

# BASAVA KUMAR M

**PRODUCT DESIGN**

**X**

**D**

**ENGINEERING DESIGN**

**S**

**USER INTERACTION DESIGN**

**G**

**VISUAL COMMUNICATION**

**MASTER OF DESIGN**

Indian Institute of Technology Kanpur



# NAVJAT PHOTOTHERAPY UNIT

PATENT FILED

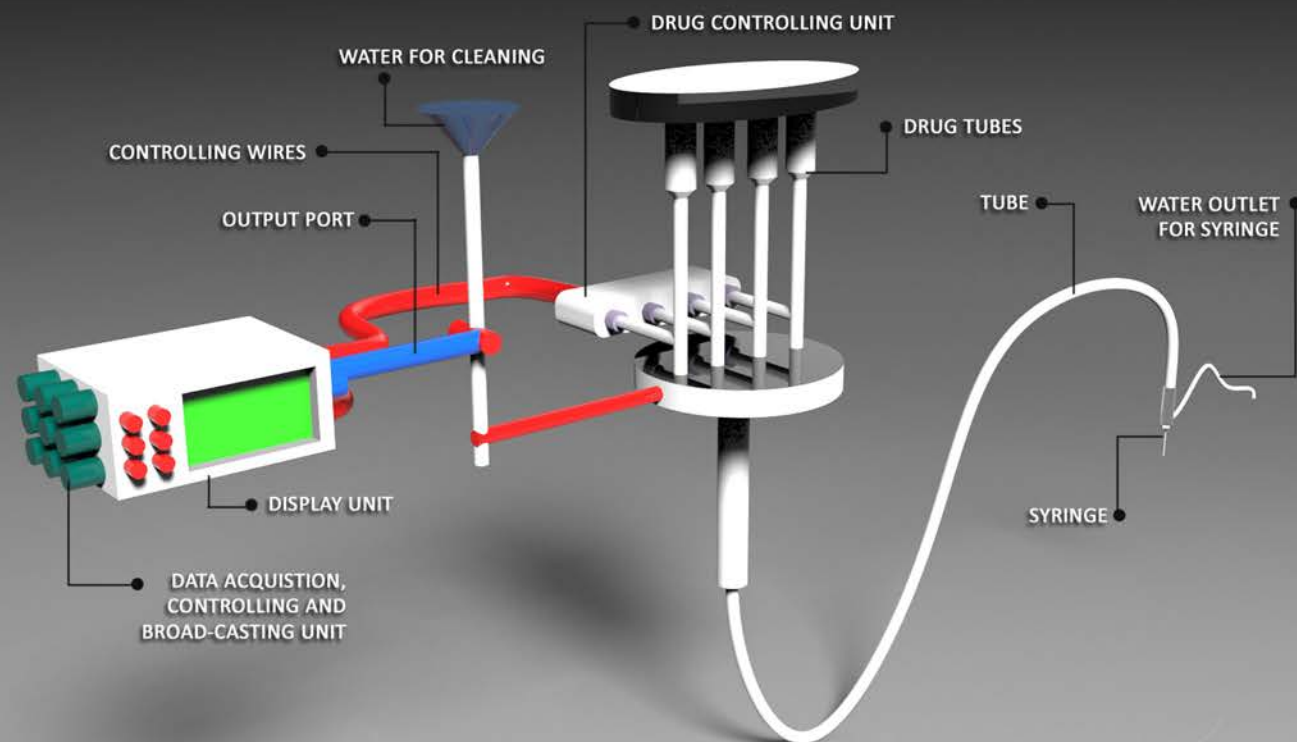


## NEED STATEMENT

Design and development of a Photo therapy unit to cure jaundice of new born babies and to cater the needs (Space, Affordability, Power scarcity, Refine Technology) in health care centre.

# A SMART DRUG DELIVERY INFUSION SYSTEM

PATENT FILED



## PROTOTYPE

Design of SMA actuator

Interfacing the actuator with host computer

Drug delivery and infusion system



Concept 1

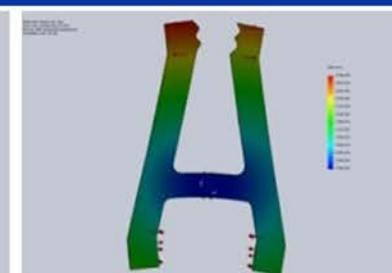
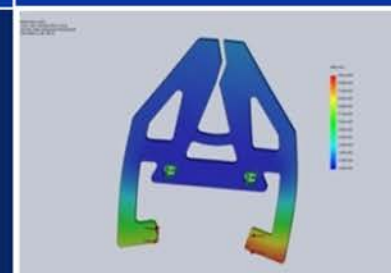


Concept 2

## NEED STATEMENT

Design and development of a Networked Health monitoring and control system (Smart Drug Delivery Infusion System -SMA Actuator) for critical condition of new born babies affected with jaundice.

## ANALYSIS



# VIRTUAL TRIAL ROOM

PATENT FILED

PROTOTYPE



PROTOTYPE LINK: [file:///E:/Documents/IIT%20Kanpur/1st%20SEM/DES%20633%20-%20Int%20New%20Prod%20Devp%20-%20NT/VTR/vtr\\_final\\_v2\\_19nov.swf](file:///E:/Documents/IIT%20Kanpur/1st%20SEM/DES%20633%20-%20Int%20New%20Prod%20Devp%20-%20NT/VTR/vtr_final_v2_19nov.swf)

## ABOUT VTR

It is a software based product that will be used for selling fashionable clothing using virtual apparel trial room

## FEATURES

- Captures photo
- Creates a user database
- Catalogue
- Drag and Drop
- USB Upload
- Instant Shopping

# SAAKAR KIT

PATENT FILED



## PROBLEMS



## SOLUTION



## NEED STATEMENT

An efficient way to distribute medications to patients in the resource constrained settings in order to minimize mismanagement of medication

## GAP ANALYSIS

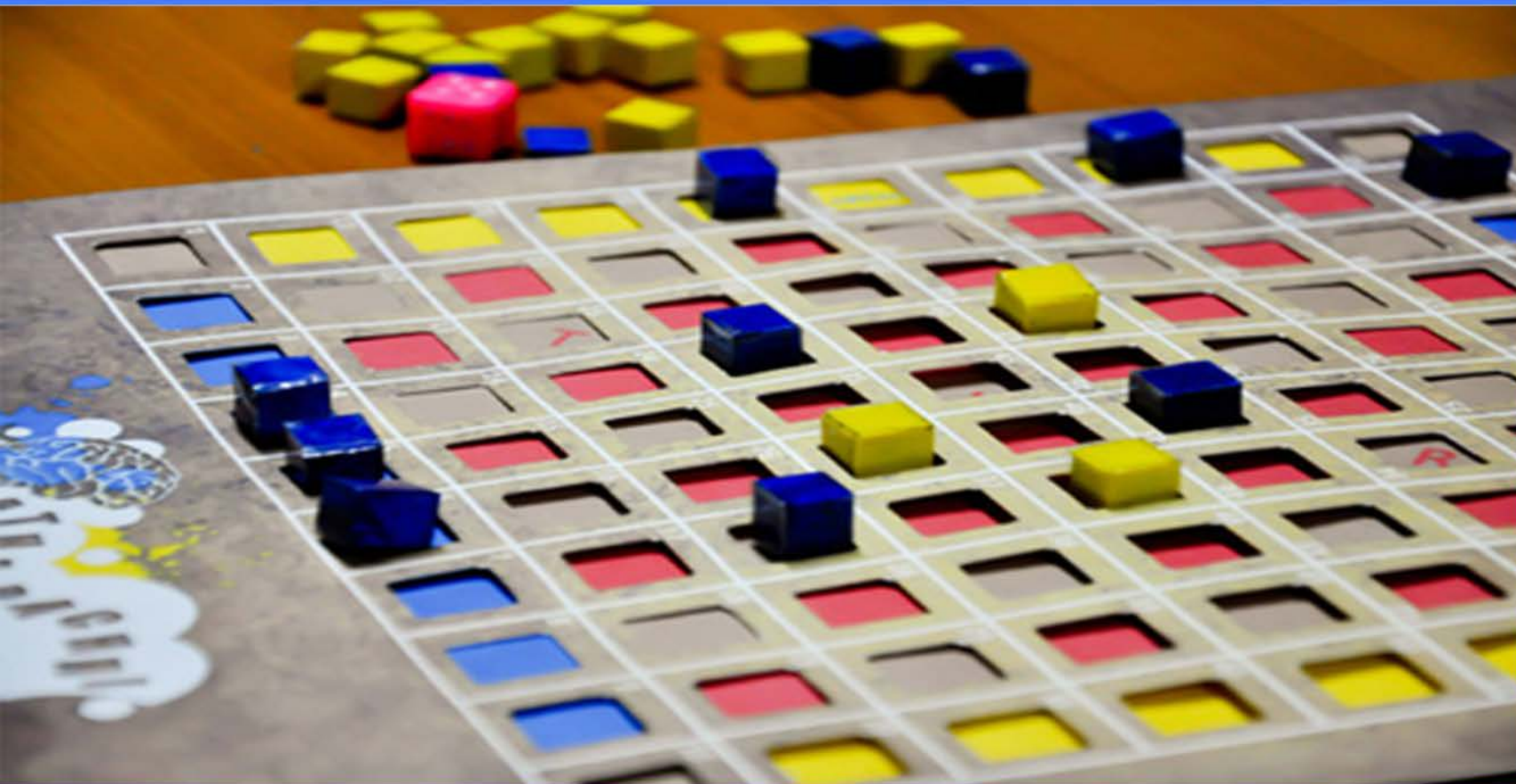
- Mismanagement of medicine in the box (usability: Arrangement, sorting, labelling)
- Lack of portability
- Insufficient space /inefficient space utilization in existing box
- No standardization of medication supply at sub center level

