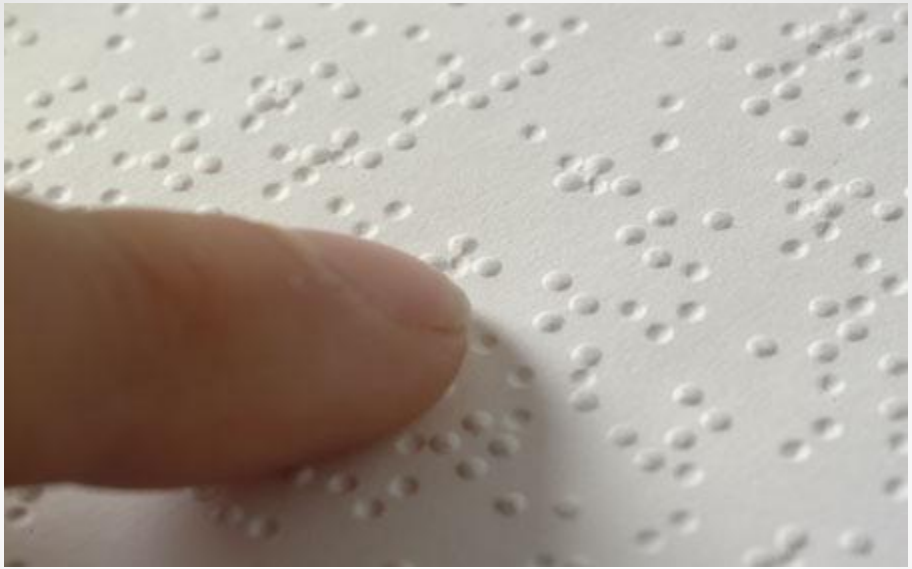

Braille Display

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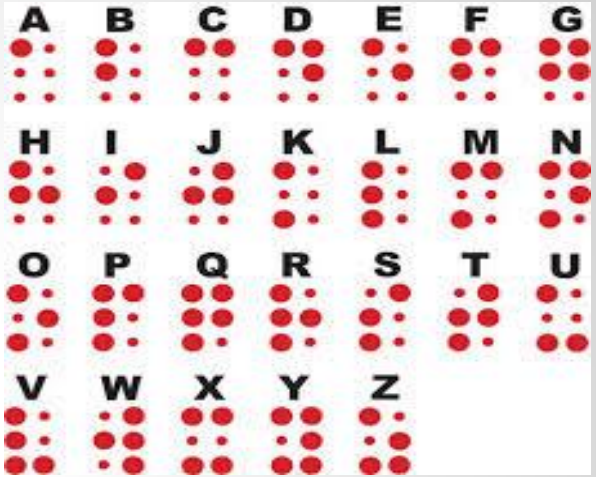
1st August 2014

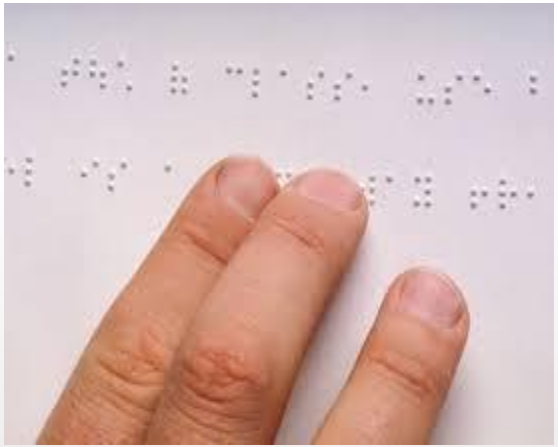
Introduction



- Visually impaired in India - 15 million
- Literacy rate - 2%
- Employment - 80% of literate and 15% of illiterate

