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1 from shapely.geometry import Polygon
2
3
4 # Identification.py
5 # Authors: Diogo Rosário, João Raposo
6 # Description: This file defines the Identification object used in main.py. It aims to represent an identification with the following attributes:
7 # - x: Float representing the starting width in pixels of the identification
8 # - y: Float representing the starting height in pixels of the identification
9 # - width: Width of the identification
10 # - height: Height of the identification
11 # - confidence: Confidence value indicating the drone's belief in the identification as a Car, House, or Tree
12 # - class_type: Type of identification, either "Car," "House," or "Tree"
13 # - drone_confidence: Confidence/reputation value specific to each drone; a static value
14 class Identification():
15
16     def __init__(self, x, y, width, height, confidence, class_type, drone, drone_confidence):
17         self.x = x
18         self.y = y
19         self.width = width
20         self.height = height
21         self.confidence = confidence
22         self.class_type = class_type
23         self.drone = drone
24         self.drone_confidence = drone_confidence
25
26     # Creates two polygons that correspond to two identifications(rectangle)
27     # Checks if to identifications collide with each other
28     def checkCollision(self, other):
29         # Create polygons for each rectangle
30         poly1 = Polygon([(self.x , self.y),
31                         (self.x + self.width , self.y),
32                         (self.x + self.width , self.y + self.height),
33                         (self.x , self.y + self.height)])
34
35         poly2 = Polygon([(other.x , other.y),
36                         (other.x + other.width , other.y),
37                         (other.x + other.width , other.y + other.height),
38                         (other.x , other.y + other.height)])
39
40         # Check if the polygons (rectangles) intersect
41         return poly1.intersects(poly2) or poly2.intersects(poly1)
42
43     # Function that compares two identifications.
44     # Used to sort a list of identifications
45     def comparator(this, other):
46         confidence_this = this.confidence * this.drone_confidence
47         confidence_other = other.confidence * other.drone_confidence
48
49         if(confidence_this > confidence_other):
50             return 1
51         elif(confidence_this < confidence_other):
52             return -1
53         else:
54             if(this.drone_confidence > other.drone_confidence):
55                 return 1
56             elif(this.drone_confidence < other.drone_confidence):
57                 return -1
58             else:
59                 return 0
60
61
62     # String representation of this object (Identification)
63     def __str__(self):
64         return "\nClass: " + self.class_type + "\n" + "Confidence: " + str(self.confidence) + "\n" + "x: " + str(self.x) + "\n" + "y: " + str(self.y)
65

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