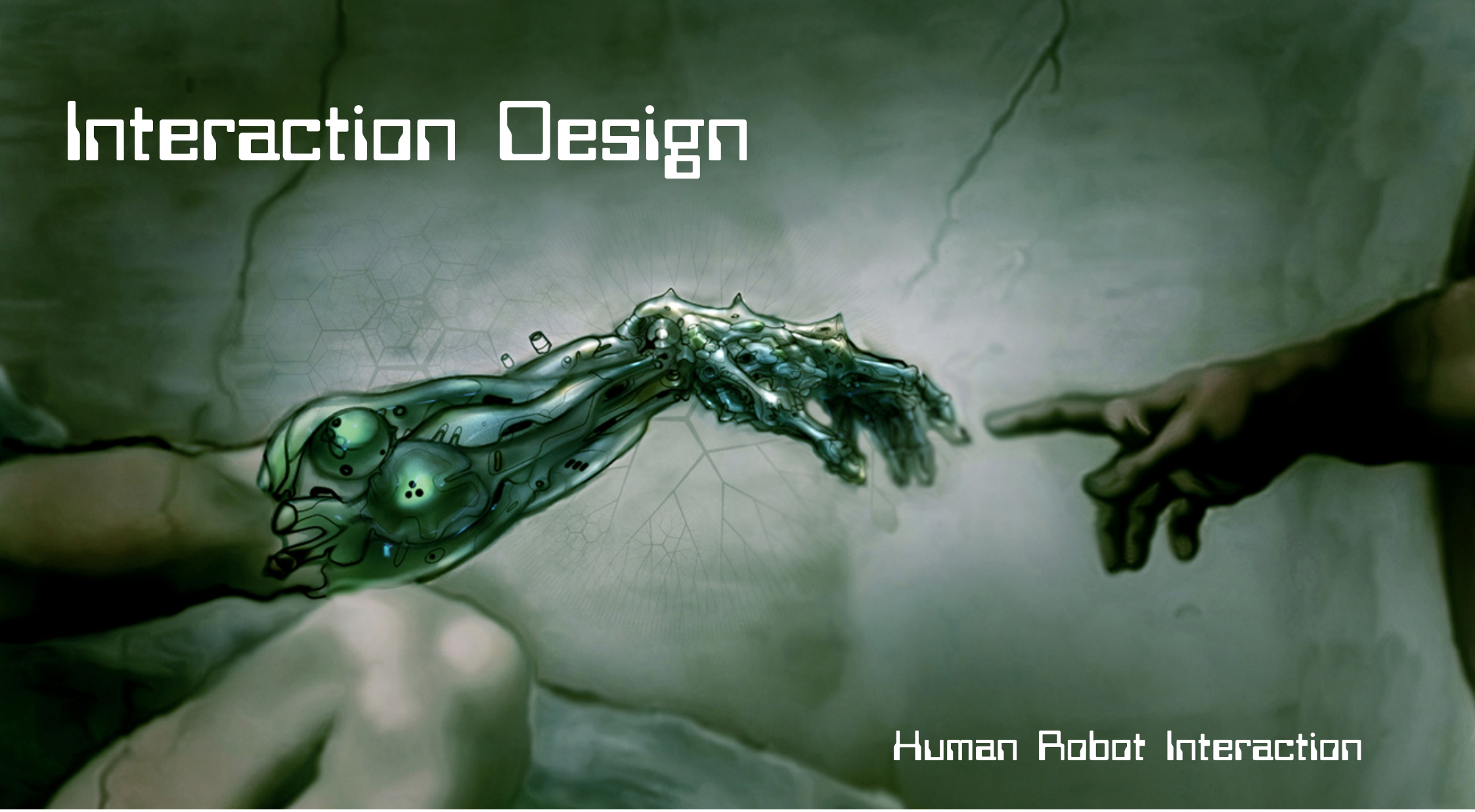
Interaction Design



Human Robot Interaction

Project Guide:
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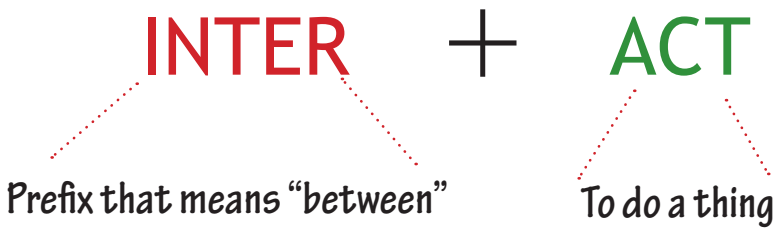
Software and User Interface Design

What is Interaction Design?