## USP

- Easy management of medicines
- Efficient space utilization
- Increased portability

# MATHA-PACHHI BOARD GAME

3 IN 1 BOARD GAME



## DESIGN PROCESS



### ADAL BADAL

The Objective of the game is to solve the puzzle With mutual co-ordination. Players should replace their Color pieces position to the opposite side of the board within the rule process.

There are 9 levels in this puzzle game

### RANN POAT

The Objective of the game is one player should try to eliminate opponent player.

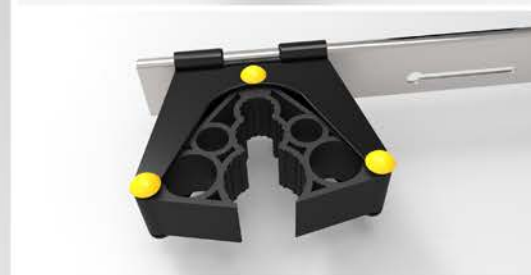
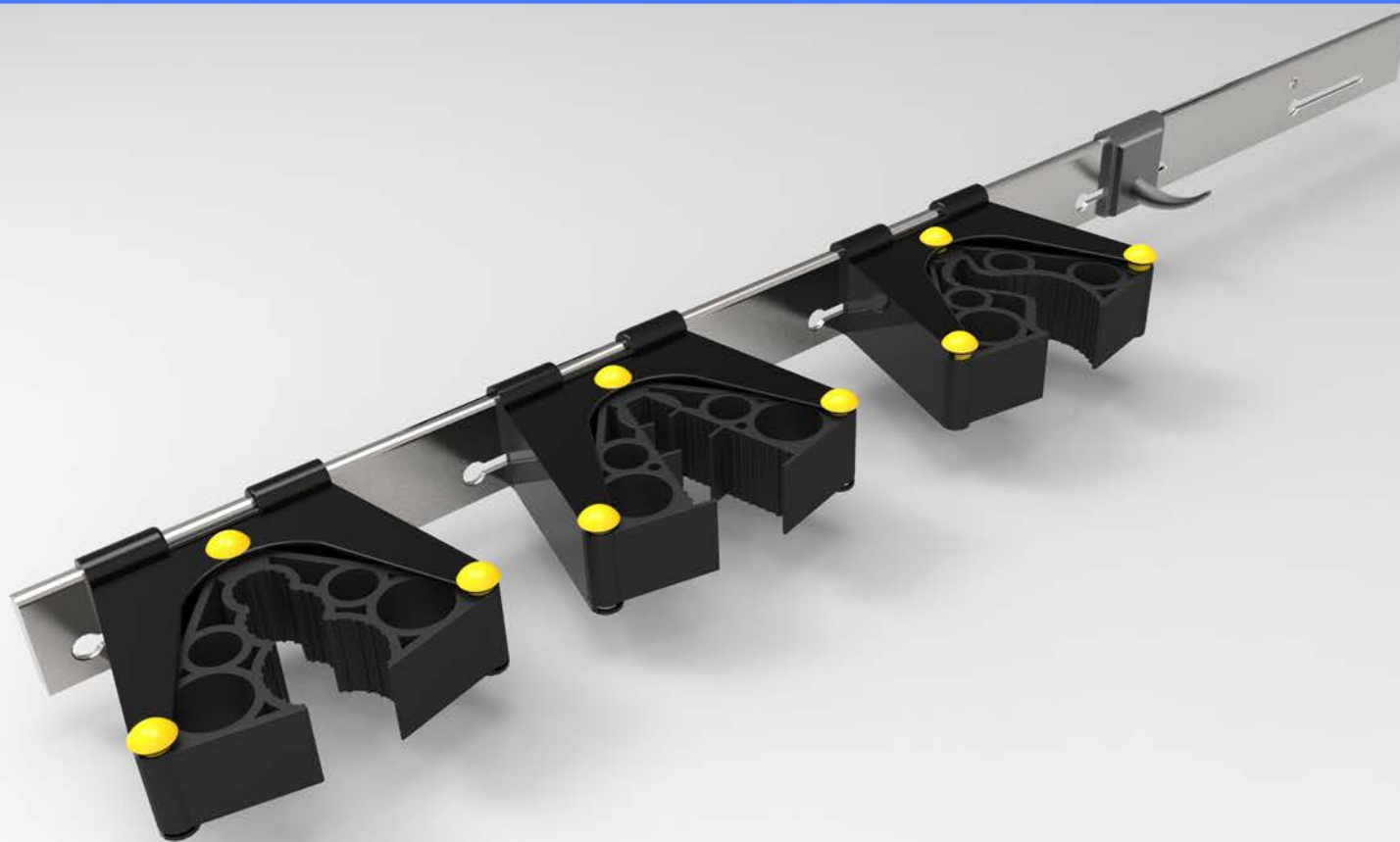
The player who eliminates all the opponent's color pieces first is the winner

### TAKARI

The Objective of the game is each player should try to reach the other end.

