



AI a AR v Robotike

Jozef Orenič





Obsah

1. Čo je AI & AR
2. Využitie a problémy, ktoré sú riešiteľné
3. Praktické aplikácie
4. SecuBot
5. Mibaro



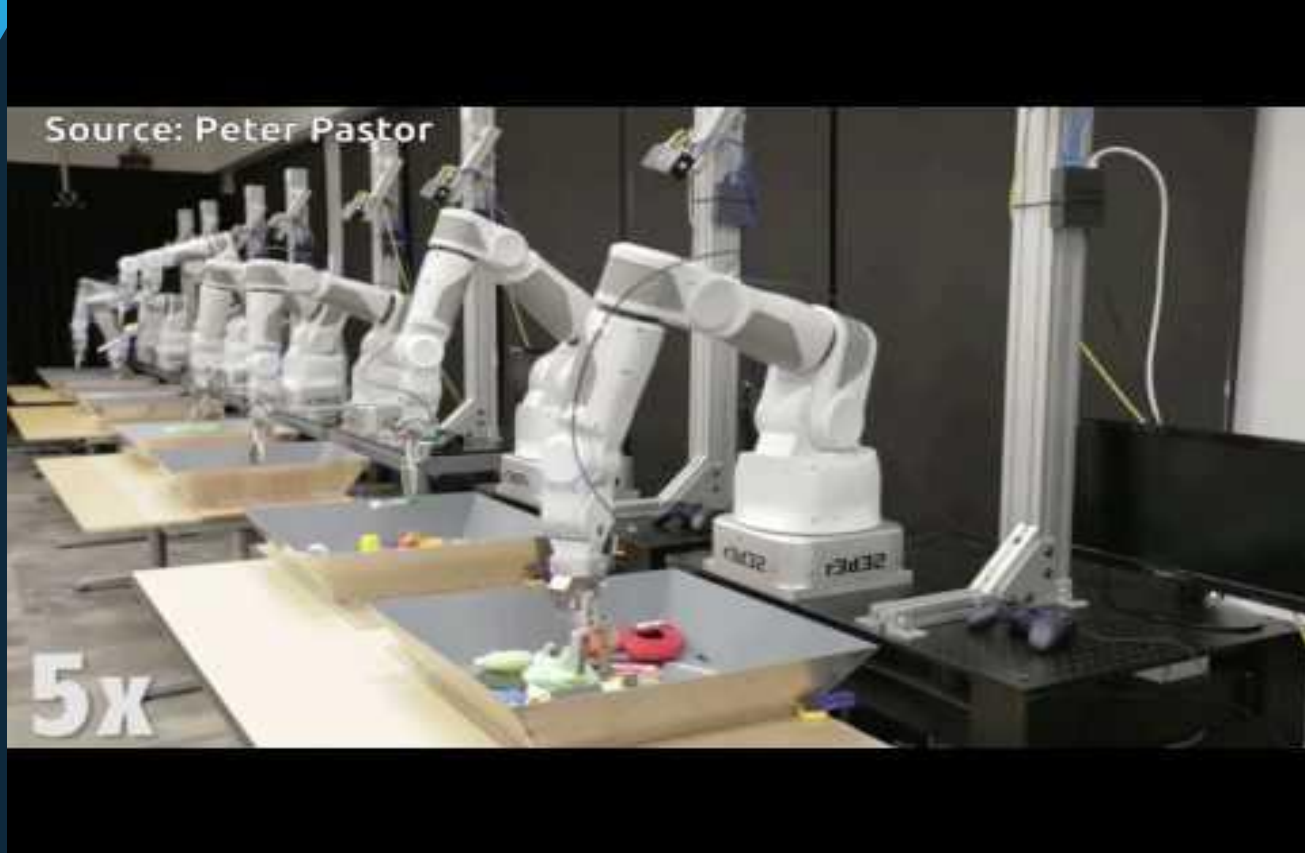


AI

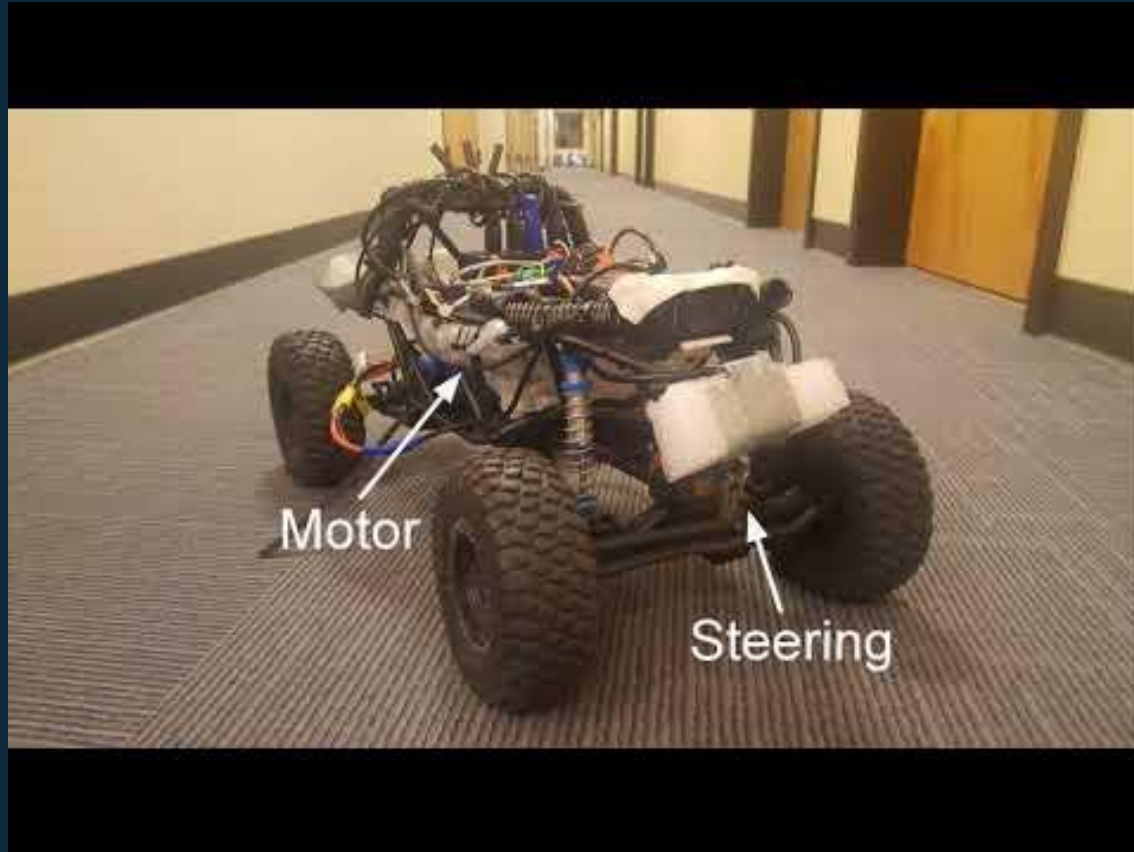
1. Reinforcement learning (live demo)
2. Genetický algoritmus
3. Game AI



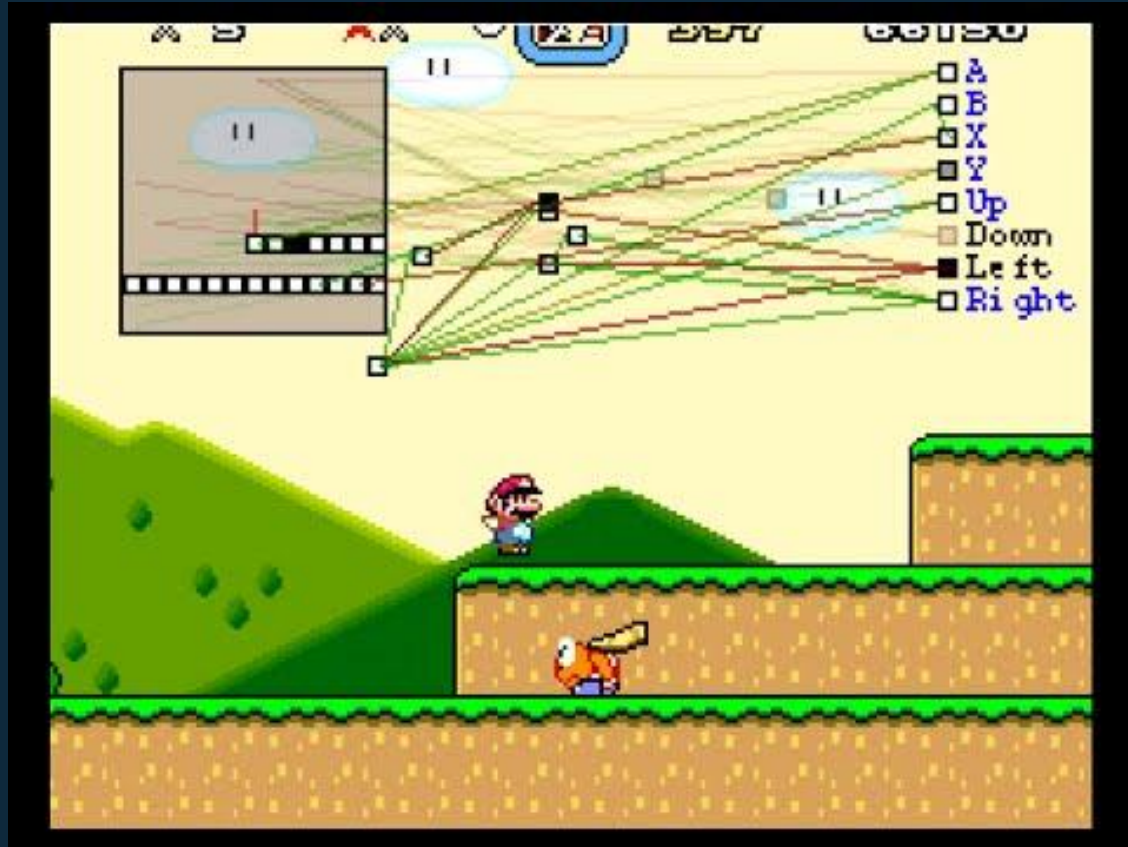
Reinforcement learning



Reinforcement learning



Genetický algoritmus



MekaMon



**MekaMon: Robotics Gaming
& Augmented Reality**



AI v hrách

1. Decision Trees
2. State Machines
3. Behavior Trees
4. Fuzzy Logic
5. Markov State Machines
6. Goal Oriented Behavior
7. Rule Based Systems
8. Tactical Analysis
9. Learning AI
10. Neural Networks
11.





