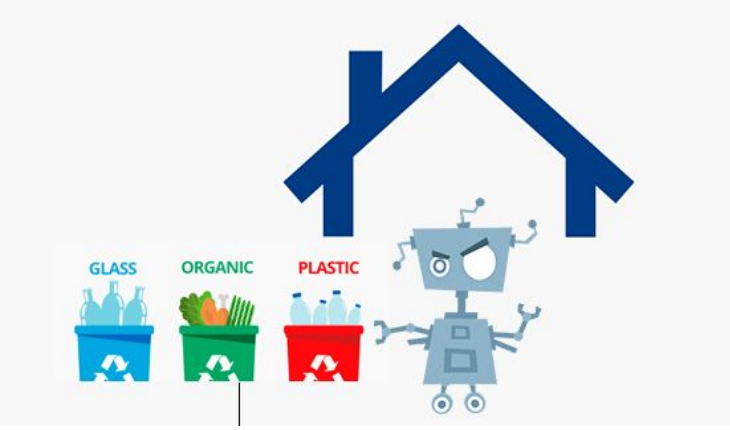
ARTIFICIAL INTELLIGENCE PROJECT REPORT



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SCENARIO

Given an initial state, a cleaner bot's mission is to achieve the state where the household area will be clean and waste objects will be used for recycling. The bot's job is to remove all the waste objects from the house and put the waste objects in bins according to the nature of the dirt. For example, *ORGANIC* waste into one bin, *PLASTICS* into another, *GLASSES* into another one.

PLAN DESCRIPTION

1. Initially The cleaner Bot is outside the house. Three types of bins are placed in the dump area and three types of dirt are located in navigable locations inside the house area.
2. It will go inside the house and move near the tile where dirt is found.
3. Then it will grab the dirt from the immediate connected tile.
4. After that, the bot will go outside of the house to the dump area. It will move near the tile according to the dirt's nature and drop the dirt in the dustbin.
5. Then the Bot will again go back inside the house area and look for dirt and the process will go on.
6. Goal is to remove all the dirt objects from the house and put them into the dustbins.

ACTIONS OF BOT

1. **Move :** This action refers to the navigations of the cleaning bot in the area where dustbins are kept, outside the house area.
2. **Move-inside :** The cleaning bot's navigation inside the house area.
3. **Go-in :** The robot will go inside the house to grab the dirt. This action will work when it will find the connection between a dirtTile and houseTile.
4. **Go-out :** The robot will go outside of the house to drop the dirt into dustbins. When a dirt object is already in the robot's hand it will find the connection between houseTile and dirtTile.
5. **Grab :** With this action the robot will grab the dirt from the house tile. Precondition of grabbing a dirt object is that the bot's hand needs to be available and the bot needs to be on any tile that is directly connected to the tile where dirt

is present.

6. **Drop :** With this action the robot will drop the dirt into the dustbins according to the nature of the dirt. Precondition of dropping a dirt object is that the bot needs to be on any tile that is directly connected to the tile where the particular dustbin is present.

OBJECTS

- The dumptiles are of dirtTiles objects whereas the housetiles are houseTiles type objects. House tiles refers to the tiles inside the house. Dirt tiles refers to the tiles of the dump area where dustbins are kept.
- CleanBot is the robot.
- Plastic, Glass and organics are dirt objects.
- Plastic bin, glass bin and organic bin are objects of the dump area.
- There is an object called the House surface where all the objects inside the house are kept.

INITIAL STATE

- The cleanBot's initial state is at dumptile-1-3.
- Glass Bin, Plastic Bin and Organic Bin are on dumptile-1-2, dumptile-2-1 and dumptile-1-3 respectively.
- Glass, Plastic and Organic dirt are on housetile-2, housetile-1, and housetile-3 respectively.
- House tiles are connected and dirt tiles are connected. Housetile-5 is connected with dumptile-2-3.
- CleanBot is available.

GOAL STATE

Goal is to remove all the dirt objects from the house.

