Interactive Charging Station

By: Hassan Alqallaf
Logan Beaschler
Gilbert Mendoza
Chrishell Mercado
Josh Gizzi

Introduction

- Located on the 2nd floor is an older interactive charging station
- We are trying to improve and create a working charging station for the engineering students to use
- The new interactive charging station will take the old ones place
- Dr Oman is the client

Gilbert

Rowing Machine

- There are so many different types of rowing machines
  - Flywheel rowing machines

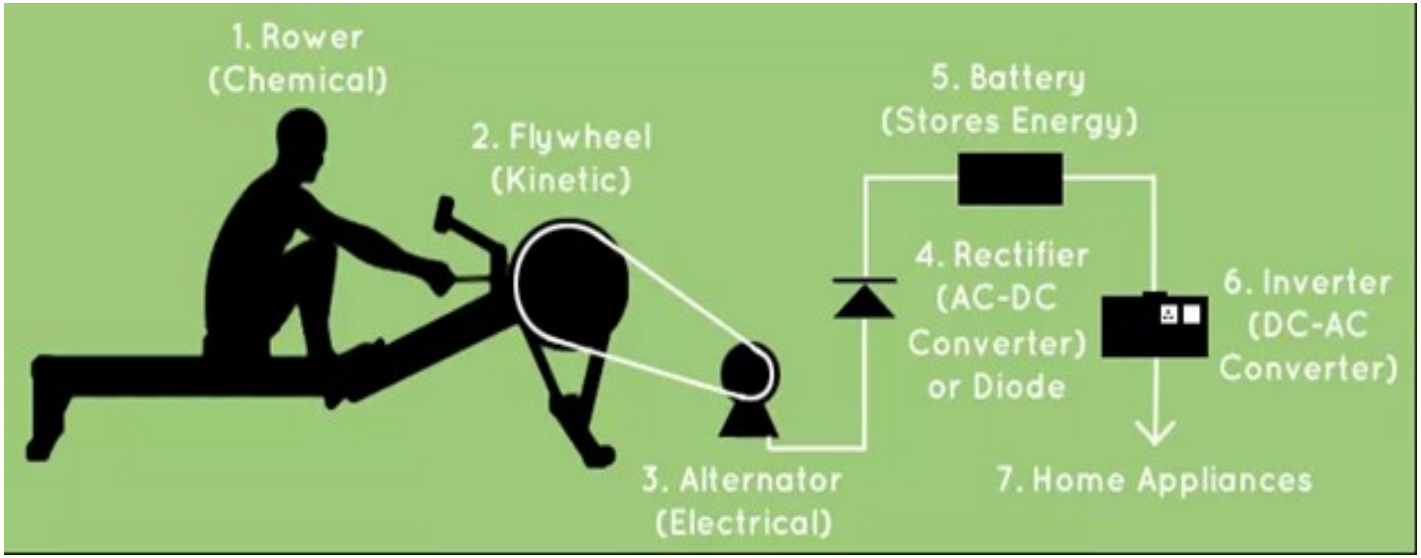


Figure 1: Flywheel Rower [1]

Gilbert

Rowing Machine

- Efficiencies & Charging
  - Alternator- 60%
  - Inverter - 85%
  - Battery- 90%
  - Overall Efficiency- 45%
  - If used at moderate pace of 2:12 for 500 meters, 150 watts should be created
  - With the 45% efficiency, 68 watts would be created
  - Will charge all new smart devices

Gilbert

Verde N685 treadmill

- Self powered
- 4 degree angle
- Low Friction
- Maximum power intake

Figure 2: Verde N685 [2]

Chris

Treadmill Sensors

- Time module
  - DS3231 precision time clock
  - Keeps track of time with its own battery supply
- Heart rate sensor
  - Infrared emitter and sensor
- Torque sensor
  - Prony brake
  - Measures force, torque, and power

