UML_ARL_PATH_PLANNER_Final

Midterm Group 1 | October 21, 2019

Environment

- obstacles : vector<Obstacle>

+ Environment(vector<Obstacle>)
+ getObstacles() : vector<Obstacle>

PathPlanner

- resolution : double

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

RobotPath

- robotPositions : vector<RobotPosition>

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

Obstacle

- centroid : Point
- radius : double

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

Robot

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

+ Robot(Point)
+ computeATransform(vector<double>) : matrix<double>
+ computeFk(vector<double>) : vector<Point>
+ computeTransformationMatrices(vector<double>) : matrix<double>
+ computeJacobian(RobotPosition, vector<matrix<double>>) : matrix<double>
+ computeIK(Point, Environment) : vector<RobotPosition>
+ crossProduct(vector<double>, vector<double>): vector<double>
+ penroseInverseMatrix(matrix<double>) : matrix<double>

RobotPosition

- jointPositions : vector<Point>
- jointAngles : vector<double>

+ RobotPosition(vector<Point>, vector<double>)
+ getJoints() : vector<Point>
+ getAngles() : vector<double>
+ checkCollision(Environment) : bool

Point

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

+ Point(double, double, double)
+ getX() : double
+ getY() : double
+ getZ() : double