Thinking Fingers

Code Documentation V1.0

1 Namespace Documentation

1.1 Camera Namespace Reference

Classes

- class Camera

  take a picture and anlyse it to detect a dice

1.2 main Namespace Reference

Classes

- class RobotControl_Thread

  Class RobotControl_Thread update postion of the robot.

Functions

- def getData ()

  launch robotController Thread
- def stateMachine (ev=int)

  stateMachine manage the state of the soft : init, running, stop

Variables

- int state = STATE_INIT

  actual state for the state machine
- int oldState = STATE_INIT

  old state for the state machine
- theRobotController = RobotControl()

  class RobotControl object
- theCamera = Camera()

  class Camera object
- t = Timer(0.1,getData)

  timer to launch thread periodically

1.3 RobotControl Namespace Reference

Classes

- class RobotControl

  Control the robot.

2 Class Documentation

2.1 Camera.Camera Class Reference

take a picture and anlyse it to detect a dice

Public Member Functions

- def __init__ (self)

  the constructor
- def initRelation (self, robotController)

  intialise relation
- def capture (self)

  capture an image
- def cameraDetectionDice (self)

  manage the dice detection then trigger the state machine of class RobotControl depending on the dice number
- def detectNumberOnDice (self, image)

  detect the number on a dice
- def midpoint (self, ptA, ptB)

  calculate the mid point between 2 points
- def foundDice (self, imagePath, width_object)

  search a dice in an image

Public Attributes

- deltaX_m

  delta x of the object in meter from the center of the camera
- deltaY_m

  delta y of the object in meter from the center of the camera
- angleRot

  orientation the object in radian
- pixelsPerMeter

  pixels per meter ration
- imgCrop

  image of the dice
- robotController

  robotController object
- camera

  camera object

2.1.1 Detailed Description

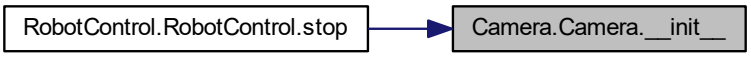
take a picture and anlyse it to detect a dice

2.1.2 Constructor & Destructor Documentation

2.1.2.1 __init__() `def Camera.Camera.__init__ ( self )`

the constructor

Here is the caller graph for this function:



2.1.3 Member Function Documentation

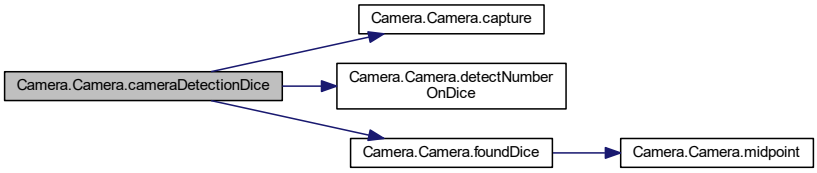
2.1.3.1 cameraDetectionDice() `def Camera.Camera.cameraDetectionDice ( self )`

manage the dice detection then trigger the state machine of class RobotControl depending on the dice number

Parameters

self	The object pointer.

Here is the call graph for this function:



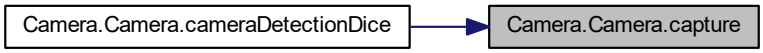
2.1.3.2 capture() def Camera.Camera.capture (self)

capture an image

Parameters

self	The object pointer.

Here is the caller graph for this function:



2.1.3.3 detectNumberOnDice() def Camera.Camera.detectNumberOnDice (self, image)

detect the number on a dice

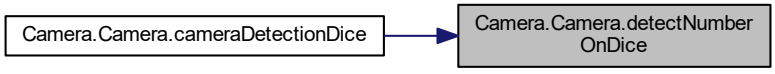
Parameters

self	The object pointer.
image	image of the dice

Returns

the dice number

Here is the caller graph for this function:



2.1.3.4 foundDice() def Camera.Camera.foundDice (self, imagePath, width_object)

search a dice in an image

Parameters

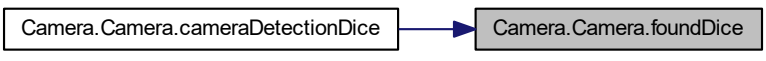
self	The object pointer.
imagePath	path to the image
width_object	width in mm of the object

Returns

an image of the dice

Here is the call graph for this function:

Here is the caller graph for this function:



2.1.3.5 initRelation() `def Camera.Camera.initRelation (`

```
self,
robotController )
```

intialise relation

Parameters

self	The object pointer.
self	The robot controller object

2.1.3.6 midpoint() `def Camera.Camera.midpoint (`

```
self,
ptA,
ptB )
```

calculate the mid point between 2 points

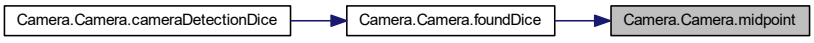
Parameters

self	The object pointer.
ptA	point 1
ptB	point 2

Returns

the middle point

Here is the caller graph for this function:



2.1.4 Member Data Documentation

2.1.4.1 angleRot `Camera.Camera.angleRot`

orientation the object in radian

2.1.4.2 camera `Camera.Camera.camera`

camera object

2.1.4.3 deltaX_m `Camera.Camera.deltaX_m`

delta x of the object in meter from the center of the camera

2.1.4.4 deltaY_m `Camera.Camera.deltaY_m`

delta y of the object in meter from the center of the camera

2.1.4.5 imgCrop `Camera.Camera.imgCrop`

image of the dice

2.1.4.6 pixelsPerMeter `Camera.Camera.pixelsPerMeter`

pixels per meter ration

2.1.4.7 robotController `Camera.Camera.robotController`

robotController object

The documentation for this class was generated from the following file:

- C:/Users/rebor/Documents/GitHub/PGA/Code/Camera.py

2.2 RobotControl.RobotControl Class Reference

Control the robot.

Public Member Functions

- def __init__ (self)
  constructor
- def initRelations (self, theCamera)
  get camera object
- def calibrate (self)
  Put the robot in original state.
- def updateCurrentPosition (self)
  update robot position get position X,Y,Z and orientation of tool center point
- def moveToPosition (self, x=float, y=float, z=float, rz=float)
  move the robot to a position XYZ with angle rz
- def setObjectPosition (self, dx=float, dy=float, rz=float)
  set the object found postion
- def statePliers (self)
  check the state of the pliers
- def adjustPliers (self, pliersState)
  open or close the pliers
- def master (self, event)
  State machine who manage the soft as follow : Step 1 : Move the pliers Step 2 : Search the dice Step 3 : dice found --> go step 4, else step 1 Step 4 : Grab the dice Step 5 : Launch the dice and go back to step 1 Stop if the dice is 6.
- def stop (self)
  this function stop the robot and put him in original state

Public Attributes

- angularvelocity
  angular velocity of the robot
- angularacceleration
  angular acceleration of the robot
- linearvelocity
  linear velocity of the robot
- linearacceleration
  linear acceleration of the robot
- posx
  tool center point position x
- posy
  tool center point position y
- posz
  tool center point position z
- rx
  tool center point orientation rx
- ry
  tool center point orientation ry
- rz
  tool center point orientation rz
- object_posX
  x postion of the object to catch
- object_posY
  y postion of the object to catch
- object_Rz
- takeOrRelease
- ZeroReached
  minimal y value
- MaxReached
  maximal y value
- evZone
  zone to search the dice
- lastZone
  last zone where the dice has been search
- BorderReached
  border x value
- xSearch
  position x to search the object
- ySearch
  position y to search the object
- zSearch
  position z to search the object
- host
  IP Address of the robot.
- state
  state of the state machine
- oldState
  oldstate of the state machine
- theCamera
  camera object
- object_posZ

2.2.1 Detailed Description

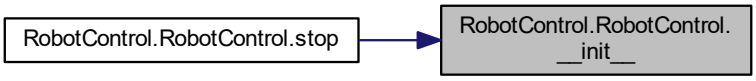
Control the robot.

2.2.2 Constructor & Destructor Documentation

2.2.2.1 __init__() `def RobotControl.RobotControl.__init__ ( self )`

constructor

Here is the caller graph for this function:



2.2.3 Member Function Documentation

2.2.3.1 adjustPliers() `def RobotControl.RobotControl.adjustPliers ( self, pliersState )`

open or close the pliers

Parameters

pliersState	True->Open, False->Close
self	The object pointer.

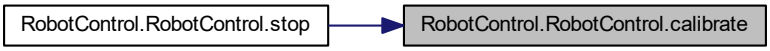
2.2.3.2 calibrate() `def RobotControl.RobotControl.calibrate ( self )`

Put the robot in original state.

Parameters

self	The object pointer.

Here is the caller graph for this function:



2.2.3.3 initRelations() `def RobotControl.RobotControl.initRelations ( self, theCamera )`

get camera object

Parameters

self	The object pointer.
theCamera	the camera object.

