BITNG LAB UPDATE

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Date 1/04/2021

Outline

- Progress to date
- Path forward

PROGRESS TO DATE

Georgia Tech
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Progress from last week

- LP ECG
  - PCB procurement
- Shriner’s project
  - Literature review

LP ECG PROJECT

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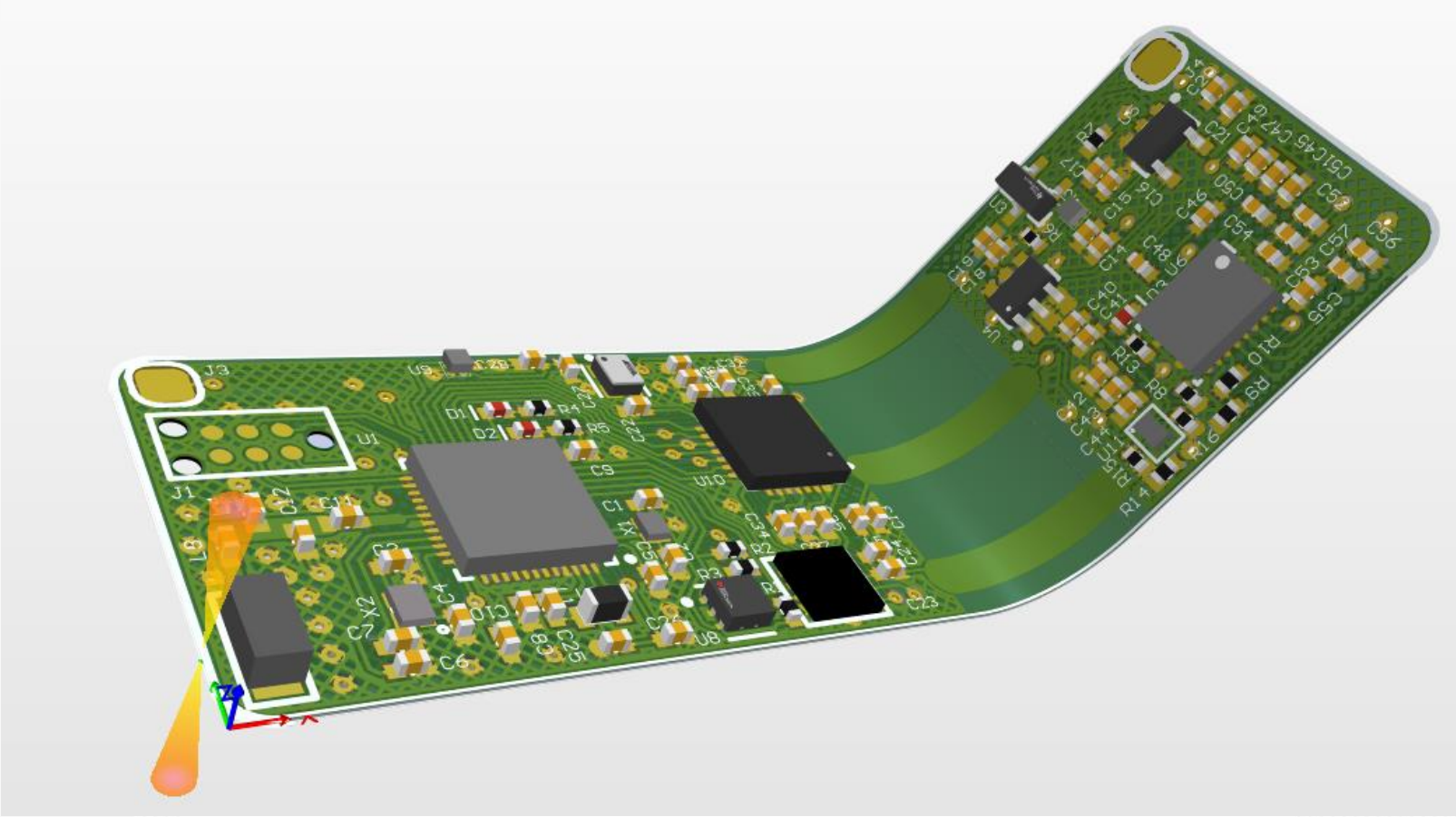
PCB layout

- ORDERED 12/31



SHRINER’S PROJECT

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Literature review

- Tables:
  - Pressure sensors (wearable sensor glove)
  - Temperature sensors (wearable sensor glove)
  - Strain sensors (wearable sensor glove)
  - Glove Application
  - Glove Characteristics
- Figures:
  - Pie chart showing all three sensor nodes
  - Application of sensor glove