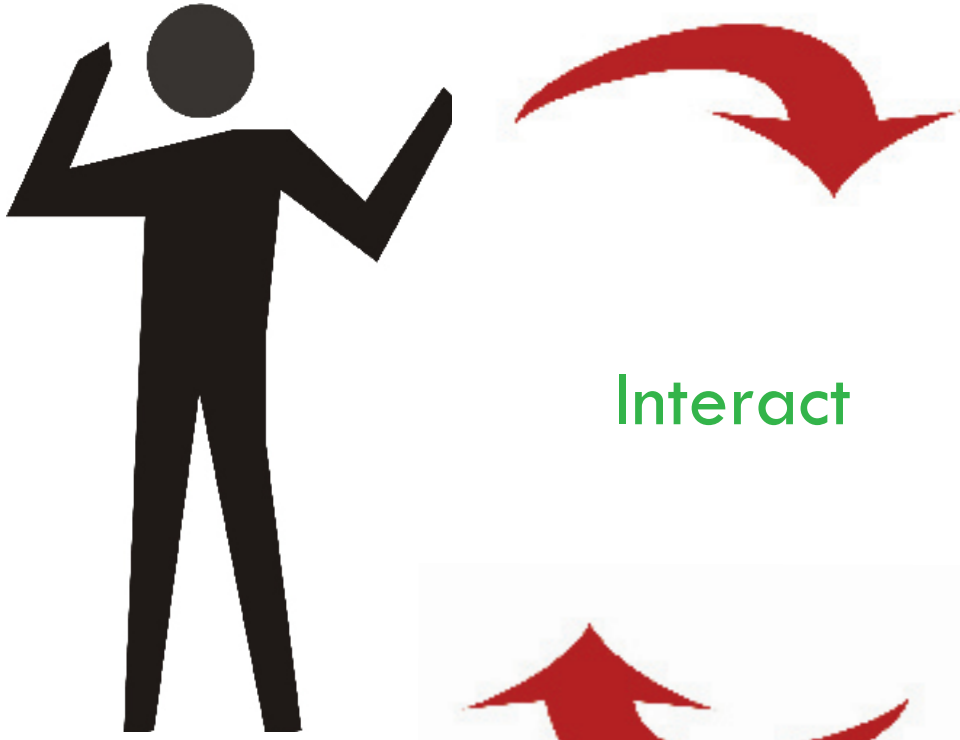
What is Interaction?



Hence Interaction means:

"to do a thing between two things"

Human Machine Interaction



Interact

Computers

Robots

Mechanical

HUMAN

MACHINE

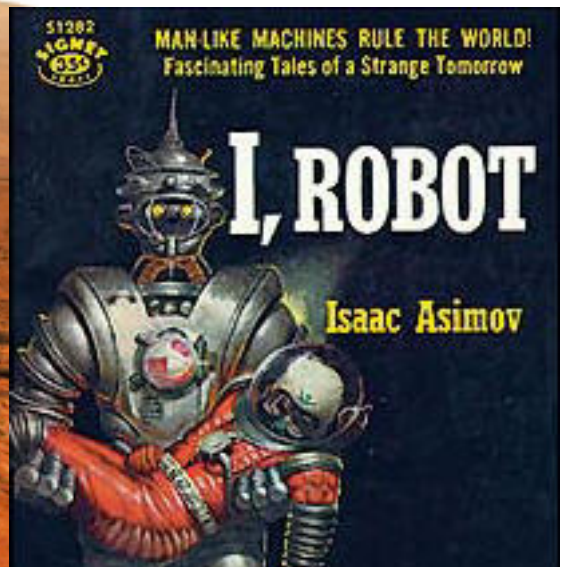
Communication between Human and machine
to do what the human wants from the machine

What is a Robot?

