

# Portfolio

Ankush Gupta



## Pseudo 3D HCI

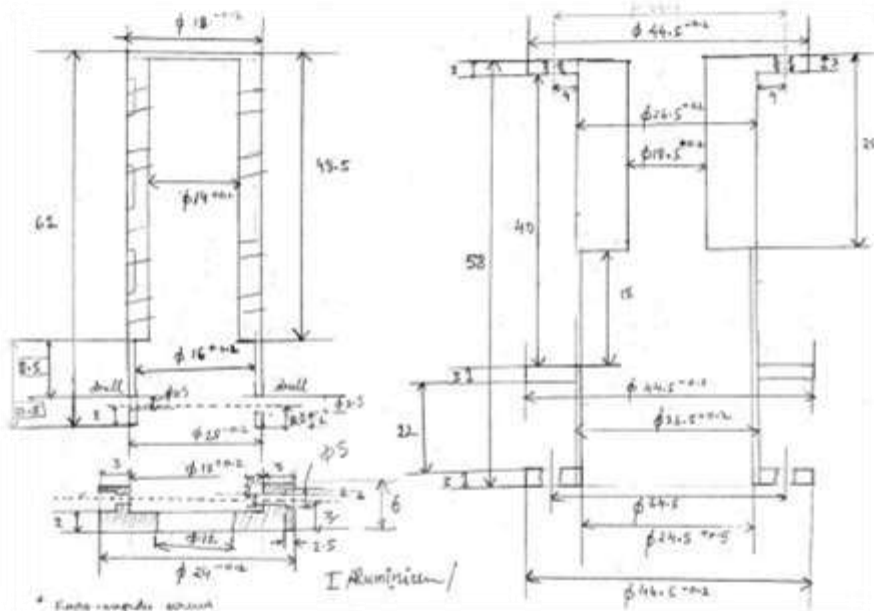
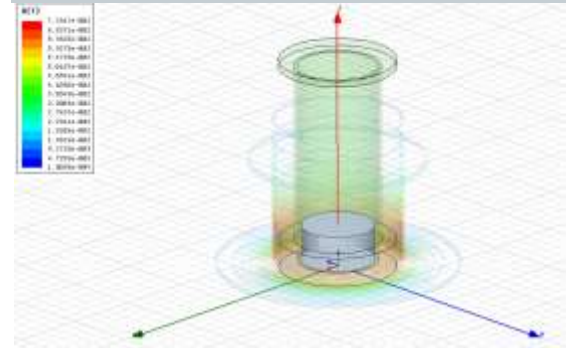
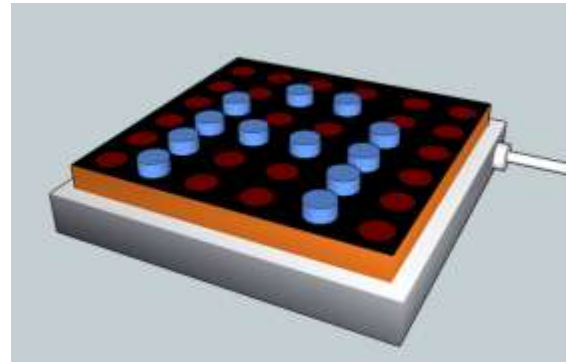
Tactile interface for projecting objects' contours in 3D

Developed a human-computer interface which projects a two dimensional shape drawn by the user on the computer screen, in three dimensions by raising and lowering stumps (pins) on a flat surface.

The idea is to move thin pins arranged in a 2D array (much like the screen pixels) and move them in and out of the plane of the screen – that way pseudo-3D contoured surfaces could be generated. The pins could be raised to varying amounts of heights to give a perception of different levels of height or depth. Then the user interface could be enhanced as all the icons, buttons etc. could be raised out of the screen which can give users a tactile feedback.

A prototype was developed as a proof of the concept under the guidance of my robotics teacher Mr. Ajithkumar K. G. at Delhi Public School, R. K. Puram and Dr. K. R. Rajagopal, Department of Electrical Engineering, Indian Institute of Technology (IIT), Delhi.

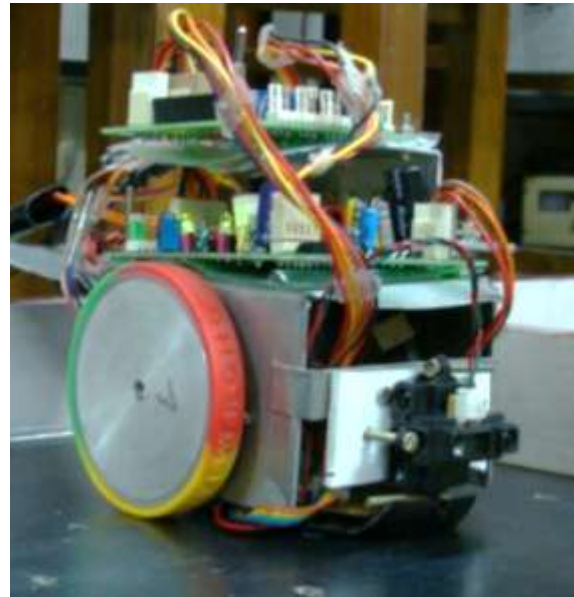
We have also filed a patent application for the concept.