The player who reaches first is the winner

# FUSION TOOL HOLDER



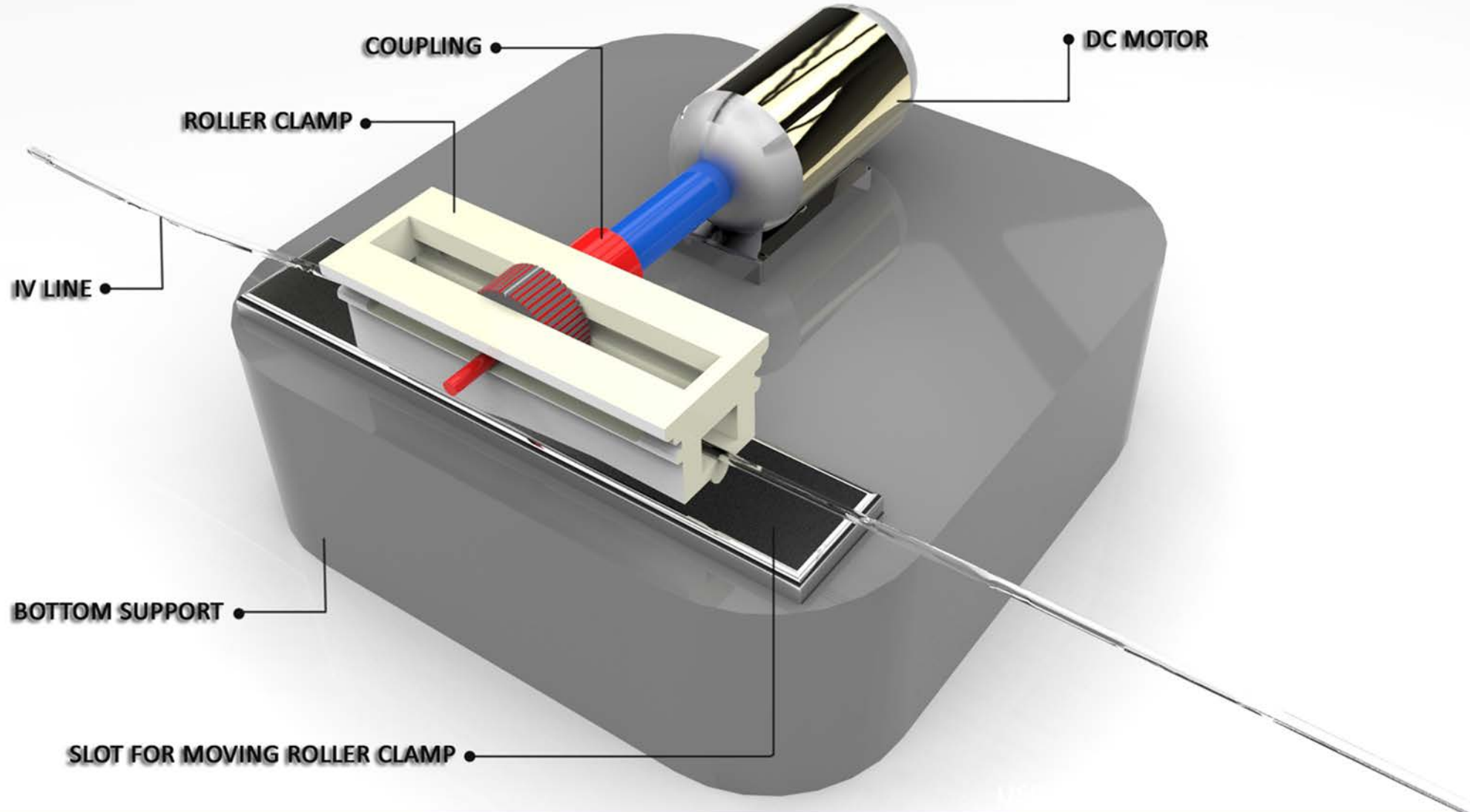
## DESIGN CHALLENGES

- Design of holder with wider diameter range (15-40mm)
- Design of holder and rail to make it easier to clean
- Design of hook that looks more robust and is longer

## DESIGN SOLUTION

A organic profile is added for more grip and friction between the tool and the holder. The round circles that support the centre area, where the tool needs to be placed. This way it is flexible and at the same time it adds force and pressure to hold the tool up in the air of different diameter range and easier to clean.

## DRUG CONTROL SYSTEM

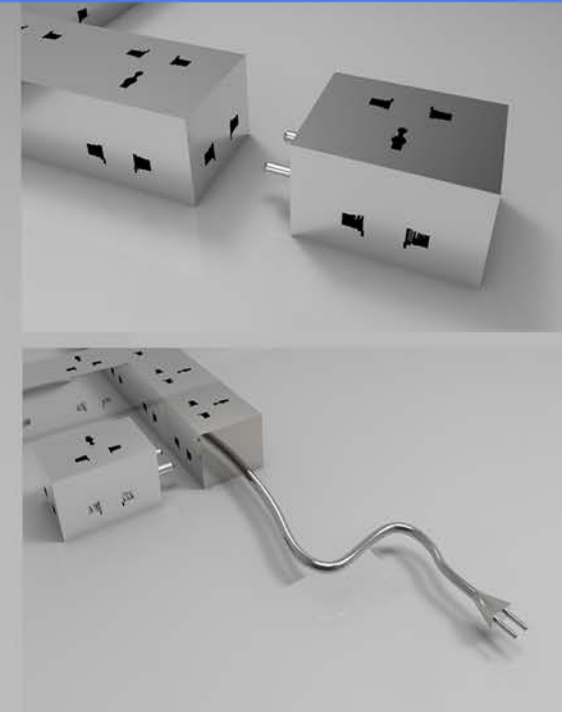
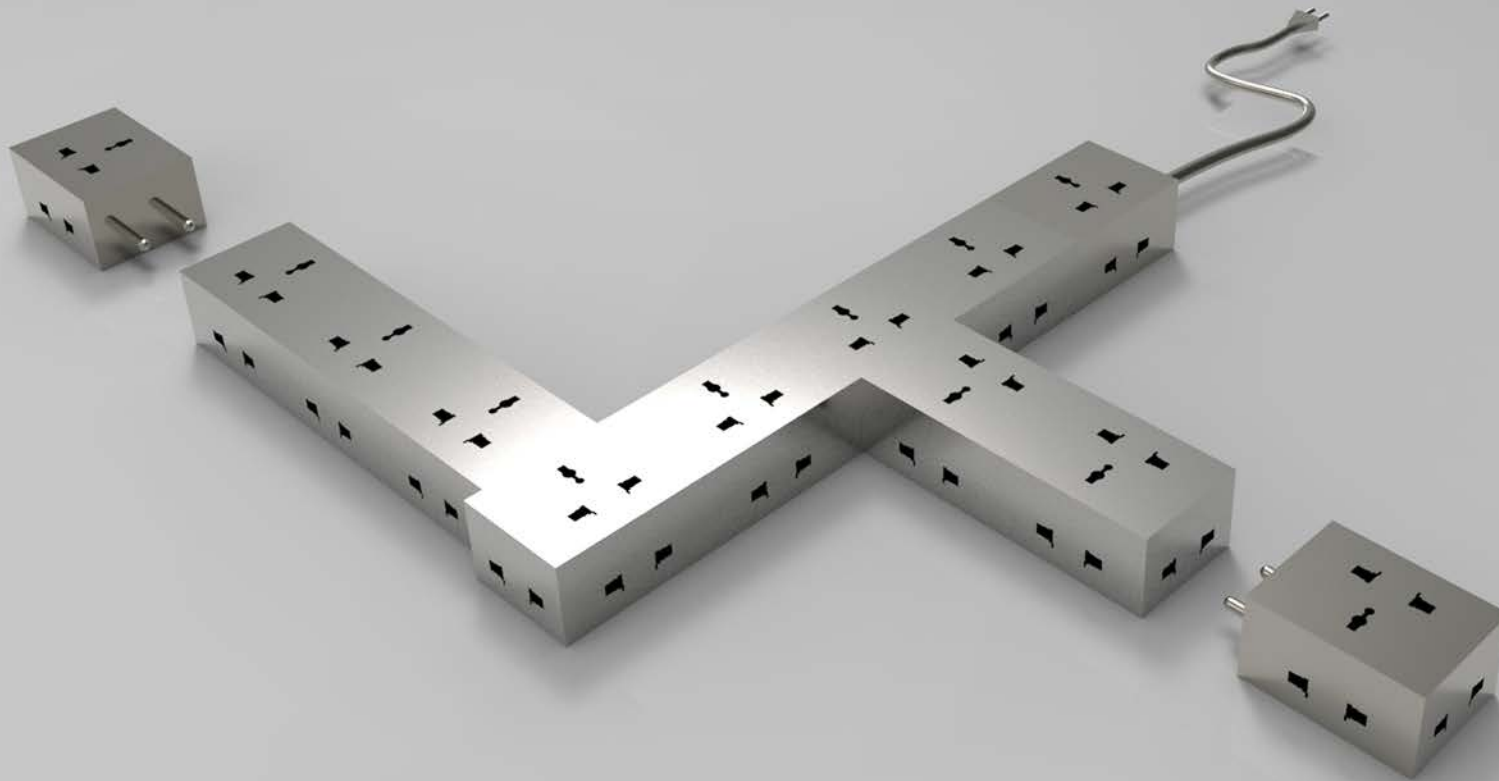


A Model of microcontroller based rotating mechanism for actuator design.

A microcontroller -Xbee communication based actuator is designed for controlling flow of drugs in multiple pipes. A driving and communication platform is used which has a motor driver, Arduino microcontroller board and an Xbee receiver. The host device is interfaced with an Xbee communicator/transmitter via VISA serial port communication in LabVIEW