Praktické aplikácie

- ◇ Google cloud AI
- ◇ Automotive - Tesla - AI
- ◇ Huawei - AR + AI (fotoaparát)
- ◇ Hololens - AR
- ◇ Magic Leap
- ◇ Ikea - AR
- ◇ ...aplikovanie AI v robotike je veľmi ťažká úloha





Boston dynamics – Atlas



- ◇ Používa “Zero moment point” algoritmus a tzv. “Dynamical control algorithm”
- ◇ V budúcnosti aj deep RL



Google Cloud Vision

Web	Document	Properties	Safe Search
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171114101806-chris-lim-hong-kong-street-photography-tram-full-169.jpg

Downtown	90%
Metropolitan Area	90%
Building	89%
Mixed-use	89%
Metropolis	86%
Snapshot	82%
Architecture	82%
Infrastructure	76%
Pedestrian	75%

Google Cloud Vision

Web	Document	Properties	Safe Search
 171114101806-chris-lim-hong-kong-street-photography-tram-full-169.jpg		<pre>mid : /m/0bmsqyq , "description": "Thoroughfare", "score": 0.712235, "topicality": 0.712235 }, { "mid": "/m/0d9wj", "description": "Urban design", "score": 0.6686716, "topicality": 0.6686716 }, { "mid": "/m/0df8xq", "description": "Nonbuilding structure", "score": 0.5140415, "topicality": 0.5140415 }, { "mid": "/m/0dnhy", "description": "Sidewalk", "score": 0.51155096, "topicality": 0.51155096 }, { "mid": "/m/0lnblt", "description": "Apartment", "score": 0.5109193, "topicality": 0.5109193 }</pre>	



Deep Mind – RL

Trained on heightfields,



- ◇ RL implementácia od firmy DeepMind
- ◇



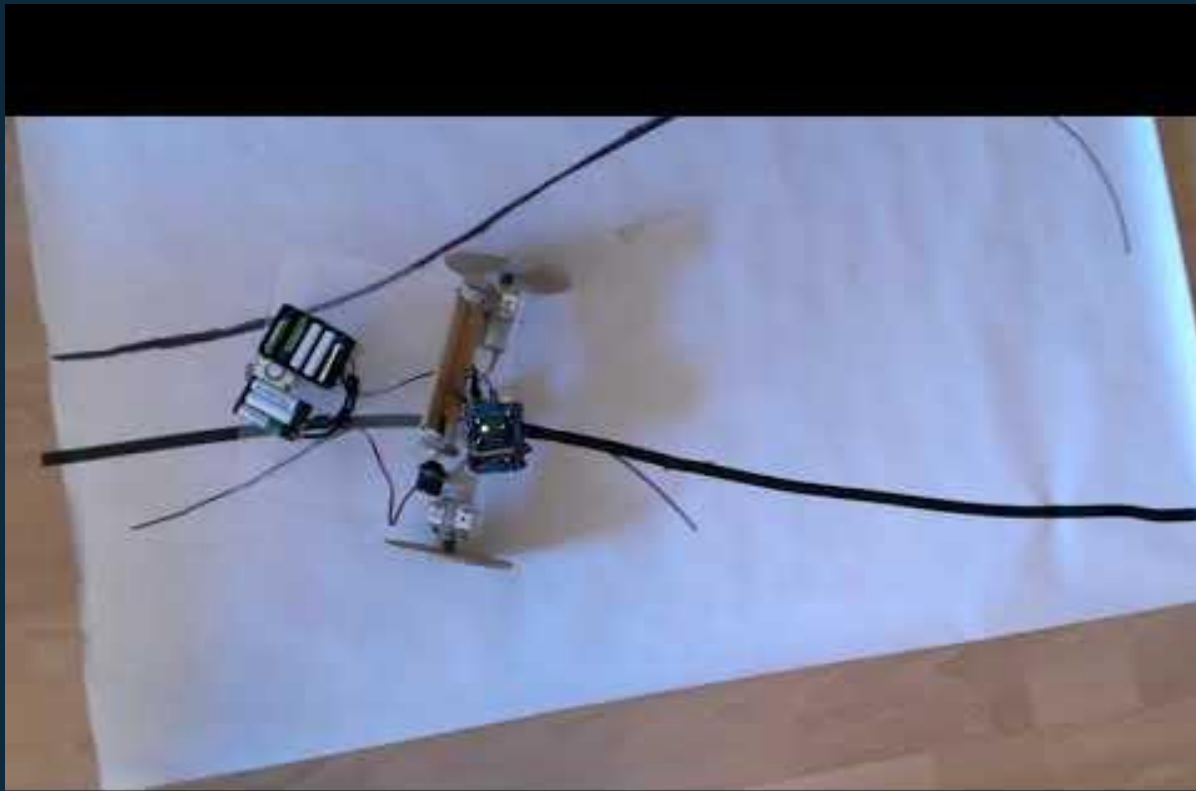


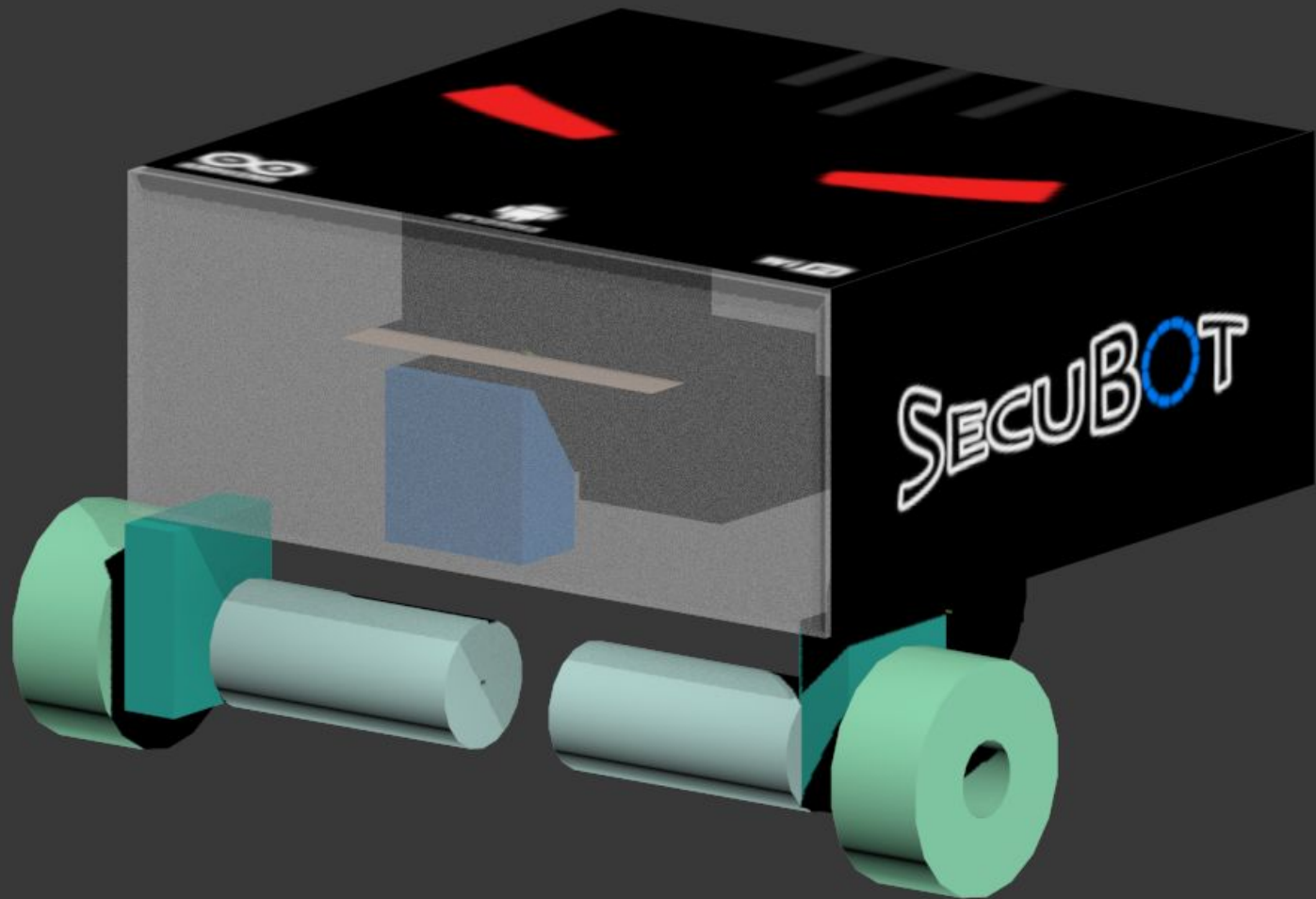
SecuBot – since 2012

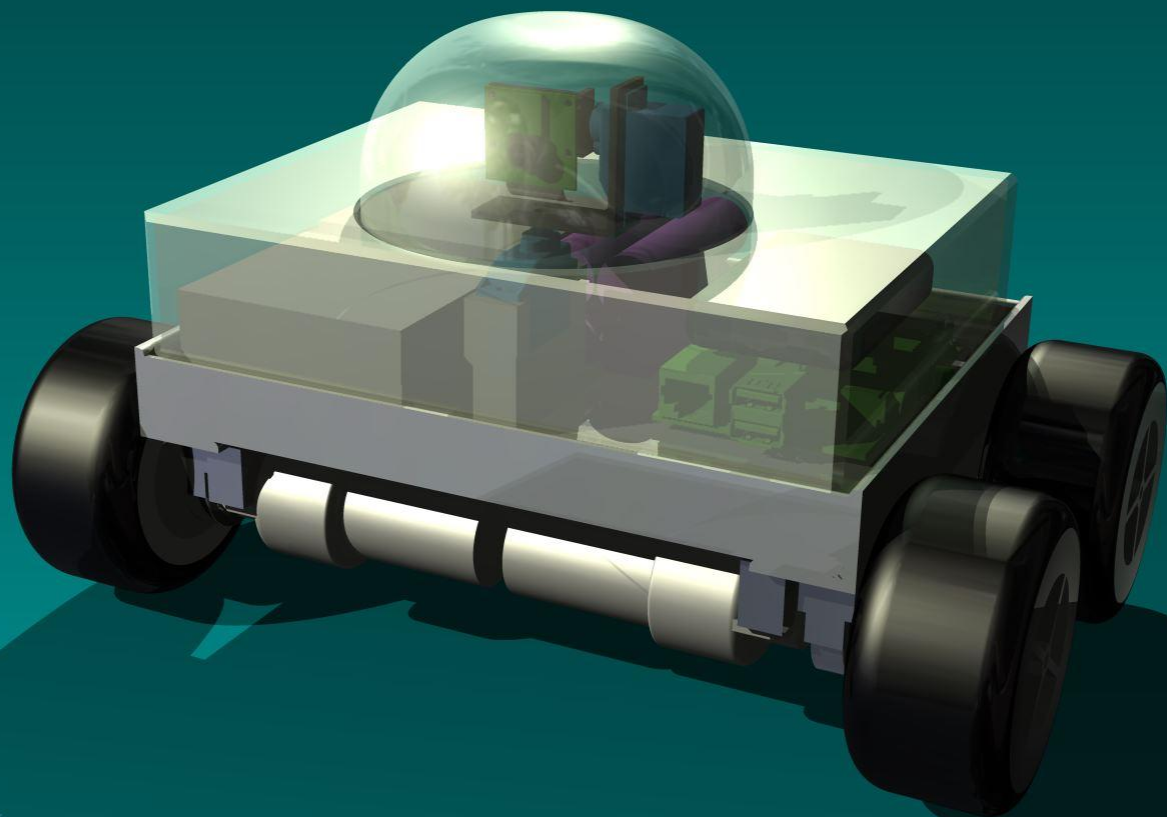
- ◆ Platforma diaľkovo ovládaného robota so solárnym dobíjaním
- ◆ Websocket
- ◆ MJPEG video stream
- ◆ NodeJS
- ◆ Angular