STRAIN SENSOR

Application	Sensor Size	Sensitivity	Materials Used	Author
Soft stretchable bending sensor and data glove applications	5 mm x 20 mm	Elongation = 800% Resistance change = 30.6%	EPR, Scotch Electrical Semi-Conducting Tape 13	Shen et. Al [3]
A wearable hand rehabilitation system with soft gloves	?	?	OTS Flexion resistance strain sensor	Chen et. Al [10]
Exploiting wearable goniometer technology for motion sensing gloves			Single-layer piezoresistive textile	Carbonaro et. Al [15]
Towards a modular soft sensor-embedded glove for human hand motion and tactile pressure measurement	H = 500 um, W = 300 um, L = 97 mm	1.58 N / V	Gallinstan liquid metal in EcoFlex silicone rubber	Hammond et. Al [17]

PRESSURE SENSOR

Application	Sensor Size	Sensitivity	Materials Used	Author
A wearable hand rehabilitation system with soft gloves				Chen et. Al [10]
Multisensory smart glove for tactile feedback in prosthetic hand	0.2” Diameter	22 N/MΩ	OTS: Interlink Electronics 0.2” Diameter Short Tail Force Sensing Resistor	Polishchuk et. Al [16]
Towards a modular soft sensor-embedded glove for human hand motion and tactile pressure measurement	H = 500 um, W = 300 um, L = 157.4 mm	125 kPa / V	Gallinstan liquid metal in EcoFlex silicone rubber	Hammond et. Al [17]

TEMPERATURE SENSOR

Application	Sensor Size	Sensitivity	Materials Used	Author
A wearable hand rehabilitation system with soft gloves				Chen et. Al [10]
Multisensory smart glove for tactile feedback in prosthetic hand	2.80 mm x 2.95 mm	0.0625 C/Bit	OTS: TC77	Polishchuk et. Al [16]

EXAMPLES FROM PREVIOUS LITERATURE REVIEW

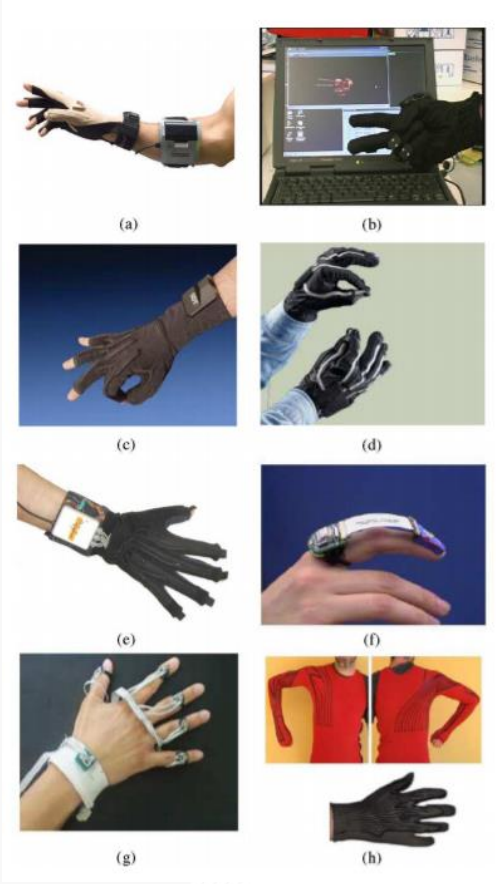

TABLE V
SUMMARY OF APPLICATIONS

Classical Applications	Design/manufacturing	Rationale	interact with computer-generated environments in a more natural way
		Alternative	keyboard, mouse
		Purpose	virtual architecture: test environments before their contruction virtual prototypes: test artifacts before their production 3D modelling virtual training
	Information visualization	Rationale	interact with data in a more natural way
		Alternative	keyboard, mouse
		Purpose	scientific visualization: manipulate scientific data audio-visual presentations: manipulate data
	Robotics	Rationale	control and program robots in a more natural way
		Alternative	keyboard, mouse
		Purpose	mobile robots: control a robot or a team of robots multi-DoF robots: control many DoFs simultaneously programming by demonstration: teach skills to robots in a natural way
	Arts/entertainment	Rationale	interact with computer-generated environments in a more natural way
		Alternative	keyboard, mouse
		Purpose	computer-animated characters: control many DoFs simultaneously musical performance: control acoustic parameters videogames
	Sign language understanding	Rationale	automatic translations
		Alternative	camera-based device
		Purpose	communication systems for the deaf
Recent Applications	Medicine/ Health care	Rationale	easy/quick measurement of hand motion
		Alternative	motion analysis system, goniometer, keyboard, mouse
		Purpose	motor rehabilitation: diagnosis, treatment human motion analysis ergonomics medical education and training
	Computers	Rationale	enhance computers' portability
		Alternative	keyboard and mouse
		Purpose	wearable computers