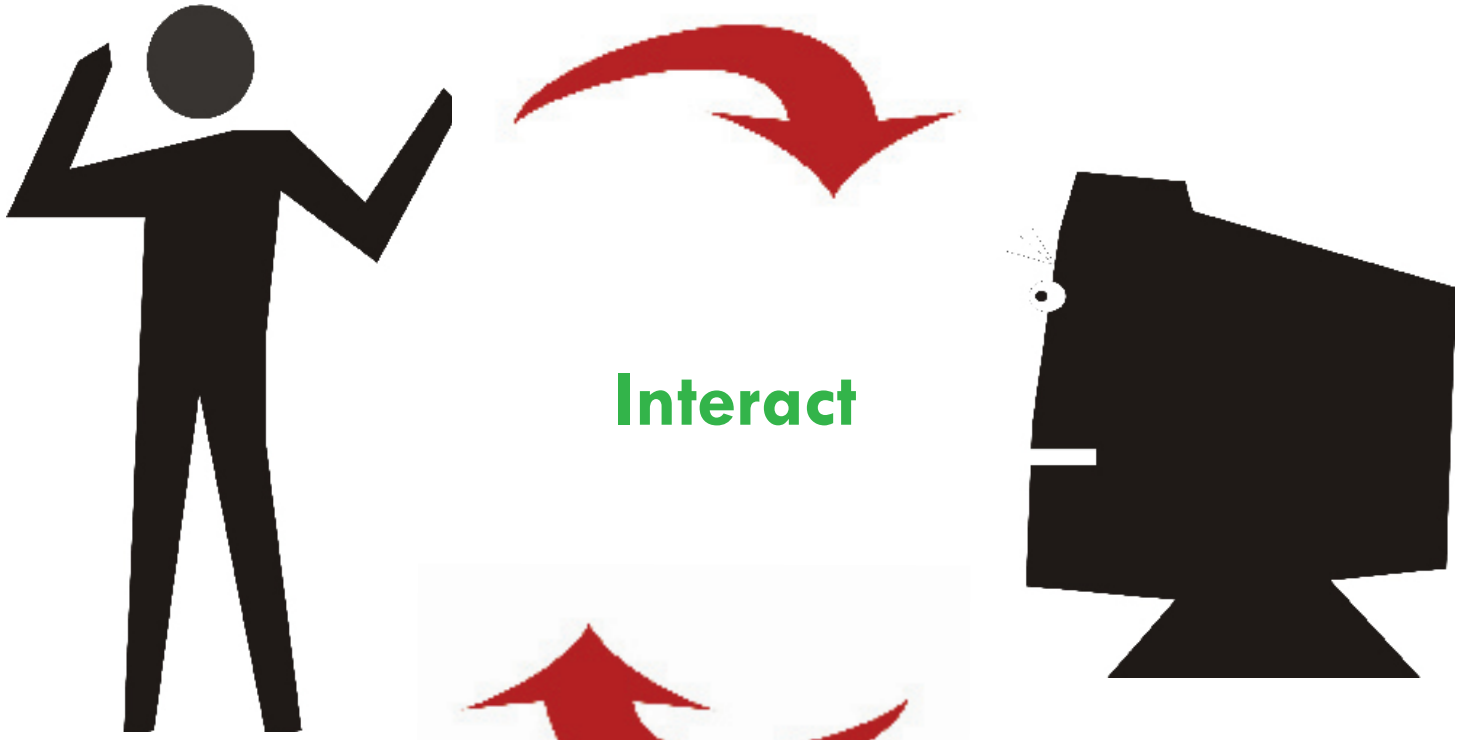
A machine capable of carrying out a complex series of actions automatically; especially in one programmable by a computer

Or

A machine resembling a human being and able to replicate certain human movements and functions automatically



Human Robot Interaction



What can i do for Autism using robotics?

What is Autism?

Autism is a developmental disability that affects the way a person communicates and relates to people around them.

It is a genetic neurological disorder that affects the normal functioning of brain.

It appears at first 3 years of life.

It is a spectrum disorder, it affects each child differently.

Not a rare disorder, being the third most common developmental disorder

Characteristics of Autistic Kids

Avoid Social Interactions

Attention to mechanical obects

Avoid Eye Contact

Difficulty in expressing needs

Change Blindness

Play alone

Inability to speak or communicate verbally

Repetitive parrot like behavior

Very Strong mathematical Mind

Ability to identify patterns

Self Stimulatory Behavior

Lack of grip attention and concentration

Doesnt play with animals

They Play readily enjoy video games

Cant Express feelings

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How can Robotics help Autism?

Autism + Robotics

Diagonosis

Therapy

Research

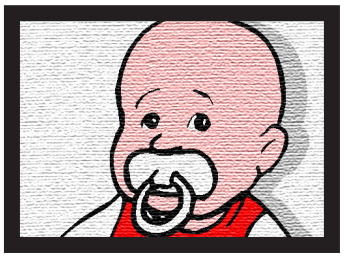
Ideation

Idea 1

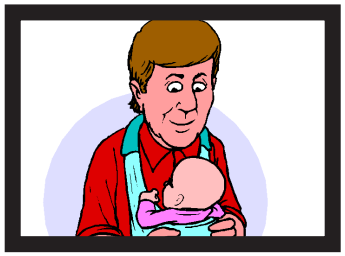
Autistic Diagonosis using wireless camera mounted on a robotic vehicle.