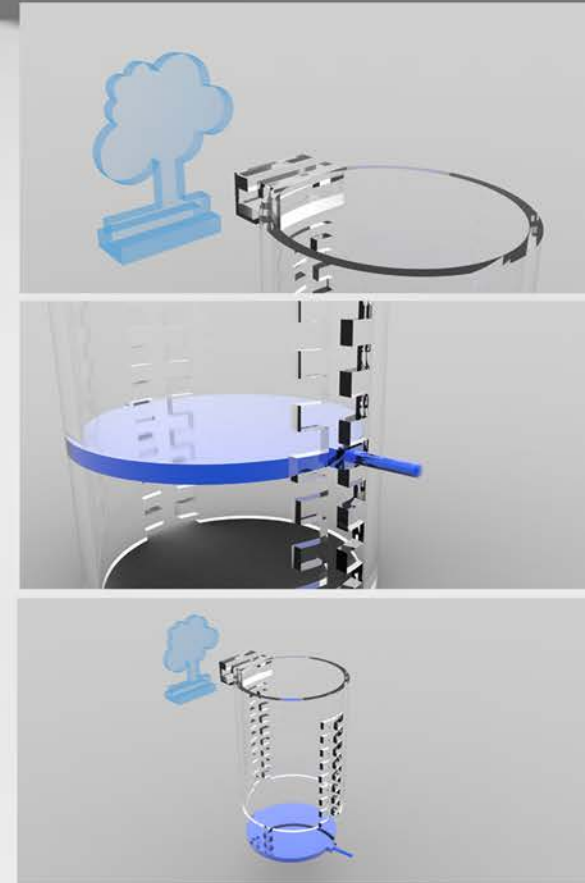
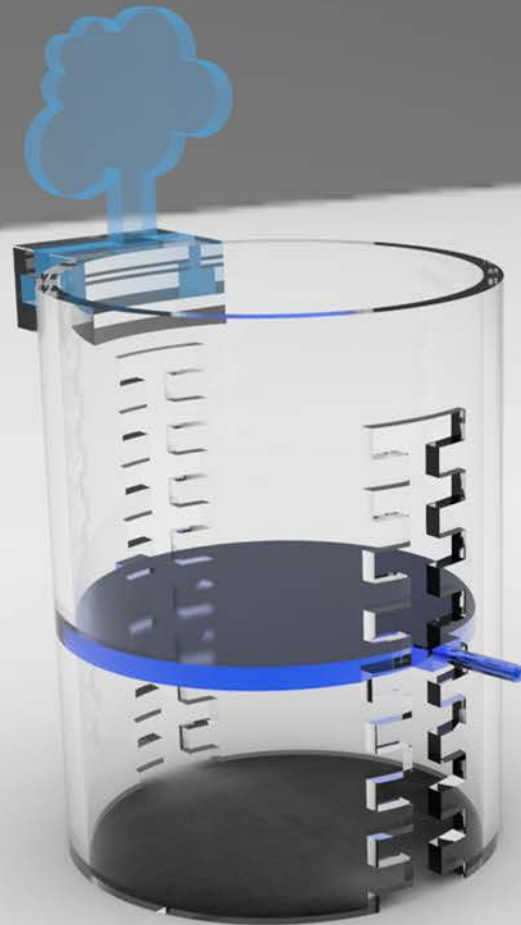


# ADD-SUB MULTIPLEX



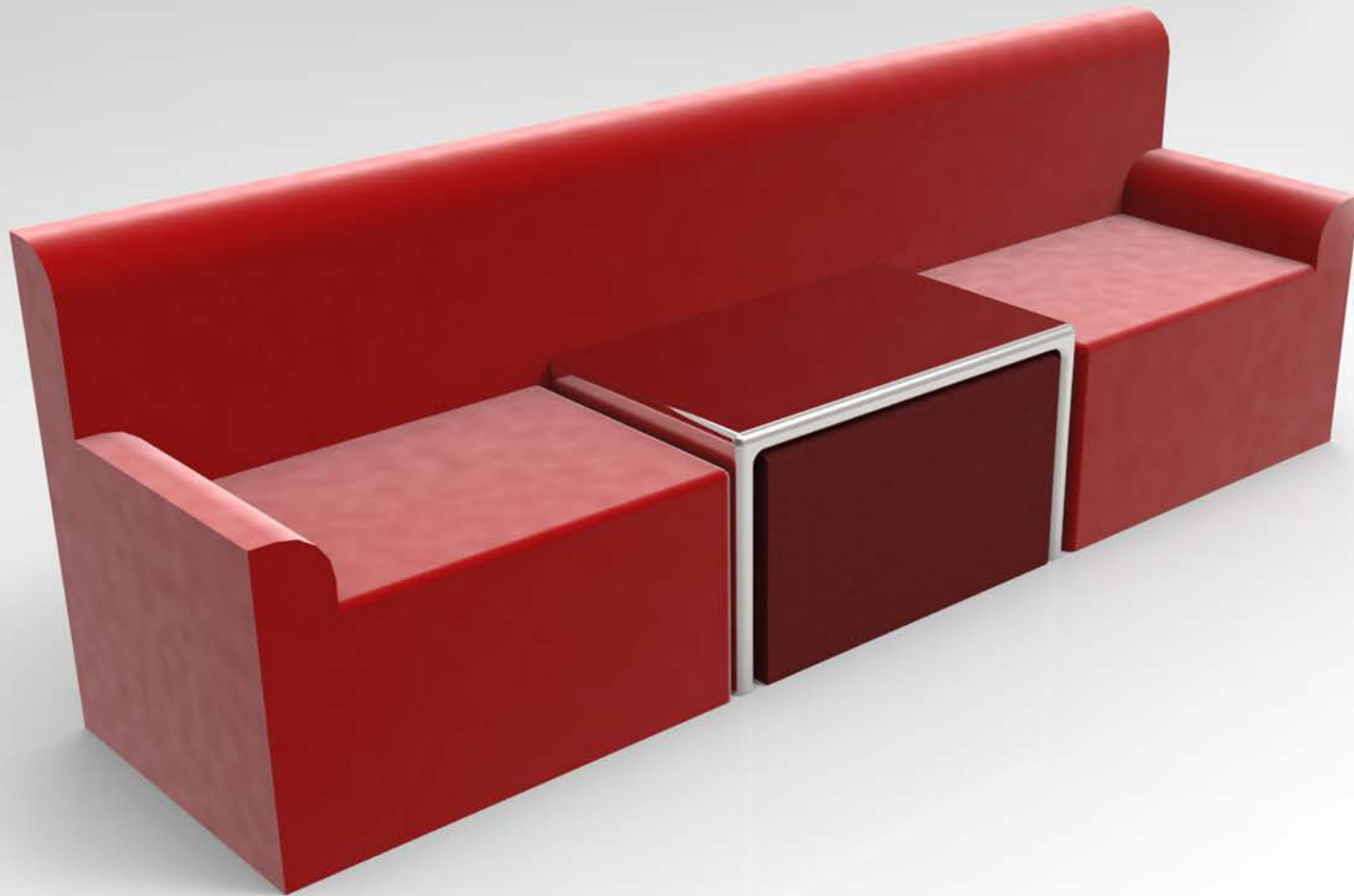
- It is an Electrical Switch- multiplex consisting of single socket switches. It can be constructed and de-constructed at any required point.
- Thermosetting plastic material is used for construction.
- Inspiration for this product design is from the Insufficient Electrical sockets in our lab.

# SHADOW STAND



- It is basically a candle stand, in which the extruded design in the candle stand is projected on the wall
- Glass/ Stainless steel is the main construction material
- Inspiration for this product design is from typography 3D project Model

## SPACIO SOFA



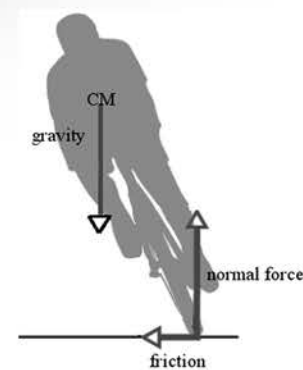
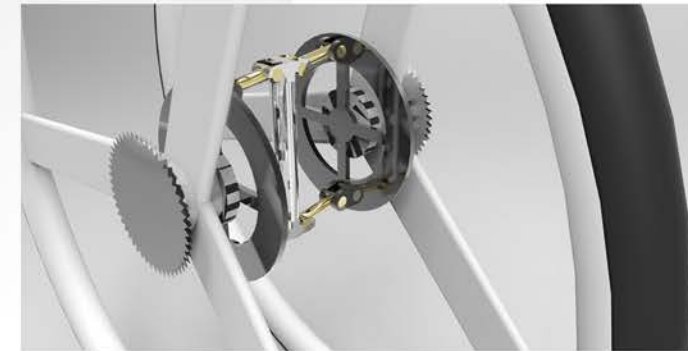
- Basically it is a 3 sitter sofa, In which middle seat is detachable so that it can be turned into 2 sitters and 2 slots are provided in the sofa so that table can be inserted in that slot. Microfiber leather and HDPE is the main construction material
- Inspiration for this product design is from Lack of space in our house

# SOLAR AQUARIUM



- It is basically an Esthetic –Aquarium, based on esthetic look of solar system
- Glass is the main construction material
- Inspiration for this product design is from the solar system model

# TILT WHILE TURNING BICYCLE



- **Design Objective:** Bicycle Re-design for user safety
- **User Group:** 5-15 Years (School going children)
- **Focus Area:** Safety while turning
- **Technical parameters** for designing Mechanism
  - Line of Contact, Surface Roughness, Surface Contact, Balance

## • Novelty in Design

- Introduction of Simple titling mechanism
- Robustness and aesthetics (more mechanical look) by maintain the ergonomics
- Safety is an integral part of cycle

# I COVER-STAND



- The I Cover-Stand is a very functional iPhone 4 case with a stand and grip function.
- It enables us to view the phone via the most proper viewing angles in the house and as well as travelling in the car.
- Although it may seem a handful, the case is actually comfortable to use stable finger grip for phone call, game, web surfing and texting.
- A hole on the backside (with in the case) to insert the stand for holding the phone.

