Ramu Droid

2016 Hackaday

Altanai Bisht & Deepak Aagri

Team

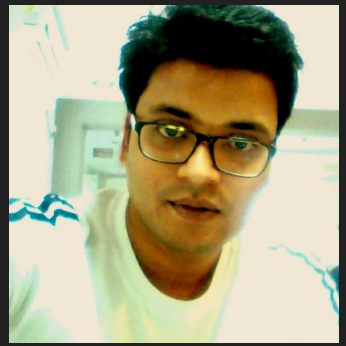
Hi ! I am Altanai

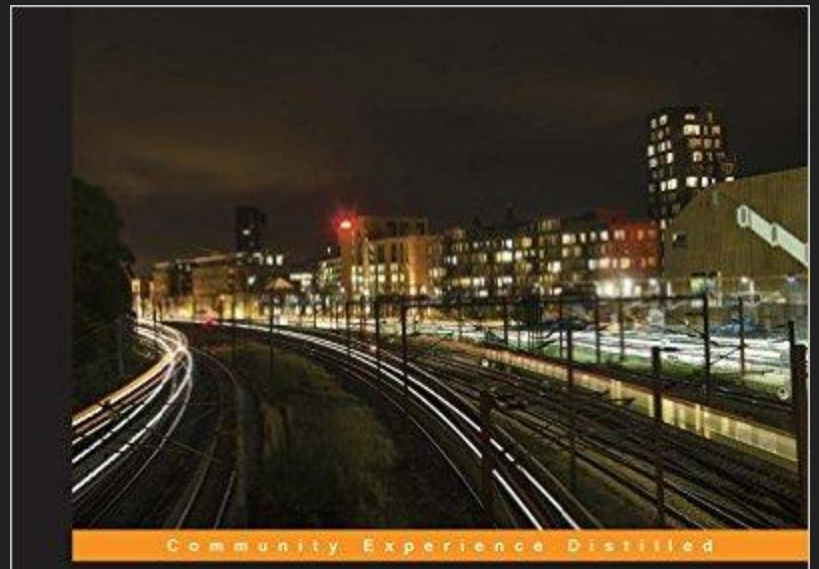
I have worked on telecom core , VOIP , Media Processing .

Author of WebRTC Integrator's Guide .

I am Deepak

Embedded developer





Community Experience Distilled

WebRTC Integrator's Guide

Successfully build your very own scalable WebRTC infrastructure quickly and efficiently

Altanai

[PACKT] open source* PUBLISHING


Let’s make the country Clean


Why do people litter ?
The area is already messy, why bother finding a trash can?

BUDGET 2015: SANITATION AND THE SWACHH BHARAT MISSION

Rs 3,265,00,00,000

updated Wednesday, March 11 , 2015

source : http://sanitation.indiawaterportal.org/english/node/3234

Swachh Bharat Rankings

8 Aug 2015

1. Mysore
2. Thiruchirapalli (Tamil Nadu)
3. Navi Mumbai
4. Kochi (Kerala)
5. Hassan
6. Mandya (Karnataka)
7. Bengaluru (Karnataka)
8. Thiruvananthapuram (Kerala)
9. Halisahar (West Bengal)
10. Gangtok (Sikkim)

15 Feb 2016

1. 1.Mysuru
2. 2.Chadigarh
3. 3.Tiruchirapalli
4. 4.New Delhi Municipal council
5. 5.Visakhapatnam
6. 6.Surat
7. 7.Rajkot
8. 8.Gangtok
9. 9.Pimprichindwad
10. 10.Greater Mumbai

By Ministry Of Urban Affairs

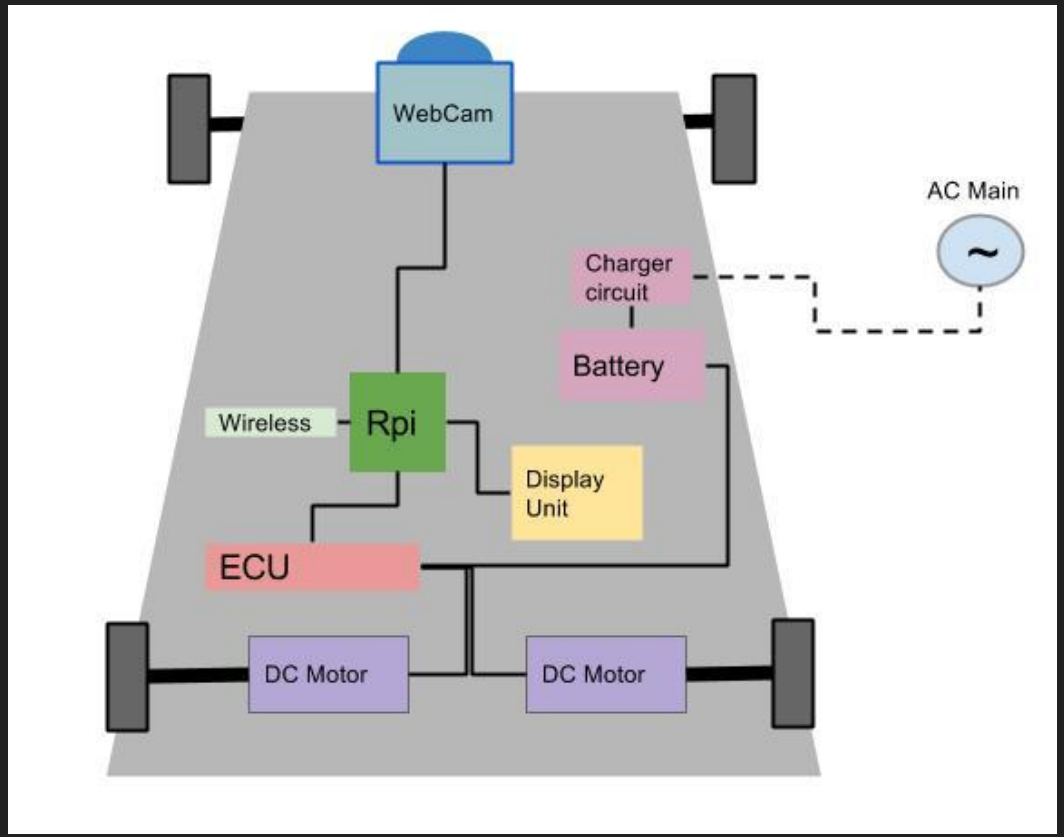
Just Imagine ..

This in place of

this

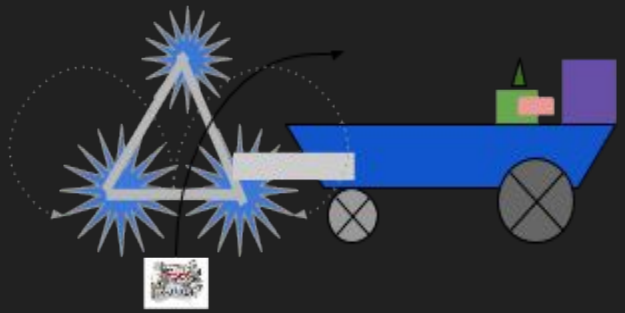
Ramudroid - bot to clean roads and outdoors