Audio response recording

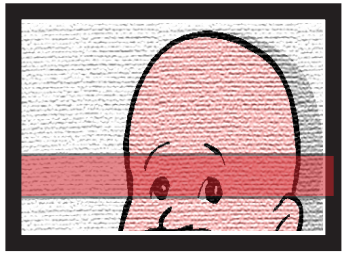
Facial Expression Recognition

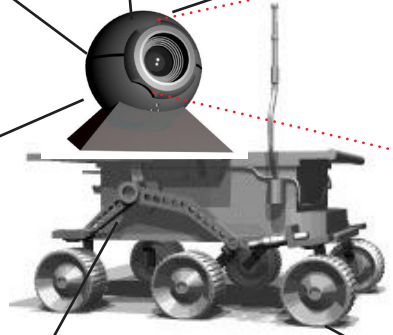


Relative Position with parents\ socially.



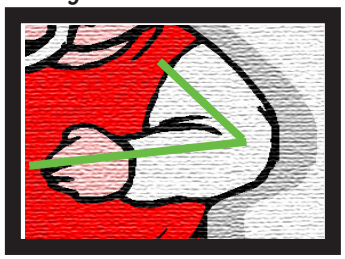
Gaze Tracking





The Wireless camera is mounted on a mobile rover which moves on the basis of the face of the kid.