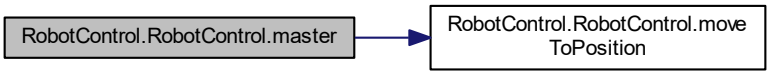
2.2.3.4 master() def RobotControl.RobotControl.master (self, event)

State machine who manage the soft as follow : Step 1 : Move the pliers Step 2 : Search the dice Step 3 : dice found --> go step 4, else step 1 Step 4 : Grab the dice Step 5 : Launch the dice and go back to step 1 Stop if the dice is 6.

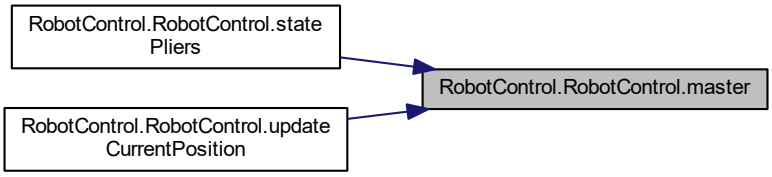
Parameters

self	The object pointer.
event	event to trigger state machine.

Here is the call graph for this function:



Here is the caller graph for this function:



2.2.3.5 moveToPosition() `def RobotControl.RobotControl.moveToPosition (`

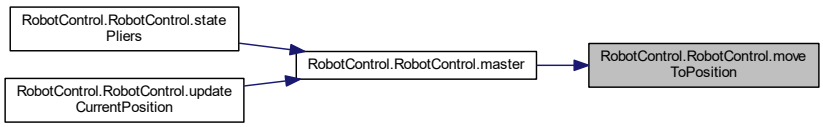
```
self,
x = float,
y = float,
z = float,
rz = float )
```

move the robot to a position XYZ with angle rz

Parameters

x	: Position X of the Tool Center Point
y	: Position Y of the Tool Center Point
z	: Position Z of the Tool Center Point
rz	: orientation of the object
self	The object pointer.

Here is the caller graph for this function:



2.2.3.6 setObjectPosition() `def RobotControl.RobotControl.setObjectPosition (`

```
self,
dx = float,
dy = float,
rz = float )
```

set the object found postion

Parameters

dx	: Delta X of the object from the center of the camera
dy	: Delta Y of the object from the center of the camera
rz	: orientation of the object
self	The object pointer.

2.2.3.7 statePliers() def RobotControl.RobotControl.statePliers (self)

check the state of the pliers

Parameters

self	The object pointer.

Here is the call graph for this function:

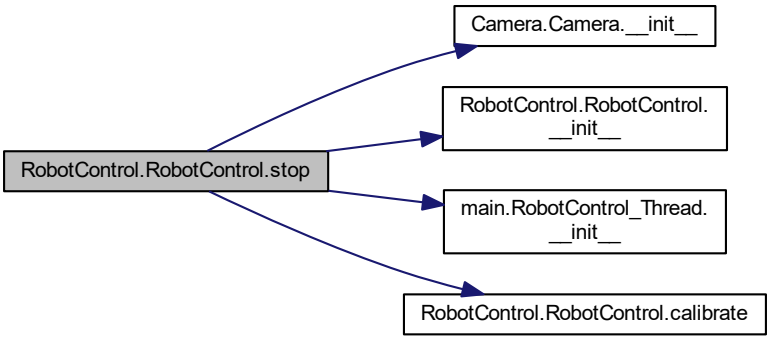
2.2.3.8 stop() def RobotControl.RobotControl.stop (self)

this function stop the robot and put him in original state

Parameters

self	The object pointer.

Here is the call graph for this function:



2.2.3.9 updateCurrentPosition() `def RobotControl.RobotControl.updateCurrentPosition ( self )`

update robot position get position X,Y,Z and orientation of tool center point

Parameters

self	The object pointer.

Here is the call graph for this function:

2.2.4 Member Data Documentation

2.2.4.1 angularacceleration `RobotControl.RobotControl.angularacceleration`

angular acceleration of the robot

2.2.4.2 angularvelocity `RobotControl.RobotControl.angularvelocity`

angular velocity of the robot

2.2.4.3 BorderReached `RobotControl.RobotControl.BorderReached`

border x value

2.2.4.4 evZone `RobotControl.RobotControl.evZone`

zone to search the dice

2.2.4.5 host `RobotControl.RobotControl.host`

IP Address of the robot.