SecuBot – první krok

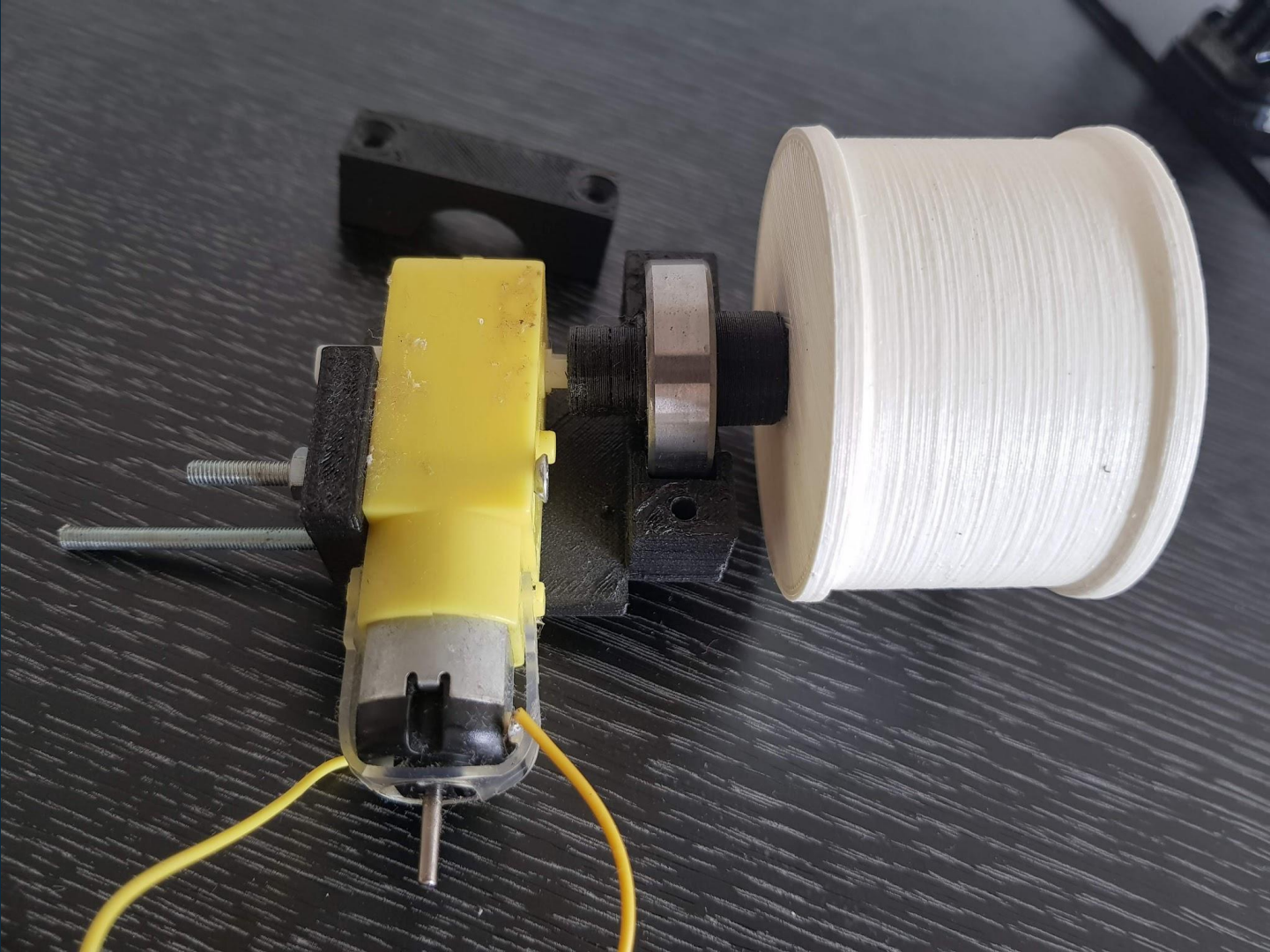


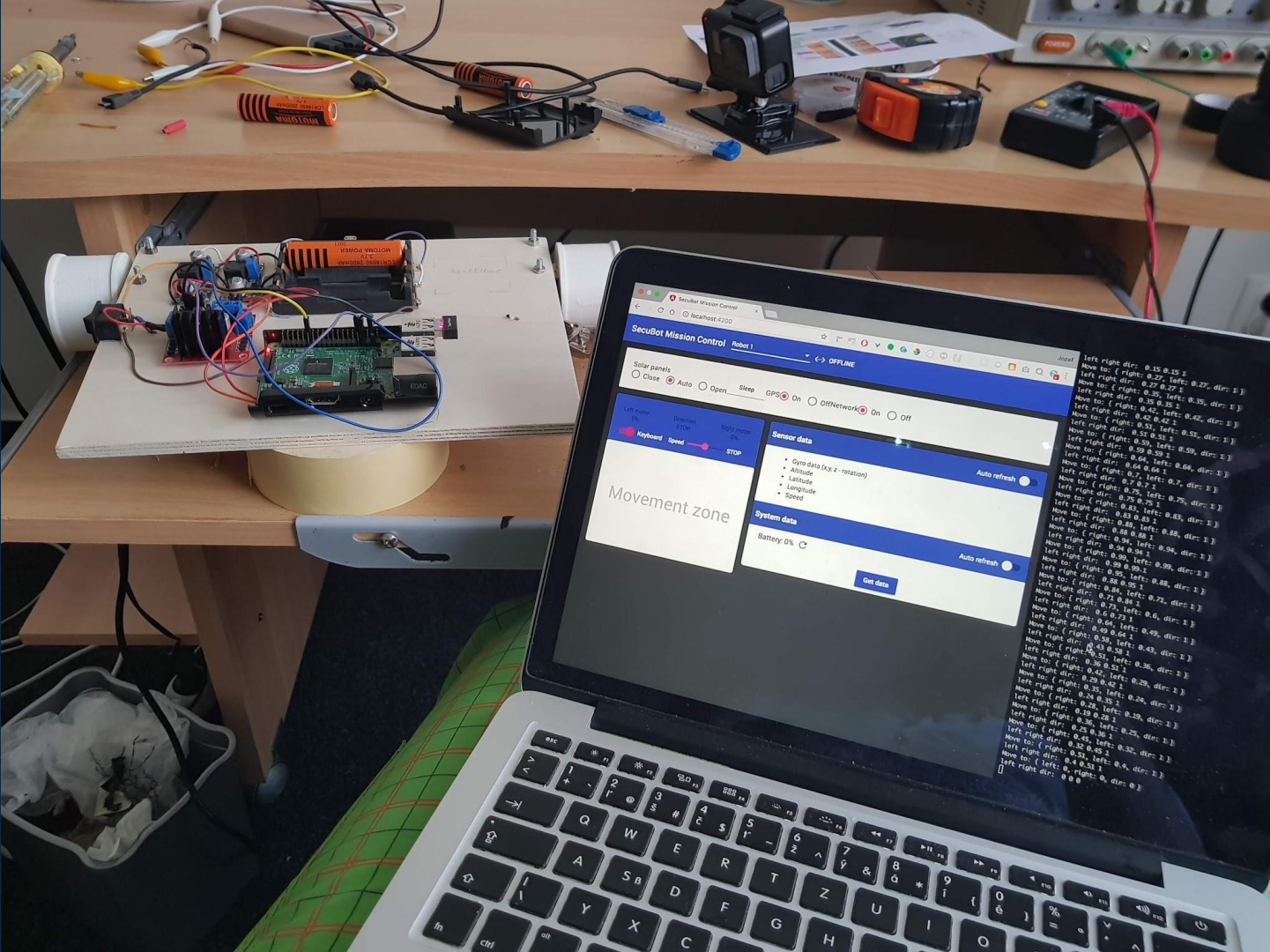


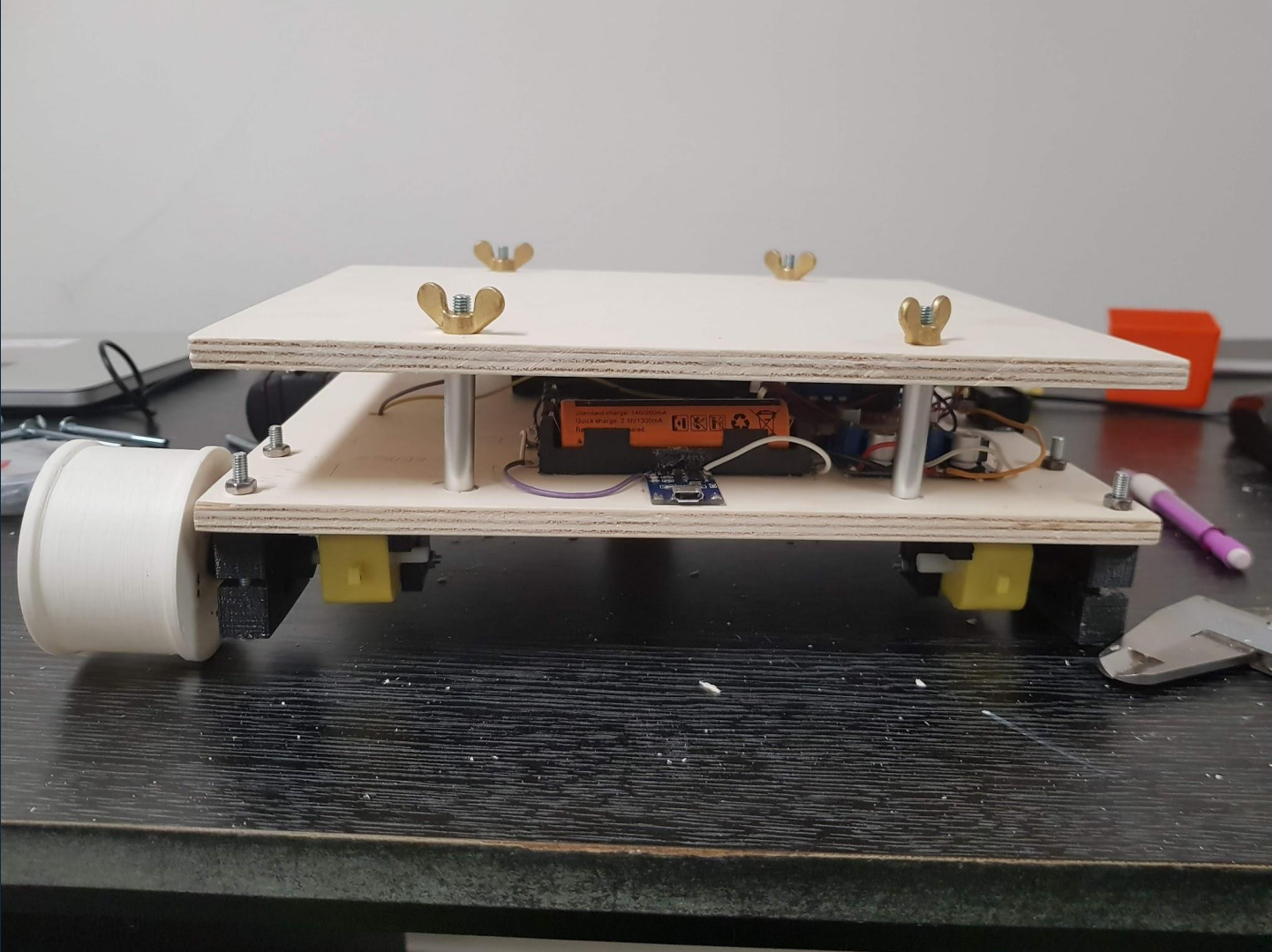




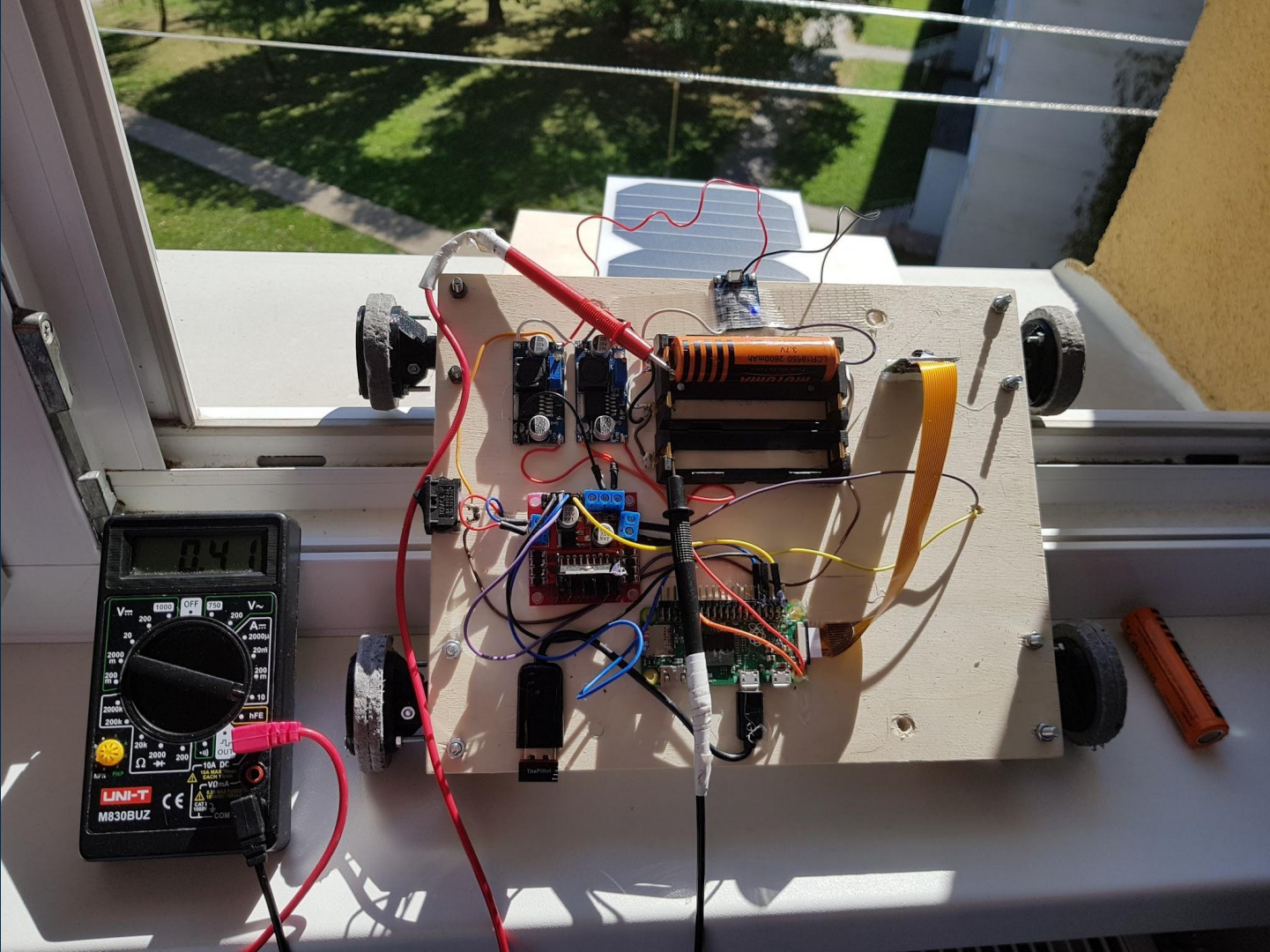


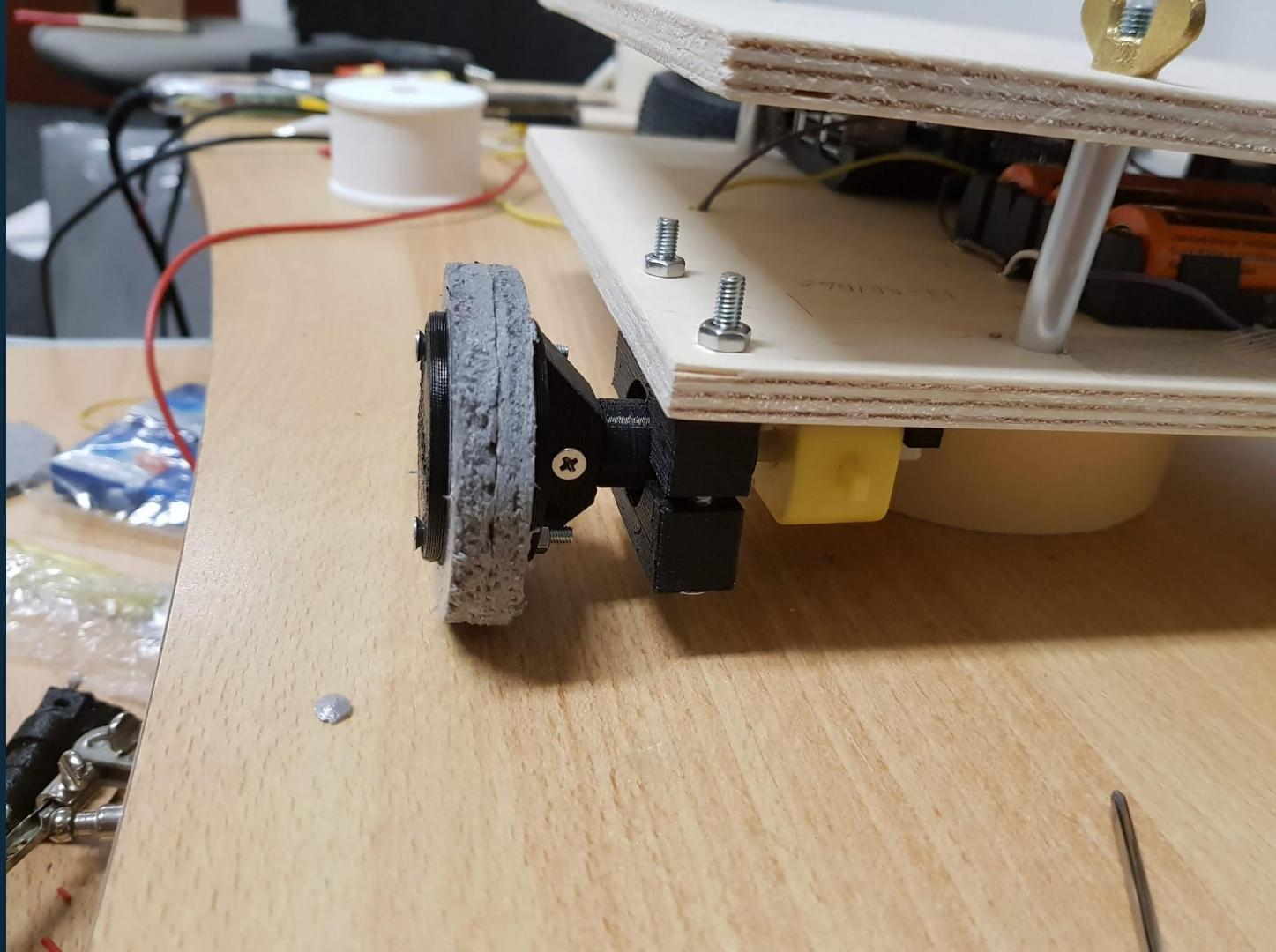


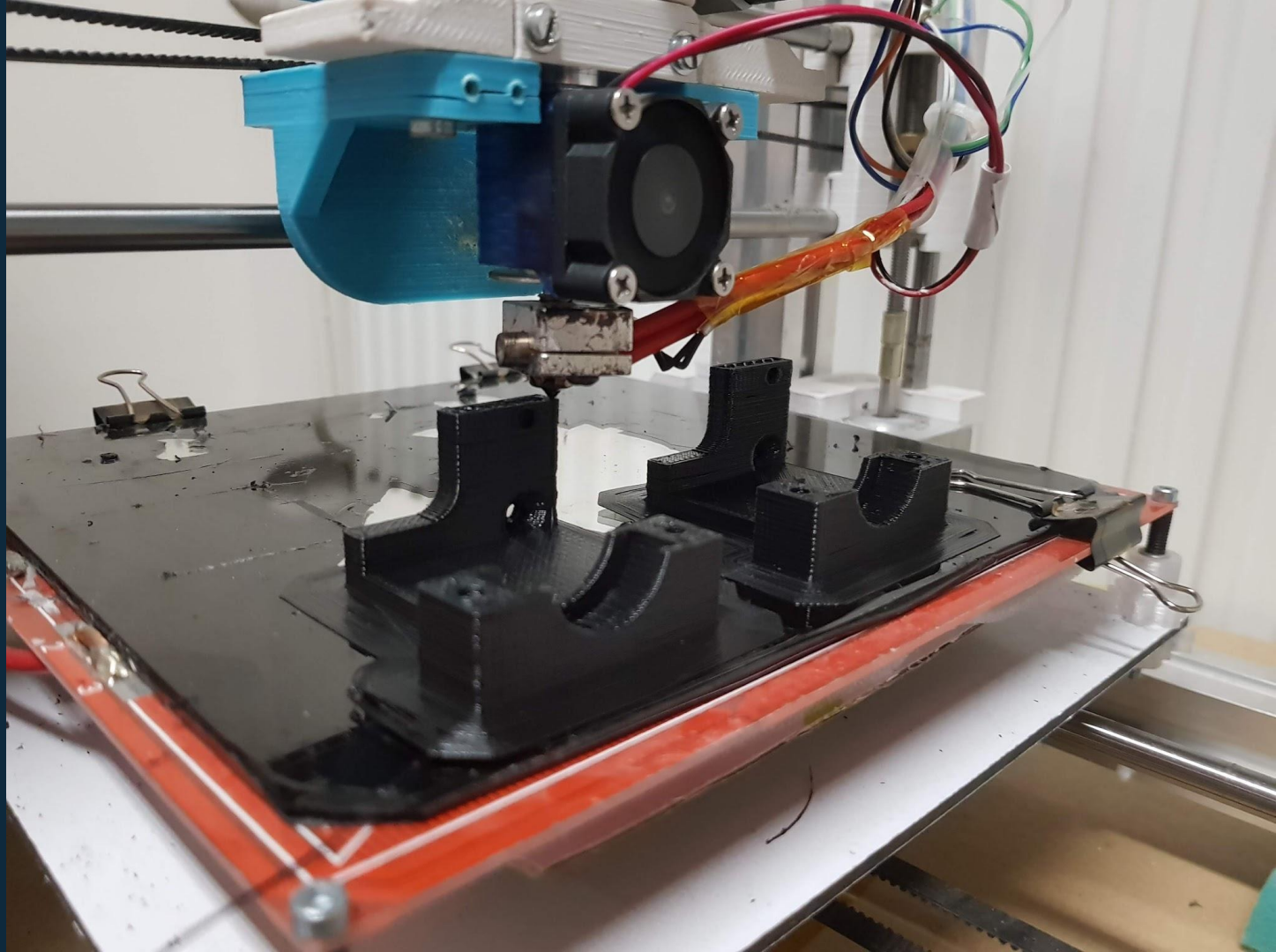


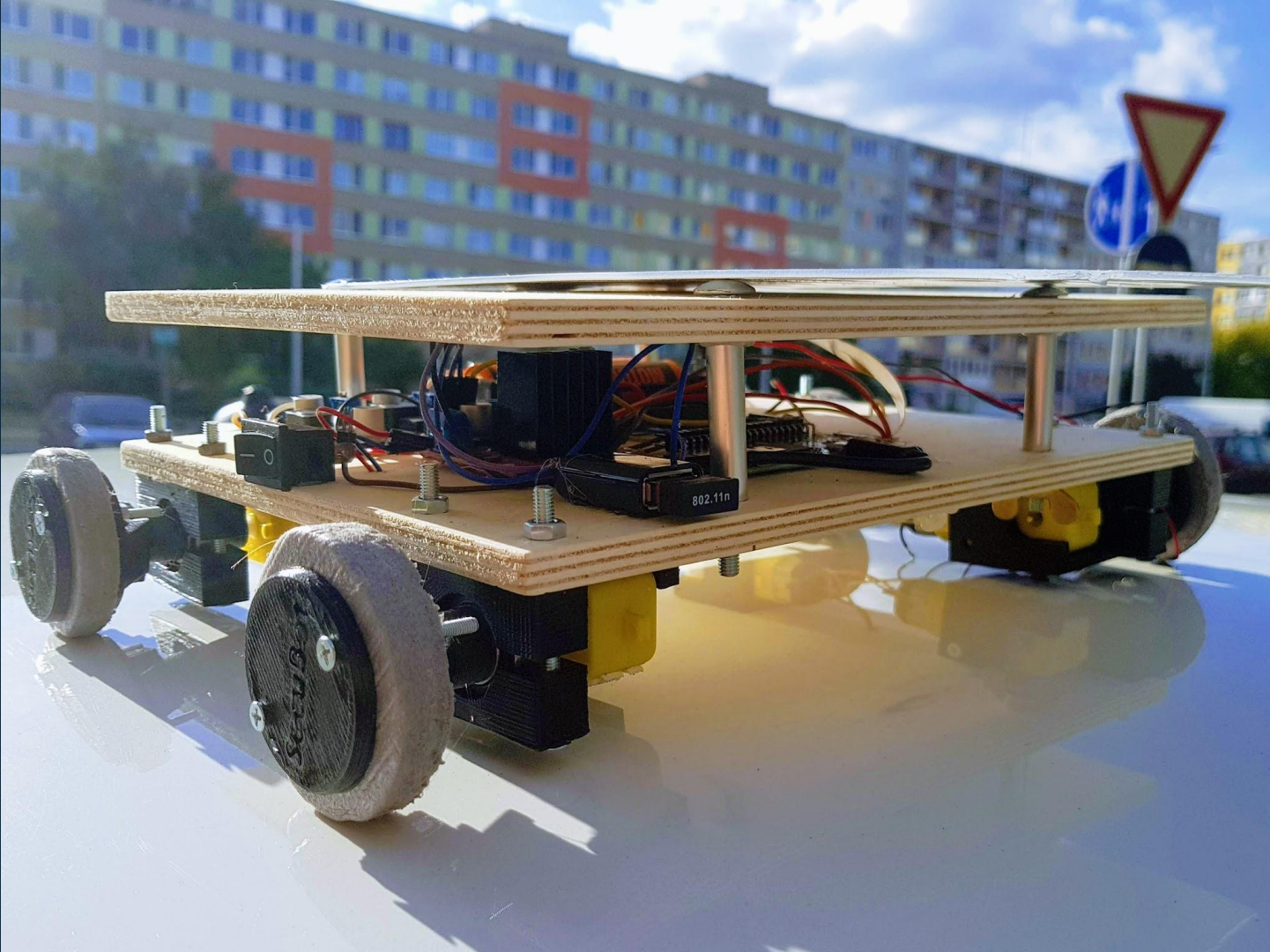


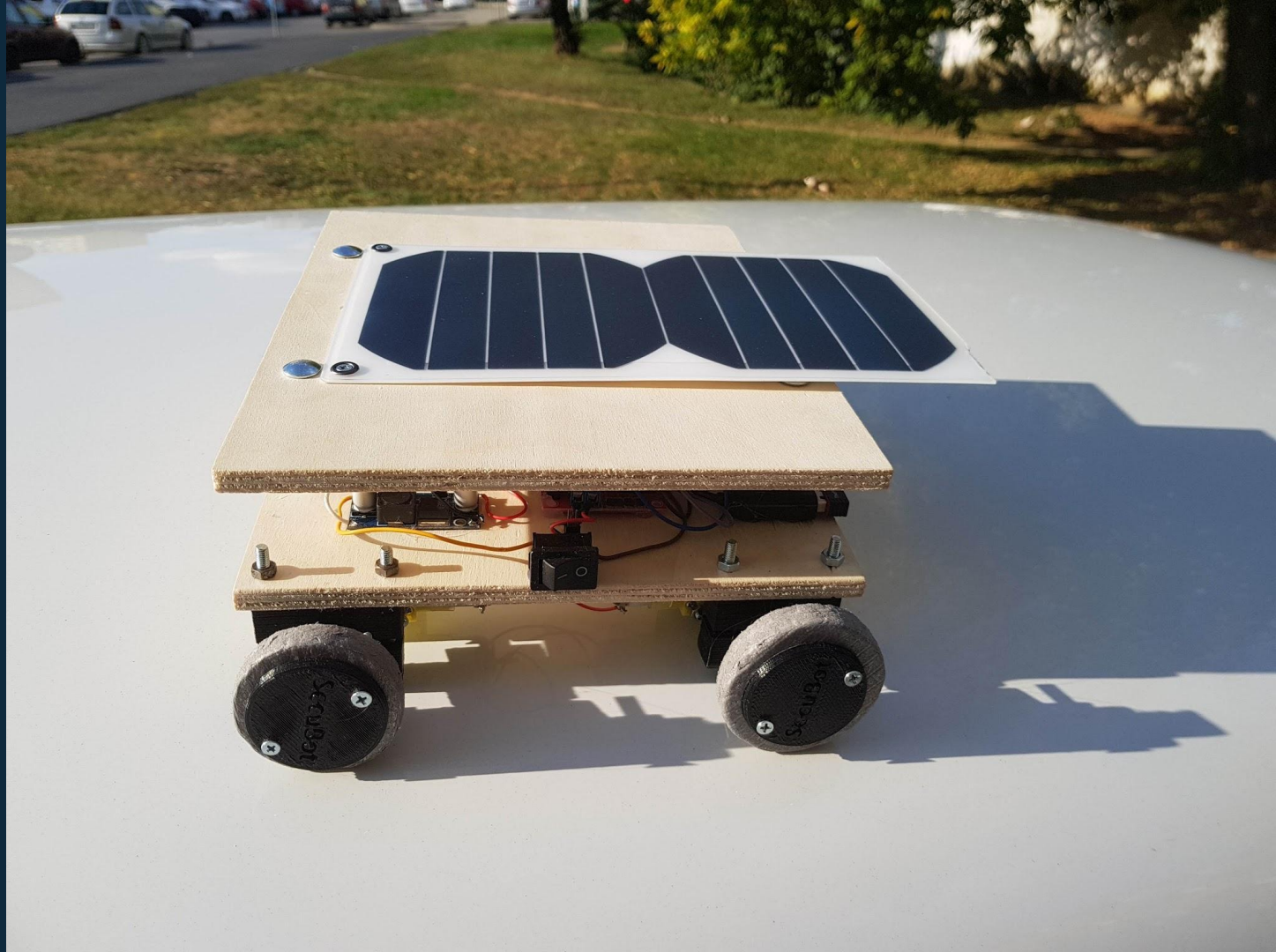