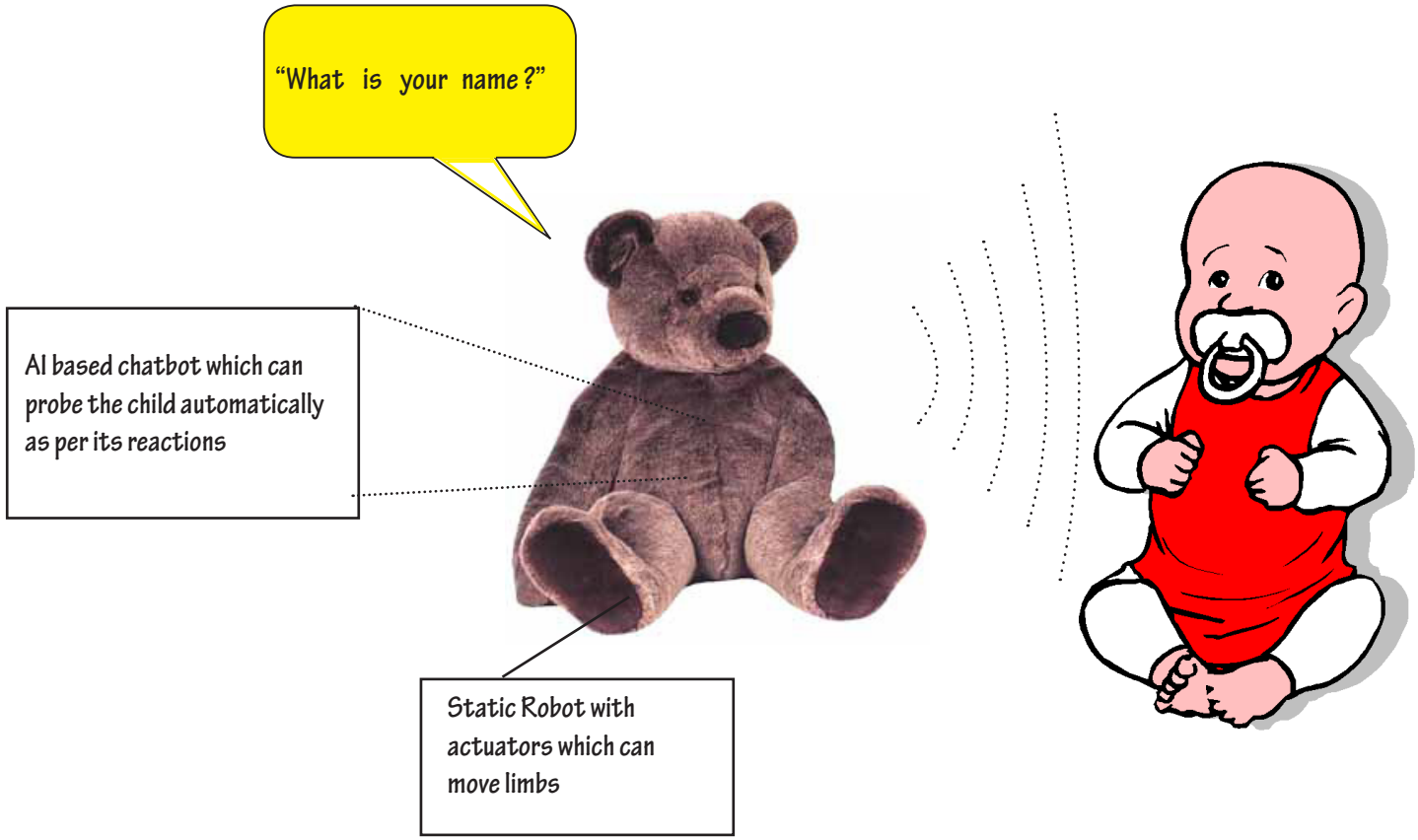
Tracking motion



Ideation

Idea 2

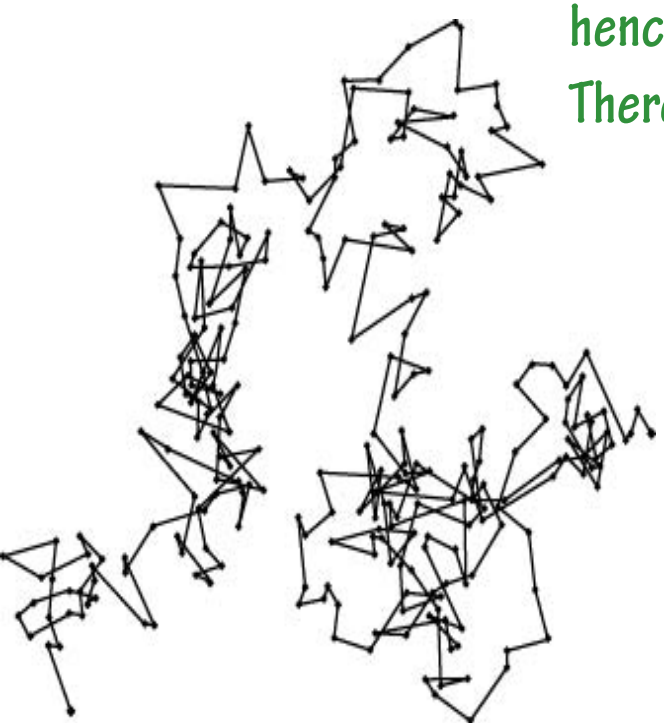
Therapautic treatment for Autism using toys with artificially Intelligent chatbot inside.



Helps the child in relating to social environments, and improve gaze and attention.
Increases the possibility of making the child talk early.

Randomness

> “A random process is a repeating process whose outcomes follow no describable deterministic pattern”



A computer generally follows instructions blindly as instructed.
hence it cannot be said that it makes its decisions on its own.
There is a possibility of predictability among computers.

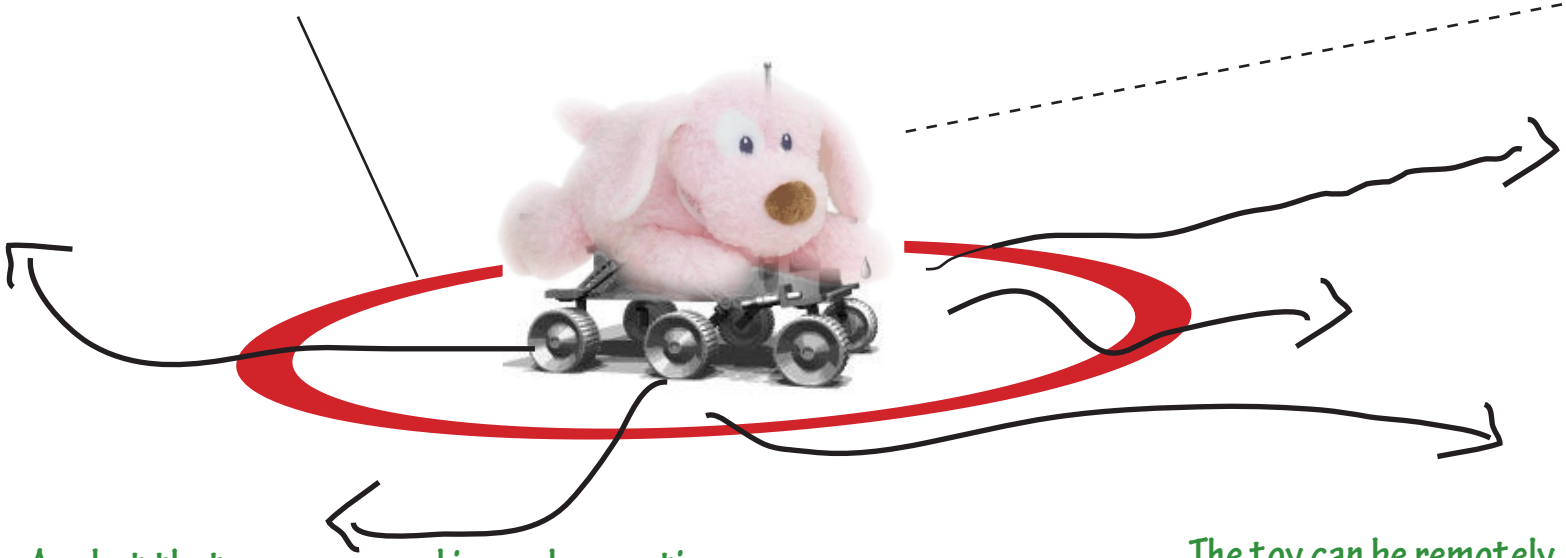
Life on the other hand is not instruction based.
If we are to create humanoids they have to take decisions randomly.
Non Deterministic Motion.