2.2.4.6 lastZone `RobotControl.RobotControl.lastZone`

last zone where the dice has been search

2.2.4.7 linearacceleration `RobotControl.RobotControl.linearacceleration`

linear acceleration of the robot

2.2.4.8 linearvelocity `RobotControl.RobotControl.linearvelocity`

linear velocity of the robot

2.2.4.9 MaxReached `RobotControl.RobotControl.MaxReached`

maximal y value

2.2.4.10 object_posX `RobotControl.RobotControl.object_posX`

x postion of the object to catch

2.2.4.11 object_posY `RobotControl.RobotControl.object_posY`

y postion of the object to catch

2.2.4.12 object_posZ `RobotControl.RobotControl.object_posZ`

2.2.4.13 object_Rz `RobotControl.RobotControl.object_Rz`

2.2.4.14 oldState `RobotControl.RobotControl.oldState`

oldstate of the state machine

2.2.4.15 posx `RobotControl.RobotControl.posx`

tool center point position x

2.2.4.16 posy `RobotControl.RobotControl.posy`

tool center point position y

2.2.4.17 posz `RobotControl.RobotControl.posz`

tool center point position z

2.2.4.18 rx `RobotControl.RobotControl.rx`

tool center point orientation rx

2.2.4.19 ry `RobotControl.RobotControl.ry`

tool center point orientation ry

2.2.4.20 rz `RobotControl.RobotControl.rz`

tool center point orientation rz

2.2.4.21 state `RobotControl.RobotControl.state`

state of the state machine

2.2.4.22 takeOrRelease `RobotControl.RobotControl.takeOrRelease`

2.2.4.23 theCamera `RobotControl.RobotControl.theCamera`

camera object

2.2.4.24 xSearch `RobotControl.RobotControl.xSearch`

position x to search the object

2.2.4.25 ySearch `RobotControl.RobotControl.ySearch`

position y to search the object

2.2.4.26 ZeroReached `RobotControl.RobotControl.ZeroReached`

minimal y value

2.2.4.27 zSearch `RobotControl.RobotControl.zSearch`

position z to search the object

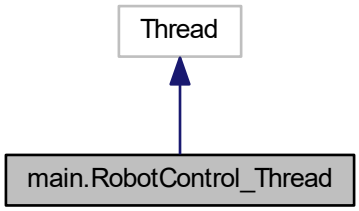
The documentation for this class was generated from the following file:

- C:/Users/rebor/Documents/GitHub/PGA/Code/RobotControl.py

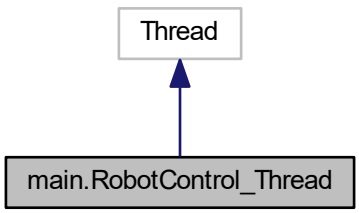
2.3 main.RobotControl_Thread Class Reference

Class RobotControl_Thread update postion of the robot.

Inheritance diagram for main.RobotControl_Thread:



Collaboration diagram for main.RobotControl_Thread:



Public Member Functions

- def __init__ (self)

  the constructor
- def run (self)

  get position of the robot

2.3.1 Detailed Description

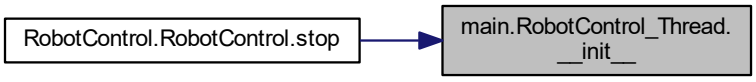
Class RobotControl_Thread update postion of the robot.

2.3.2 Constructor & Destructor Documentation

2.3.2.1 __init__() `def main.RobotControl_Thread.__init__ ( self )`

the constructor

Here is the caller graph for this function:



2.3.3 Member Function Documentation

2.3.3.1 run() `def main.RobotControl_Thread.run ( self )`

get position of the robot

The documentation for this class was generated from the following file:

- C:/Users/rebor/Documents/GitHub/PGA/Code/main.py

3 File Documentation

3.1 C:/Users/rebor/Documents/GitHub/PGA/Code/Camera.py File Reference

Classes

- class Camera.Camera
  take a picture and anlyse it to detect a dice

Namespaces

- Camera
- camera

3.2 C:/Users/rebor/Documents/GitHub/PGA/Code/main.py File Reference

Classes

- class main.RobotControl_Thread
  Class RobotControl_Thread update postion of the robot.

Namespaces

- main

Functions

- def main.getData ()
  launch robotController Thread
- def main.stateMachine (ev=int)
  stateMachine manage the state of the soft : init, running, stop

Variables

- int main.state = STATE_INIT
  actual state for the state machine
- int main.oldState = STATE_INIT
  old state for the state machine
- main.theRobotController = RobotControl()
  class RobotControl object
- main.theCamera = Camera()
  class Camera object
- main.t = Timer(0.1,getData)
  timer to launch thread periodically

3.3 C:/Users/rebor/Documents/GitHub/PGA/Code/RobotControl.py File Reference

Classes

- class RobotControl.RobotControl
  Control the robot.

Namespaces

- RobotControl