

מועמדים יקרים!

כפי שצוין בכנס המועמדים, עליכם למלא את המטלה (לבחור 1 מתוך ה 3 הקיימות) ולהגישה בצירוף קורות חיים בקישור שיופיע בהמשך, עד לתאריך 30.1 בשעה 23:59.

לאחר ההגשה מועמדים מתאימים יזמנו לראיון אישי.

קישור להגשה: <https://forms.gle/JwUC3jB428Lbk7Kw9>

**** שימו לב שאת ההגשה ניתן לבצע דרך חשבון המייל של אוניברסיטת בן גוריון בלבד ****

לשאלות נוספות ניתן לפנות אלינו לכתובת המייל: bgracing@post.bgu.ac.il

המשימות מנוסחות בלשון זכר מטעמי נוחות אך מתייחסות כמובן לשני המינים !

בהצלחה!

Software Assignment 1: Cones Detection

It's crucial to detect the cones on the road to race in the autonomous Formula Student competition. Cones can be detected via Lidar, Cameras (Maybe Radar), etc.

In this assignment, you are required to develop software to detect the cones in images/videos.

Task:

- Try to find an open dataset for cones. (Keywords: traffic cones dataset, formula student cones dataset). Recommended site for datasets: Roboflow
- Use an AI model to detect the cones (for example YOLOv5, YOLOv8 & OpenCV)
- Draw bounding boxes around the cones you detect.
- Bonus section: try to identify the color of the cone.



Ben Gurion University Race Car 2014

Please submit (in the google forms) a zip file that includes :

- Your results (in word document and video/image with detections).
- Any other resource that shows your work (optional).

[Example video](#)

Software Assignment 2: Traffic Signs Recognition

You must have heard about the self-driving cars in which the passenger can fully depend on the car for traveling. But to achieve level 5 autonomous, it is necessary for vehicles to understand and follow all traffic rules.

In the world of Artificial Intelligence and advancement in technologies, many researchers and big companies like Tesla, Uber, Google, Mercedes-Benz, Toyota, Ford, Audi, etc. are working on autonomous vehicles and self-driving cars. So, for achieving accuracy in this technology, the vehicles should be able to interpret traffic signs and make decisions accordingly.

- In this assignment you need to use classic/old computer vision && image processing algorithms for object detection (You can use Machine Learning but not Neural Network).

- Try to recognize a stop sign using 2 different algorithms. Before you use any algorithm, you must check it's not a neural network method. It's ok if you manage to do only one algorithm, but that would be a disadvantage compared to other candidates.

- You need to be able to explain how the algorithms you used are working. (Compared to the first task where there is no need to explain the neural network)

Clarification: It's enough if you manage to recognize the stop sign just in 2 different pictures (You don't have to deal with all the use cases)



Please submit (in the google forms) a zip file that includes:

- Your code.
- Your results (in word document).
- Any other resource that shows your work (optional)

Software Assignment 3: Video Stabilization

You must have heard about autonomous drones. Although the main goal of self-autonomous cars and autonomous drones are quite similar (autonomous navigation), the difficulties are usually different.

Let's say you developed a security autonomous drone, and now you are sitting in relief and watching the live feed from your drone, just like a security guard would do. Oh no, unfortunately, the video is shaking and unfriendly to the users.

[Example Video](#)



One of the difficulties of the drone industry is to stabilize the video footage.

In this assignment you have to:

- Develop a video stabilization algorithm. (Keywords: OpenCV, Video Stabilization).
- Explain how it the algorithms you used. (Bonus if you know to explain in depth the algorithms)

The techniques and algorithms you will use in this assignment are probably the basis for visual autonomous navigation algorithms for autonomous drones! (If you wish, we will explain in the interview)

[Expected results](#)

Please submit (in the google forms) a zip file that includes:

- Your code.
- Your results (in word document).
- Any other resource that shows your work (optional)

Good luck!!