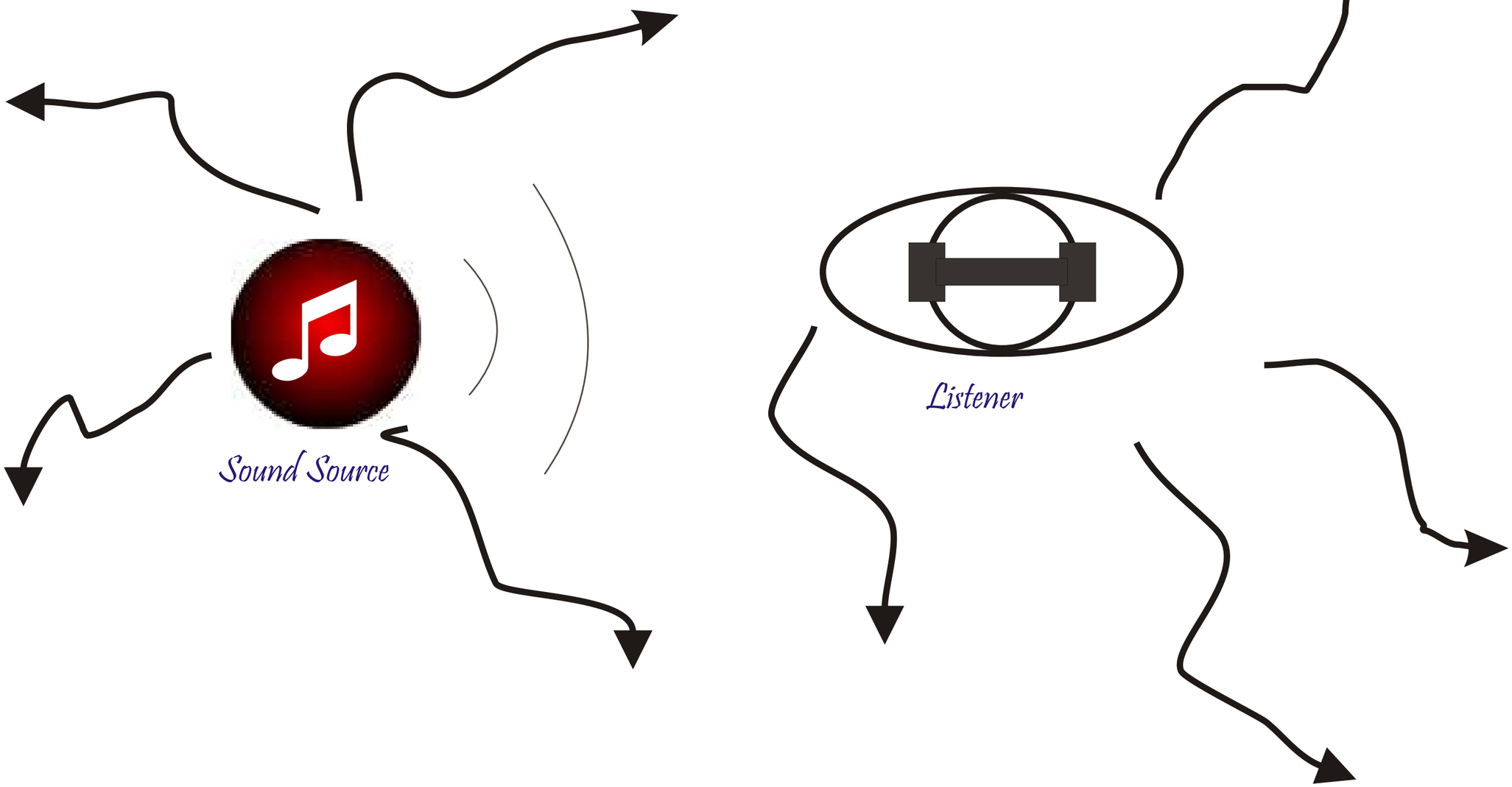
3D Sound based Interactions

3. Listener moving and sound source constant



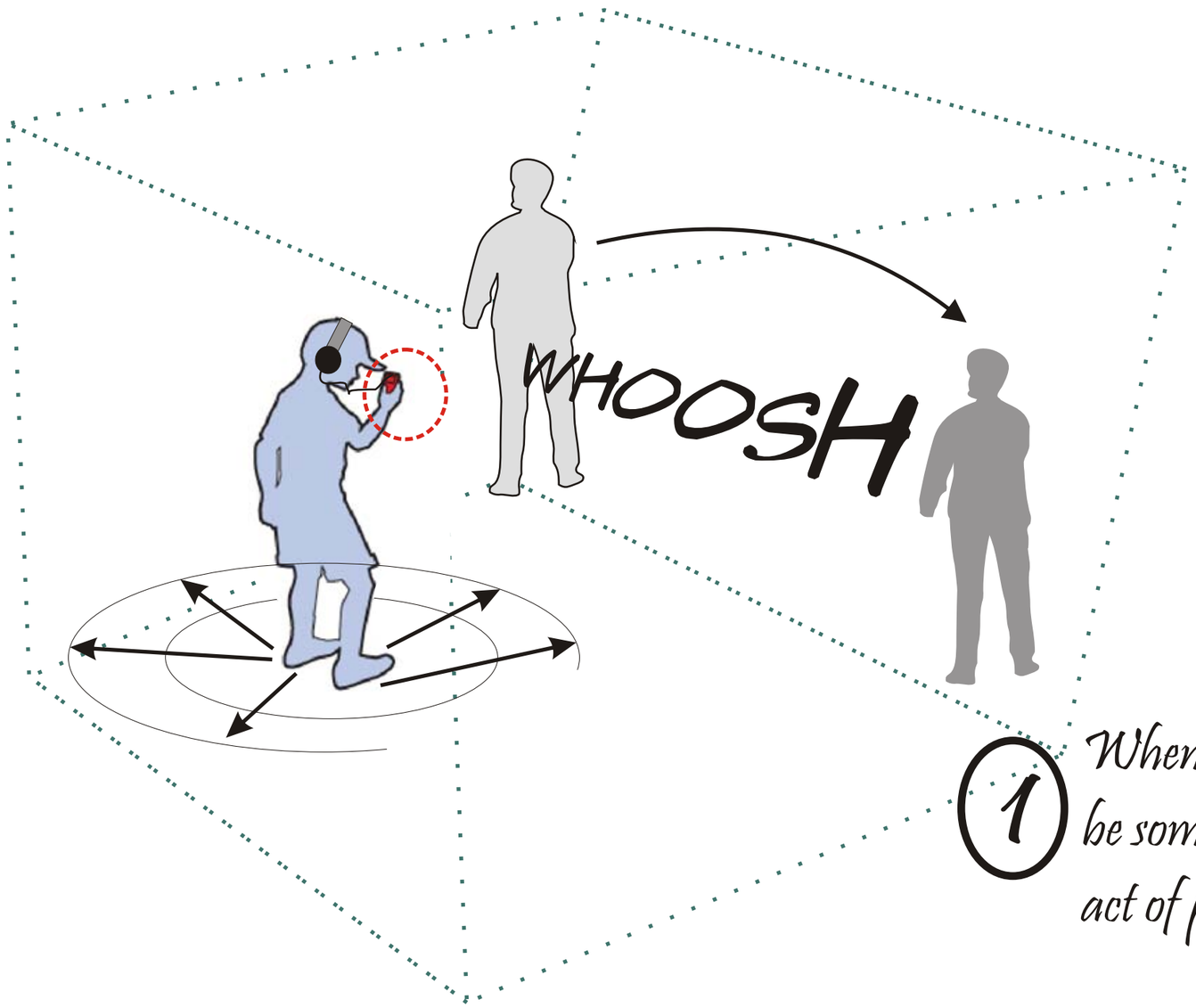