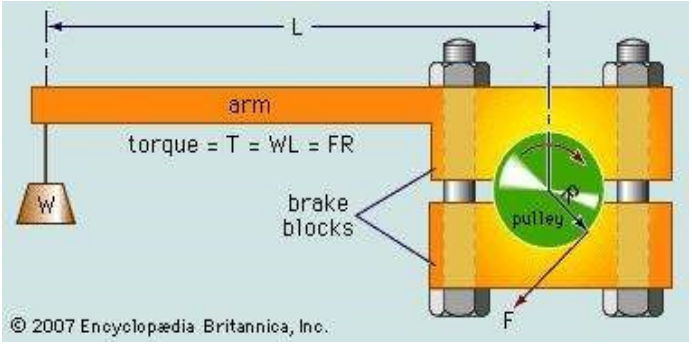


Figure 3: Prony Brake [3]

Chris

Xebex Runner Treadmill

- Self powered
- Curved Treadmill
- Non-motorized
- 200 Watts/hour
  - Converted to AC power and sent to facilities grid
- Health and performance benefits

Figure 4: Xebex Runner

Hassan

Modifications to Treadmill

- Ability to work while charging devices
- Small added screen
  - Displays highest amount of power created in list
  - Ranks people on how much power is created
  - Possibly make a game for engineering department?

Figure 5: Desk Modification

Hassan

Measuring Power

- Point of reference and interactivity
- AC or DC?
- ACS712 Hall effect sensor
- Voltage divider
- Tachometer

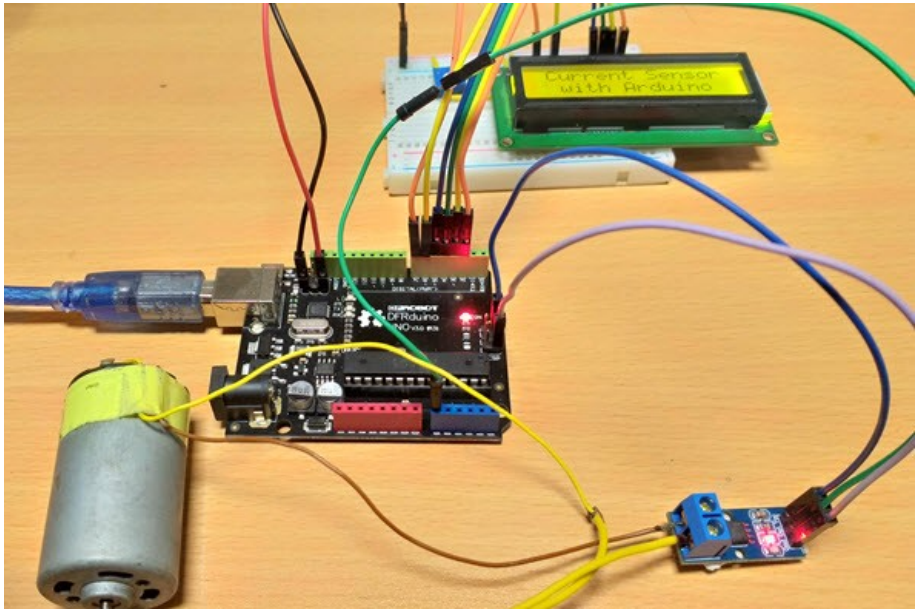
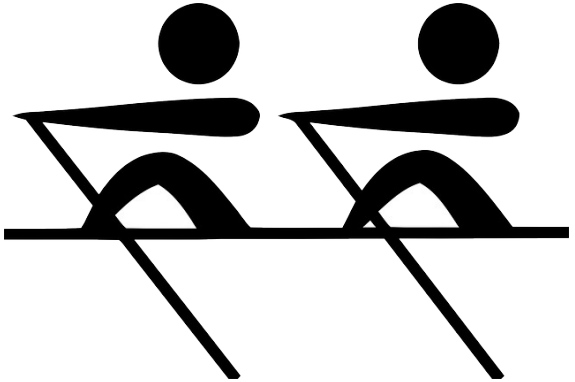


Figure 6: Sample Circuit [4]

Logan

Utilizing Power Data

- Incentivize use through competition
  - Distance or power creation
  - Survival Type Game
- Power Creation Vs. Usage
- Efficiencies of electrical devices
- Cumulative statistics



Logan

Converter Process

- Generator gives torque and rpm values
- Battery Voltage
- Power/voltage = Current
- Charge controller
- Inverter

Josh

Conclusion

- Treadmill or a rowing machine?
- Basic sensors and power sensor
- Power creation versus usage
- Convert power captured into a usable one
- Prototyping

Chris

References

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Questions?