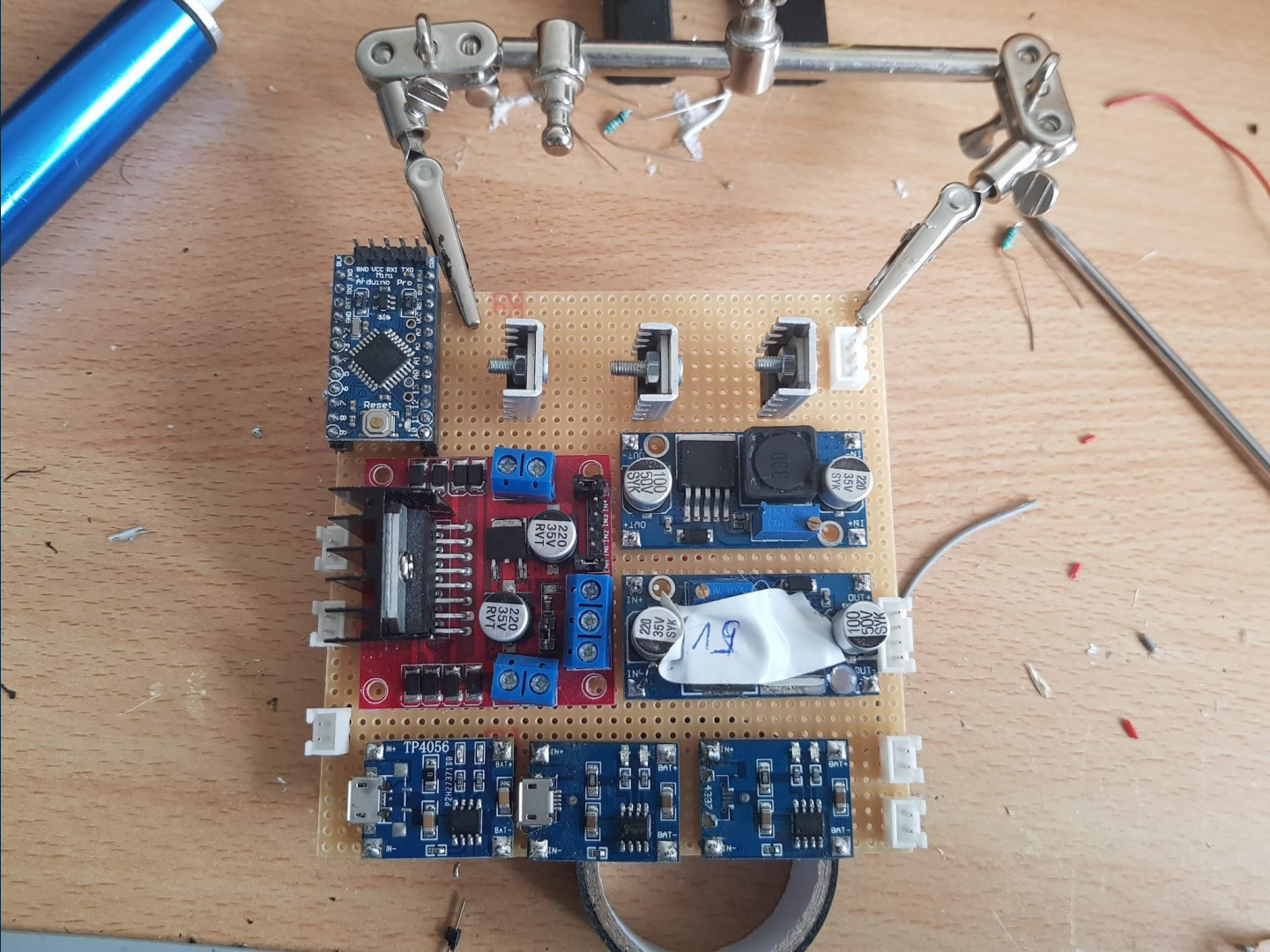












Solar panels

☐ Close ☒ Auto ☐ Open GPS ☒ On ☐ Off Network ☒ On ☐ Off

Left motor
0%

Direction
STOP

Right motor
0%

☒ Keyboard Speed STOP

Movement zone

Sensor data

Auto refresh ☐

- Gyro data (x,y, z - rotation)
- Altitude
- Latitude
- Longitude
- Speed

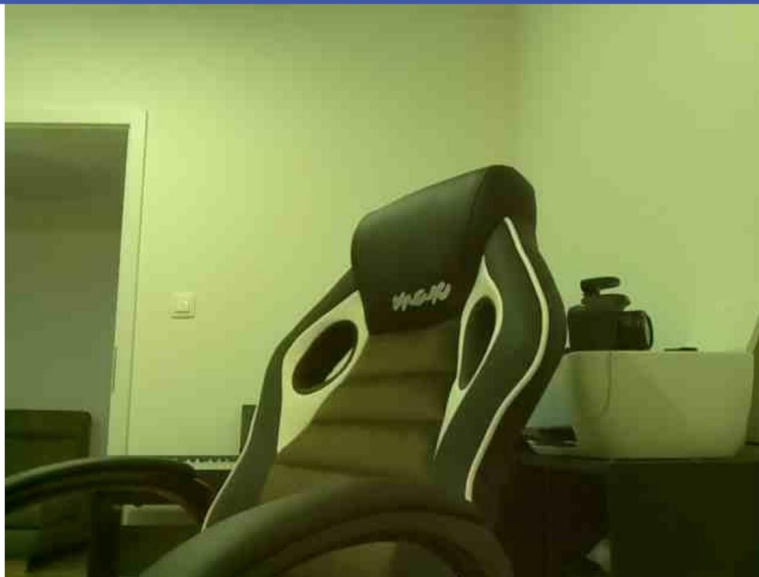
System data

