UML_ARL_PATH_PLANNER_v7

Midterm Group 1 | October 18, 2019

Environment

- obstacles : vector<Obstacle>

+ getObstacles() : vector<Obstacle>

PathPlanner

- resolution : double

+ findStraightPath(Point startPoint, Point endPoint) : vector<Point>

RobotPath

- robotPositions : vector<vector<RobotPosition>>

+ RobotPath(allRobotPositions : vector<vector<RobotPosition>>)
+ getPositions() : vector<vector<RobotPosition>>
+ existsCollision(Environment environment) : bool

0..*

Obstacle

- centroid : Point
- radius : double

+ Obstacle(Point startCentroid, double startRadius)
+ getCentroid() : Point
+ getRadius() : double

Robot

- numberLinks : int
- initialEEPosition : Point
- path : vector<RobotPath>
- dhParams : vector<vector<double>>
- tTransformations : vector<matrix<double>>

- computeATransform(vector<double> dhRow) : matrix<double>
- computeFK(vector<double> jointAngles) : vector<Point>
- computeJacobian(RobotPosition robotPosition) : matrix<double>
+ Robot(Point startingPos)
+ computeIK(PathPlanner pathToFollow) : RobotPath
+ crossProduct(Vector, Vector): Vector<double>

RobotPosition

- jointPosition : vector<Points>
- jointAngles : vector<double>

+ RobotPosition(vector<Point> jointPositions, vector<double> jointAngles)
+ checkCollision(Environment environment) : bool

Point

- x : double
- y : double
- z : double

+ Point(double newX, double newY, double newZ)
+ getX() : double
+ getY() : double
+ getZ() : double