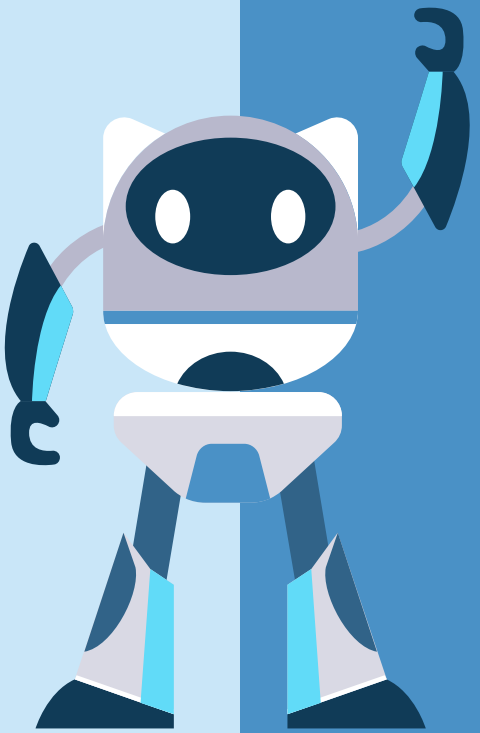
PUSHPAK ROVER

A sustainable and innovative project by team Pushpak.

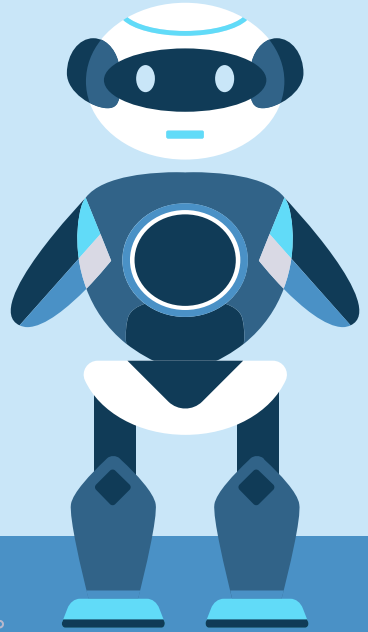


INTRODUCTION

Pushpak Rover is a semi-automated robot designed to carry and deliver parcels from one fixed location to another.

Key features:

- Sensors to track path.
- Battery operated (rechargeable).
- Compartment to carry parcels.

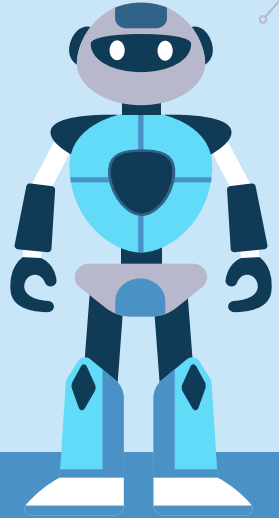


PROBLEM STATEMENT

Currently, any kind of parcels ordered by students or faculty using the college address are delivered to the campus main gate.
The parcels have to be collected by the recipient by personally going to the main gate to collect their parcels from the delivery people.

This system has certain flaws:

- The recipient's physical effort is wasted in walking long distances (often from hostels to the main gate).
- Valuable time has been dedicated to this task instead spending it on something productive or leisurely.



SOLUTION

The Pushpak Rover aims minimize the two main problems faced in the current parcel delivery system in the following ways.

1.

Reducing human effort:

The parcel just needs to be placed onto the rover, which it will carry to its destination by following road markers.

2.

Saving recipient's time:

The recipient just needs to collect parcel from the specified location which is determined as per their convenience. (e.g. hostel)

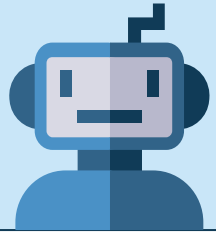
WORKFLOW

01

Delivery person places the parcel in the compartment at pickup point.

02

The rover is placed on the delivery line.



03

It follows the line and reaches the drop point.

04

The receiver will collect the parcel and place the rover on the returning path.

05

The rover goes back to the pickup point.

DESIGN

MECHANICAL

- 4 Wheeled
- Compartment for Parcel
- Aluminium chassis
- Weight capacity 2kg

ELECTRICAL

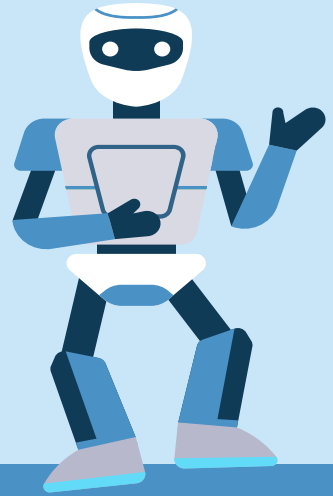
- Arduino Board
- Lipo batteries
- Geared DC motors
- Motor drives L298N

SENSORS

- IR infrared sensor module
- Ultrasonic distance sensor

SOFTWARE

- Arduino IDE
- Line follower code



IMPLEMENTATION STEPS

STEP 1

Planning and requirement analysis.

STEP 2

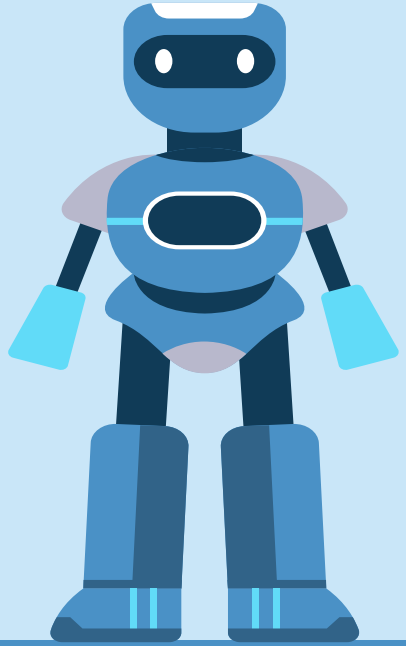
Hardware and Software design.

STEP 3

Prototype development.

STEP 4

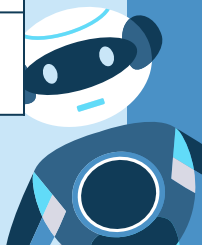
Deployment and scaling.



Challenges

The various challenges that may be encountered by the Rover are :

Problems	Description
1.Discontinuous Tracking Lines	Tracking lines used for guiding rover can be discontinuous which can lead to wrong orientation of the rover or complete disruption in the delivery process.
2.Battery Limitation	Increasing range of rover requires increasing the size of batteries, which further increases the load on batteries, this poses a serious limitation in range extension.
3.Rough Terrains	Unpaved and unlevelled roads may disrupt the overall balance of the rover.
4.Weather conditions	Strong winds and heavy rains can temper with the tracking lines and also damage various components present in the rover.
5.External Intervention	Stray animals and miscreants can temper with the rover by deflecting it from its path and damaging the components.



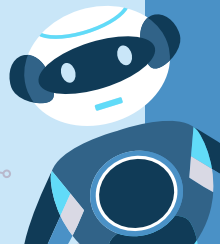
CONCLUSION

The Pushpa Rover saves time and effort of users with respect to the current parcel delivery system. Moreover it is an eco-friendly project as it directly powered by electrical energy which can be easily sustainably produced without high carbon emissions.

Future scope for upscaling and improvements:

- Integration with IoT for real-time tracking and security .
- Charging stations which use renewable energy for battery charging (e.g., solar panels).

Thus the Pushpa Rover project can provide value to the efficiency of thee working of the campus.



Thank You!