Design Blueprint v1.0

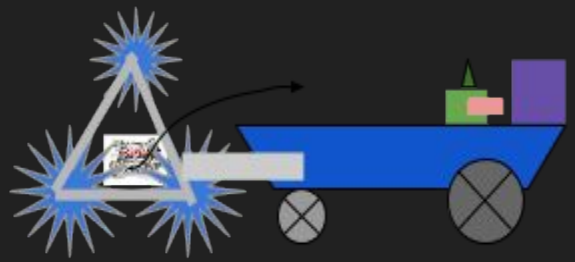


First product blueprint of RamuDroid

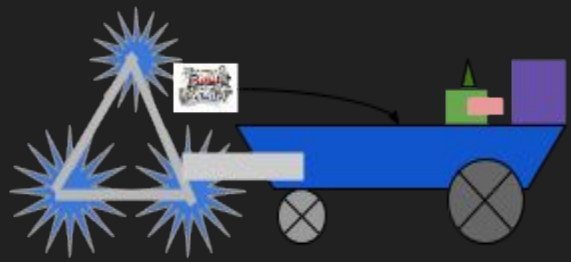
Working



1. Litter comes between rotating brushes



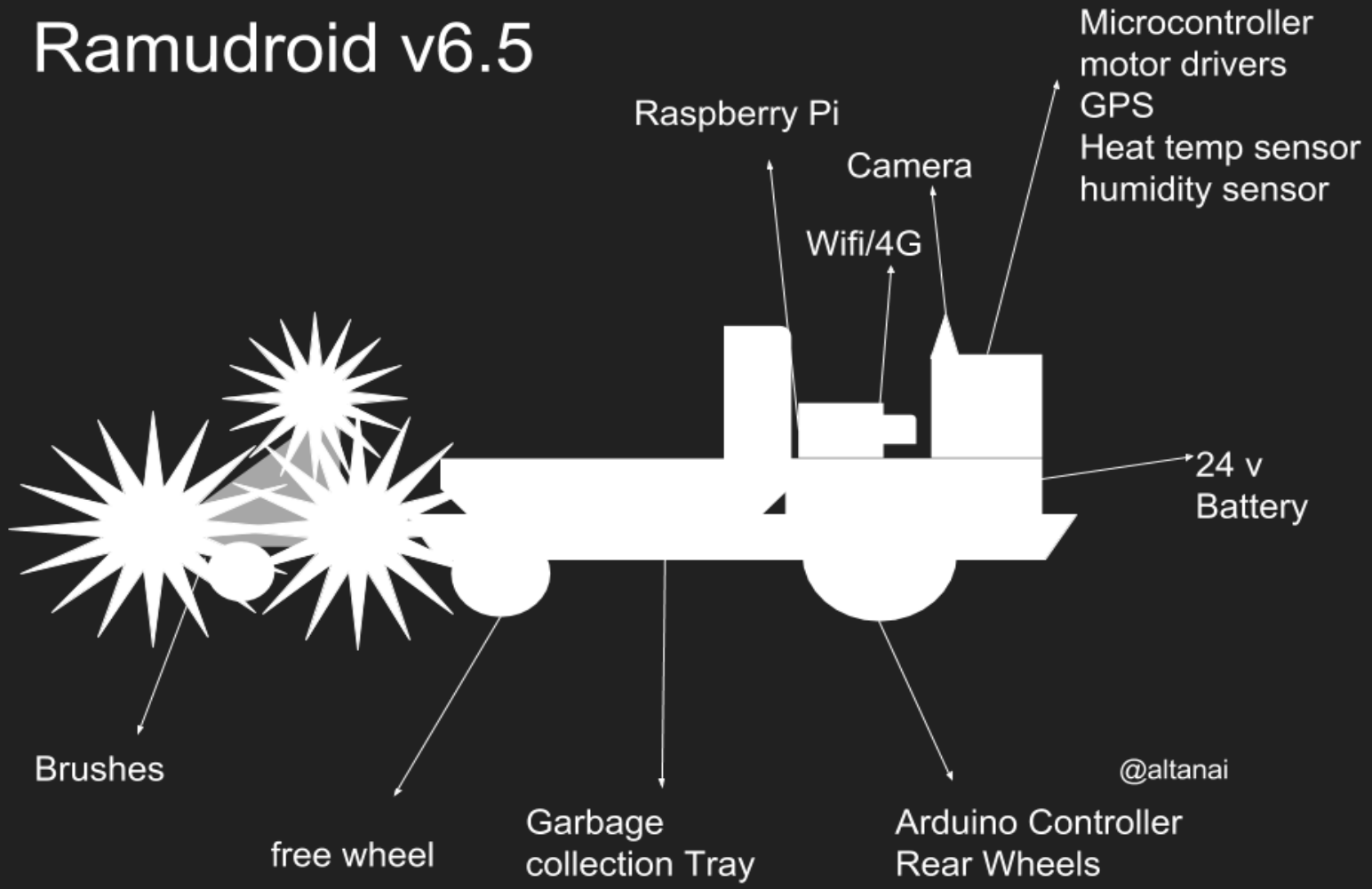
2. Litter is picked by brushes and pushed upwards



