ENME 489Y – Remote Sensing: Spring 2018

Department of Mechanical Engineering

Due Date Tuesday, February 13th, 2018

Submission Information
- Submit response to Question #1 via Gradescope by 9:30 am
- Submit images and .kml files via email to mitchels@umd.edu by 9:30 am

Question #1 (5 points)

This semester we will be working with the Raspberry Pi, including the camera for the Pi. I recommend the Raspberry Pi 3 Model B Camera Kit, which comes with everything you need, although if you already have a RPi you should be able to make due by purchasing only the 8MP camera. I've had good success with MCM Electronics, now Newark, and would recommend them as a distributor:

http://www.newark.com/raspberry-pi/83-16566rk/raspberry-pi-3-model-b-camera/dp/31AC4869

Note that this kit comes with the standard 8MP camera. There is an option to purchase a separate, additional camera with a near-infrared filter. You do not need to purchase this near-infrared camera for the class, but I want you to be aware of its existence.

We will begin working with the RPi extensively in Assignment #2. Therefore, if you have not already, **order your RPi *asap***.

In 1-2 sentences, write a brief note to Dr. Mitchell informing him of the status of your RPi (e.g. "I have everything already…" or "it's on order, due in by…" or "dude I need help getting my RPi!"). Submit your note via .pdf upload to Gradescope.

Question #2 (15 points)

The semester project for ENME 489Y requires students to select a target of interest on the campus of the University of Maryland and map the target using their lidar sensor. Full project details are available on ELMS \ Modules \ Project.

To kick off the project, **identify and rank your top three (3) targets** of interest on campus. Complete and email the following:

a) Record at least one (1) digital image of each target. (hashtag-worthy images always encouraged!)
b) Download a GPS logger to your phone (e.g., I use GPS Logger for Android) and create a separate .kml file for each target by placing your phone on the target and recording at least 60 seconds of GPS data. Dr. Mitchell will compile each .kml file into Google Earth to give students an idea of lidar data coverage across campus.

A few recommendations for target identification:

a) Targets **must be outside**, with a sufficient view of the sky such that GPS data can be recorded.
b) Target approval will be **first come first served**, based on the time stamp of email submission. Keep in mind the long-term goal to create a 3D map of campus, so feel free to "spread out" across campus when identifying targets.
c) Targets should be of manageable volume, i.e. on the order of 6-ft cubed, such that a student can map the target in a reasonable amount of time. Examples that come to mind are the Tau Beta Pi bent in front of Martin Hall, or the Testudo statue in front of McKeldin. In this sense, attempting to map the exterior of the Kim Building would be considered unreasonable for a single student to complete in a single semester, and will not be approved.
d) Keep in mind you may be 3D printing a solid model of the target (derived from your 3D point cloud of lidar data), so consider if a 3D printer could successfully print a model of the target. Feel encouraged to talk with the folks at Terrapin Works (https://terrapinworks.umd.edu/), who are a fantastic resource for students both in terms of design for 3D printing as well as 3D printing services.
e) Since the bulk of the project grade is based on the YouTube video, **I highly recommend taking 30-60 second video clips of your proposed targets**. Experience has taught me the following *general theme of engineering documentation*: take images and video all the time, as you go, then edit as desired later on. Also, if you have not yet, please watch immediately: https://www.youtube.com/watch?v=Bt9zSfinwFA.