SCHOOL OF COMPUTING

FACULTY OF ENGINEERING

SECJ3553 ARTIFICIAL INTELLIGENCE

SECTION 10

ASSIGNMENT 2

Project Title: Smart Recycle Pick-Up Route Application

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Contents

State Space Search

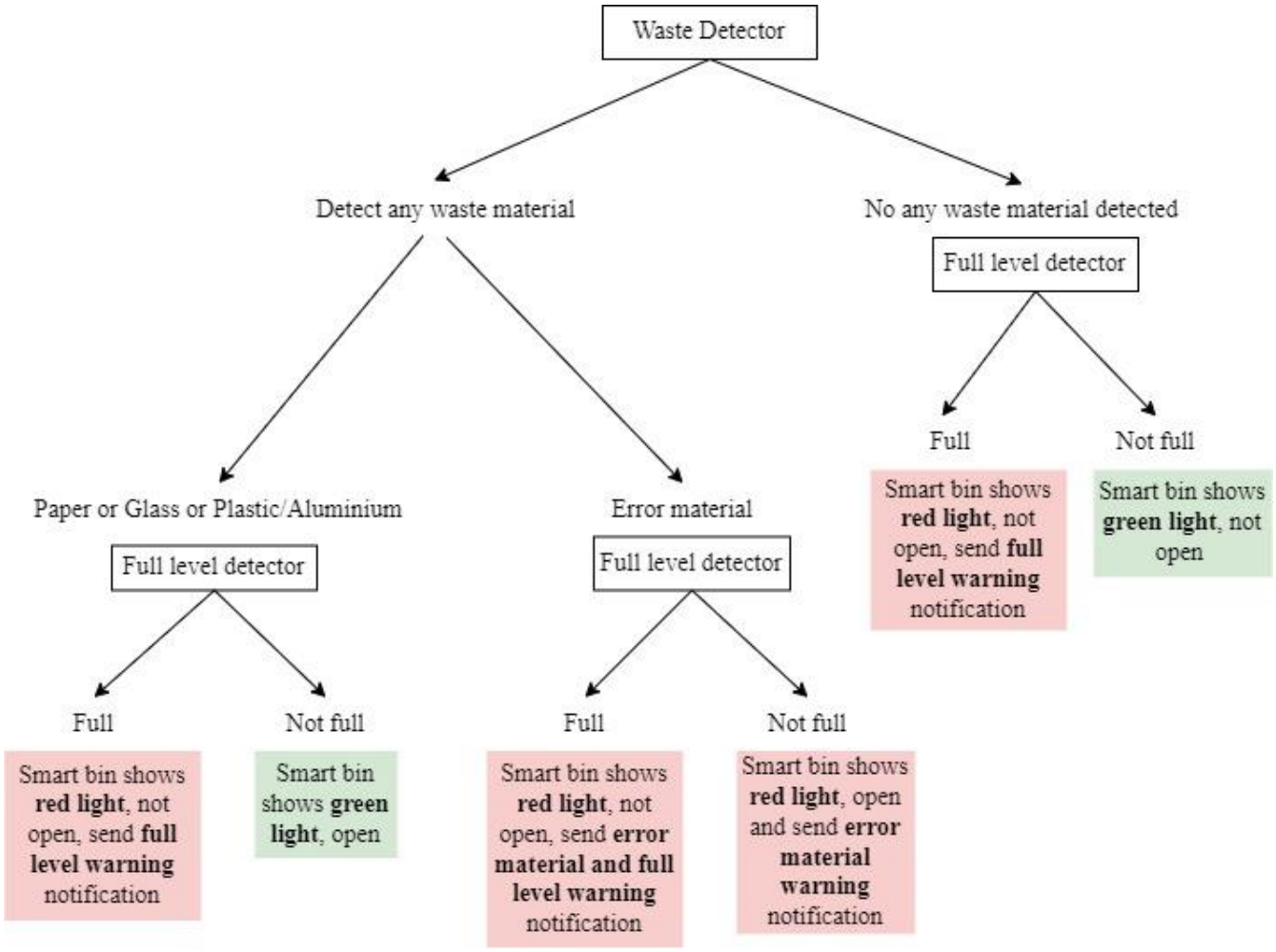
Details of States and Actions

1st state: The waste detector will detect whether there is any waste material. If there is no waste material is detected, the full level detector will detect the full level capacity of the recycle bin. If there is waste material detected, the waste detector will detect the material inside.