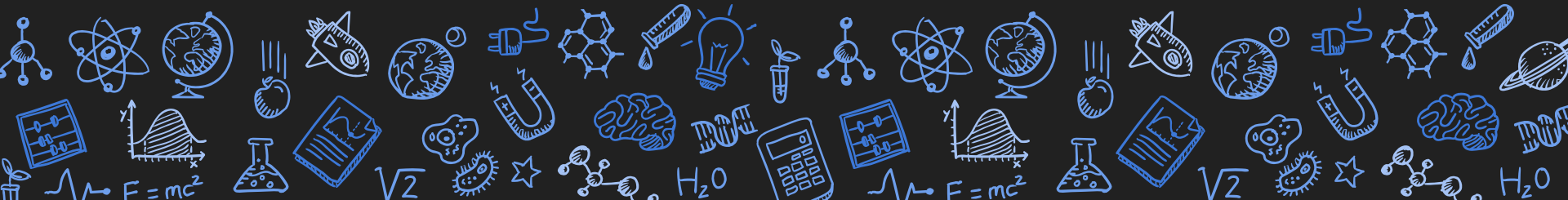
3. Brushes push it towards the tray

Stages of garbage collection

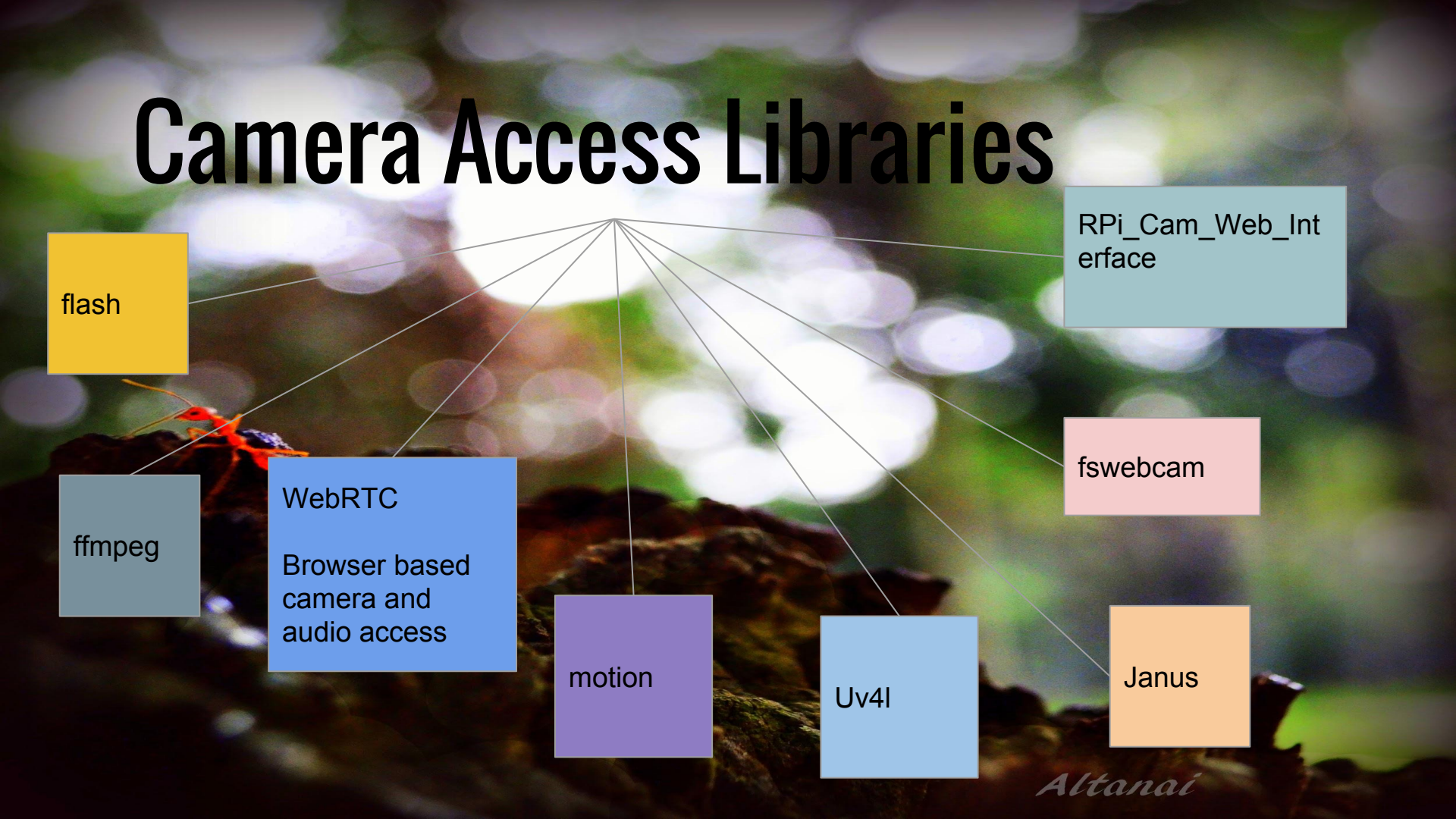
Ramudroid v6.5



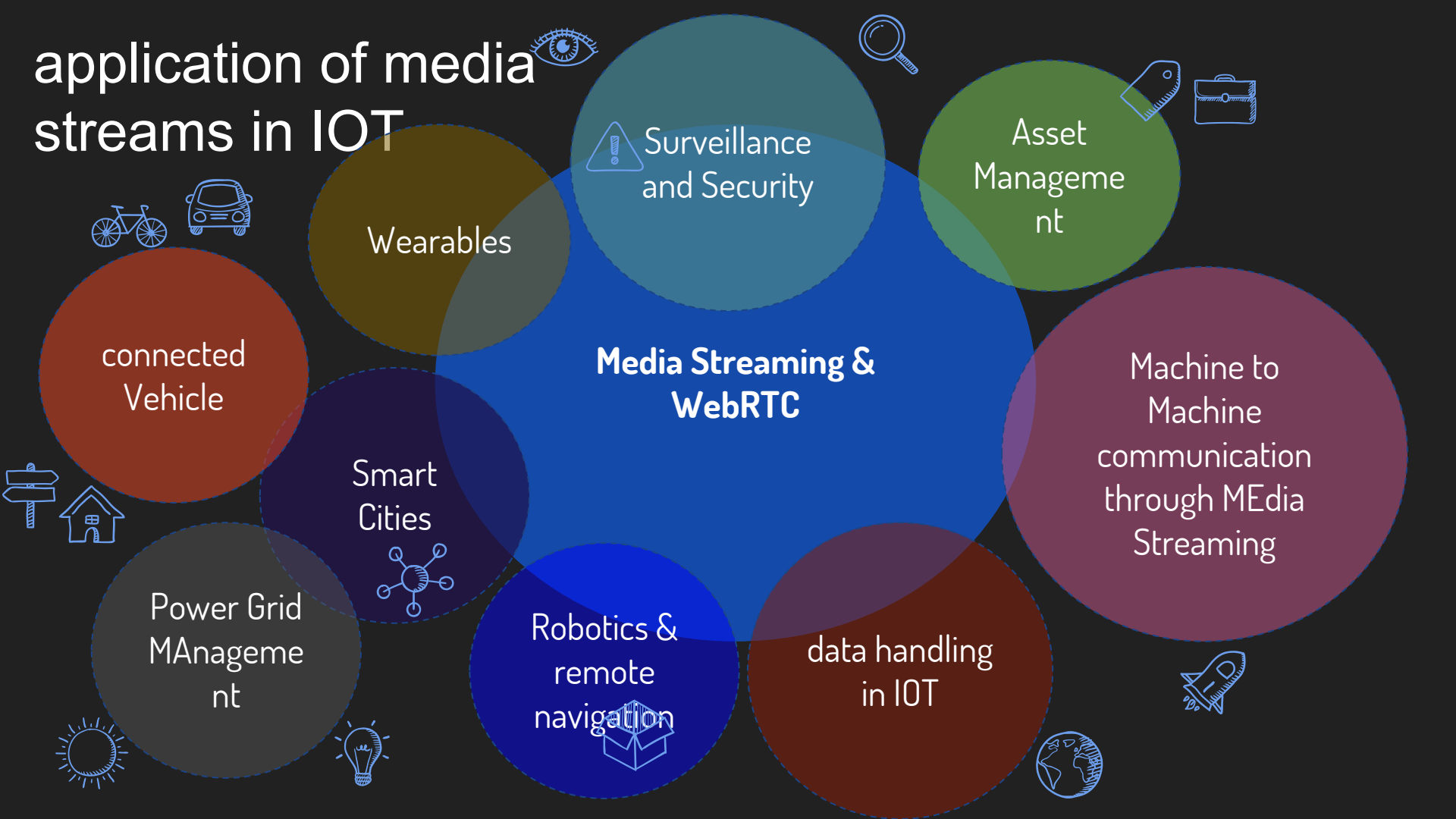
Media Streaming



Camera Access Libraries



application of media streams in IOT



Pros and cons of different Media Capture Libraries

Motion -mjpeg

Adv:

- Easy to install and run
- Inbuilt monitoring

Disadv:

- Delay in stream capture
- Frame reload visible

Ffmpeg

Adv:

- Flexibility to change parameters

Disadv:

- Many dependencies
- Heavier to install and make on Rpi h/w

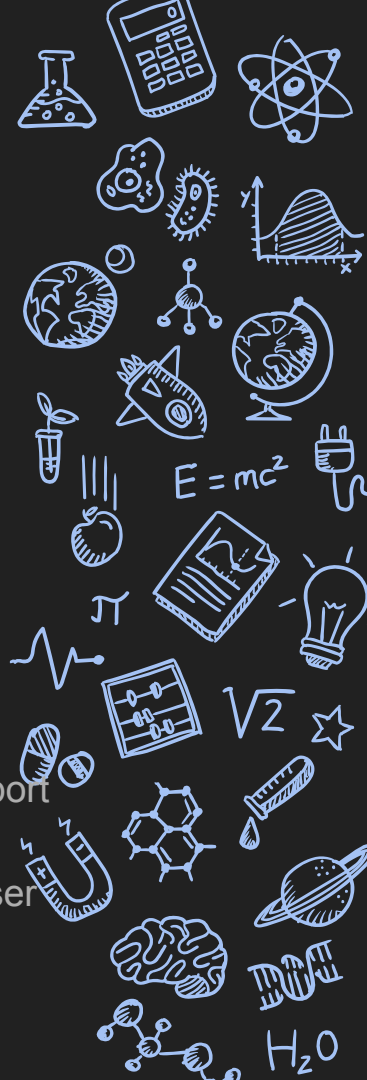
Uv4l - WebRTC

Adv:

- Fast , no delay
- open codec - vp8

Disadv:

- P2p only
- Limited codec support
- Requires https to capture from browser



Why is WebRTC suited for IOT ?