3D Sound based Interactions

4. Both Listener and sound source are moving



3D Sound based Interactions

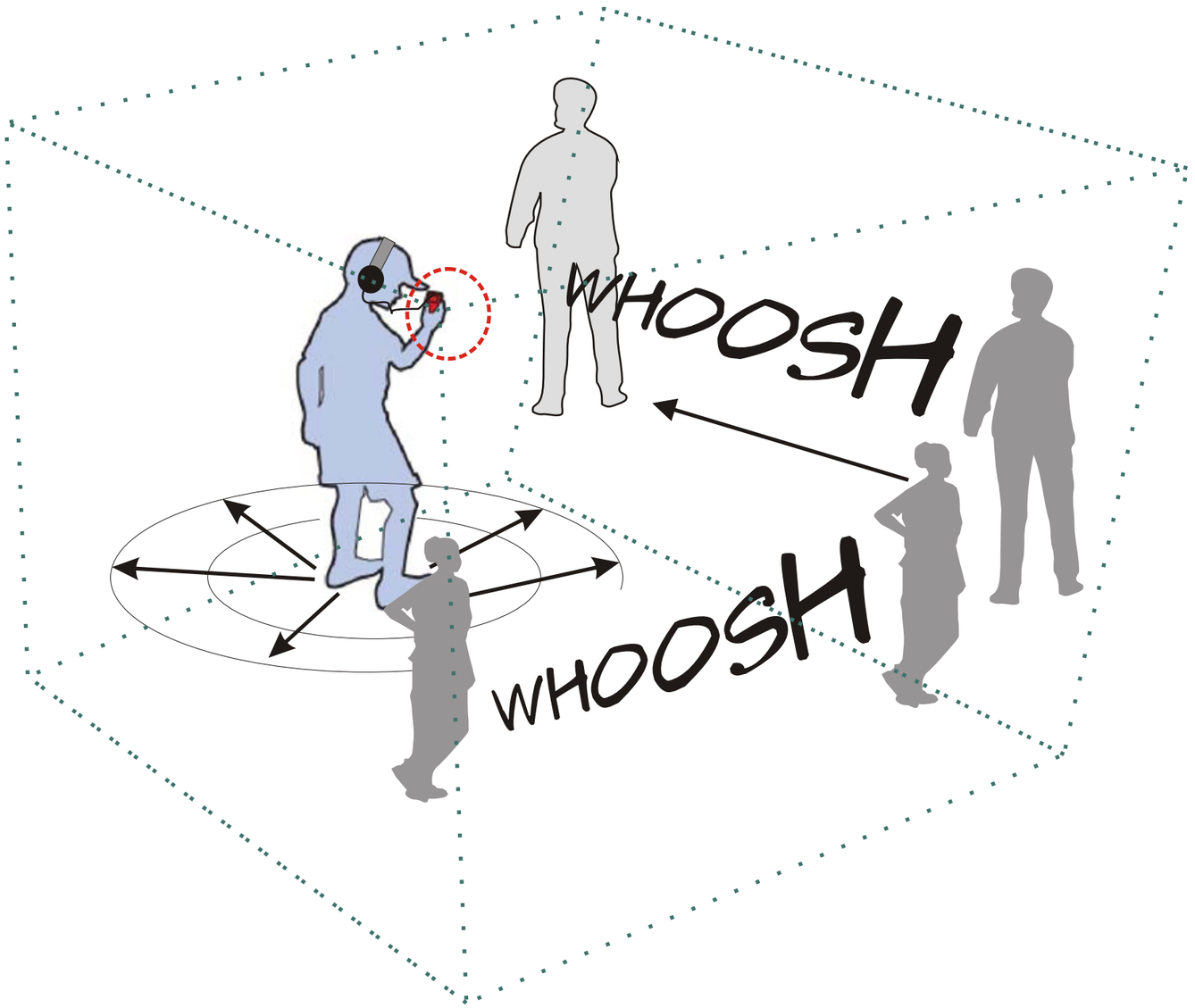
Suggested Pattern in VBMB



1 When a person moves his or her position there needs to be some kind of sound distinct to him or distinct to the act of position change in itself