Auto refresh ☐

Battery: 0% 

Get data

Video vision

Turn on camera ☒ VR ☐ Left motor
0%Direction
STOPRight motor
0%

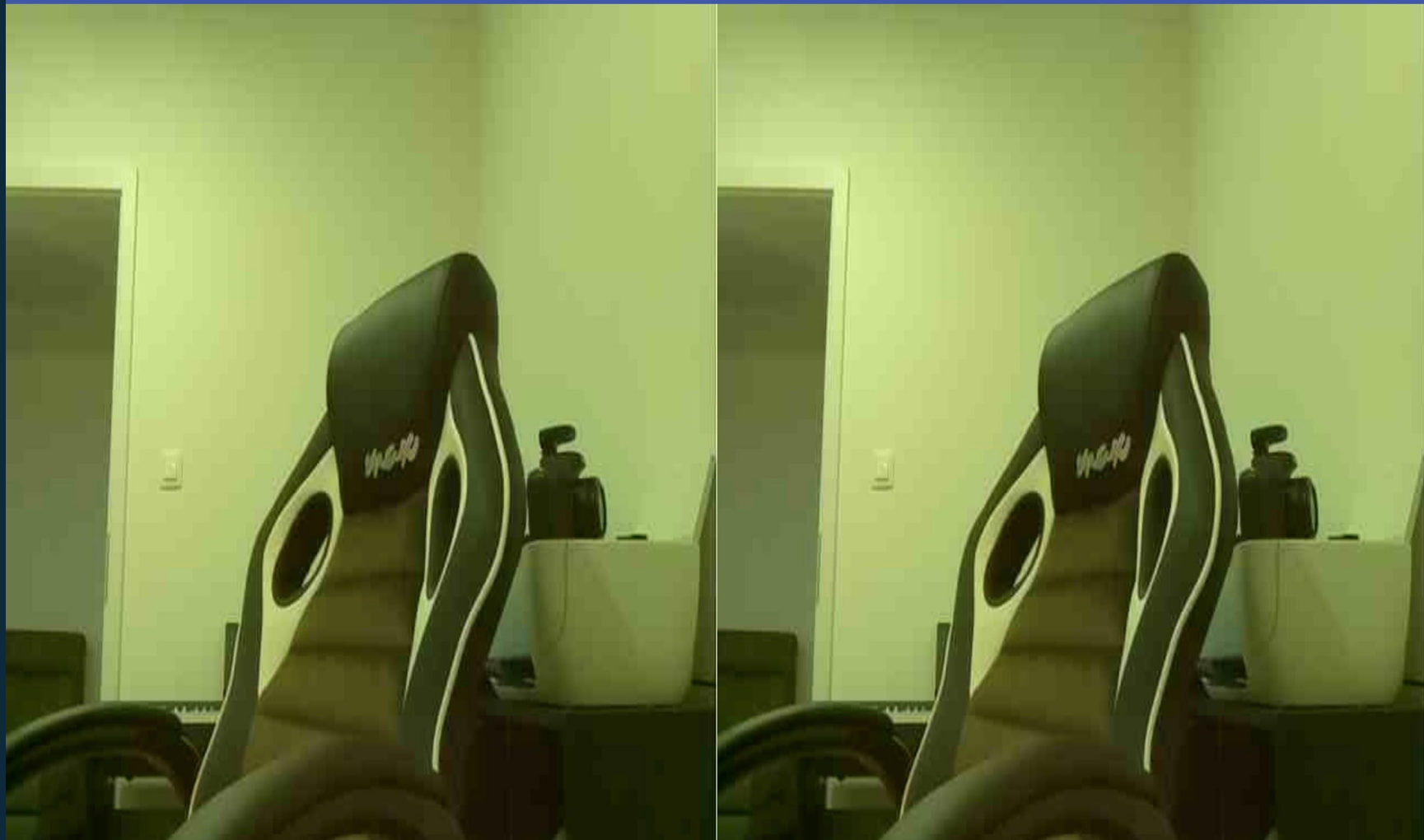
Keyboard

Speed



STOP

Movement zone



SecuBot





Mibaro + SecuBot

- ◇ využitie schopnosti streamu videa
- ◇ nízka spotreba
- ◇ optimalizácia pre real-time ovládanie (video+príkazy)
- ◇ OpenCV - AI