No plugins

No installations of flash or any other 3rd party plugins

Royalty free codec

VP8 , VP9 , OPUS
MIT , GPL

Rapid Support

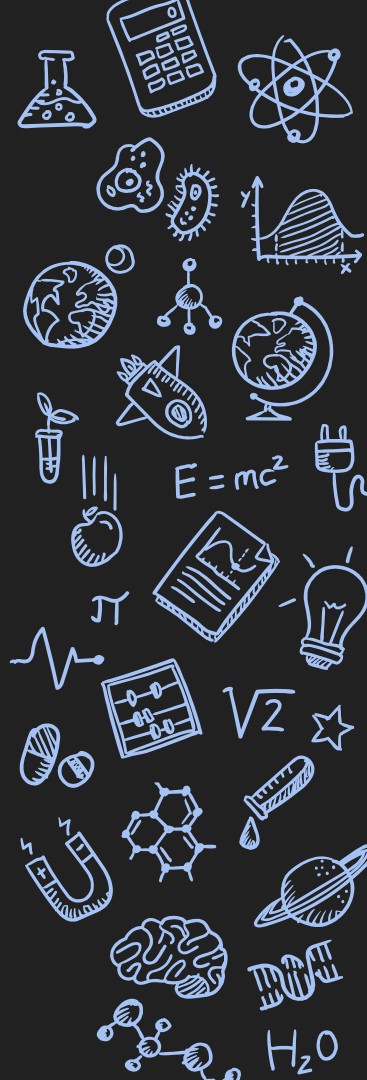
Community support and adoption by major browsers, native SDKs

Javascript

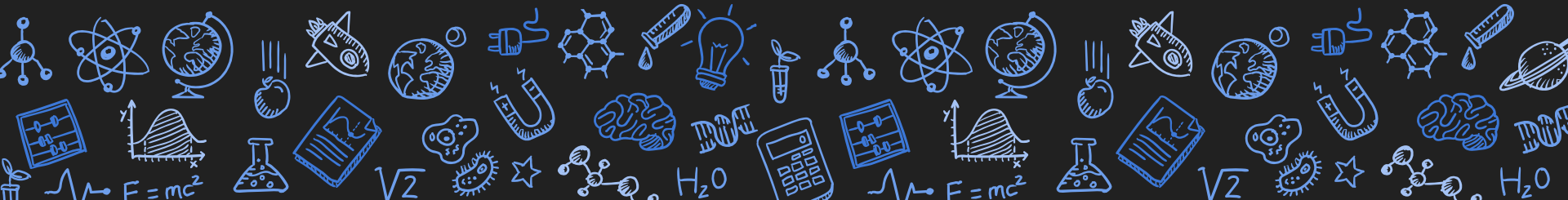
Support for js is the key to making it easily adoptable by developers