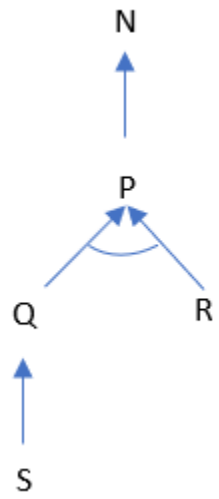
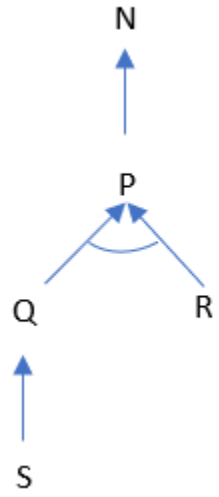
2nd state: The waste detector will detect the material of waste whether it is paper, glass or plastic /aluminium. If the waste detector detects two or more materials, then the material is an error material.

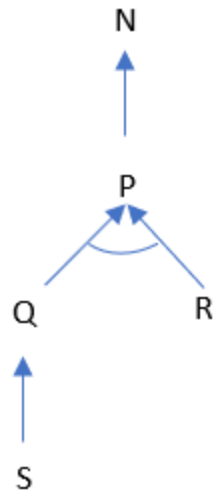
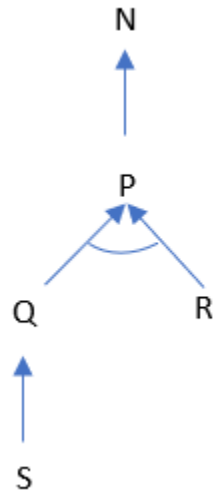
3rd state: After checking the type of the waste material, the smart bin will check whether the full capacity detector is activated or not. If the capacity of the smart bin is full, it will not open, activate the full level capacity detector and generate full level capacity warning to the user and notify the driver to pick up. If the capacity of the smart bin is not full with the condition of error material warning is not detected, the smart bin will open and classify the recycled waste and sort the waste into the compartments according to the type of the material determined.

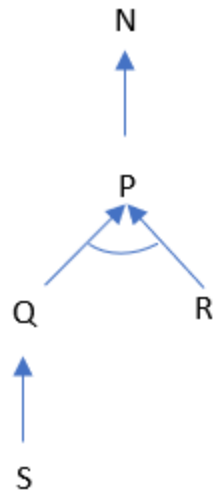
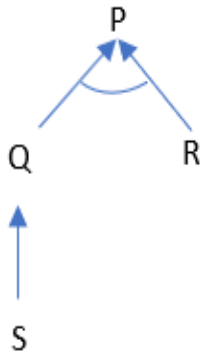
Overview of Actions Graph



Hypergraph

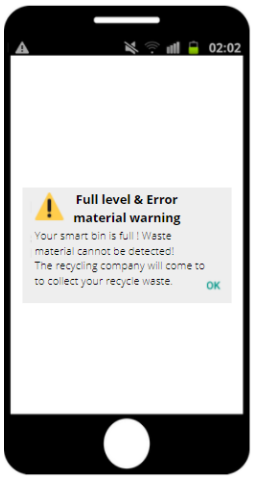
N = Notification shows full level warning P = Smart bin shows red light Q = Full level detector notice full level R = Waste detector notice Paper/Glass/PA material S = Current Recycle bin have no response	
N = Notification have no response P = Smart bin shows green light Q = Full level detector did not notice full level R = Waste detector notice Paper/Glass/PA material S = Current Recycle bin have no response	

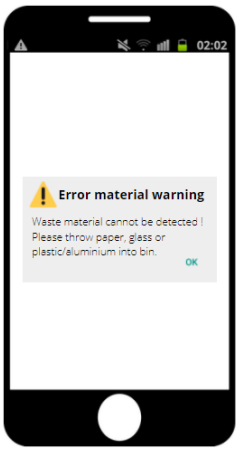
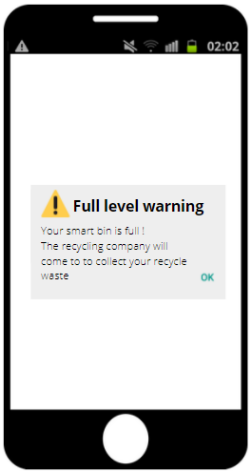
N = Notification shows full level and error material warning P = Smart bin shows red light Q = Full level detector notice full level R = Waste detector notice two or more material (Paper/Glass/PA) S = Current Recycle bin have no response	
N = Notification shows error material warning P = Smart bin shows red light Q = Full level detector did not notice full level R = Waste detector notice two or more material (Paper/Glass/PA) S = Current Recycle bin have no response	