# BALL CHAIR



- The Ball Chair - or Globe Chair as it's called sometimes - designed by using one of the most simple geometric forms - the ball.
- Removing of unwanted internal material and Cutting a slice at top and bottom of the ball makes it stable.
- This cute stylish, contemporary look, Light and robust little chairs for both indoor and outdoor use.
- Material Used: ABS plastic

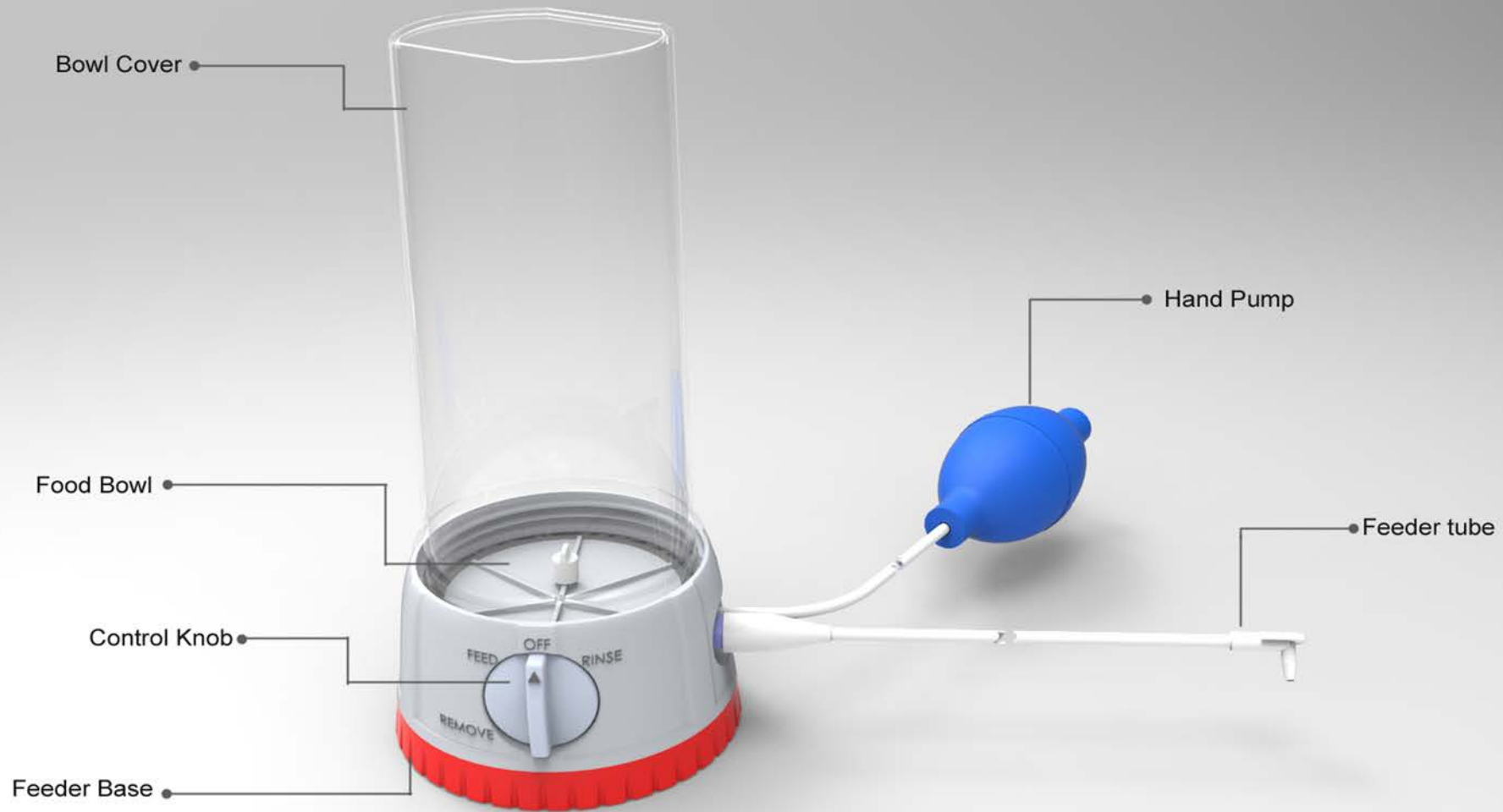
# PURE-H2O WATER BOTTLE



- It is a water bottle with filter attached to the cap.
- Water flow is crucial to the filtering process. This design makes filtering water as easy as drinking through a straw.
- Each and every piece of this bottle is replaceable. Making a modular product is not just for replacing, its also for making it your own.
- Constructed from BPA free Tritan, this non-toxic, non-leaching 'co-polyester' offers the clean aesthetics of glass with the forgiveness of plastic.