Ideation

Idea 3

Therapautic treatment for autistic kids using robots which move in random motion.

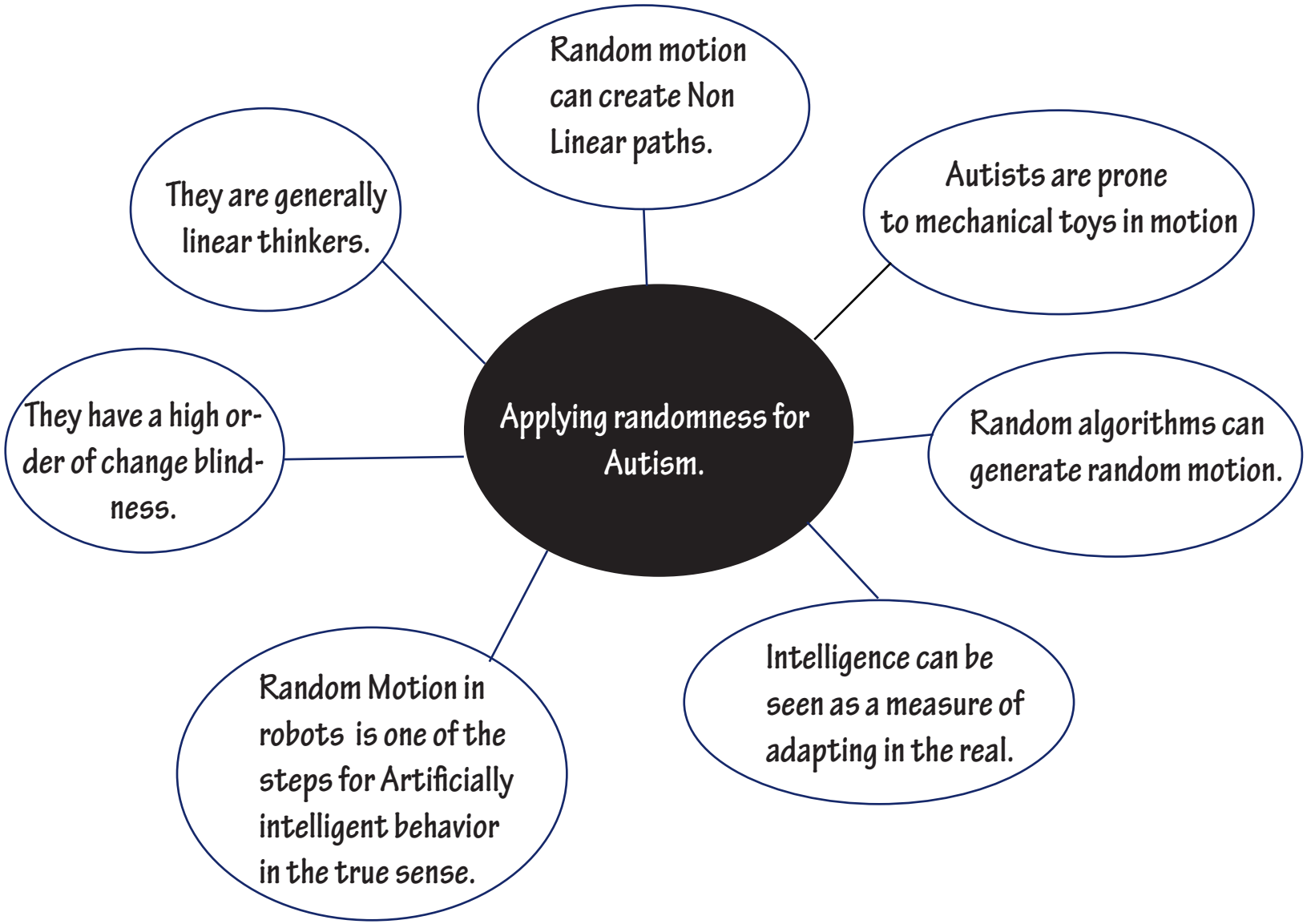
If someone comes close to the toy or if it goes close to the walls the toy is able to change its path on its own.