Integrate with any signalling method

- SIP
- XMPP
- Socketio
- websocket



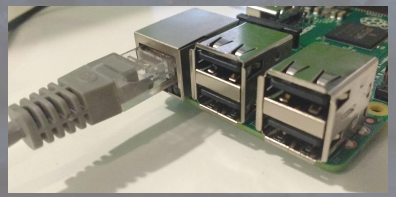
Communication



Modes Of Communication

Ethernet LAN

Wired connection



Bluetooth Low Energy

Range 30 m

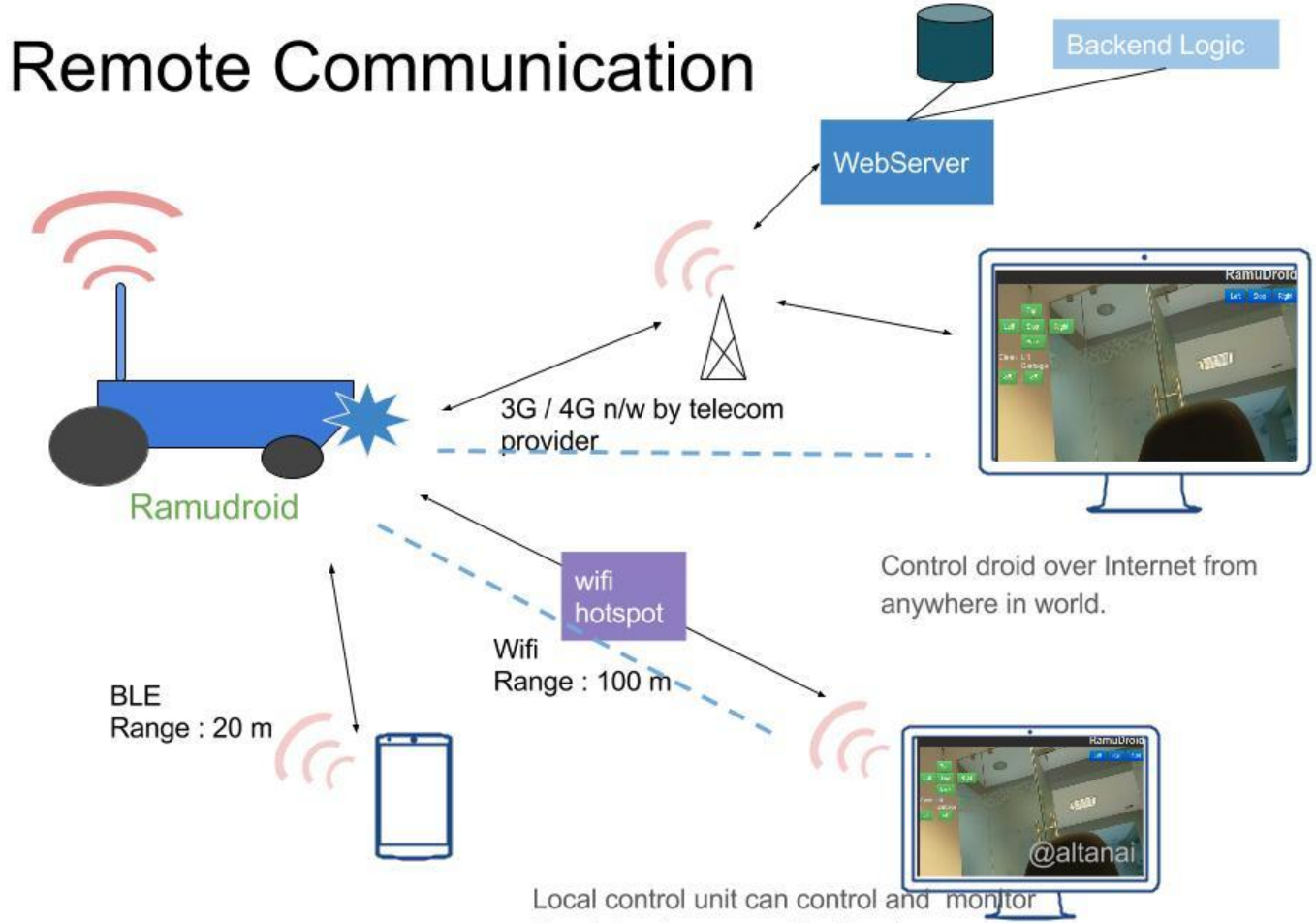
Wifi

Range 100 m

GSM / 3G

Range unlimited

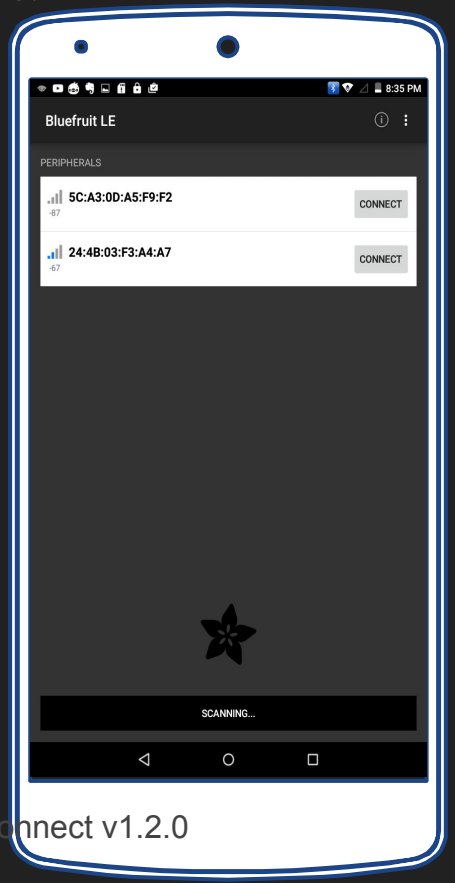
Remote Communication

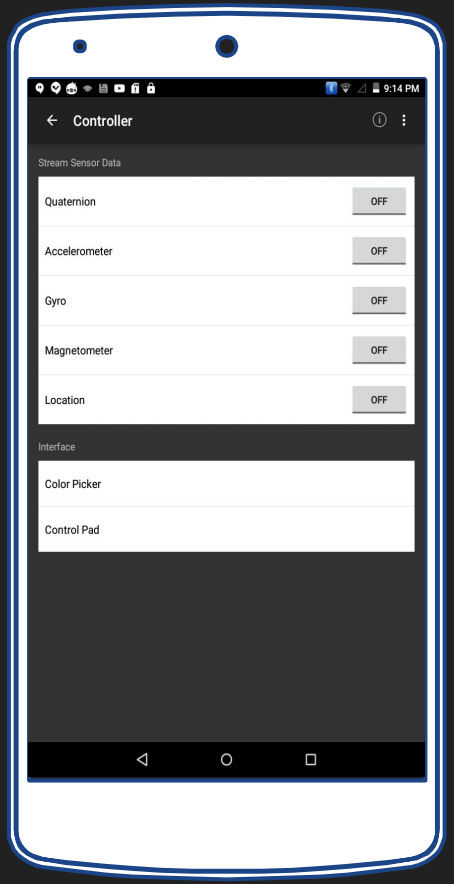


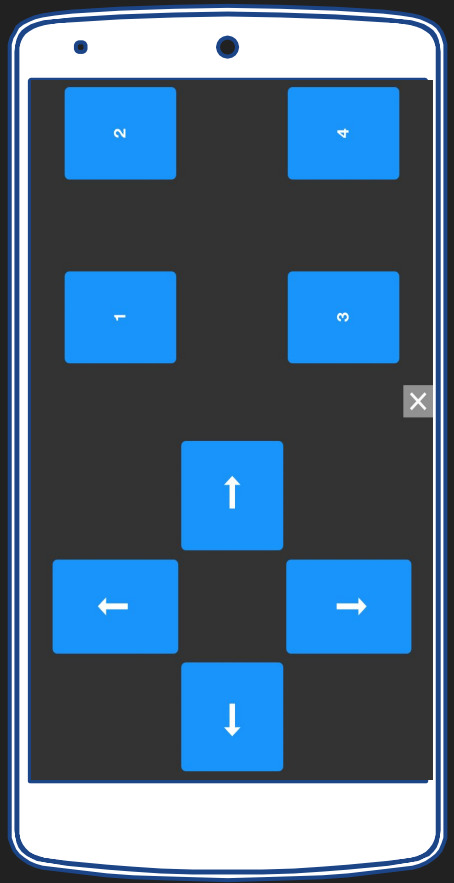
BLE control

(Bluetooth Low Energy)

[Demo]

