Three UG Research Projects – summer 2021:

Dr. Ayman Elmesalami and Dr. Soad Ibrahim are looking for motivated undergraduate (sophomore, junior, or senior) CS students to work on research projects in summer 2021. Good programming skills and a GPA of 3.0 or above are required. The students will receive a stipend. Undergraduate research positively affects the student's education.

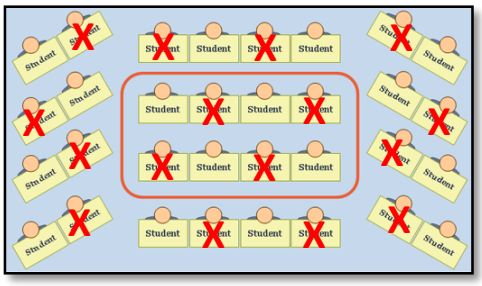
For more information about the UG research opportunity and the three available projects, you can contact Dr. Elmesalami at aelmesal@odu.edu.

The projects are:

1. **COVID-19 automatic classroom seating:** The UG students will use the Raspberry Pi tiny computers to regulate the classroom seating at ODU during the pandemic time. The objective is to automate the process of detecting seating violations, warning students within the violation vicinity, notifying the instructor, and keeping the instructions running with minimal disturbance.

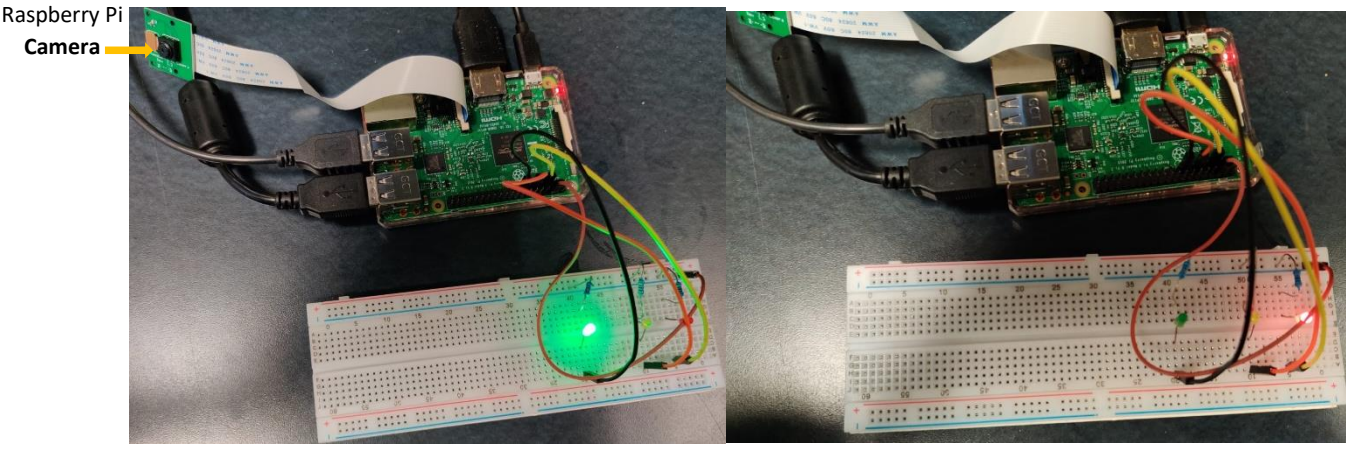
2. **Automatic costal flood detection in Norfolk City:** In this project, undergraduate students will develop a vision system controlled by the Raspberry Pi. The system automatically detects the flood levels low, moderate, and severe. Students will learn image processing concepts and how digital devices interpret an image, extract information from the image, and make a decision.

3. **ODU automatic parking control during big events:** In this project, the undergraduate students will develop a system to control parking, display a list of partially filled lots, block filled lots, and automate the collection of fees. The objectives are minimizing the check in time, balancing numbers of cars in lots, and allow easy access to the emergency vehicles.