Developed micromouse named ATOM - an autonomous, self-contained “intelligent” robot, designed to reach the center of a maze in the shortest possible time.

Its future application could be to build networked, small but intelligent agents with sensors (agents) which could be used to map the environment and form a configuration for carrying out a task which no single agent can do or where failure of single agent could mean the failure of the mission.



Machine control interfaces are often badly designed and users have to “learn” them before they can use them efficiently.

The idea behind Propeller was to break that learning barrier and develop an intuitive graphical user interface which makes a wheeled machine follow a path defined by the user by plotting points on the screen.

Propeller also allows remote controlling a machine over a TCP/IP network.



### Awards for Propeller:

- Won the **National Level CBSE Science Exhibition 2008** conducted by the Central Board of Secondary Education. A total of 2,000 teams participated.
- Exhibited at in the prestigious **35th Jawaharlal Nehru National Science Exhibition for Children-2008**, conducted by the National Council of Educational Research and Training (NCERT), India.





## Opus Magnum

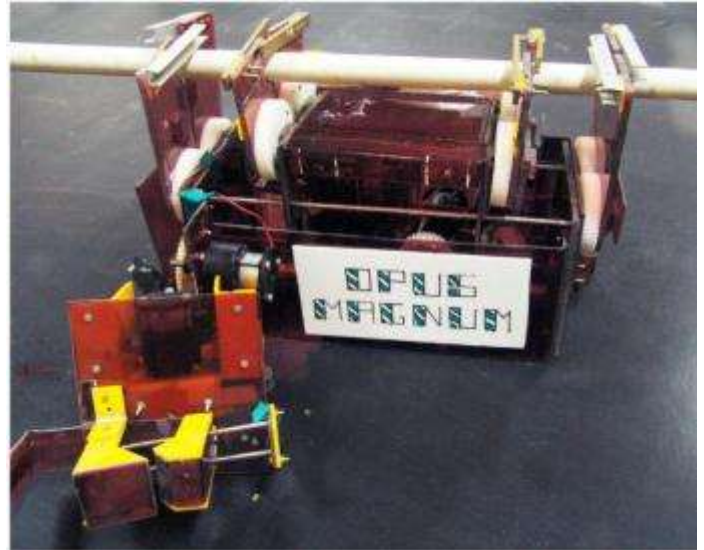
Pipe traverser robot

My first robot, Opus Magnum was designed to traverse a network of pipes.

It could traverse a grid of pipes, pick up a cylinder, and place it in a container hung at the end of the grid. It uses an inch-worm like motion using four claws to cling on to the grid.

It was designed for the technical competition at Indian Institute of Technology (IIT), Bombay and was awarded the Judges' Special Prize for innovative design and concept.

Dr. Rodney Brooks, Director of the MIT Computer Science and Artificial Intelligence Laboratory (CSAIL) were the guest of honor at the event.



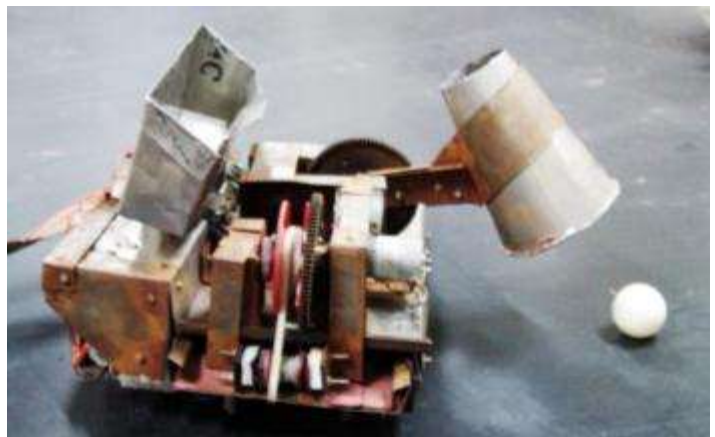
## Steel

Move...Grab...Store...Cross...Deploy

An important step forward for me – Steel.

This robot was developed for carrying out very versatile tasks –picking up tennis balls, store them in a chute, deploy a bridge across a pit and put the stored balls in a small hole dug in the ground.

It was ranked 20th (out of 215 teams) at Void, Techfest 2007, Indian Institute of Technology (IIT), Bombay





## W.ASP

Autonomous Line Following Robot

W.ASP is an autonomous line following robot. It does not use any microcontrollers. It was designed using wired logic by feeding the output from the light sensors to the relays which controlled the motional motors of the robot. The sensors too were custom made using IR LED's and phototransistor pairs.

It stood third at Troika 2008 conducted by Delhi College of Engineering (DCE).



## Voodoo

An octopod walker

Voodoo is an octopod which was designed to traverse smooth and rough terrains.

It employs two DC motors and simple gear trains to transfer the motion to the eight legs. It is controlled using a wired remote control. It has acrylic body with steel pipes to reinforce it. The legs itself are made of the steel pipes. It has a unique lever system which converts the rotatory motion of the gear trains into the oscillatory/elliptical motion of the legs.

It stood third at the technical festival Innova 2006 of the Delhi College of Engineering

