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Summary:
We sketched a visual representation of our project, the eco-friendly beach-cleaning robot. Within the illustration, we determined the robot's main features. Lastly, we divided our team into three sub-teams.

What C.C completed this week:

- Using the preferences outlined in Professor Eric's feedback We simplified the robot sketch and determined the two main features: 1) eco-friendly; 2) autonomous driving. We also set dimension limit using a straw as the smallest, and a 2-liter bottle as the biggest.
- We referred to current products [1], [2] and previous studies in order to design ours [3], [4].
- We determined our demonstration environment to be James Lee Beach (Destin, FL 32541) and Henderson Beach State Park (17000 Emerald Coast Pkwy, Destin, FL 32541).
- We divided our team into three sub-teams, each with its own role : 1) a physical team (Booyong Kim, Jeeyoung Oh); 2) a networking team (Eunmin Kim, Seoyeong Lee); and 3) a computer vision team (Hanbyeol Lee).
- We met Caleb Ikalina (Caleb) from Purdue University (09/14) and introduced our project. We then gave him some roles such as background research, grammar checking, paper-writing assistance. We also scheduled the next meeting with Caleb (09/15).
- We picked out some of the equipment that we want to use such as proximity sensors, distance sensors, a GPS sensor, and two ESP8266's [5].
- We installed Raspberry Pi, set up the environment [6], [7]. We then studied sensors and Raspberry Pi's features such as servo motor testing [8]. We sketched network units: 1) a laser; 2) GPS; 3) an IR camera; 4) an LCD panel; 5) two Raspberry Pi's; and 6) two computers. And we decided LORA is appropriate for communication between the computer and the robot, due to the range of signal between the robot and the computer (about 3.5km).
- We searched for types of LiDAR that could detect humans and sea turtles, and for algorithms such as Complexer-Yolo [9] and Voxel Net [10] that work with LiDAR 3D's object detection. After researching, we determined that LiDAR can be difficult to detect sea turtles because of a lack of data. So, we decided to use LiDAR only for detecting people.
- We searched for specific lighting that is safe for use on sea turtles [11], [12]. We looked into the Florida Fish and Wildlife Conservation Commission (FWC), to see if we can distinguish sea turtles' body temperature and the sand's temperature. We chose LiDAR A1 as our version of LiDAR and still discuss Raspberry Pi's operating system.

Things to do by next week:

- We will continue studying how to use Raspberry Pi, LiDAR sensor, Complexer-Yolo, and VoxelNet.
- We plan to write a mid-term paper draft and write out code for the proximity sensor.
- At some point we will discuss the ideal way to detect sea turtles after receiving the e-mail from FWC.
- We will request equipment, subsequently we will create a prototype robot that has caterpillar wheels, a solar panel, a wind turbine, and batteries. The prototype will be able to move forward, backward, and turn left and right.
- We will also study GPS tracking.

Problems or challenges:

- Some of us do not have any experience with Raspberry Pi and or sensors, so we had to study the basics of the hardware.

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