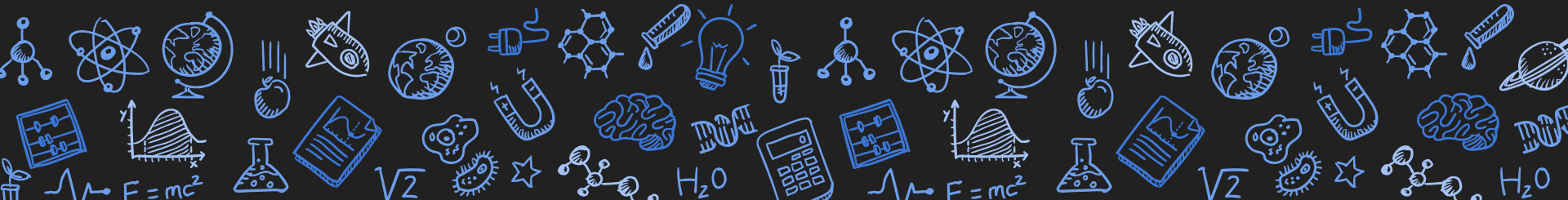




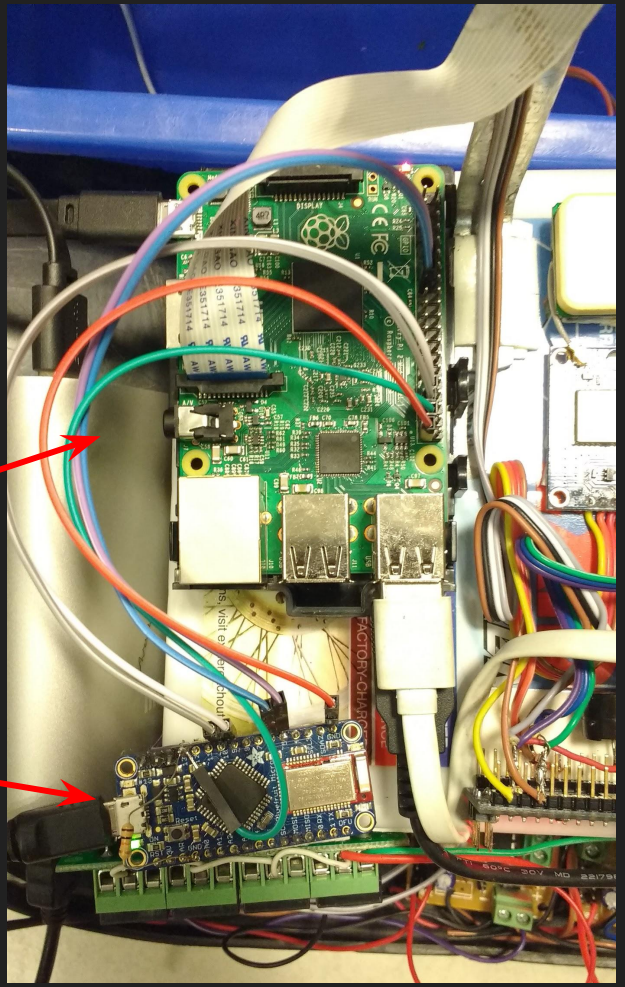


App used : Bluefruit LE connect v1.2.0

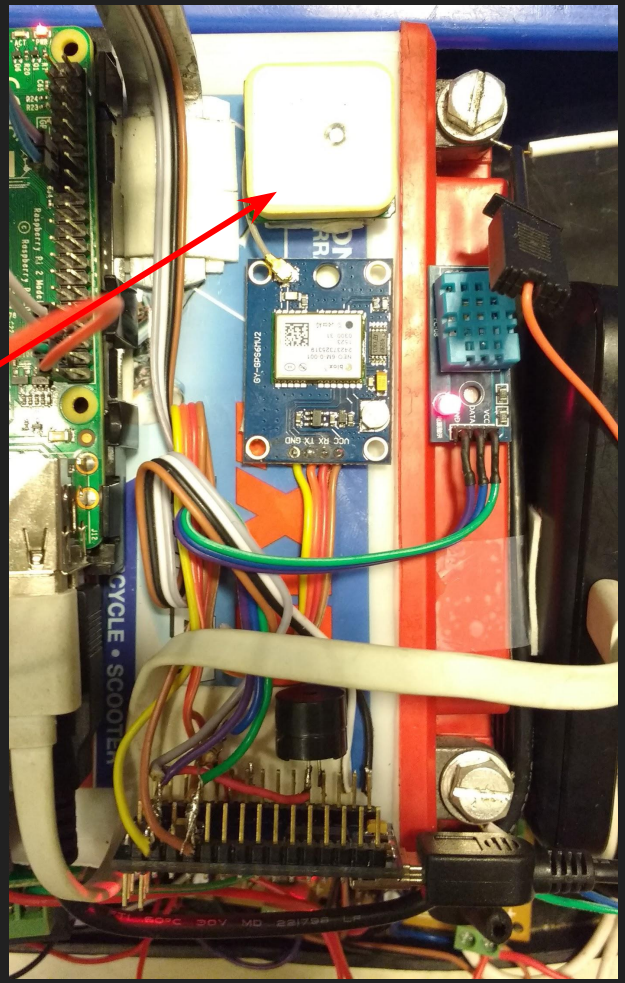
Components of Robot

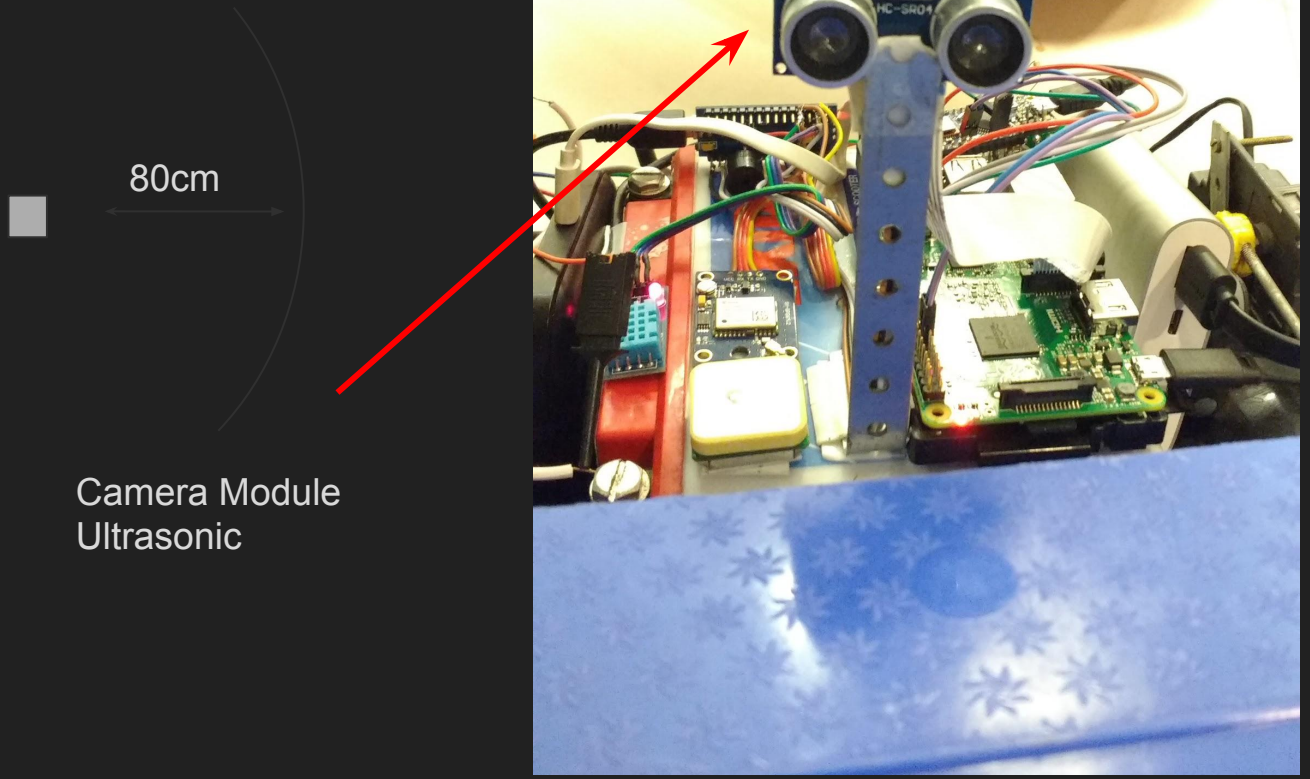


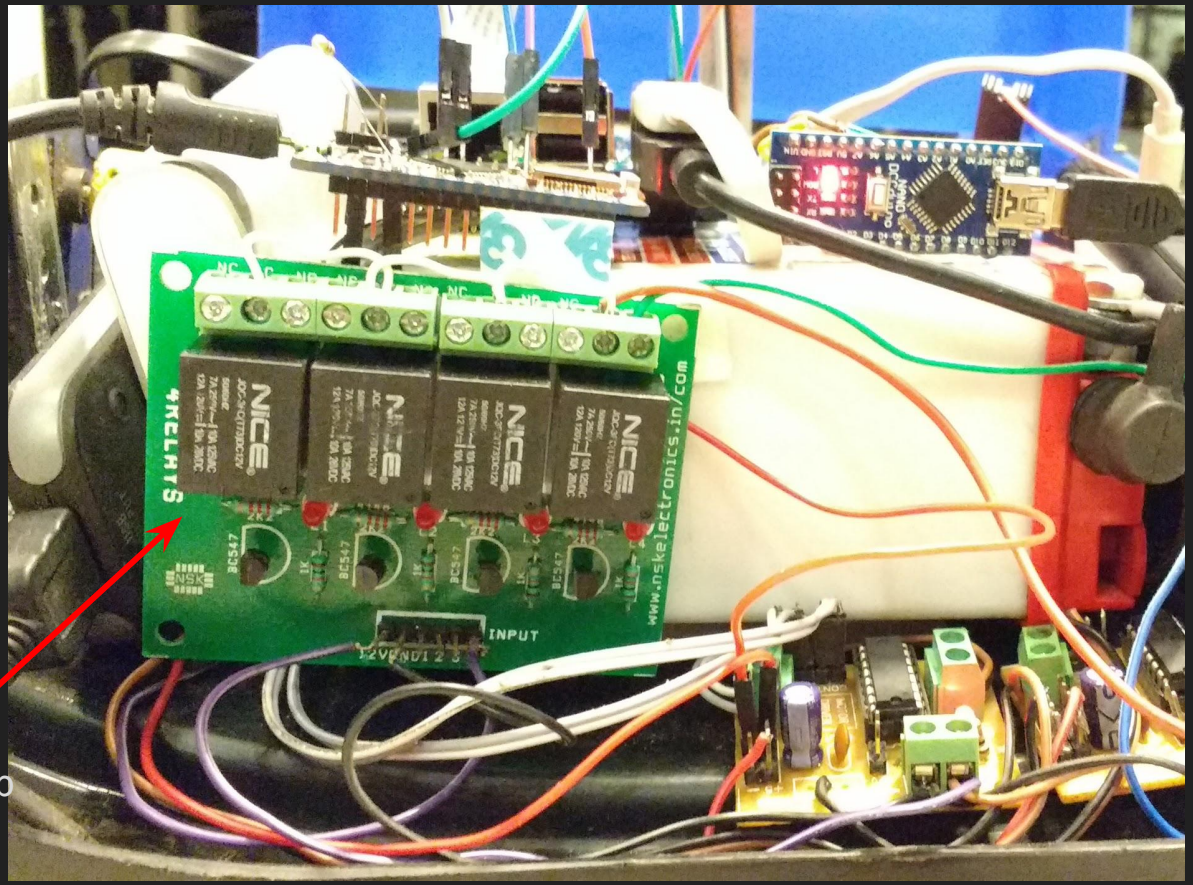