3D Sound based Interactions

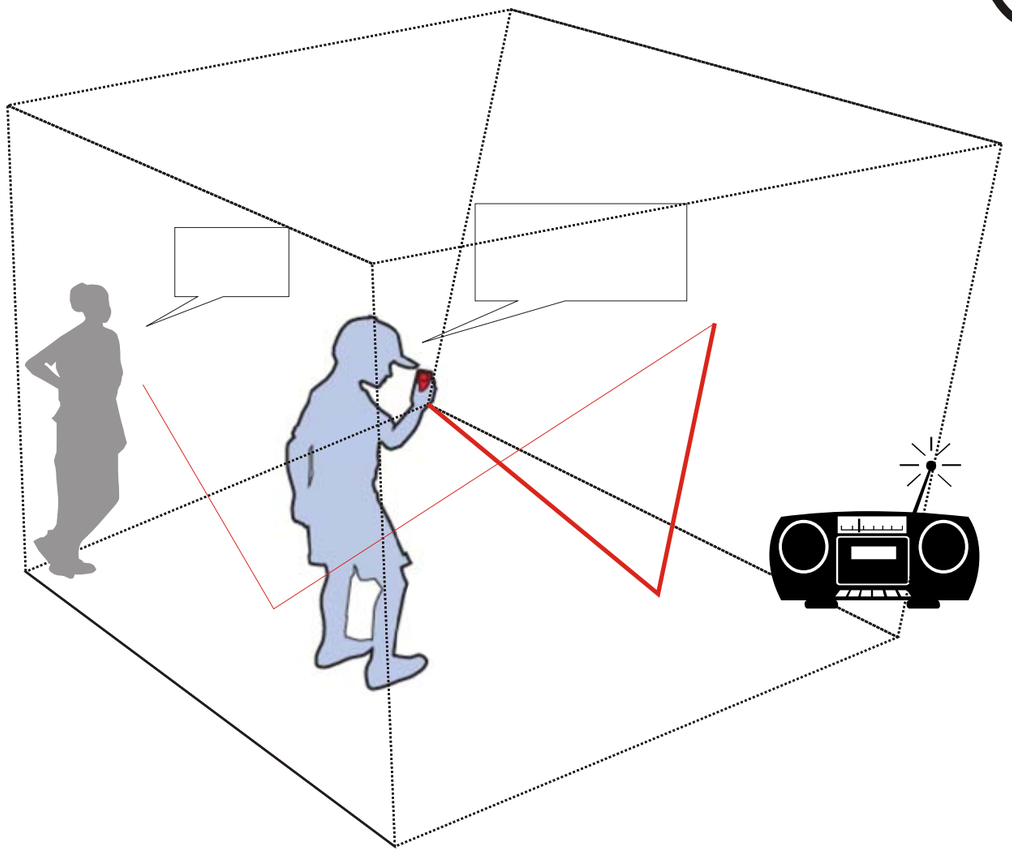
② Motion of the persons in the virtual world needs to be unitary, i.e. One person should move at a time, which can be made automatically



③ One person should speak at a time to avoid over lap of sounds at least in Lower levels

3D Sound based Interactions

4 Environment selection and reverberation shall help the blindfolded person track the person to be caught



5 The blind folded person should be allowed to speak too hence allowing him to identify his and others position

6 Sound Icons can increase the sense of direction

Required technologies to implement

Real time 3D/ spatial sound synthesizers

Motion capture using inertial sensors

Can interconnect sound based networks

Can be implemented in mobile phones with hands free and two channels

Conclusion

The scope in designing for virtual sound worlds is very high

A different approach is needed from traditional interface design

3D sounds has many applications and can be widely used in todays mobile world.

An architecture for spatial sound interactivity and interface needs to be studied and built

“Thank You ”