

Project 0: Pin Sculptor

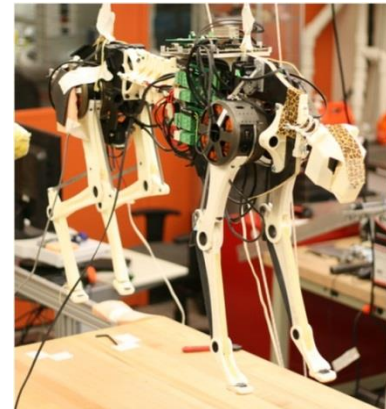
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Who am I?

- Mechanical engineering graduate student working in the Biomimetic Robotics Lab
- Strengths in :
 - Fabrication (i.e. lathe, mill, 3D printer, laser cutter, polymer molding)
 - CAD software and PCB design
 - Electronics (i.e. Arduino, mbed)



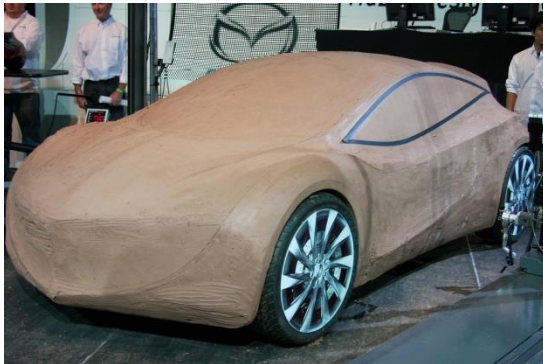
Problem: Physical Prototypes

- Designers and engineers still work with physical prototypes even though CAD models are widely used in the industry
- Prototypes convey information not readily captured by computer models (i.e. size, look, feel)
- However, physical prototypes do not allow for collaboration as easily as CAD models



Problem: Clay modelling

- Especially true in the automotive industry
- Clay models are a design staple before the car/motorcycle design is finalized, started in 1930s
- Time and labor intensive, difficult to iterate the design



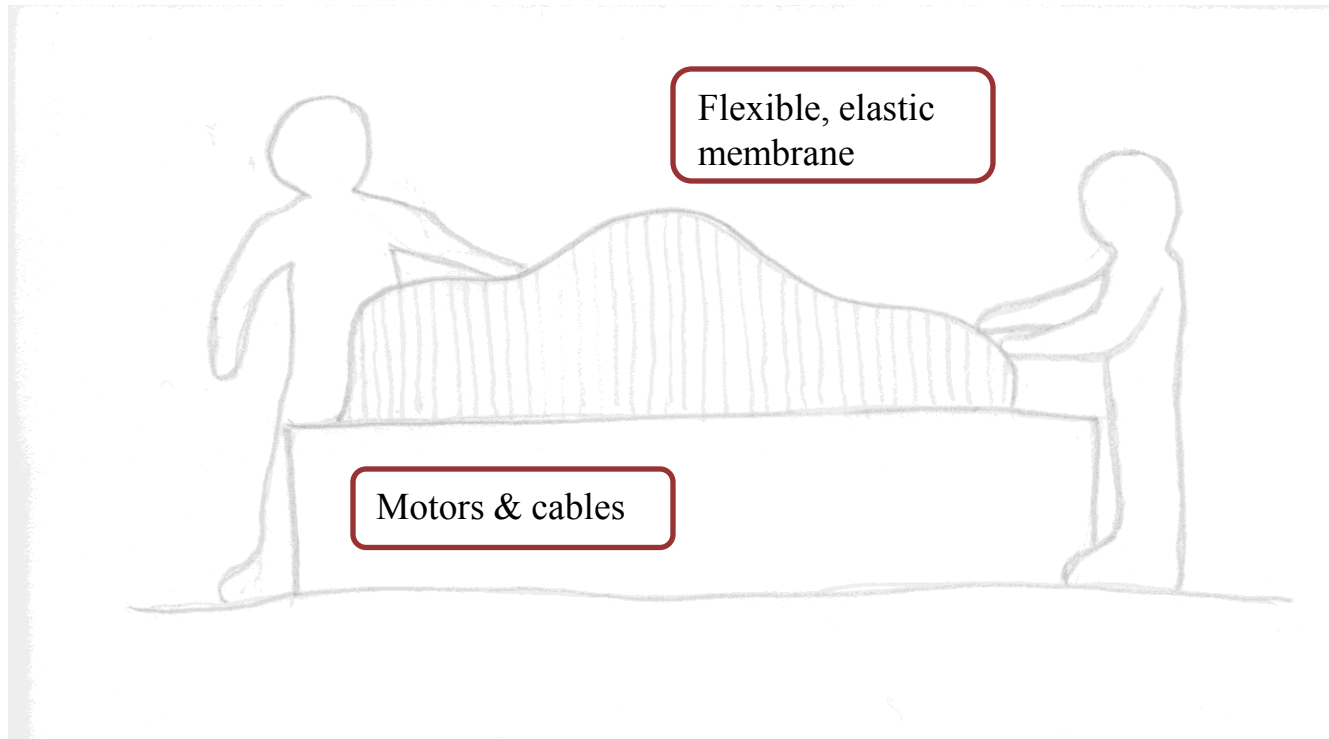
Inspiration: Pin Art

- Pin Art novelty toy, forms 3D relief of objects



Solution – Pin Sculptor

- “Sculpting with pins”