- Plastic type dirt will be dropped inside the plastic bin.
- Glass type dirt will be dropped inside the glass bin.
- Organic dirt will be dropped inside the organic bin.

PLAN

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step    0: MOVE CLEANBOT DUMPTILE-1-3 DUMPTILE-2-3
        1: GO-IN CLEANBOT DUMPTILE-2-3 HOUSETILE-5
        2: MOVE-INSIDE CLEANBOT HOUSETILE-5 HOUSETILE-2
        3: GRAB CLEANBOT PLASTIC HOUSETILE-1 HOUSETILE-2 HOUSESURFACE
        4: MOVE-INSIDE CLEANBOT HOUSETILE-2 HOUSETILE-5
        5: GO-OUT CLEANBOT HOUSETILE-5 DUMPTILE-2-3
        6: MOVE CLEANBOT DUMPTILE-2-3 DUMPTILE-1-3
        7: MOVE CLEANBOT DUMPTILE-1-3 DUMPTILE-1-2
        8: MOVE CLEANBOT DUMPTILE-1-2 DUMPTILE-1-1
        9: DROP CLEANBOT PLASTIC DUMPTILE-2-1 DUMPTILE-1-1 PLASTICBIN
       10: MOVE CLEANBOT DUMPTILE-1-1 DUMPTILE-1-2
       11: MOVE CLEANBOT DUMPTILE-1-2 DUMPTILE-1-3
       12: MOVE CLEANBOT DUMPTILE-1-3 DUMPTILE-2-3
       13: GO-IN CLEANBOT DUMPTILE-2-3 HOUSETILE-5
       14: GRAB CLEANBOT GLASS HOUSETILE-2 HOUSETILE-5 HOUSESURFACE
       15: GO-OUT CLEANBOT HOUSETILE-5 DUMPTILE-2-3
       16: MOVE CLEANBOT DUMPTILE-2-3 DUMPTILE-1-3
       17: DROP CLEANBOT GLASS DUMPTILE-1-2 DUMPTILE-1-3 GLASSBIN
       18: MOVE CLEANBOT DUMPTILE-1-3 DUMPTILE-2-3
       19: GO-IN CLEANBOT DUMPTILE-2-3 HOUSETILE-5
       20: GRAB CLEANBOT ORGANIC HOUSETILE-3 HOUSETILE-5 HOUSESURFACE
       21: GO-OUT CLEANBOT HOUSETILE-5 DUMPTILE-2-3
       22: DROP CLEANBOT ORGANIC DUMPTILE-1-3 DUMPTILE-2-3 ORGANICBIN
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1. The bot is ***moving*** from dumptile-1-3 to dumptile-2-3.
2. The bot ***goes inside*** the house from the dump area.
3. It ***moves inside*** the house from housetile-5 to housetile-2.
4. The robot's position is now on housetile-2. Housetile-1 is directly connected to housetile-1. The bot is ***grabbing*** the plastic object from housetile-1 while the bot is on the housetile-2.
5. After grabbing the dirt object, it starts looking for the exit point and so it ***moves inside*** the house from housetile-2 to housetile-5.
6. The robot finds the exit point and it ***goes out*** from housetile-5 to dumptile-2-3.
7. The bot ***moves*** from dumptile-2-3 to dumptile-1-3.
8. Again ***moves*** from dumptile-1-3 to dumptile-1-2.
9. The next ***move*** is from dumptile-1-2 to dumptile-1-1.
10. Dumptile-1-1 is directly connected to dumptile-2-1 where the plastic bin is present. So, the robot ***dropped*** the plastic object inside the dustbin while the bot is on dumptile-1-1.

11. The process goes on till the robot grabs and drops all the dirt objects in the respective dustbins.

FUTURE SCOPE

12. The cleaner Bot will have a cart where it can pick up multiple objects at a time.
13. Cart will have a limit.
14. The robot cannot pick up mixed dirts together. For example it can’t load organic dirt with glass or plastics in the cart.