LEGO Augmented Raspberry Bot

Contents

1 Prototyping

1.1 Inspiration and Sources

The prototype is a combination of a raspberry bot by Ivan Sanders [4] and the LEGO remote car, which can be seen in the raspberry tutorial [1] [1]. Like the LEGO raspberry bot from the tutorial, the prototype is controlled with the Blue Dot App [2][2] via Bluetooth. A shell script is executing the python code, which is responsible for the behavior of the bot. I used the LEGO Technic 42065 -set as the base for the bot. The wire of LEGO motors has to be hacked to make it possible to connect them to the motor control module, which i used the posts from Scuttlebots [3] as a guideline. The design can be seen in the figures 1, 2 and 3.

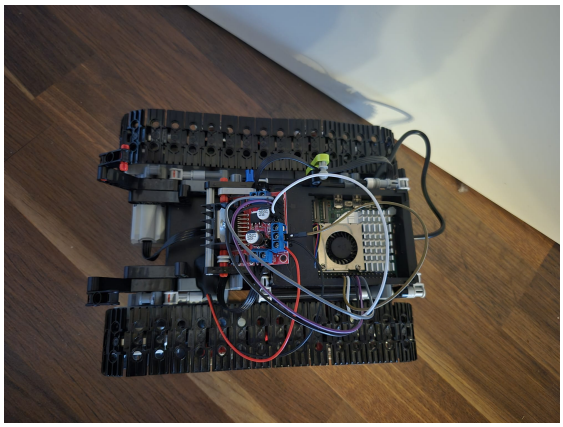

Figure 1: Prototype 1 topview

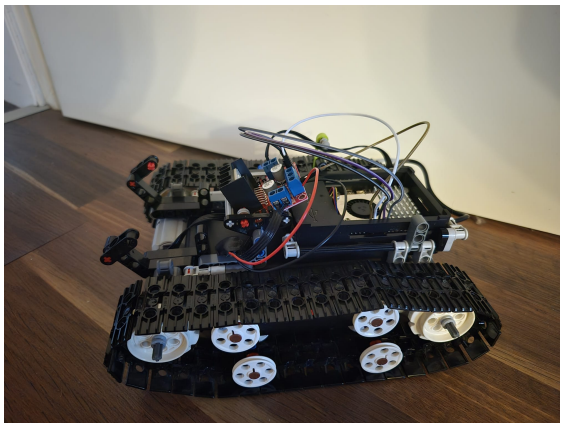

Figure 2: Prototype 1 sideview

[1] LEGO remote car by raspberry
[2] BlueDot

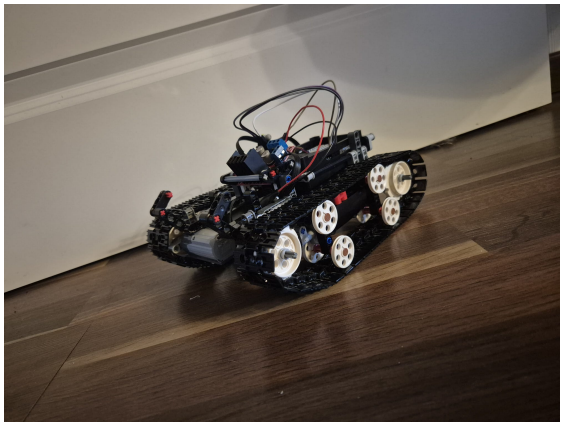

Figure 3: Prototype 1 frontview

1.2 Functionality

Startup	Uppon Startup the Bot connects to my Phone via Bluetooth
Movement	Bot can be controlled by using BlueDot as a joystick. The movement is clunky, can only turn on the spot while standing still

Table 1: Functionality of the prototype

1.3 Parts and Cost

All costs are in € and depend on the day of purchase (25.11.24 for the Raspberry and 23.12 - 30.12.24 for the other parts); all links are not sponsored.

Part	Cost	Note
Raspberry pi 5, 8GB	135,99	I used the Raspberry Pi 5 8 GB starter kit from Amazon as my first Raspberry setup
Jumper Wires	5,94	ELEGOO Jumper Wire
L298N Motor Control Board	9,99	L298N Motor Drive Controller Board
Powerbank for the pi	16,24	EMOS - ALPHA 10S Powerbank
LEGO Technic 42065	50	Estimation of the original price, can divert by 20€ because of different factors
Powerbank for LEGO motors	13,59	JUBOTY Lithium-Ion Battery
Battery connectors	5,99	9 V I-type battery connectors
	237,74	Total

Table 2: Used Parts for the Prototype

1.4 Prototype 2

After some testing around, i decided to replace the chains to wheels (Fig. 4, 5, 6), resulting in a faster vehicle. The bot is now lacking a system to take take turns as well as a stable chassis, which will be addressed in the next milestone.

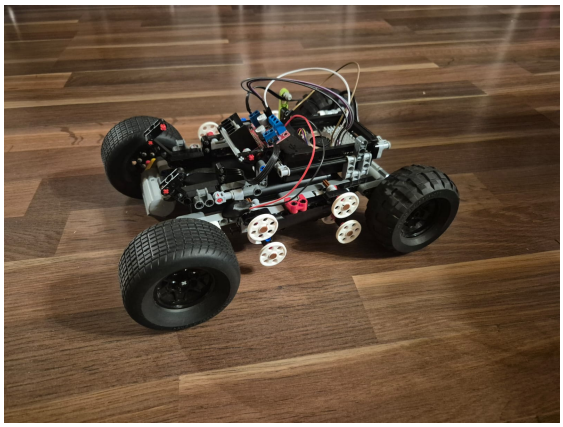

Figure 4: Prototype 2 sideview

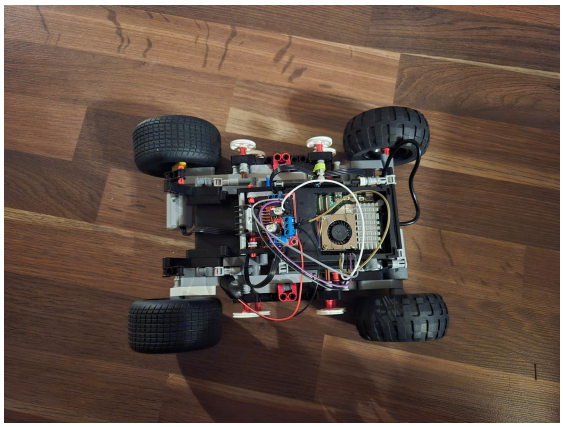

Figure 5: Prototype 2 topview

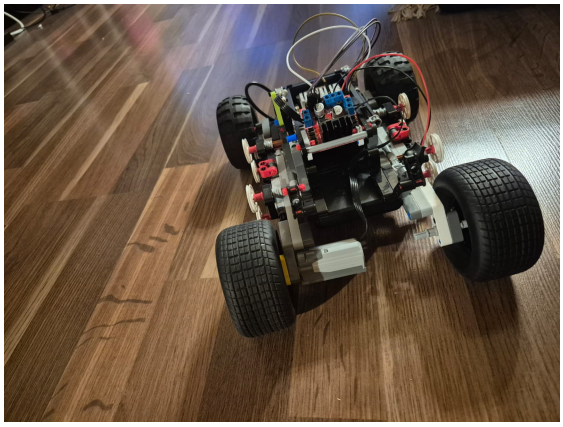

Figure 6: Prototype 2 frontview

2 Milestone 1: Turning and Chassis

2.1 Turning-System

2.2 Stable chassis

2.3 Functionality

2.4 Parts and Cost

3 Milestone 2

4 Milestone 3

5 Milestone 4

References

[1] *Ferngesteuertes LEGO® Auto — Build-hat, Python — Coding Projekte für Kinder und Jugendliche*. URL: https://projects.raspberrypi.org/de-DE/projects/lego-robot-car/0 (visited on 01/06/2025).

[2] *Getting Started — bluedot 2.0.0 Documentation*. URL: https://bluedot.readthedocs.io/en/latest/gettingstarted.html (visited on 01/06/2025).

[3] ihayes42. *Lego PF Hacking – Wire Hacking*. Scuttlebots. Mar. 2, 2014. URL: https://scuttlebots.com/2014/03/02/lego-pf-hacking-wiring/ (visited on 01/06/2025).

[4] Ivan Sanders. *Pi Diary: Making My Own "RC Car" using Raspberry Pi — In Plain English*. plainenglish.io/blog/pi-diary-making-my-own-rc-car-using-raspberry-pi-e767559d82. URL: https://plainenglish.io/blog/pi-diary-making-my-own-rc-car-using-raspberry-pi-e767559d82 (visited on 01/06/2025).