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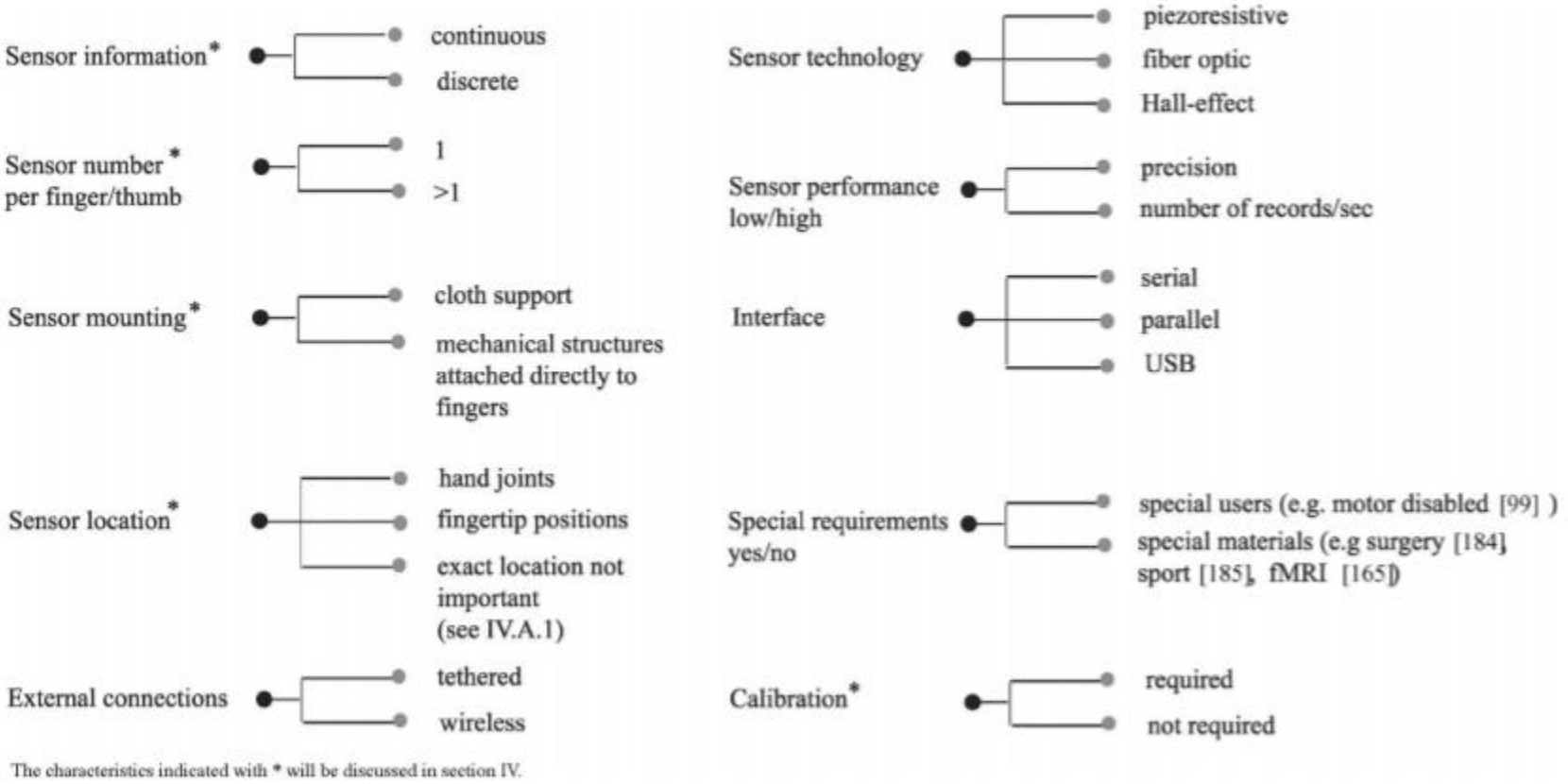
EXAMPLES FROM PREVIOUS LITERATURE REVIEW

TABLE I
GLOVES CHARACTERISTICS



The characteristics indicated with * will be discussed in section IV.

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PATH FORWARD

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Path forward (1/4/21 – 1/11/21)

- Shriner's Project:
  - Literature review
    - Tables and figures

APPENDIX