Method list of uct program

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Abstract

class StateNode(object):

addActionNode(self):

input: self
output: the index of the added action under current state node
Function: For a state node, it will add an action node to the nodelist:self.actVect_, return the index and update(add one) the self.actPtr_, which is used to record how many actions has been tried.

isFull(self):

input: self
output: true if the length of self.actVect_ is equal to self.actPtr_
Function: Find out Whether all the possible actions has been tried under current state.

class ActionNode(object):

containNextState(self, state):

input: self,state
output: True if current action node has a state in its state node
Function: If true, it means this action has been expended, if not, we need to add it to the current action node's state list.

getNextStateNode(self, state):

input: self,state
output: the index of the state in the state list if current action node have this state under this action
Function: return the index of the state

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addStateNode(self, _state, _actVect, _reward, _isTerminal):

input: self, _state, _actVect, _reward, _isTerminal
output: return the added state
Function: add a state node under the current action node's state list

class UCTPlanner(object):

setRootNode(self, _state, _actVect, _reward, _isTerminal):

input: self, the root state, the actVect of the root, the reward of the root and the whether the root is terminal
output: None
Function: set the root

plan(self):

input: self
output: None
Function: Build a UCT. This method is the main part of the whole program

getAction(self):

input: self
output: the index of an action
Function: get the index of the action which has the highest UCB

getMostVisitedBranchIndex(self):

input: self
output: None
Function: return the branch of the root who has been visited most

getGreedyBranchIndex(self)

input: self
output: None
Function: return the branch which has the highest UCB value

getUCTRootIndex(self, node)

input: self,a state node
output: the index
Function: return the state node's child's index who has the highest UCB value

getUCTBranchIndex(self, node):

input: self,a state node
output: the index
Function: return the state node's child's index who has the highest UCB value

updateValues(self, node, mcReturn):

input: self,a state node, and the current state's return value
output: None
Function: This is the function of the backpropagate.

MC_Sampling(self, node, depth=-2)

input: self the state node where start the sampling, and the limited depth
output: the sampled return
Function: we get a satate and start the samlping. When depth = -2, we stop the sampling when the state is terminal, else we stop when the sampling depth reach "depth".

modifyReward(self, orig):

input: self,the original reward of a state node
output: the modified reward
Function: modify the reward and return it

printRootValues(self):

input: self
output:
Function: print the values of the root

clearTree(self):

input: self
output:
Function: delete the tree

terminalRoot(self):

input: self
output: whether the root is a terminal state
Function:

prune(self, act):

input: self, the action will be pruned
output:
Function: delete one action's sub-tree of the root

pruneState(self, state):

input: self, the action will be pruned
output:
Function: delete one state's sub-tree

pruneAction(self, act):

input: self, the action will be pruned
output:
Function: delete one action's sub-tree

testRoot(self, _state, _reward, _isTerminal):

input:
output:
Function: test whether the root is a specfic root

testDeterministicProperty(self):

input: self
output:
Function:

testDeterministicPropertyState(self, state):

input: self
output:
Function:

testDeterministicPropertyAction(self, action):

input: self
output:
Function:

testTreeStructure(self):

input: self
output:
Function:

testTreeStructureState(self, state):

input: self
output:
Function:

testTreeStructureAction(self, action):

input: self
output:
Function:

input: self
output:
Function:

Below are the functions of uctPlanner.py

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input: self
output:
Function: