EE Senior Project

Fall 2019

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Weekly Progress Report and Planning Sheet

Solar Powered Charging Dock for eScooters

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Week of: <u>11/12/2019</u>

<u>Activities Completed This week:</u>

- Met with Professor Adel
- Would like to use this software to easily source components from schematic.
    - https://easyeda.com/
- Website that we would like to source any components for
    - https://lcsc.com/?gclid=EAIaIQobChMI1sz_jrPl5QIVDZ6fCh2rnw4_EAAYASAAEgITb_D_BwE
- Made a lot more progress on the website. Created a domain: GSUSeniorSolar.com
- Research on PV Panel Power output:

    3.2.4. PV Array Output

    HOMER uses the following equation to calculate the PV array output:

    $$P = Y \times \mu \times (Gc/Gs) \left[1 + \beta\, (Tc - Ts)\right] \qquad (5)$$

    where P is the PV array output (kW). Y is the rated capacity of the PV array, thereby indicating that its power output is subject to slandered test conditions (kW). μ is the PV derating factor with a value between 0 and 1, it is a scaling factor that applies to the PV array power output to account for reduced output in real-world operating conditions compared to the conditions under which the PV panel is rated; Gc is the solar radiation on the PV array in the current time step (kW/m^2); Gs is the solar radiation on the PV array at standard test conditions (kW/m^2); β is the temperature coefficient of power (%/°C); Tc is the PV cell temperature in the current time step (°C); Ts is the PV cell temperature under standard test conditions (°C).
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    - B. Ye, J. Jiang, L. Miao, P. Yang, J. Li, and B. Shen, "Feasibility Study of a Solar-Powered Electric Vehicle Charging Station Model," *Energies*, vol. 8, no. 11, pp. 13265–13283, 2015.

- Researched Servo motors for the locking mechanism. Servo motor makes more sense, since the lock needs to be automated, doesn't need to spin fast, and is not going to be in continual use. The motor needs to be able to move from one specific spot(the open spot) to another (the locked spot). Currently Looking for the right kind of Servo Motor. It

needs to be fairly small for what we want. About a square inch. Maybe something like this:

- https://alexnld.com/product/12v-dc-0-43a-mini-electric-bolt-lock-push-pull-cylindrical-solenoid-lock-5mm-stroke/?gclid=EAIaIQobChMIn8748uDi5QIVjIzICh2cXAnKEAkYCCABEgKE2fD_BwE

- Found the test solar panel that will be used:
  - https://www.amazon.com/ECO-WORTHY-Portable-Folding-Charge-Controller/dp/B00ICE0ES4/ref=asc_df_B00ICE0ES4/?tag=hyprod-20&linkCode=df0&hvadid=343221168684&hvpos=1o1&hvnetw=g&hvrand=1254883605091494755&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9010995&hvtargid=pla-733272997878&psc=1&tag=&ref=&adgrpid=67045469697&hvpone=&hvptwo=&hvadid=343221168684&hvpos=1o1&hvnetw=g&hvrand=1254883605091494755&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9010995&hvtargid=pla-733272997878

- Expanded on arduino locking mechanism
  - Switch Active:
    - Green LED on
    - Servo shift vertical
  - Switch Inactive:
    - Red LED on
    - Servo shift left 90º
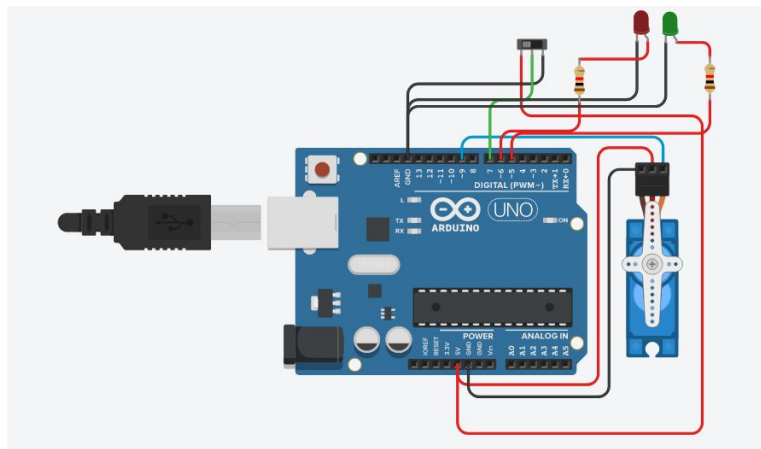
- Website made available through https://deadbody13.github.io

Activities in Progress:

- Samu is sourcing the components that will be used to create a prototype in adels lab, and is also modeling the station in solid works and lock.
- Zach is working on building the circuit in simulink proof of concept solar charging. Also, there is a possibility that a local company might allow us to use their electric scooters as a base for the setup. Also working on a better schematic for the circuit.

Activities to be Started Next Week:

- More research.
- Working 3D modeling

Issues for Immediate Action and Attention:

- Should the charging be hard wired into the circuit, or should an inverter be used in conjunction with the charging cable that comes with the scooter? Maybe the cable can be added in a way that is impossible to steal?

Key Team Interdependencies and Resolution:

- Relying on Nate for all the website production/upkeep.