Raspberry Pi
Arduino



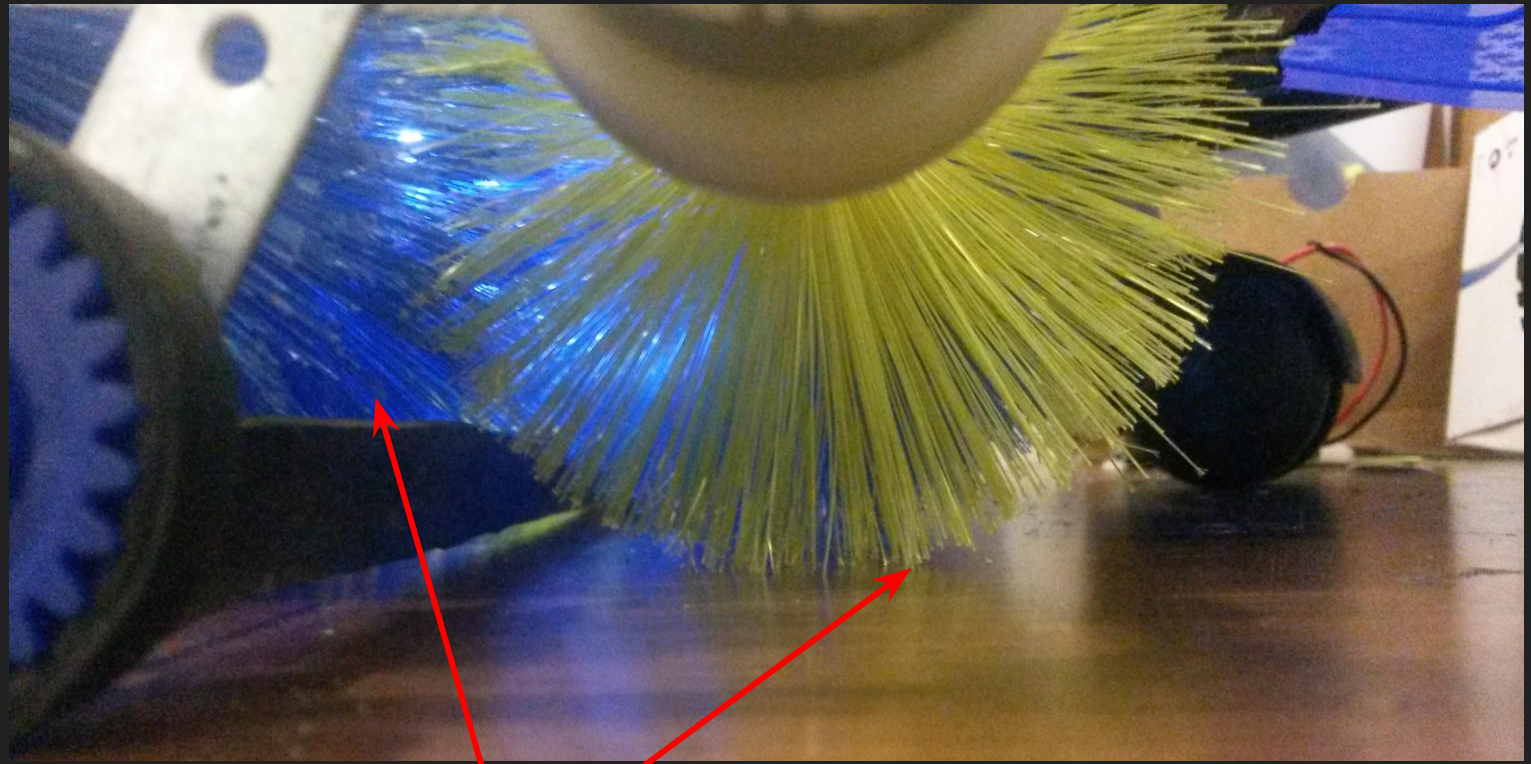
GPS
Temperature sensor



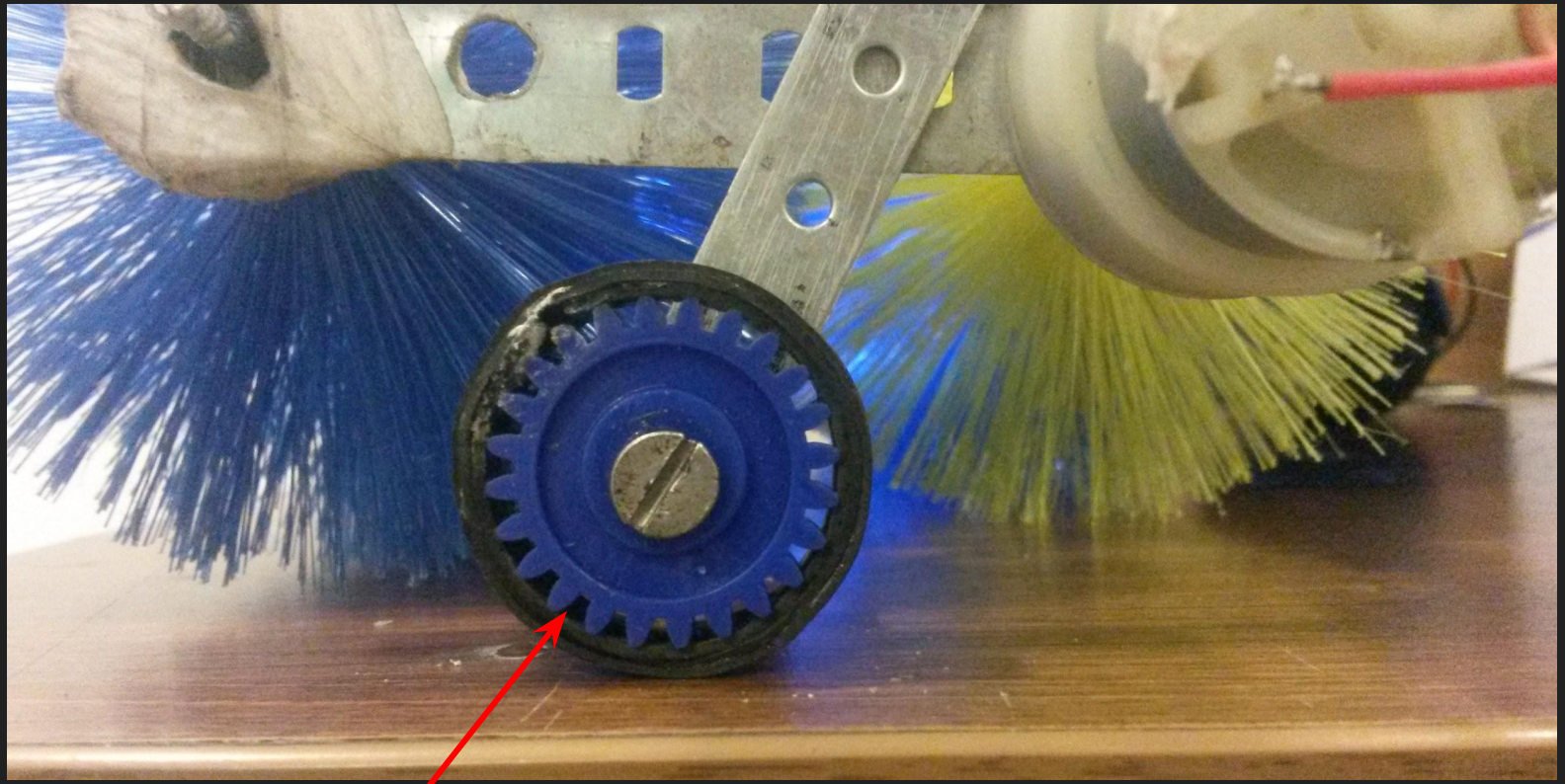

80cm
Camera Module
Ultrasonic



Relay
230 v 7 Amp



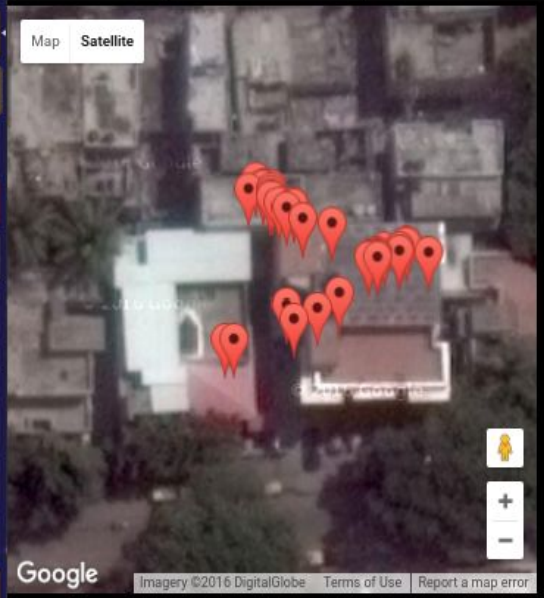
2 Brushes rotating clockwise and anticlockwise