Mibaro

Micro Battle Robot

- ◇ nový herný žáner
- ◇ možnosť pripojiť sa odkiaľkoľvek
- ◇ vďaka AR možnosť rôznych grafických úprav
- ◇ AR boti





Herný princíp

- ◇ využitie AR v reálnej hre
- ◇ využitie AI pre učenie sa botov
- ◇ hra v tímoch
- ◇ možnosť výberu scény/reálnej arény
- ◇ vďaka skutočnej fyzike skvelý pocit z hry
- ◇ samotný herný princíp podobný Laser Tag



Mibaro



Micro Office BA

2/2015

Mi: B=Ball
Baro
APRO

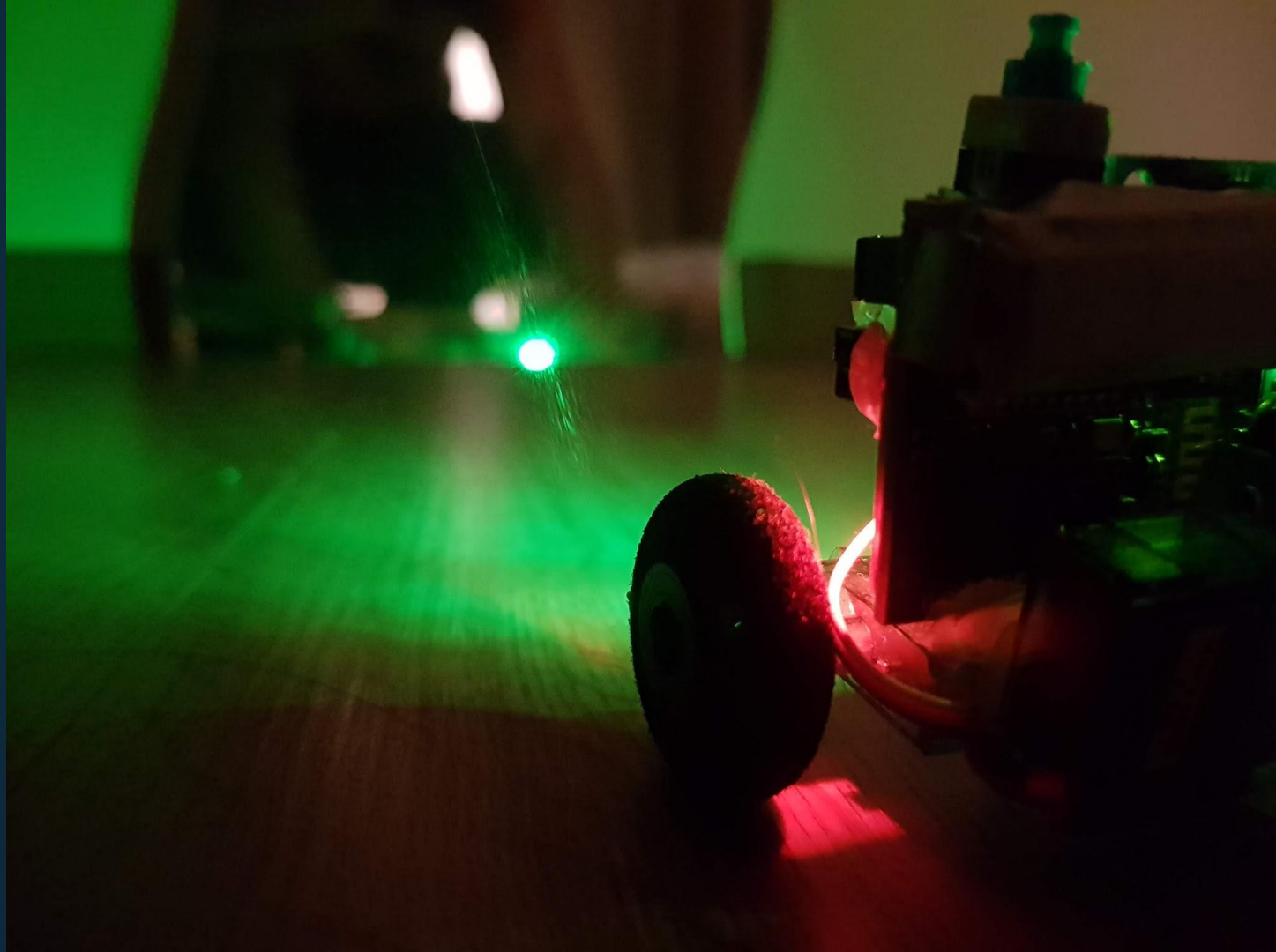


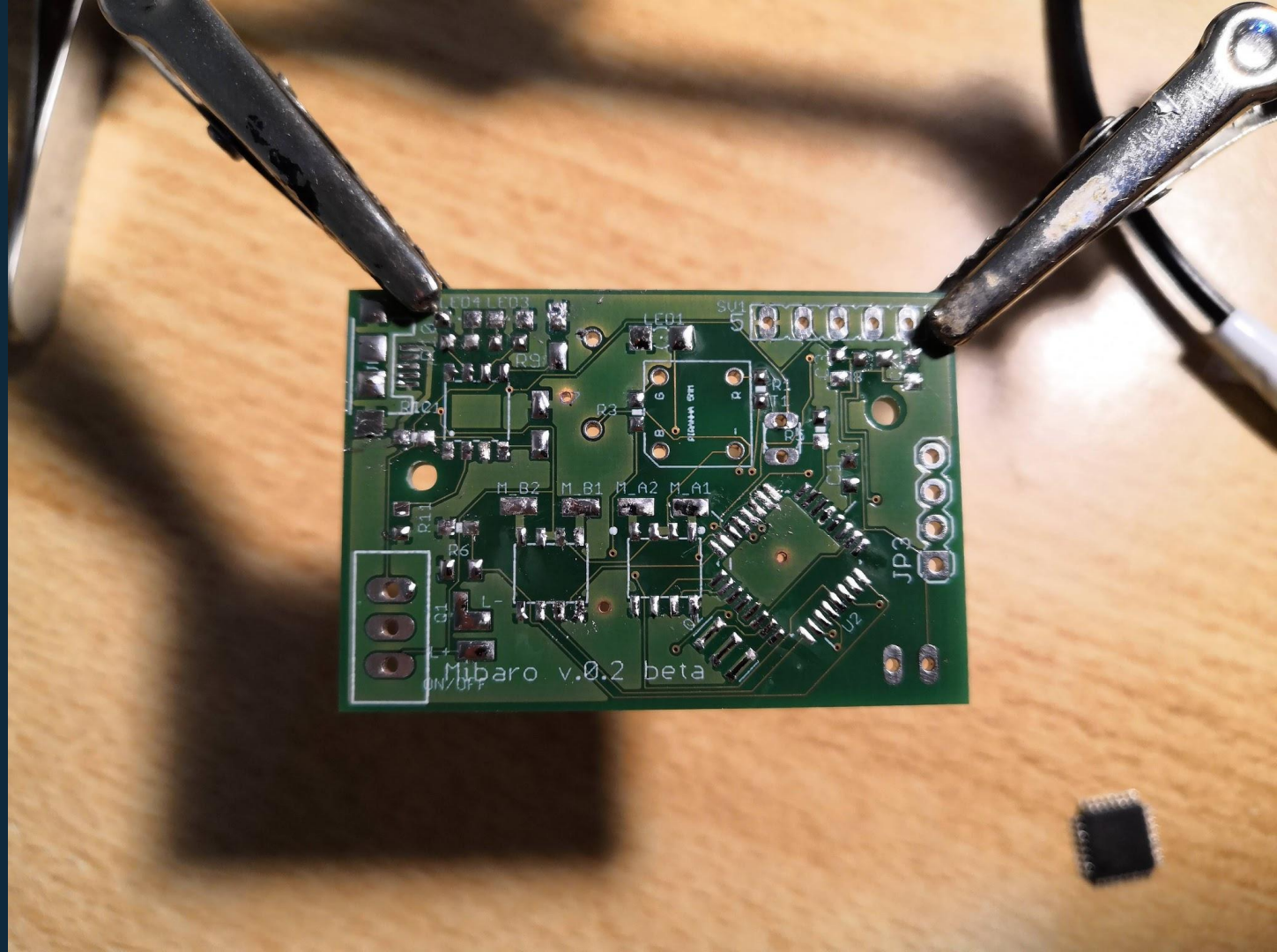
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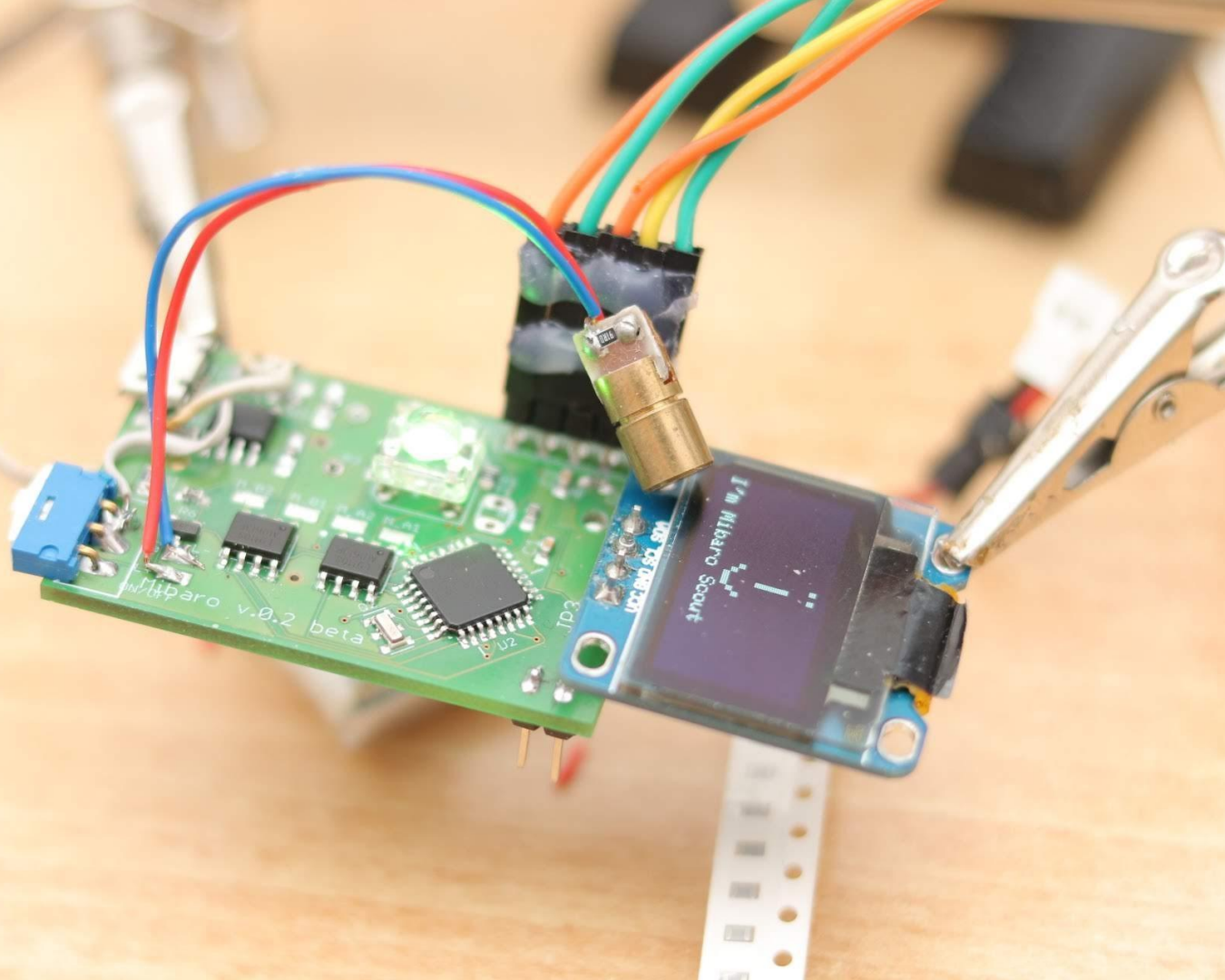