Major reason behind the literacy crisis-

- Difficulty of learning Braille
- Lack of resources

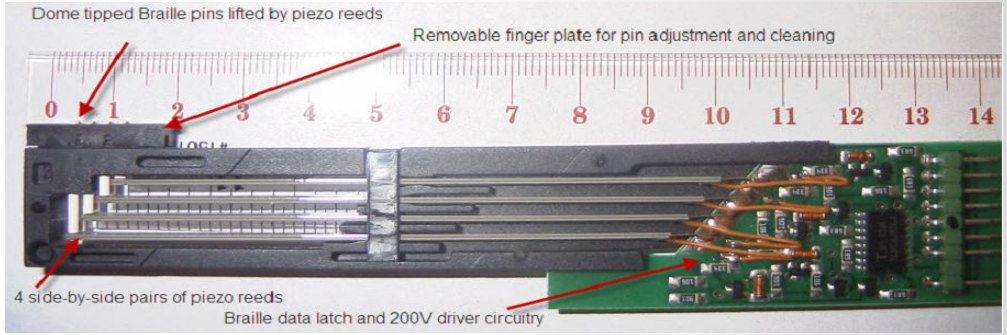


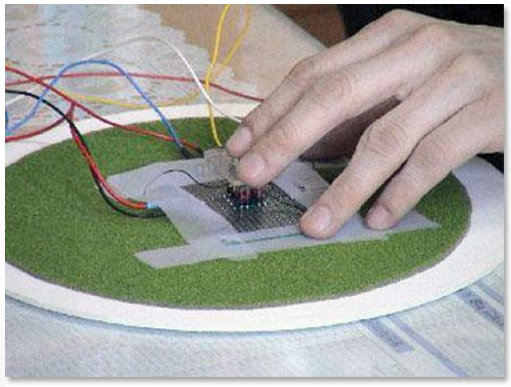
Project Goals

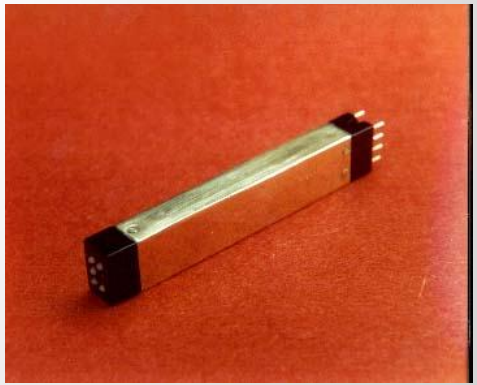
- The hardware cost should be under **INR 6000**
- Achieve cycle rates of **10Hz**
- The device should operate reliably for **5-6 years**
- It should be a portable device with a battery life of **min 5 hours**
- The device should adhere to all dimensional and operational constraints set by National Federation for Blind (NFB)

Research activities worldwide

- Piezoelectric
- Solenoids
- ER & MR fluids
- SMAs
- EAP
- Stepper motor based
- Bucky Gel based

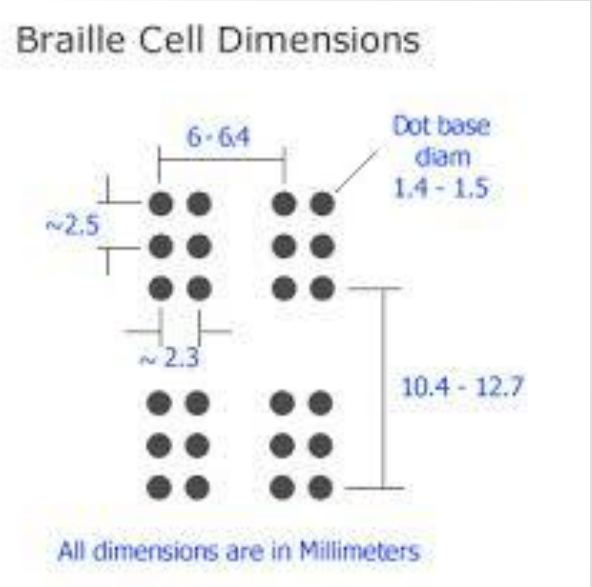




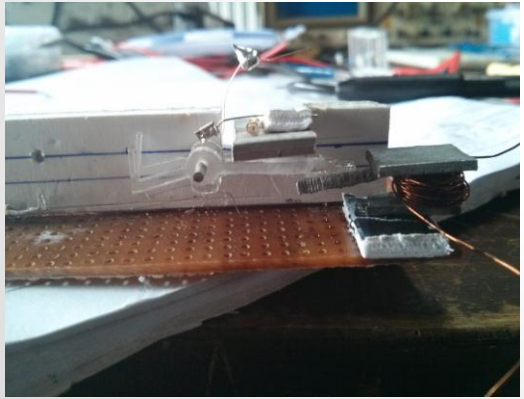


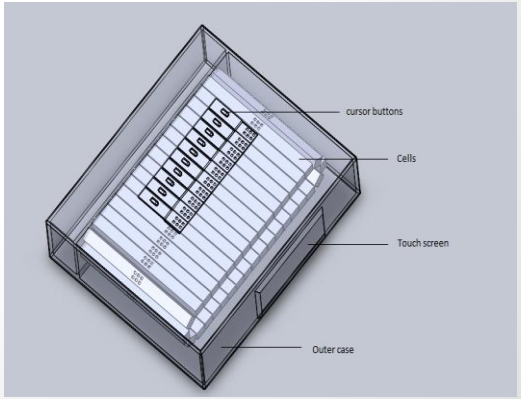
Challenge

Operational constraints	
Parameter	Value
Resisting force	>20gf per braille pin
Refresh rate	10Hz
Actuator Life	$>10^7$ cycles
Voltage	<300 V
Portability	Hand held
Battery life	5 hours
Temperature range	0-40C



Previous efforts

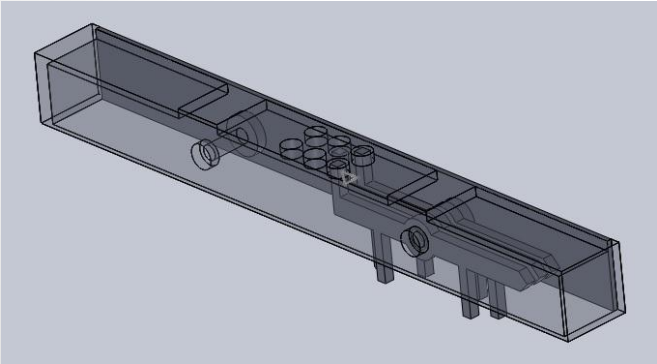


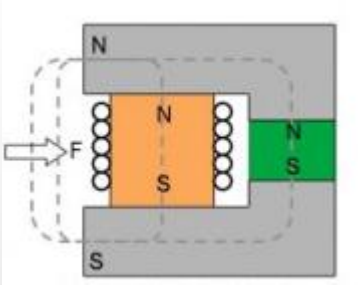


Current status

- Electropermanent actuator built and optimized
- Actuator testing completed for 6 x 10^6 cycles
- Electronic design complete
- Cell design underway

parameter	Value
Actuation speed	100Hz
Power consumed	30 mJ
Force	100gf
Cost	Rs 20 / pc
Dimensions	5 x 6 x 6 mm





A Braille tablet

Work to be done

- Cell design – compactness
- User testing
- User controls
- Electronic hardware development
- Software development using Android OS

Thank you Technovation