A robot that moves around in random motion. It gives a feeling of real life. Yet it is mechanical, hence close to reality but yet an artificial look.

The toy can be remotely switched on and off by the teacher or parent as they monitor the kids

How can it help Autism ?



Detailed Design

Idea3 = Final Idea

The Functionality

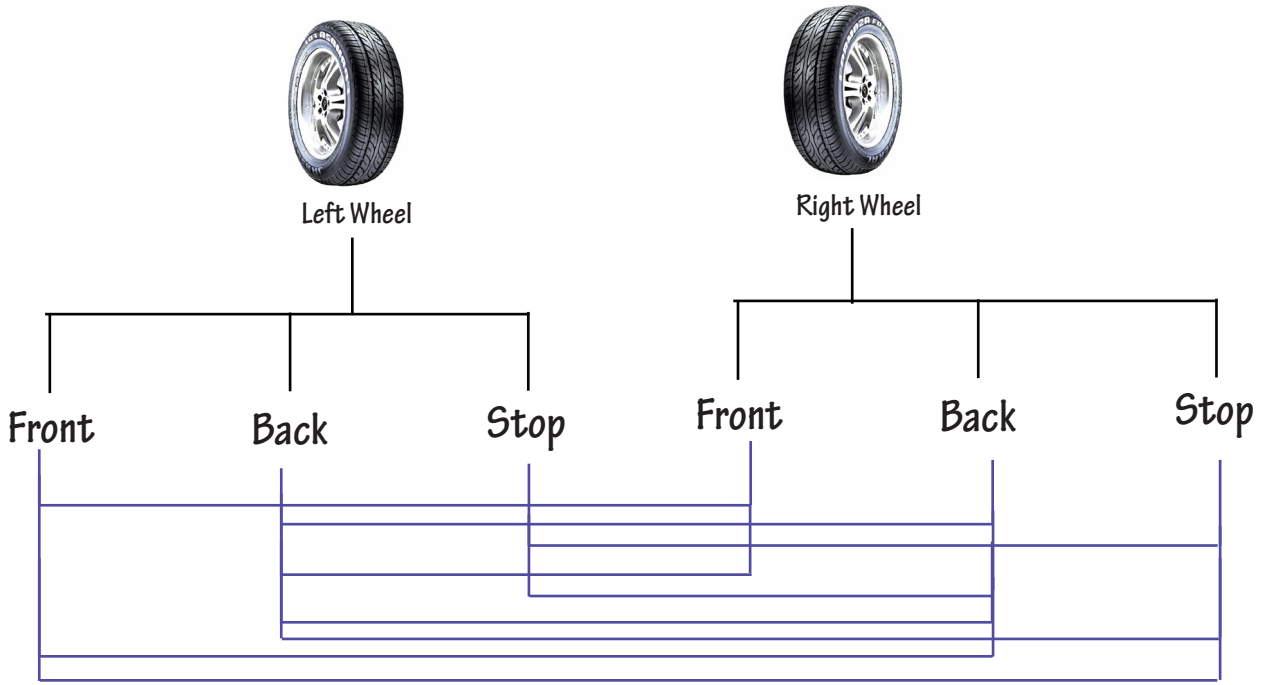
It is a 2 Wheeled robot supported by a third castor wheel.
Each wheel of the robot can work in either of the three possible states

----->
Front

<-----
Back

■
Stop

With 2 Wheels and Differential Drive we can have 9 different states of locomotion.