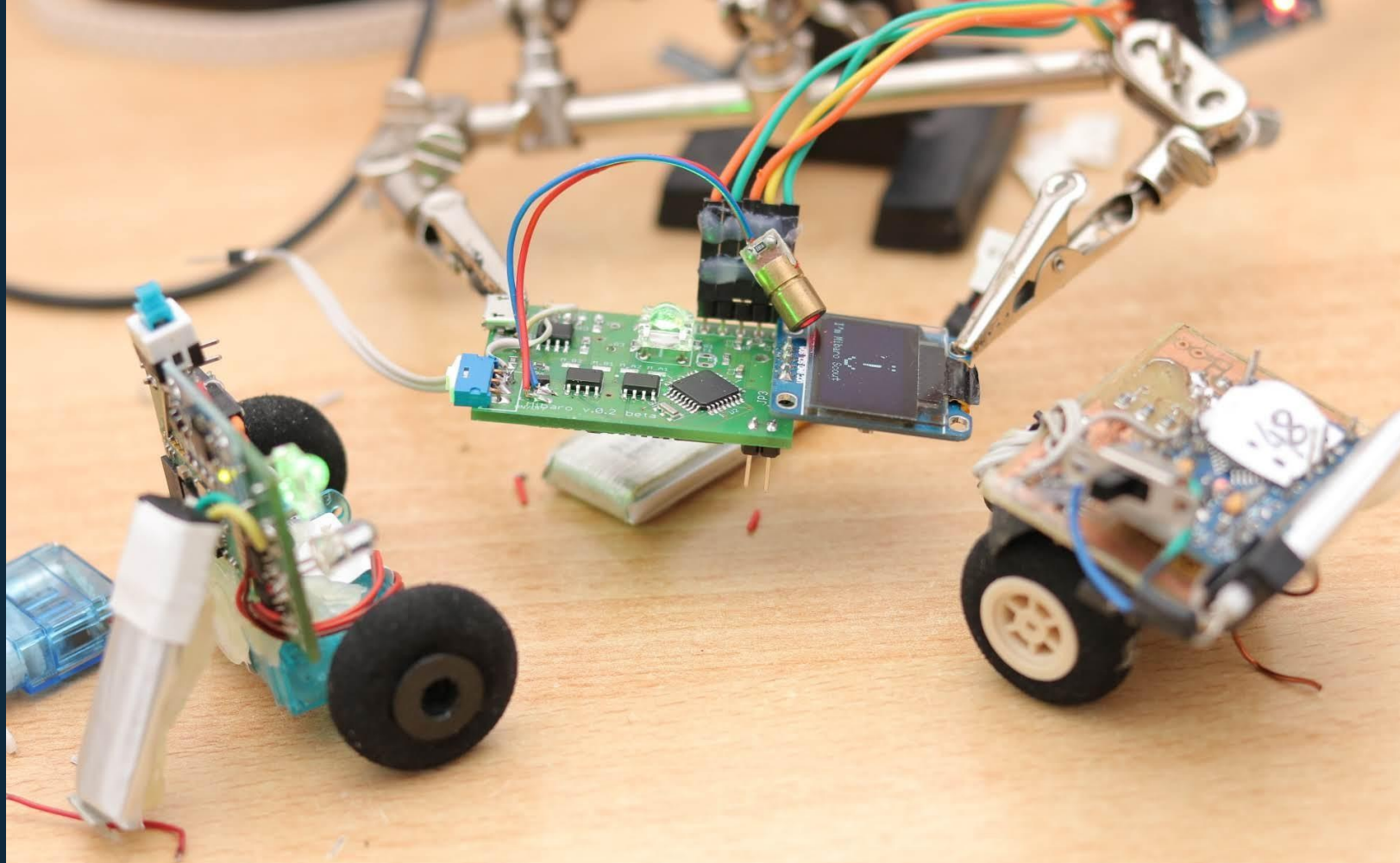
Mibaro

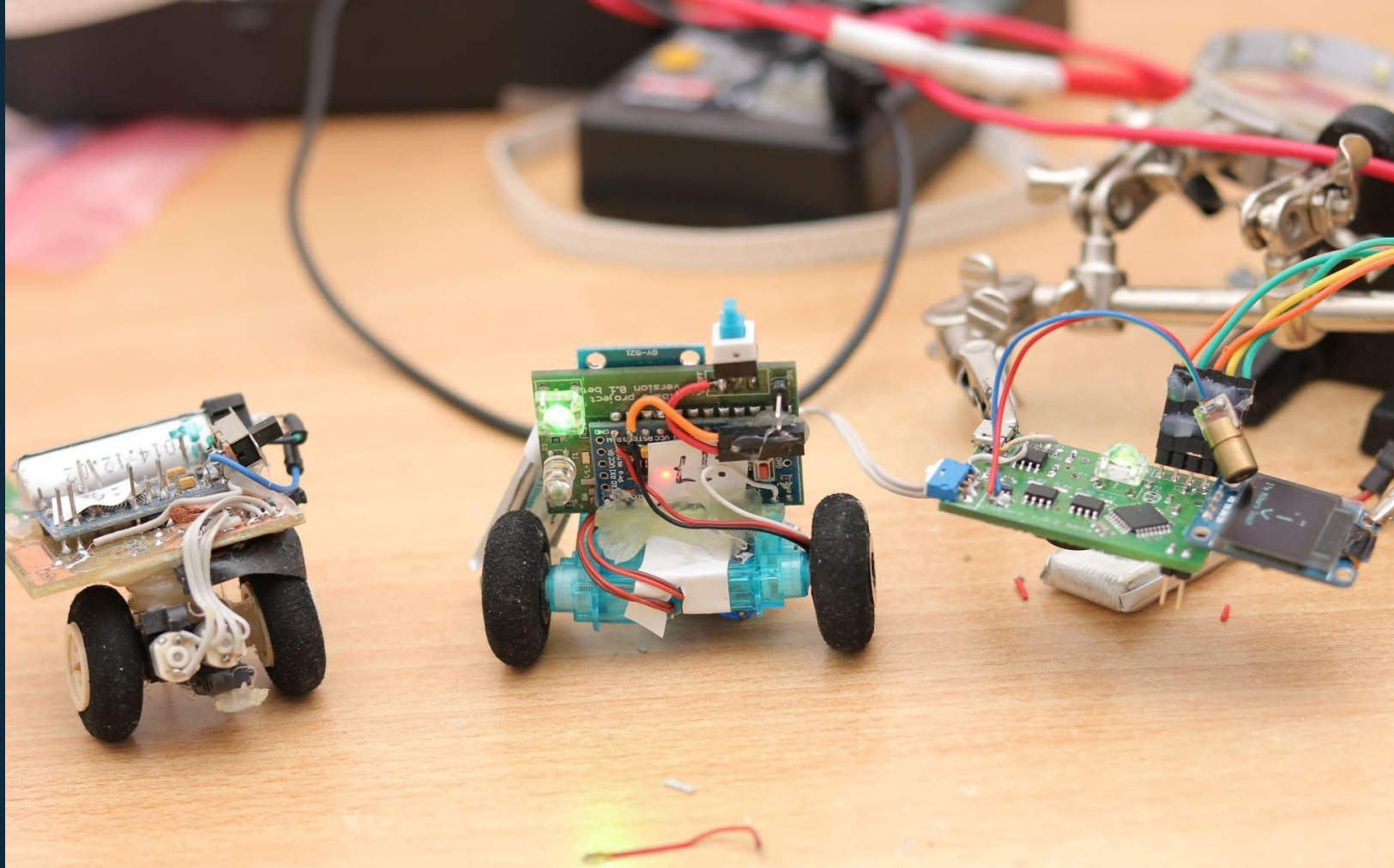


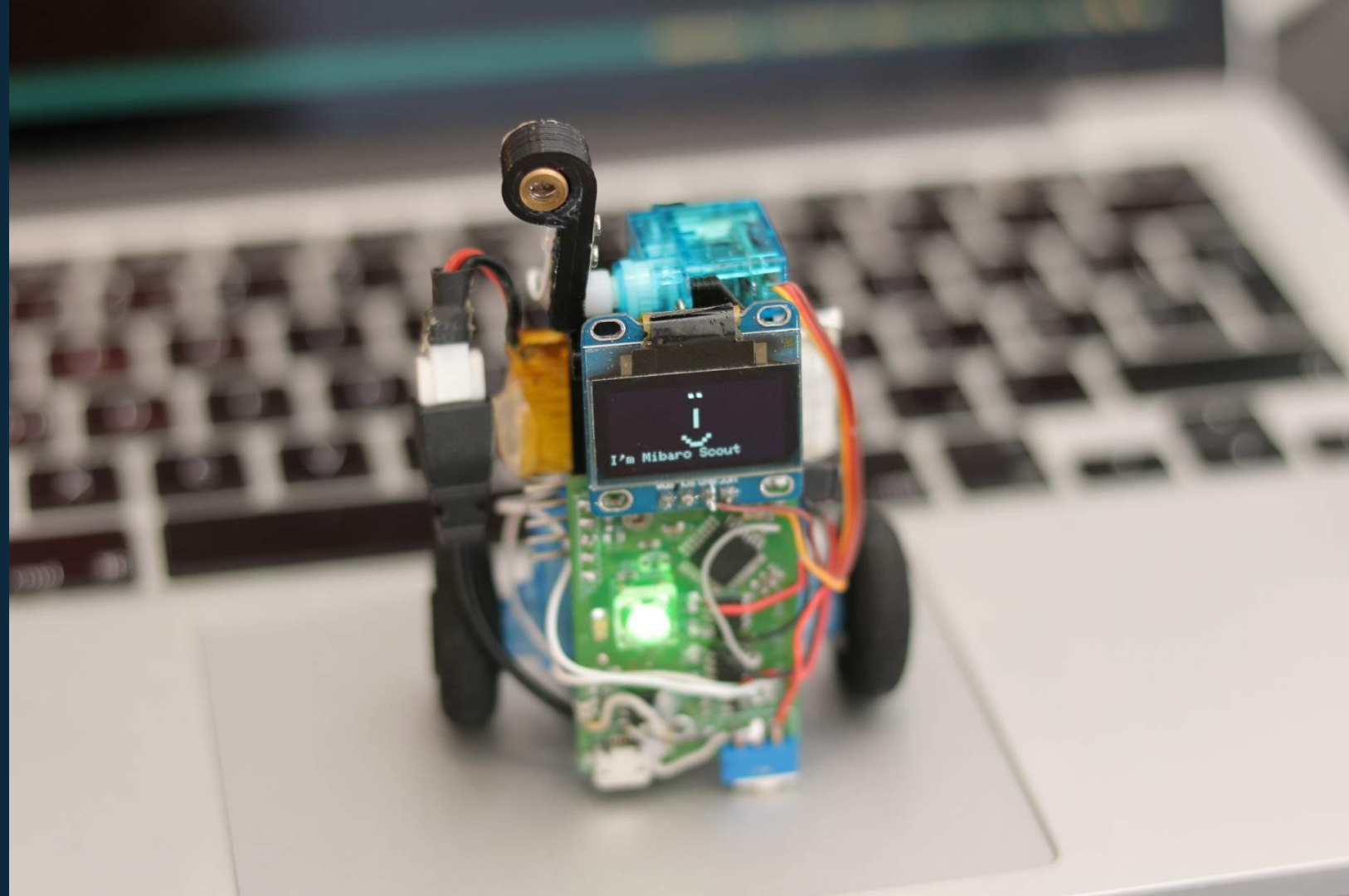


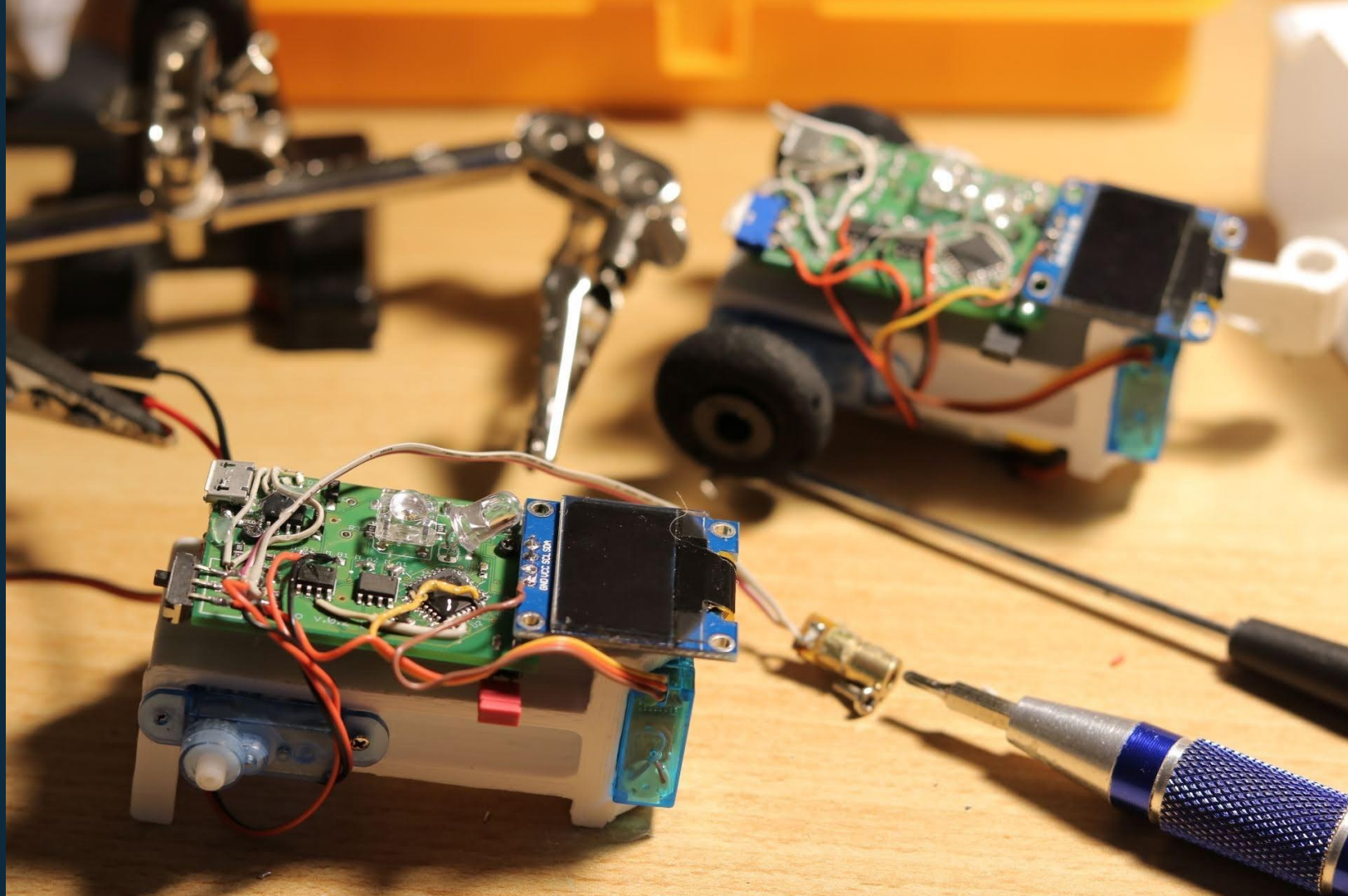


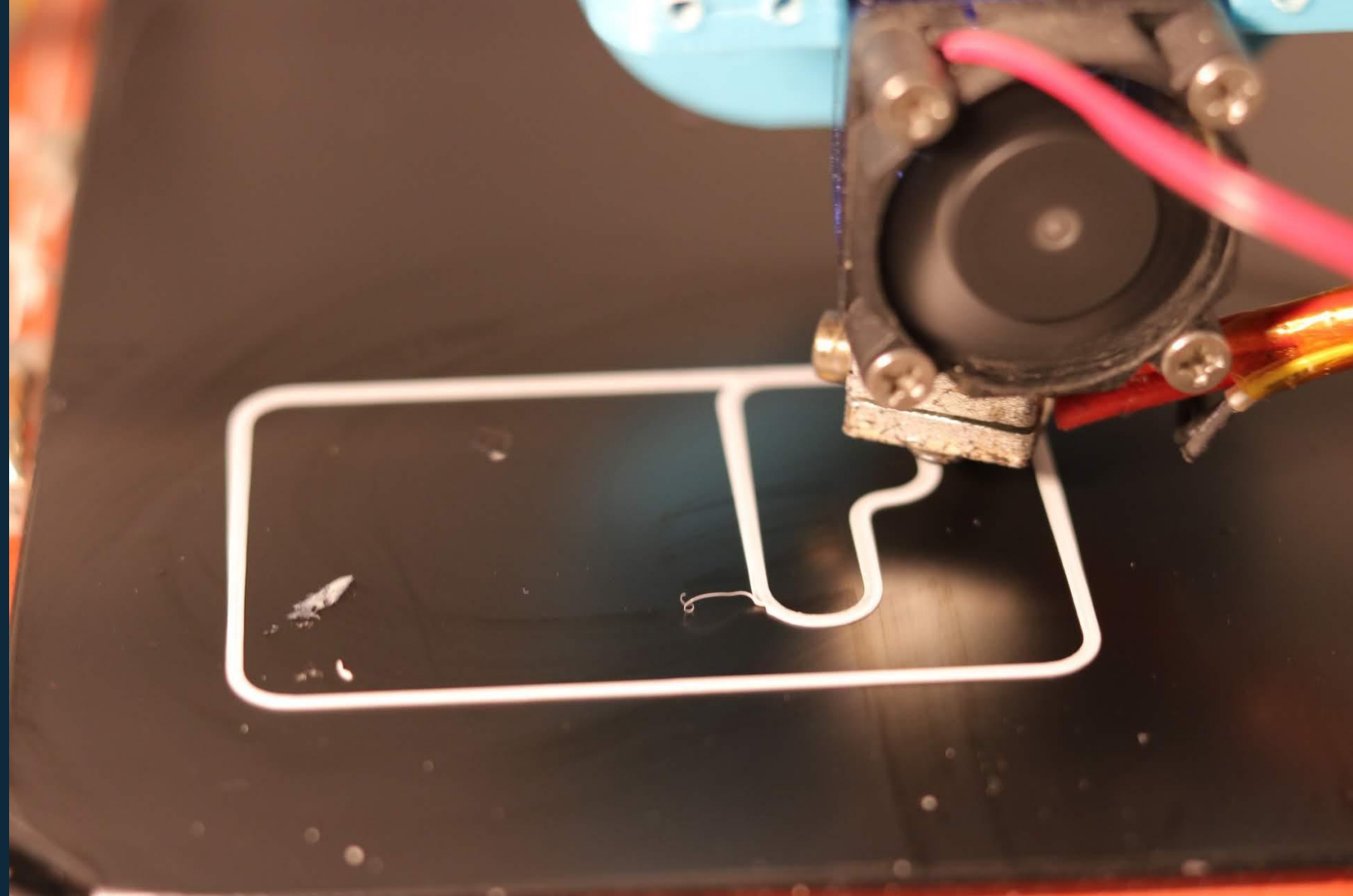








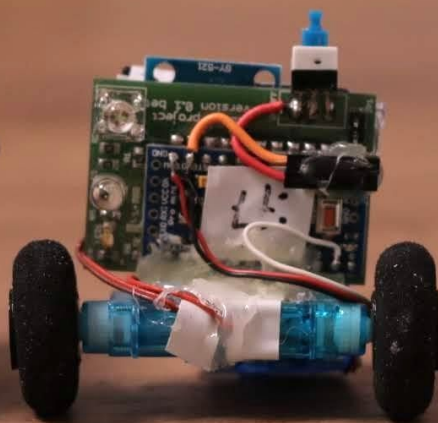




Mibaro









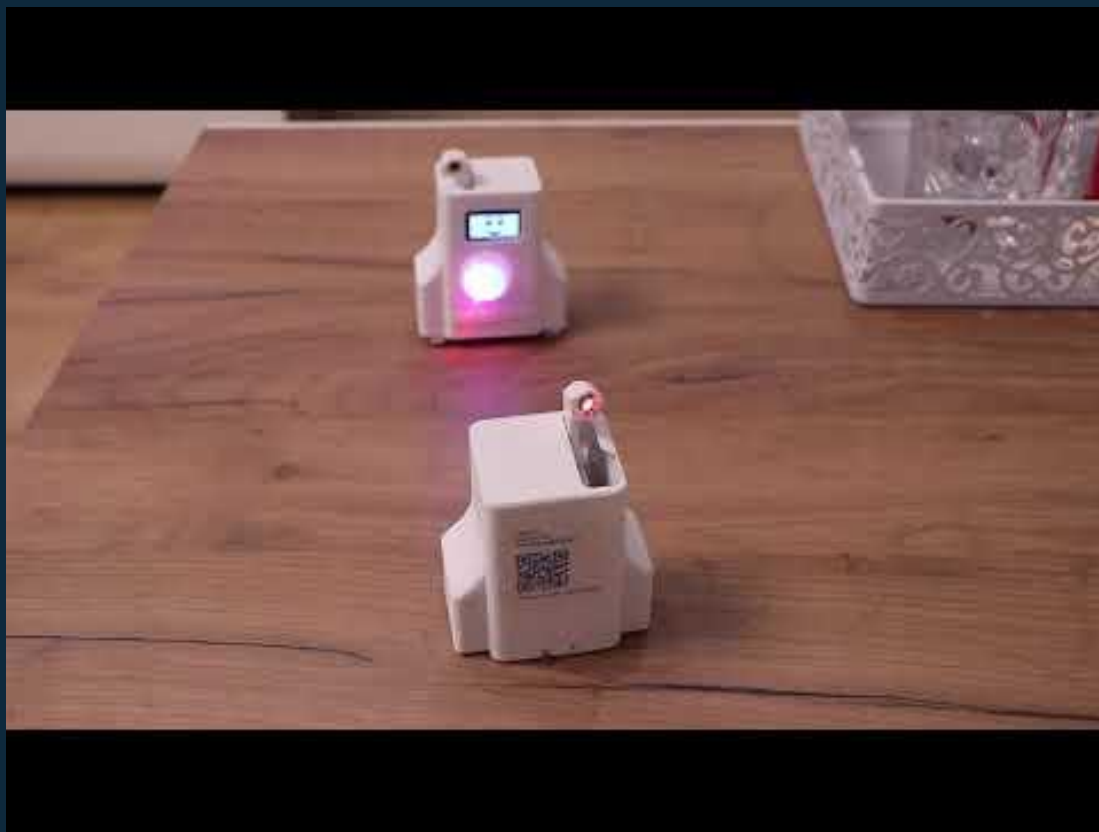


Mibaro Scout

- ◇ Laser gun
- ◇ Bluetooth
- ◇ Android app
- ◇ OLED displej



Prvý súboj





Mibaro Ranger

- ◆ Laser gun
- ◆ Wifi
- ◆ Android Unity game/app (efekty bleskov a pod. - AR)
- ◆ 1st person z pohľadu robota
- ◆ P2P
- ◆ rôzne druhy/vylepšenia za príplatok (vyššia rýchlosť, silnejšie zbrane, atď.)





Mibaro Bot

- ◇ #1 AI implementované do reálneho robota
- ◇ #2 AI v podobe virtuálneho robota v AR
- ◇ Virtuálny hráč v reálnom prostredí



Live Demo

Otázky?