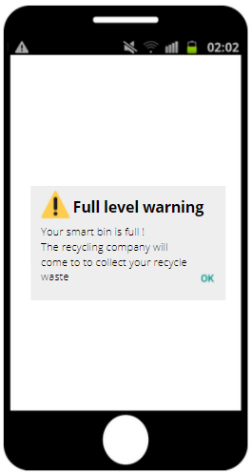
N = Notification shows full level warning P = Smart bin shows red light Q = Full level detector notice full level R = Waste detector did not notice any material S = Current Recycle bin have no response	
P = Smart bin shows green light Q = Full level detector did not notice full level R = Waste detector did not notice any material S = Current Recycle bin have no response	

Problem Formulation

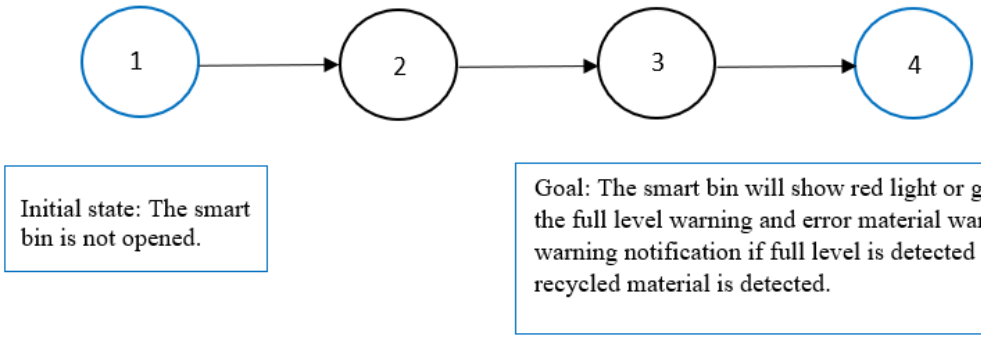
1. Initial State: The smart bin is not opened.
2. Action: The smart bin detects the recycled waste and classifies recycled waste material. The types of the recycled waste and the full level capacity of the smart bin will be determined to generate the response.
3. Goal: The smart bin will show red light or green light based on the full level warning and error material warning as well as send warning notification if full level is detected or error material of recycled material is detected.
4. Path Cost: 1 unit per action

No.	Correspond KRs	Waste Detector	Full level Detector	Action	
				Smart Bin Respond	Notification
1.	KR1, KR3, KR5, KR 9	Detected, Error Material	Activated	Red light, Not Open 	Full level capacity warning, error material warning 

2.	KR2, KR4, KR6, KR10	Detected, Error Material	Not activated	Red light, Not Open 	Error material warning 
3.	KR7,KR11,KR13	Detected, Recycled Material	Activated	Red light, Not Open 	Full level capacity warning 
4.	KR8, KR12,KR14	Detected, Recycled Material	Not Activated	Green light, Open  	No notification

				  * Recycled material will sort into different compartments in the smart bin based on the material type detected.	
5.	KR15	Not detected	Activated	Red light, Not Open 	Full level capacity warning 
6.	KR16	Not detected	Not activated	Green light, Not Open 	No notification

Solution: Sequence of Actions Leading from Initial State to Goal State



Explanation of formulated problem to support the proposed KR

1. The smart bin detects the error material of recycled waste, shows red light, and sends error material and full level capacity warning when it detects the waste that cannot be classified as any kind of recycled waste material and full level of smart bin as shown in KR1,KR3 KR5 and KR9.

2. The smart bin detects the error material of recycled waste, shows red light, and send error material warning when it detects the waste that cannot be classified as any kind of recycled waste material and does not detect full level capacity as shown in KR2, KR4, KR6 and KR10

3. The smart bin detects the recycled waste, shows a red light, sends full-level warning when the full level detector is detected and the error material detector is not detected as shown in KR7,KR11 and KR13.

4. The smart bin detects the recycled waste, shows green light and it sorts the recycled waste according to material type detected by the waste detector when the full level detector and error material is not detected as shown in KR8, KR12 and KR14.

5. The smart bin does not detect any recycled waste, it will show red light when the full level detector is detected and error material is not detected shown in KR15.

6. The smart bin does not detect any recycled waste, it will show green light when the full level detector and error material is not detected shown in KR16.