
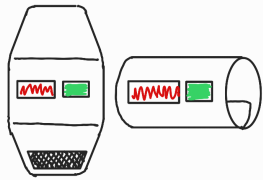




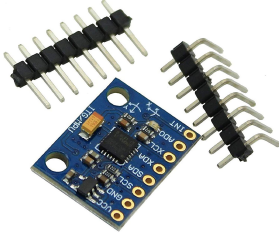
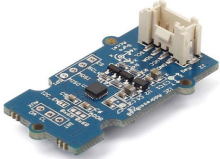
- **Title:** Preventing Weightlifting Injuries by Barbell Modifications, Weightlifting Injuries, BME301
- **Date:** 2/10/24-2/17/24

| Last Name | First Name | Role | Email |
|--------------|------------|--------------|-----------------------|
| Settell | Megan | Advisor | settell@wisc.edu |
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| BlomWillis | Nolan | Leader | blomwillis@wisc.edu |
| Kafar | Kaden | Communicator | kafar@wisc.edu |
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- **Problem statement:** Over one million weightlifters each year experience weightlifting injuries that put them in the emergency room. Of these one million, 18-46% are reported to be caused by bench pressing a barbell. Our team's task is to create a pitch-able system that increases safety for lifting, specifically bench pressing.
- **Brief status update:** A code is in the process of being worked on. Testing to see how an ultrasonic sensor would work measuring velocity of the bar.
- **Difficulties / advice requests:** No difficulties or advice requests for this coming week
- **Current design:** We are thinking about going with a barbell attachment that will use radar to calculate the height of the barbell during the lift.

| Design | Full barbell | | Barbell attachment | | Full suit + VR | |
|-------------------------|---|----|--|----|---|----|
| |  | |  | |  | |
| Safety (25) | 4/5 | 20 | 5/5 | 25 | 5/5 | 25 |
| Ease of Use (20) | 4/5 | 16 | 5/5 | 20 | 2/5 | 8 |
| Uniqueness (20) | 3/5 | 12 | 2/5 | 8 | 5/5 | 20 |
| Marketability (20) | 3/5 | 12 | 4/5 | 16 | 5/5 | 20 |
| Cost (10) | 3/5 | 6 | 5/5 | 10 | 1/5 | 2 |
| Ease of Fabrication (5) | 2/5 | 2 | 4/5 | 4 | 1/5 | 1 |
| Overall Score: | 68 | | 83 | | 76 | |

| | | | |
|------------|-------------|---------------|-----|
| Technology | Radar/Lidar | Accelerometer | IMU |
|------------|-------------|---------------|-----|

| | | | | | | |
|--------------------------|---|----|--|----|---|--|
| |  | |  | |  | |
| Accuracy (25) | 5/5 | 25 | 4/5 | 20 | 3/5 | |
| Reliability (25) | 3/5 | 15 | 4/5 | 20 | 4/5 | |
| Marketability (20) | 5/5 | 20 | 2/5 | 8 | 3/5 | |
| Cost (15) | 2/5 | 6 | 4/5 | 12 | 3/5 | |
| Ease of Fabrication (10) | 2/5 | 4 | 4/5 | 8 | 3/5 | |
| Safety (5) | 5/5 | 5 | 5/5 | 5 | 5/5 | |
| Overall Score: | 75 | | 72 | | 67 | |

- Materials and expenses:** a concise accounting of the amounts and types of expenses incurred on the project. Use the template provided here: <http://bmedesign.engr.wisc.edu/course/resources/#bpag>

| Item | Description | Manufacturer | Mft Pt# | Vendor | Vendor Cat# | Date | QTY | Cost Each | Total | Link |
|-------------------|-------------|--------------|---------|--------|-------------|------|-----|--------------|---------------|------|
| Category 1 | | | | | | | | | | |
| | | | | | | | | | \$0.00 | |
| | | | | | | | | | \$0.00 | |
| Category 2 | | | | | | | | | | |
| | | | | | | | | | \$0.00 | |
| | | | | | | | | | \$0.00 | |
| | | | | | | | | TOTAL | \$0.00 | |

- Major team goals for the next week:** Complete the preliminary design presentation

- **Next week's individual goals:** A concise statement of intended action to continue progress on the project - be specific, i.e. what will you research.

Kaden: Finish up work on presentation and give the presentation. Create a base prototype of design.

Jacob: Help finish the preliminary presentation and deliverables and help work on preliminary prototype.

Nolan: Aide in deciding which sensor interface we should look at purchasing and working on for our project

James: Work with Kaden on the Arduino and finish up research on sensors/materials.

| Project Goal | Deadline | Assigned | Progress | Completed |
|-------------------------------------|----------|----------|----------|-----------|
| Initial meeting with client | 1/31 | Team | 100% | Y |
| Gather research/project information | 2/2 | Team | 100% | Y |
| Product Design Specification (PDS) | 2/8 | Team | 100% | Y |
| Design Matrix | 2/15 | Team | 100% | Y |
| Preliminary Presentation PDF | 2/26 | Team | 25% | N |
| Preliminary Report | 3/1 | Team | | |
| Order/Gather Materials | 3/20 | Team | | |
| Create prototypes, test | 4/22 | Team | | |
| Final fabrication | 4/22 | Team | | |
| Test and finalize final design | 4/22 | Team | | |
| Poster Presentation PDF | 4/22 | Team | | |
| Final Report | 5/1 | Team | | |
| Final Notebook Team | 5/1 | Team | | |

- **Previous week's goals and accomplishments:**

Team: The code for the ultrasonic sensor was created and touched up by Kaden. Worked on Diversity Equity and Inclusion for design ideas to take into consideration users of all skill levels.

Kaden: Created a way to track position, velocity, acceleration, and force using an ultrasonic sensor and arduino. Worked on setting up the presentation for next week.

Jacob: Looked into radar and lidar options that can be used to test the basic principles of the device.

Nolan: Researched more about radar technology including what is already out there in regards to patents around it.

James: Started work on preliminary presentation slides, thought of design solutions, and researched technologies and materials that will be used in the design.

Activities: a concise accounting of time spent working on the project.

| | Kaden | Jacob | Nolan | James |
|---------------|--------------|--------------|--------------|--------------|
| Week 1 | 2.5hrs | 2.5 hrs | 3hrs | 2.5hrs |
| Week 2 | 2 hrs | 1.5 hrs | 2hrs | 1.5hrs |
| Week 3 | 1.5 hrs | 1.5 hrs | 1.5hrs | 1hr |
| Week 4 | 2.5 hrs | 2 hrs | 1.5hrs | 1hr |