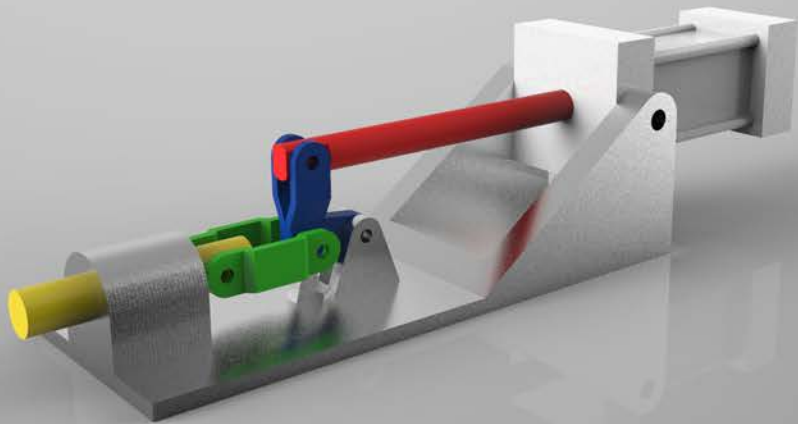


# MANUAL FOOD DISPENSER

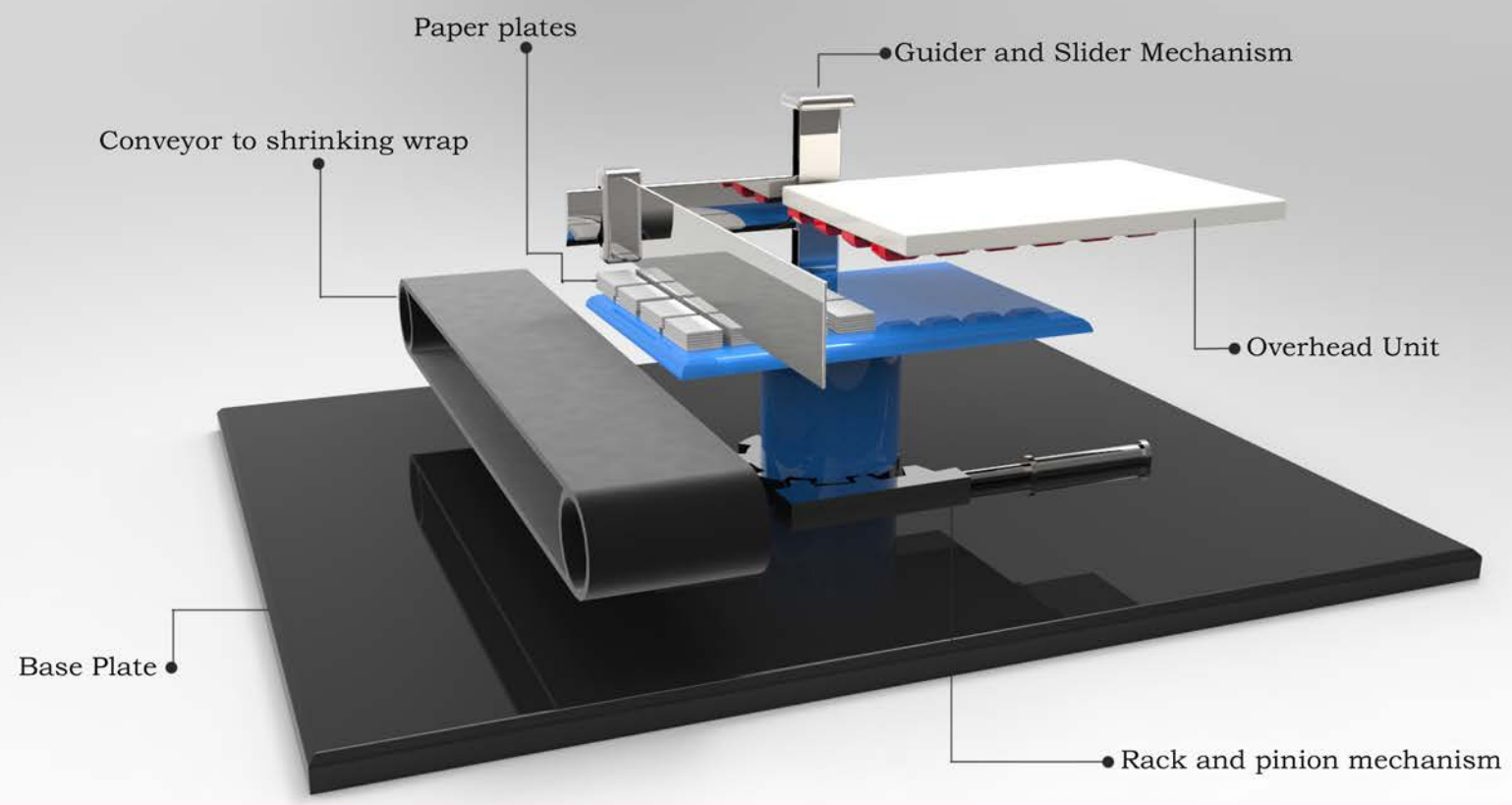


- This device used for dispensing food to people who can not eat solid food.
- Machine requires no power and is operated by a hand pump.
- It has control knob for feed, rinse and remove (manually operated)

# MODELLING - RENDERING



# AUTOMATED COUNTER AND STACKING SYSTEM



## PROBLEM



## PRODUCT SPECIFICATIONS

Products	Picture	Dimensions (mm)	Weight (gms)	Pieces/cycle	Mold layout
Cup		Max Diameter : 100 Min Diameter : 45 Height : 40	4.5 - 5	32	
Circular Plate		Max Diameter : 135 Min Diameter : 100 Height : 15	6 - 9.5	24	
Circular Plate		Max Diameter : 185 Min Diameter : 145 Height : 18	8	18	
Square Plate		Max L*W: 152*152 Min L*W: 105*105 Height : 25	7 - 8	24	
Circular Plate		Max Diameter : 202 Min Diameter : 215 Height : 20	8	18	
Rectangular Plate		Max Length: 280 Min Length: 235 Max Width: 230 Min Width: 175 Height : 40	35	8	

## OBJECTIVE

Design of Automated Counter and Stacking system for Thermoformed disposable paper dishes

## STUDY

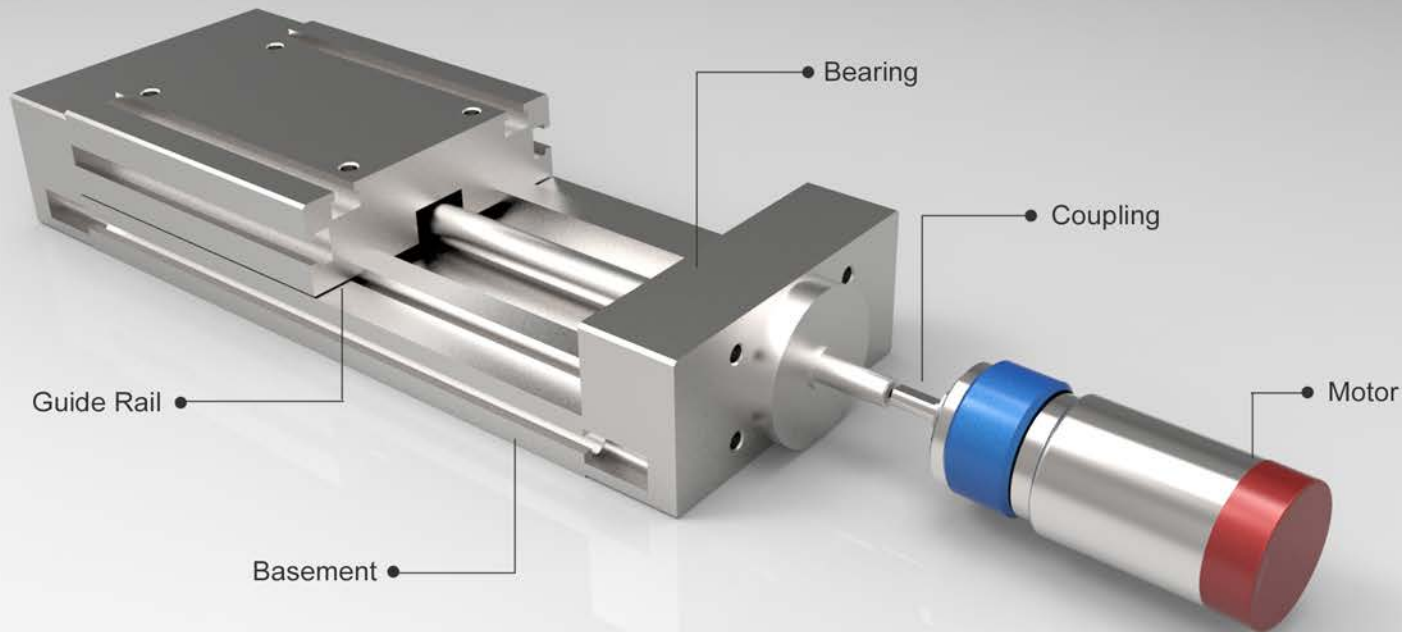
1. Field study/ workspace analysis
2. Machine specifications
3. Product specifications
4. Other miscellaneous constraints

## CONCEPTUAL DESIGN

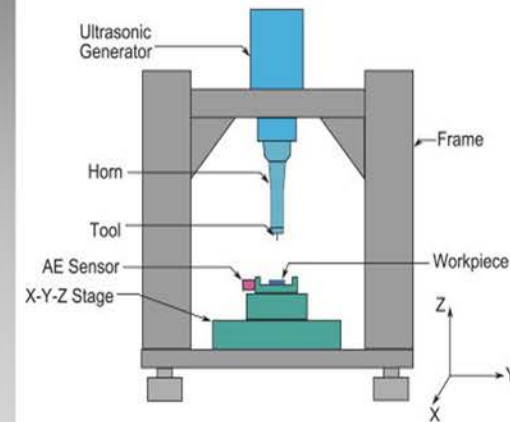
It is basically design of material handling system that is used for counting and stacking be done continuously during the passage of the product. This system can have following sub-systems.

- A. Conveyor and collector system
- B. Sensors for counting
- C. Stacking System

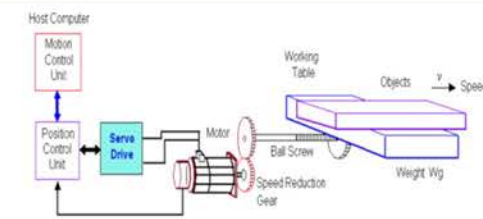
# MICRO ULTRASONIC MACHINE BASE TABLE DESIGN



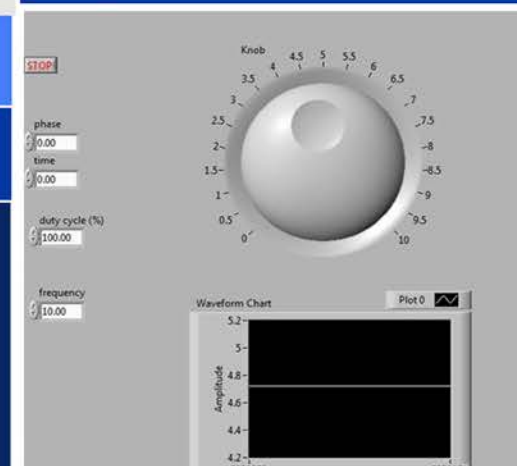
## MICRO USM



## BASE TABLE DESIGN



## FRONT PANEL OF THE PROGRAM (LABVIEW PROGRAM FOR SPEED CONTROL OF DC MOTOR)



## ABOUT MICRO USM BASE TABLE

Micro ultrasonic machining (micro USM), is one of the efficient material removal processes especially suitable for the micromachining of hard and brittle materials.

