



Sensing Forceps

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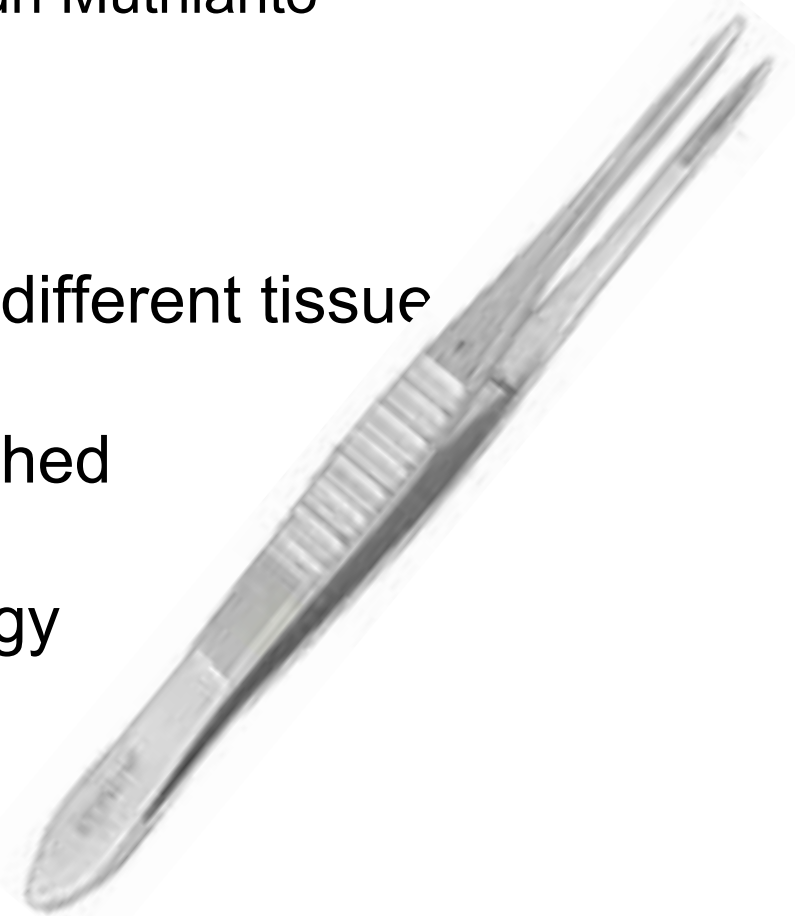
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Client: Michael Zinn & Carter Smith

Background

- Continuation of last semesters project:
 - By Stephen Young, Tanner Marshall, Kelsey Hoegh, Karin Rasmussen, Vinodh Muthiahto
- Universal in surgeries
- Different thresholds for different tissue
- Currently being researched
- Piezoresistive technology
- Strain Gauges



Motivation

- Determining tissue thresholds
- Teaching tool
- Give real-time feedback





Client Requirements

- real-time display and feedback
- cost less than \$500
- universally compatible
- Do not encumber
- less than 250 grams
- withstand exposure to bodily fluids
- easy to read



Problem Statement

- No current way to measure the force exerted by the forceps
- Forceps that measure and display forces
 - Needed for research and surgical use in pediatrics
- Force display
 - Straightforward
 - Clearly readable
 - Non-cumbersome



Capture Program

- Use LabVIEW or Java
- Input data stream from USB microcontroller
- Convert strain gauge output to Newtons

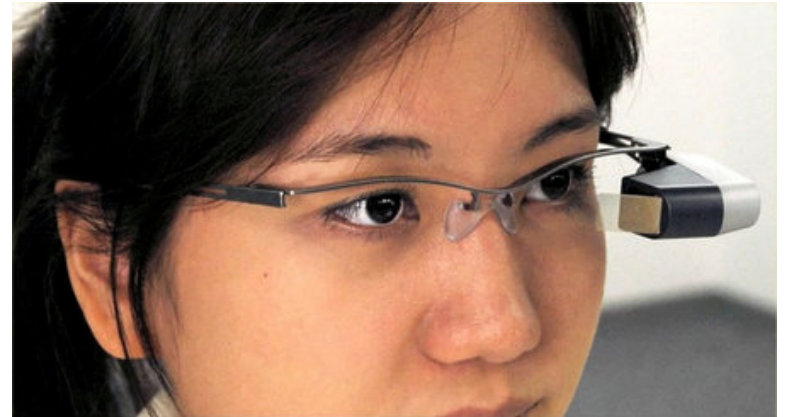


Alternative Designs

1. Glasses Design
2. Monitor Design
3. Arm Band

Glasses Design

- Removable display
- Specialized film
- LED numeric display
- Flashing LED warning



Monitor Design

- Mounted on mobile cart
- Numerical Display
- Stop Light Visual
- Pitch Change Audi



Arm Band Design

- Display mount on armband
- Change in auditory alert volume
- Change in stop light color



Design Matrix

Design	Feasibility	Cost	Durability	Sterilization	Ubiquitous	Cumbersome	Total score
Glasses Design	3	3	2	4	5	2	19
Monitor Design	5	4	5	5	3	4	26
Arm Band Design	5	4	5	3	3	2	22

Final Design

- Monitor mounted onto a rolling cart by a pivoting arm
- Stop light thresholds
- Numeric force
- Auditory alert





Future Work

- Acquire appropriate materials
- Real time feedback
- Testing
- Decide on Compiler

References

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