EXPERIMENT NO 2

Problem Statement: Autonomous Toy Sorting System.

<u>PEAS of the above problem statement:</u>

Performance Measure:

- Efficient sorting of toys within the shortest time.
- Minimization of energy consumption for robot movement.
- Accurate placement of toys in their designated bins.

Environment:

- A playroom with different types of toys, bins labeled with toy categories, and obstacles.

Actuators:

- Wheels for robot movement.
- Robotic arm for picking up and placing toys into bins.

Sensors:

- Cameras for recognizing toy types and bin labels.
- Ultrasonic sensors for measuring distances and detecting obstacles.

Initial State:

- The autonomous toy sorting robot is stationed near a pile of unsorted toys.
- No toys are placed in the bins.

Goal State:

- All toys are accurately sorted into their designated bins.
- The robot returns to the standby position.

State Space:

- Robot's location in the playroom.
- Presence of toys in the robot's gripper.
- Status of each bin (whether it contains the correct toy type or not).

Actions:

- Move to different locations within the playroom.
- Pick up a toy from the pile.
- Drop a toy into a designated bin.
- Avoid obstacles in the playroom.

State Space Tree:

Level 1:

Node 1: Robot near the pile of unsorted toys

Action: Move to Toy A

Action: Move to Toy B

Action: Stay near the pile

Level 2: (Picking Up Toy A)

Node 2: Robot picking up Toy A

Action: Move to Bin A

Action: Move to Bin B

Action: Stay with Toy A

Level 3: (Dropping Toy A into Bin A)

Node 3: Robot dropping Toy A into Bin A

Action: Move to Toy B

Action: Move to Bin B

Action: Move to Standby Position

Level 4: (Picking Up Toy B)

Node 4: Robot picking up Toy B

Action: Move to Bin A

Action: Move to Bin B

Action: Stay with Toy B

Level 5: (Dropping Toy B into Bin B)

Node 5: Robot dropping Toy B into Bin B

Action: Move to Toy A

Action: Move to Bin A

Action: Move to Standby Position

Level 6: (Robot at Standby Position)

Node 6: Robot at the standby position

Action: Move to Toy A

Action: Move to Toy B

Action: Stay at the standby position

Conclusion:

In the above experiment we took a ai applications problem on basis of which we created a simplified possible solution along with the space tree which gives us almost all the possible possibilities of the solutions to the above taken problem statement.