P2 Rescue people

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1 Practice goals

The drone must fly to the rescue zone and obtain the position of the people in the sea by detecting their faces. After the mission is completed the drone must return to the base.

2 Algorithm

Previous to coding the algorithm a transformation of the given coordinates to UTM meter is done via the web provided in one of the exercise statements. Lets define the UTM coordinates of the drone platform and the rescues Cd and Cr respectively.

The algorithm works only by position commands. Given Cr and Cd one can calculate the movement of the drone to the rescue zone as the difference between Cr and Cd. Let Cg = Cr - Cd , then a 2D grid of (x,y) positions is created from Cg with a step of 1m used in X and Y axis and a number of rows and columns. Also the height of the drone in the rescue zone is set to 1 m only to ensure that face detection algorithm will work properly as well as to minimize several detections of the same person("which is not a big issue but better to avoid").

Given the grid positions the drone explore all them with a short pause in each one to stabilize itself and take a proper image of the person at the sea. At each position a ventral camera image is obtained and passed to the face detection several times with diffent rotations. This is because the opencv haar cascade detection seems to work well between -30 and 30 degs. When a face is detected the current grid position is set as the person position given that the drone is only 1 m over it. When all the grid positions are explored or a timeout of the mision(set to 60s) occurs the drone retruns back to the base. The following is an image of the drone operating in the rescue zone.