Design of the base table by using ball screw mechanism and design of circuit and program to communicate between hardware and software we can achieve 3D machining of the brittle parts.

# SCREW JACK DESIGN



## ABOUT SCREW JACK

It is used to lift heavy loads / weight with or by applying little effort.



## OBJECTIVE

Designing and manufacturing of a basic model of power screw i.e., Screw Jack (to know end to end Product engineering design process).

## SCREW JACK SPECIFICATIONS

- |    |                                      |                 |
|----|--------------------------------------|-----------------|
| 1. | Load to be lifted                    | - 15 KN         |
| 2. | Height at which load is to be raised | - 250mm.        |
| 3. | Mechanical Advantage                 | - 37.5          |
| 4. | Efficiency                           | - 19.85%        |
| 5. | Maximum & Minimum Height             | - 715mm & 470mm |
| 6. | Net weight                           | - 17 Kg         |

# EDUCATIONAL AID FOR ILLITERATE WOMEN

## RESEARCH

GUIDED BY: *Shweta Tyagi*

### SEARCHING FOR A PROBLEM STATEMENT



### RESEARCH FINDINGS



OUR INTEREST AREA

IT WAS FOUND THAT **MONEY** WAS INVOLVED IN THE EXCHANGE FOR **WASTE** MATERIAL WHICH BRINGS MUTUAL BENEFIT IN THE WASTE MANAGEMENT CYCLE. HENCE THERE IS A **MOTIVATION, INTEREST & VALUE.**



SINCE RECYCLE FACILITIES ARE ALREADY AVAILABLE, INTERACTION **SOLUTIONS** IN OUR AREA OF INTEREST IS CONFINED WHERE WASTE CAN BE **PREVENTED, MINIMIZED** AND **RE-USE** IN AN EFFECTIVE WAY. THERE IS ALSO A NEED FOR IMPROVING THE FLOW OF **MONETARY BENEFIT.**



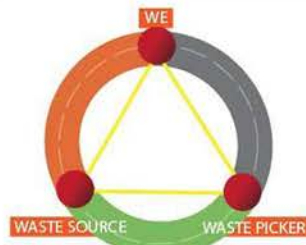
### HIERARCHY

## NEED

### AWARENESS & MOTIVATION



### BUILDING THE AREA



### SOURCE OF MOTIVATION



OUR INTEREST AREA

THE MOST EFFECTIVE SOURCE FOR SPREADING **AWARENESS & MOTIVATION** WAS FOUND TO BE THE KIDS. THEY ARE THE MOST **INFLUENTIAL** AND DRAWS ATTENTION OF ALL AGE GROUP. THEY ARE THE **FUTURE** OF TOMMOROW'S SOCIETY.



AWARENESS THROUGH FUN ELEMENTS IN SCHOOL AND ALSO AT HOMEWORK

## NEED

### ILLITERATE WOMEN

AFTER INTERACTING WITH THE KIDS FOR A WEEK WITH **FUN ACTIVITIES** IT WAS FOUND OUT THAT THE PARENTS OF THE STUDENTS WHO ARE IN THE **BELOW POVERTY LINE** CATEGORY ARE **IGNORANT**. THEY SHOWED NO SIGN OF INTEREST MAINLY BECAUSE THEY WERE **ILLITERATE.**

OUR INTEREST AREA

WOMEN ARE CLOSEST TO THEIR EYES. THEY SPENT MAXIMUM TIME WITH THEIR CHILDREN. THERE IS A NEED FOR EDUCATION

### RESEARCH FINDINGS

### WHY ILLITERATE?



### WHERE & WHY IS IT IMPORTANT TO HER?



HOW? she learn



OBSERVATION!!!!



## NEED STATEMENT

# Designing an Educational aid for illiterate women

# EDUCATIONAL AID FOR ILLITERATE WOMEN

**INSIGHTS ABOUT THE PROJECT:**

Started off with WASTE MANAGEMENT in which a research has been done for a week. Our research has found out that AWARENESS is the main drive to control waste management. We targeted on childrens as they are the future and also they can act as a good source of communication to the masses. But the parents of BOP childrens are so ignorant due to illiteracy that they would not even allow their kids to go to school. So we took a sharp bend in our project to educate the BOP parents mainly the women/mothers.

(PLEASE ZOOM THE PAGE FOR CLEARER VISION)

**ILLITERATE WOMEN**

WHY?

"Give me an educated mother, I shall promise you the birth of a civilized, educated nation"

- Napoleon Bonaparte



Among the parents in a family, the mother is the closest to the child and spends most time with the child.

Lack of education make them feel insecure to embrace new solutions.

Educate the women, only then they can themselves practice good waste disposal and encourage their children to do the same

**PROBLEM STATEMENT**

We are designing an **'EDUCATIONAL AID'** for illiterate women to read basic words.

**BASIC:** Learning alphabets A-Z  
Framing words and read



**RESEARCH FINDINGS**

**WHY ILLITERATE??**

- No School
- Financial crisis
- Family Condition
- After Marriage condition
- Social pressure

**EDUCATION**

Non literate  
Semi literate

**MOTIVATION**

Awe of device  
No class room type  
Entertainment based  
Monetary benefit

**TOUCH POINTS** (Reading)

- Banks
- Shops
- Offices
- Mobile phones
- Parents and teachers meetings
- Kids Homework

**MARITAL STATUS**

Married  
Unmarried

**LEISURE**

Time  
No Time  
Flexible

**CONSTRAINTS**

less time  
No time

**VOCABULARY TOUCH POINTS**

Easy vocabulary which they can associate their day to day lives

BANK	PARENTS MEETINGS	CHILDREN'S HOMEWORK	ELECTRONICS
Chennai Cash Counter Deposit Loan Withdrawal Cashback Card ATM	Principal Teachers School Headmaster Phone Report Card	Subjects Science English Hindi Social Science Geography Maths	Balls Table Light Sun Press Flag Switch Board Fridge TV Fan Radio Compluter Mobile Phone
MARKET	RECHARGE SHOP	GARMENT	STATIONARY
Recharge Shop Tailors Saree Commodity Beauty Parlour Bakery Stationary Electronics Stationery Sari Shop	Recharge ATM Mobile Data Network SIM	Carton Saree Saree Saree Saree Saree	Ballpoint Compluter Mobile Phone Scribble Scribble Scribble
SARBI MAN	Phalar Carnet Thermos		

**DEVELOPING DESIGN PROTOTYPE**

Demo to practice Alphabets (Visual & Audio)  
Demo of pressing alphabet and spelling out.  
Demo of how to use the device

An exercise which will be like a game where entering the right alphabet and correct spelling leads to the NEXT LEVEL. This will be through Pictorial, Text writing and Audio. It will help them in terms of concentration and memorizing.

Deriving scenarios and scenes which is easy to remember. Not only this it is very important to make them realize that learning will help them in many ways. To make them understand MOTIVATION is required. So the exercise itself should be something which will give them a sense of challenge to learn.

Grading system for motivation  
Improvement indicator  
Audio sensor to improve pronunciation

Required Bluetooth and memory slot to transfer update and introduced levels of chapters and exercise.

After being familiar with Alphabets and spelling words this device should continue to help them read out what they text. This will enhance their exercise in future.

still in progress.....



**CREATING SCENERIOS**



**CREATING CONCEPT PROTOTYPE**

Familiar words from touchpoints.  
Easy to understand and evaluate them  
Pictorial representation of objects and actions  
Spelling in English and Hindi  
Phonetics, to teach pronunciation in English  
Explanation of the meaning in Hindi  
Contextual applicability

**USER TESTING new insights**

- \*Unusual Sharp Memory
- \*Taste of stories
- \*Problems faced due to illiteracy
- \*Pattern recognition for products
- \*Simple and self learnt tactics
- \*Familiar with mobile phones.