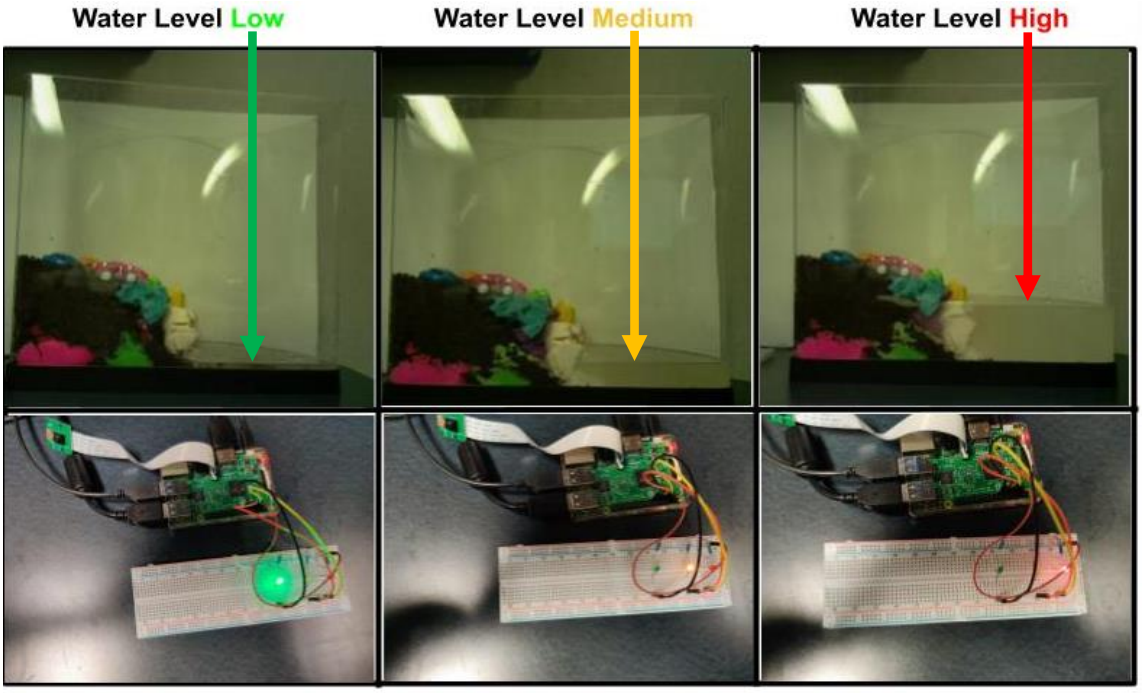


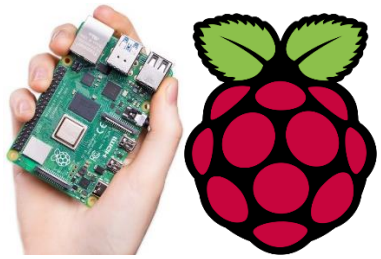
```
pi@node03:~/Desktop/PiCamUtils/floodDetection $ ./floodDetection.py
1: Capture Image
2: Training the Model
3: Testing the Model
0: Exit
```

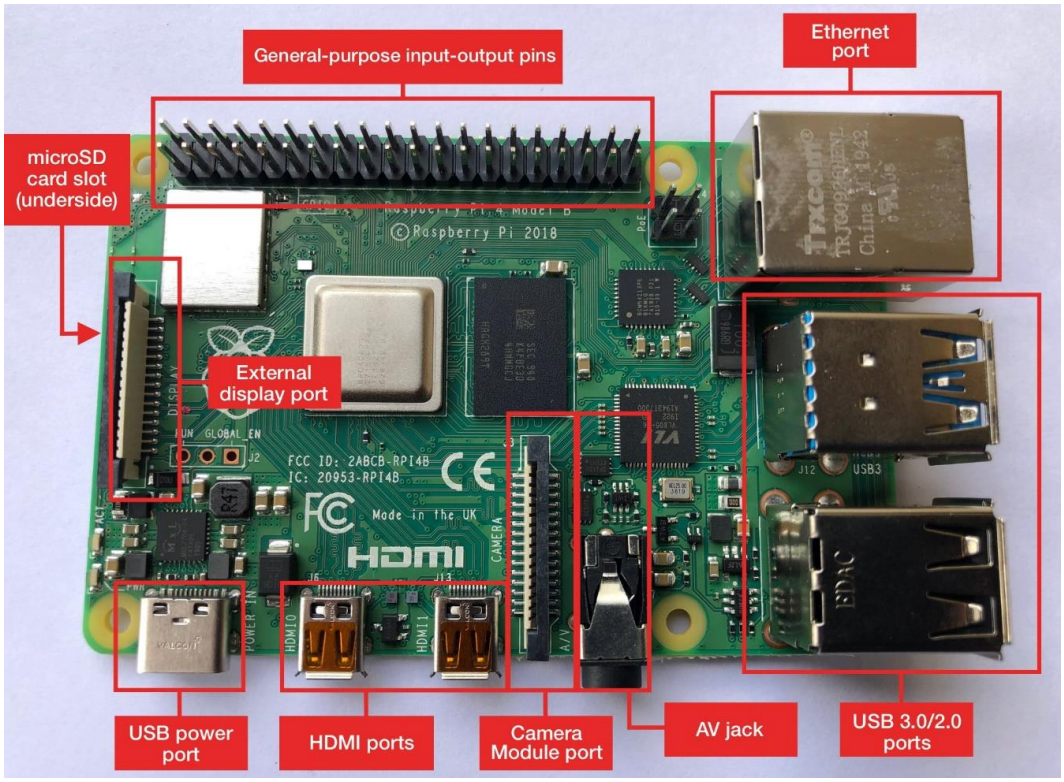
```
3
Enter Debug Mode (Y/N):  N
Enter Image Name from the testing folder:  testImage2
```



Automatic detection of the flood level


Water Level Low
Water Level Medium
Water Level High
LED Light Green
LED Light Yellow
LED Light Red




General-purpose input-output pins
Ethernet port
microSD card slot (underside)
External display port
USB power port
HDMI ports
Camera Module port
AV jack
USB 3.0/2.0 ports