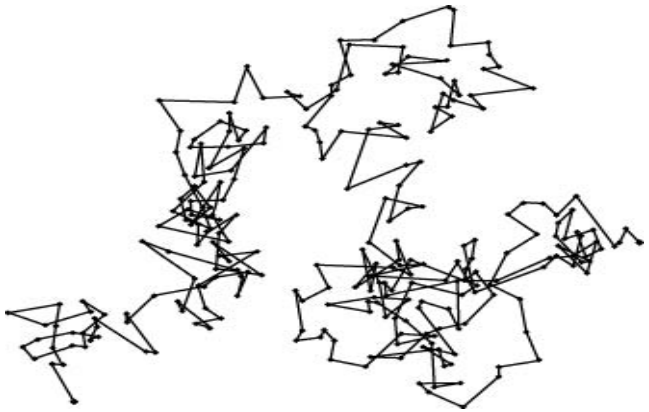
Detailed Design

Idea3 = Final Idea

The Functionality

RANDOM MOTION

The nine states can be moved using a random function command. This random function generates new patterns every time it moves. The strength of the random motion can determine the randomness of the patterns.

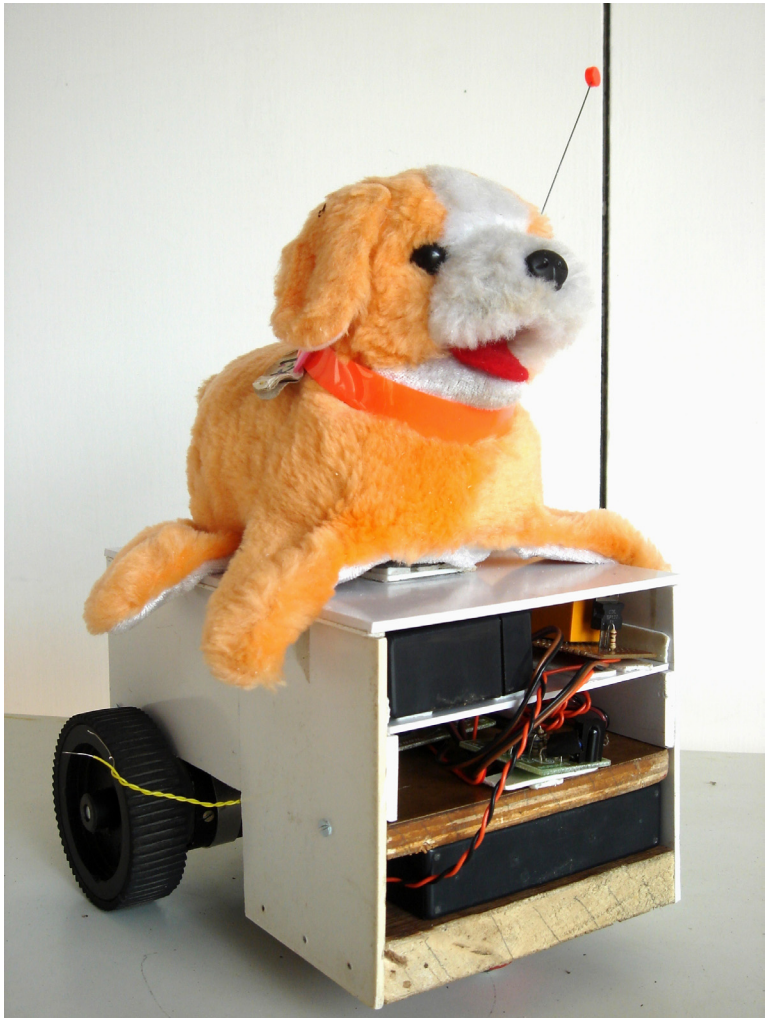


A teacher or Human can shut down or start the robot whenever needed.

Whenever someone touches the bot it will stop or turn or react like a real being.

Construction and Prototyping

Idea3 = Final Idea



The prototype currently displays semi functionality of the conceptualized product

Drawbacks and limitations

The prototype displays fixed area implementation.

Complete sensory touch is not implemented successfully. This can create a feeling of an artificial animal altogehter depending in its response.

The random motion can create an initial non acceptance.

The design can try to map more detailed interaction to make the toy more interactive.

The implementation needs to be tested with autistic kids.

The project was built using a premade user study, first hand experience still matters.

Future possibilities and Other applications

These bots can create differnt types of patterns with any artistic media. Such a pattern can be used as Robotic Art or it can be used as atechnique to identify new patterns

Random motion robots can be used for other contexts and scenarios
for eg. to help in early stages of elderly people.

Instead of a programmed random no. function a natural input can be used to identify or map environmental behaviors on paper or in motion.

Certain patterns can be observed and interactions can be recorded, the same patterns can be made to replay.