**REFINEMENT OF prototype**

Integrating Alphabets and Stories which she can connect with her day to day lives.  
Evaluation of learning through FUN EXERCISE  
Learning through Stages with LEVELS of difficulties gradually increases.  
Inclusion of Hindi spelling and explanations as AUDIO guide  
Pattern of operating mobile phones

**CREATING PERSONAS**

**Name:** Suship  
**Occupation:** Shopkeeper  
**Age:** 35 years  
**Literacy level:** studied up to 2nd Std  
**Marital status:** married  
**Children:** One daughter, studying in 6th std.  
**Residence:** Nankan village

**Name:** Renu  
**Occupation:** Housewife  
**Age:** 41 years  
**Literacy level:** married  
**Marital status:** married  
**Children:** Two, a son, 5th std daughter, 7th Std.  
**Residence:** Nankan village

**USER XPERIENCE MODULE**  
UNDER THE GUIDANCE OF Jhumkee Iyengar

## An Application to help women learn the Basic English words and identify alphabets through their day to day lives



LOGIN

SIGN UP

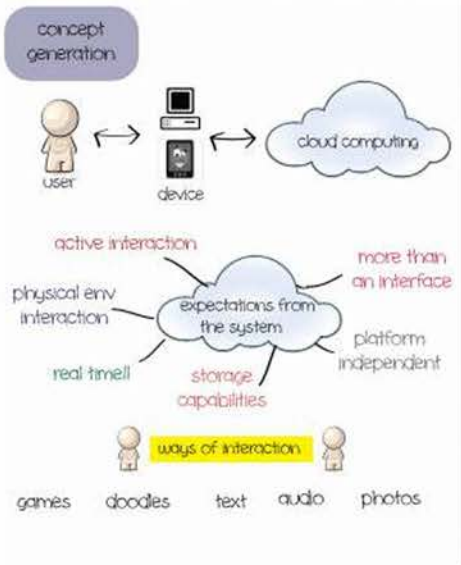
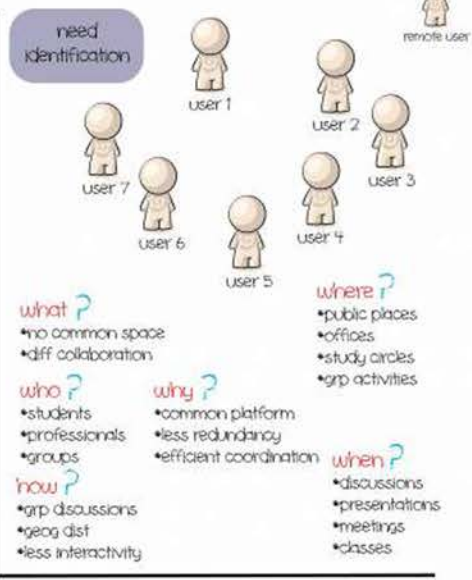
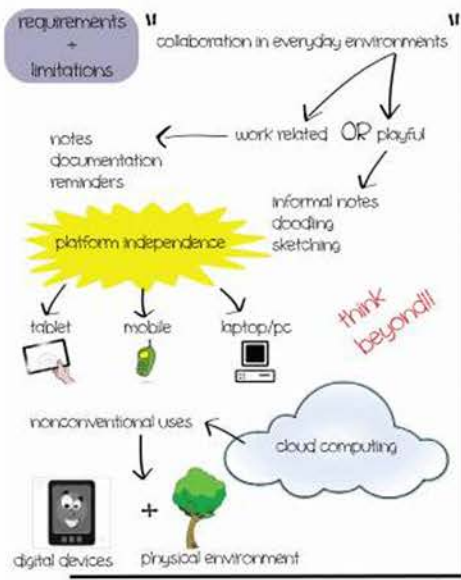
NAME

PASSWORD



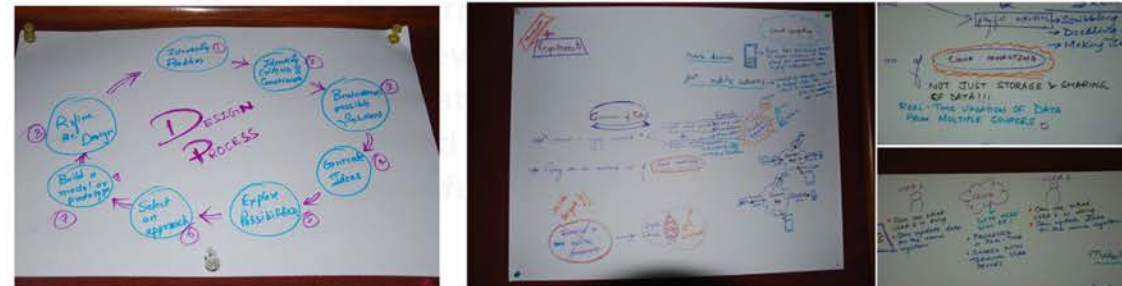
# VIRTUAL WHITEBOARD

## team ENIGMA virtual whiteboard



## An application through cloud computing

It is a common window where you can have an option to interact through all the possible means like Conversing through text, Sharing images and videos, playing games, Sketching and doodling.





# AN APP FOR DAILY LIFE



## DESIGN CHALLENGE:

Design a mobile app for your daily life.

Pretend it's an app that you view/edit these stats:

Heart rate, Drinks consumed, Food eaten, Hours slept, Highfives received

# VISITING CARD EXCHANGER

A Mobile App to get the contact details by using a visiting card

## KEY BENEFITS:

- It eliminates the need to type contact information into the phonebook
- It helps in updating the Contacts List in a systematic manner, by filling all the fields usually not filled because of the difficulty and lack of time to type
- It takes very less time to update the entire contact information.



A Mobile App using Augmented Reality to make the experience of reading & understanding books easier

## KEY BENEFITS:

- Easy to get the word meaning,
- Can act as a handy tool to learn English quickly
- No need to carry pocket dictionary



# QUICK LOOKUP



# MOTION PICTURES (VIDEOS)

## DEEPA

Short film on girl/women status in some parts of India and their sacrifices

Video link: <https://www.youtube.com/watch?v=QZL5BY58Ft8>



## KHUJLI

A one minute short film -  
The film depicts the character of a person who is very impulsive

Video link: <http://www.youtube.com/watch?v=f9OpYkzDzv8>



## STRINGS

A 3mins short film:  
STRINGS - Your dreams are not yours alone.

Video link: <http://www.youtube.com/watch?v=kWXY87LEtiU>



## INTER-VIEW

A 8mins short film: INTER-VIEW

Video link: <https://www.youtube.com/watch?v=m3F6eiGoX14>



## LOGO DESIGN

Rural Technology Action Group - Indian Institute of Technology Kanpur



NavJat Phototherapy Unit

SAAKAR KIT - A Medical Kit

**NavJat**  
Phototherapy Unit

**SAAKAR**  
KI+



I am currently pursuing master of Design in Indian institute of technology Kanpur, India. Previously I did my bachelors in Mechanical Engineering in RVCE, Bangalore and worked for 1 year with Essar Steel Hazira Ltd.

### DESIGN TO ME

Simplicity is design. I am passionate about Product and industrial design with a keen interest in innovative product based work including Static and dynamics. However, I enjoy exploring a variety of fields found within Design. I am enthusiastic and experimental with my approach towards a brief, with a strong appreciation of the research and production methodologies. Design has taught me that no matter what you work on, each project is different and unique in its own way.

My job is to Creating a relationship between the users – The product - the Technology. As a designer, I enjoy influencing that relationship with my strong design skills, aesthetic clarity and understanding of marketing principles. Each experience has helped me grow as a designer and as a person.

### Examination

Master of Design(2014)

B.E. (Mechanical Engg)(2010)

Diploma (Mechanical Engg)(2007)

S.S.L.C (2004)

### Institution

Indian Institute Of Technology, Kanpur

RVCE, Bangalore

Sandur polytechnic, Yeswanthnagar

Bharathi Sishu Vidyalaya, Kampli

### University/Board

IIT Kanpur

VTU, Belgaum

DTE, Bangalore

KSEEB, Bangalore

### CGPA / Aggregate %

10 (Pursuing II Year)

86.53 %

91.91 %

83.04%

### CONTACT:

Phone: +91 8090204131, 9739461437

E-mail: mbasavakumar@gmail.com, mbasava@iitk.ac.in

Online portfolio link: <http://www.behance.net/basavakumarm>

### WORK EXPERIENCE:

Company: ESSAR STEEL HAZIRA LTD



Designation: Assistant Manager in Maintenance and operation Department in Blast furnace

Duration: One year (15th July 2010 – 15th July 2011)

### INTERNSHIP:



Company: STANFORD INDIA BIODESIGN, AIIMS

Designation: Product Designer

Duration: 3 months (15th May 2013 – 15th Aug 2013)



PENTAGON TURBINES PVT LTD-BANGALORE

Mechanical Engineer

One year (July 2008 – June 2009)

### SKILLS:

- Technical Skills: CATIA, Solid Edge, AutoCAD, ANSYS, SolidWorks, ProE, Mold flow, Rhinoceros, KeyShot, SketchUp.
- User Experience: Wireframes, User Research and Testing, Personas, Scenarios, Storyboard, Prototyping.
- Applications: Adobe Photoshop, Adobe Premiere Pro, Microsoft Office Suite.
- Programming: CNC programming, PLC programming, C programming.