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Algorithm for social distance robot

Abstract:

As the world currently straggling with COVID19, social distance becomes very important to limit the chance of getting the various. This file provides two algorithms/technology which will be used on the social distance robot to alert citizen to keep the social distance while there are in public places.

Technology1:

- Bluetooth beacons are primarily used to allow other Bluetooth devices such as smartphones or Bluetooth-WiFi gateways to determine their location and associated sensor information. In terms of working distances, beacons fit between NFC and GPS and provide a solution to the problem of GPS not working indoors. Bluetooth beacons also use much lower receiving device battery power than GPS.
- Buzzer: to alert the citizen by a voice massage from the robot.
- A mobile robot.

Algorithm1:

After designing an app for smart phones to connect NFC, GPS, Bluetooth beacons together. As well as to Create a server which will scan all the data need it. the following algorithm shows the inputs and the outputs of the system.

1- Start.
2- Declare: a closed hall or the place dimensions which the robot will be motive there.
3- Read: the mac address of all the devices in that area.
4- Locate: all the mac addresses that was read on the GPS.
5- Calculate: the distance between the mac addresses.
6- If (distance< =1.5m)
7- True: robot moves toward the mac addresses→ Output: the voice massage that alert the people to keep the distances while they communicate.
8- End.

Recourses1:

1- https://www.beaconzone.co.uk/what_are_beacons
2- https://www.bluepyc.com/products-portfolio/ble-echobeacon-social-distancing-special-edition/

Technology2:

- Using any security camera, we can use OpenCV face detection approach to locate if the social distance restrictions was not followed and connect it to our robot which will alert the citizen to follow the restrictions.

Algorithm2:

Connect a mobile robot to the security camera, develop a python software which uses OpenCV classes face detection.

Software requirements:

tensorflow-
gpu>=1.15.2
tqdm
matplotlib
numpy>=1.16.4
opencv-python>=3.2.0
scipy>=1.2.1
sklearn>=0.20.3

1- Start.
2- Read faces in the image.
3- Calculate the distance between the faces.
4- If (distance <=1.5m)
5- True: the robot moves the nearest point of the zone that the social distance was not kept and alert the citizen with a voice massage.
6- End.

Resources2:

1- https://github.com/JunweiLiang/social-distancing-prediction