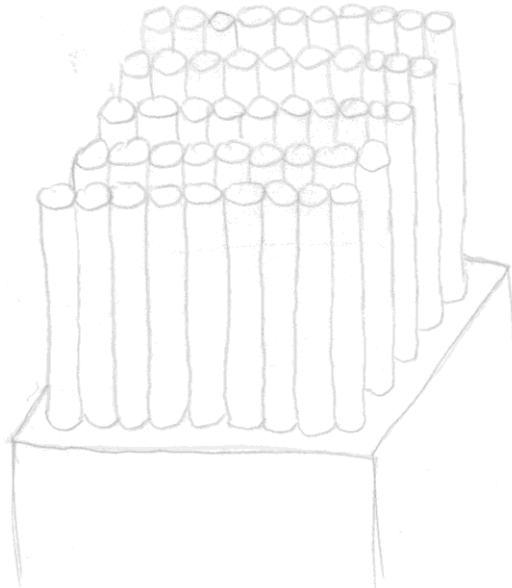


Solution – Pin Sculptor

- Have a bundle of pins/cables, arranged in a grid array

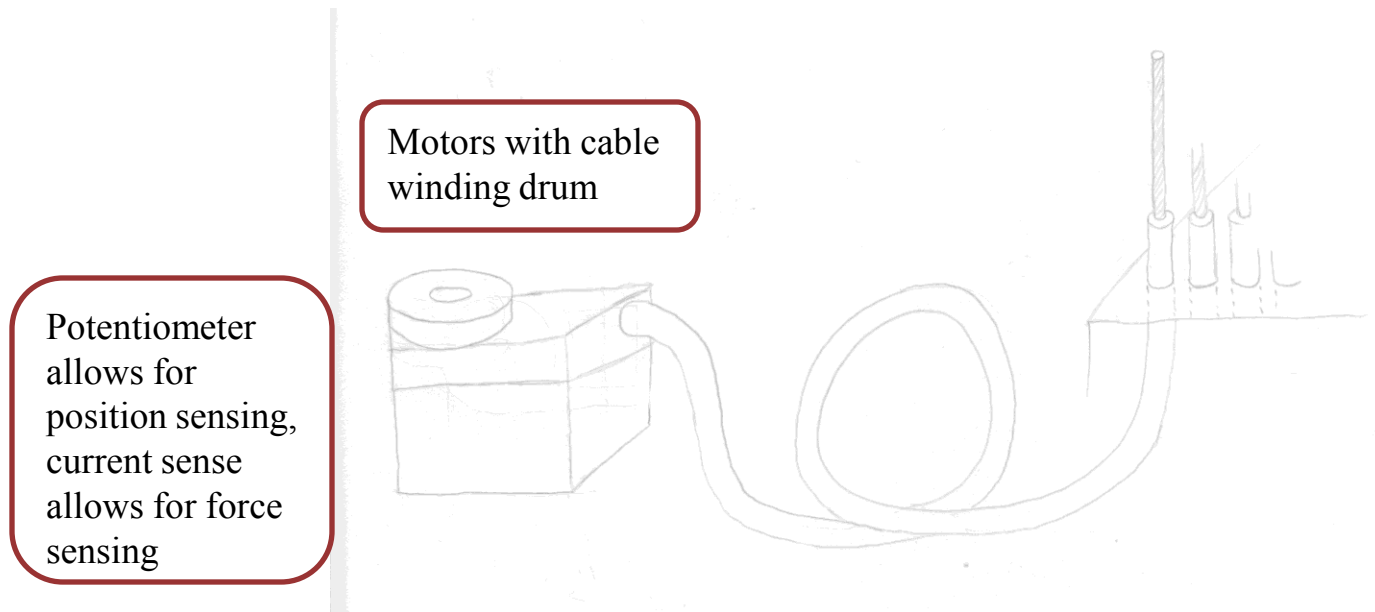
Pins/cables are housed in individual cable sheathes

Spacing between pins is limited by only sheath diameter



Solution – Pin Sculptor

- Each pin is actuated by a push-pull cable
- Can sense the force being applied individually and react to it



Solution – Pin Sculptor

- This information can be synchronized with another ‘Pin Sculptor’ to enable collaboration
- It can also be stored and played back to show the designer’s thought process