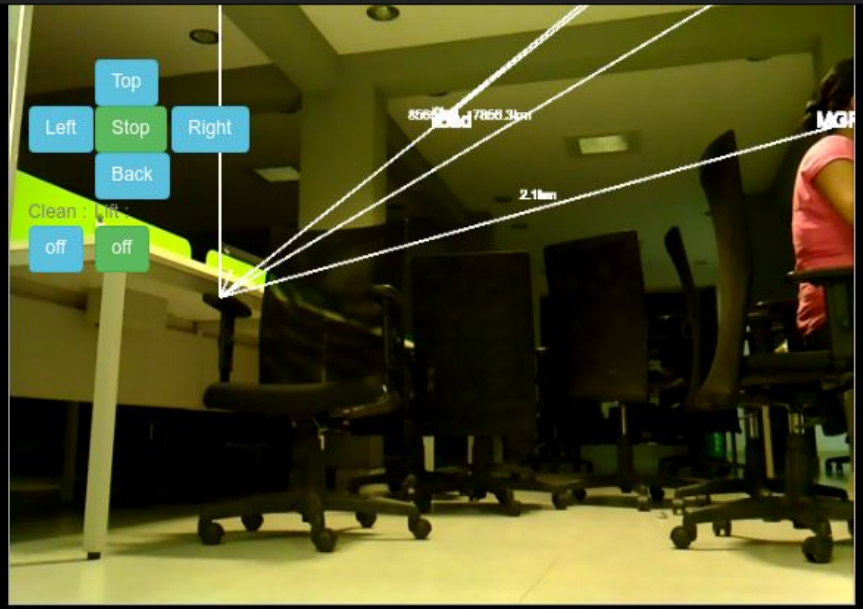


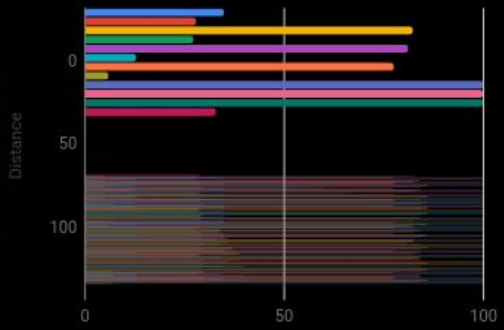
Counter road potholes and uneven surface

RamuDroid | Remote Navigation | About | Resources | Call up | Motion Control

[Demo]

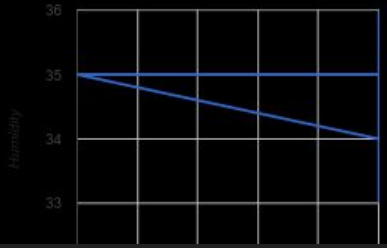




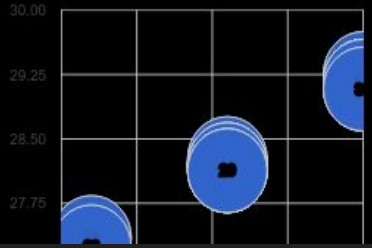


Web Control Dashboard

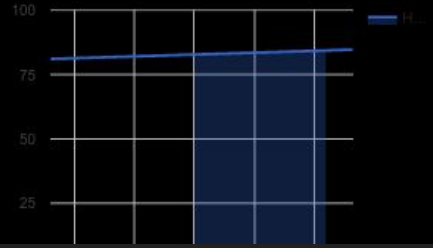
Temperature



Heat



Sat , prec , err checksum



180

Pause/Resume

Mute/Unmute

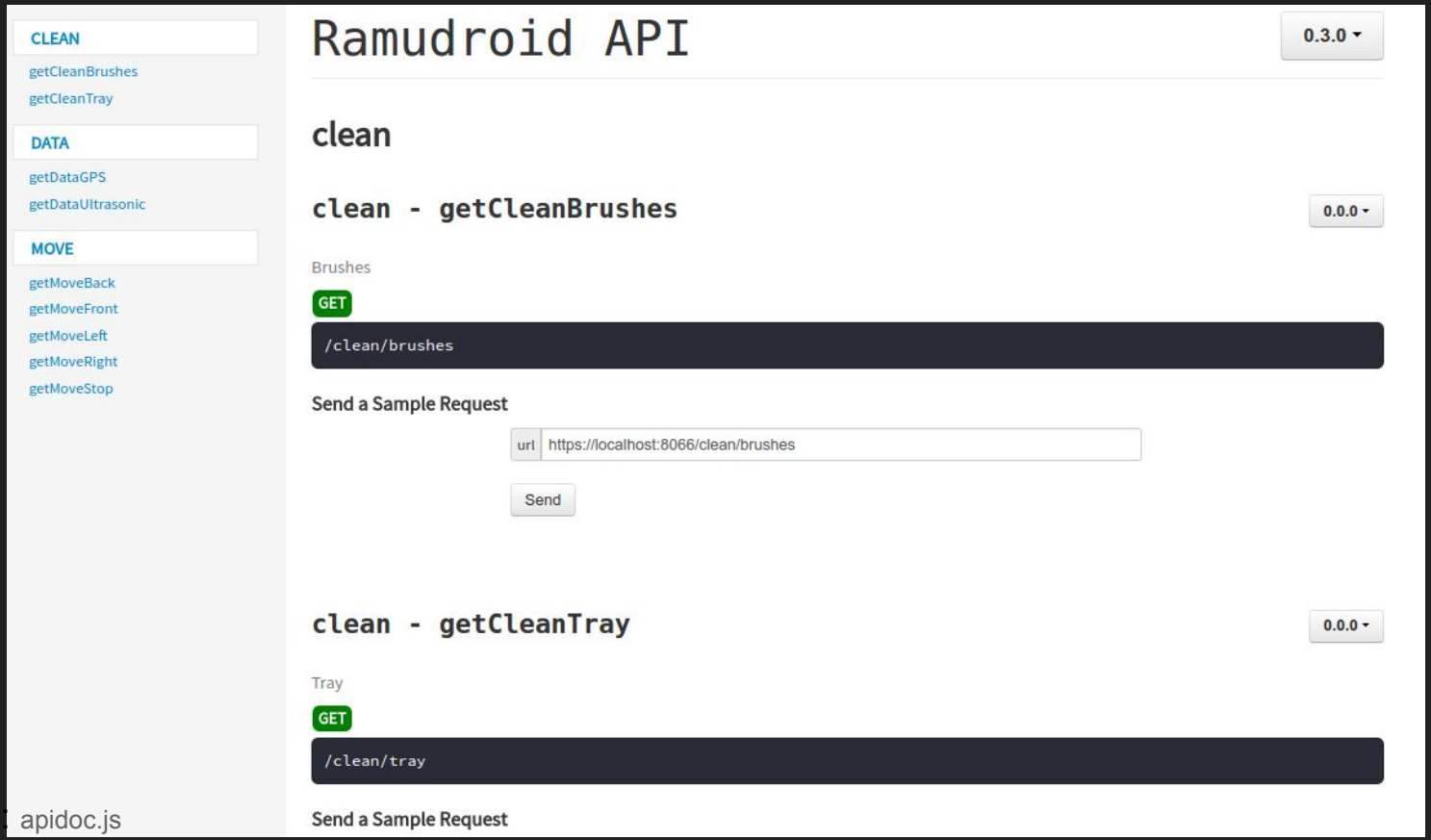
Fullscreen

WebRTC Settings

Robot's CPU

REST APIs to control Droid

[Demo]



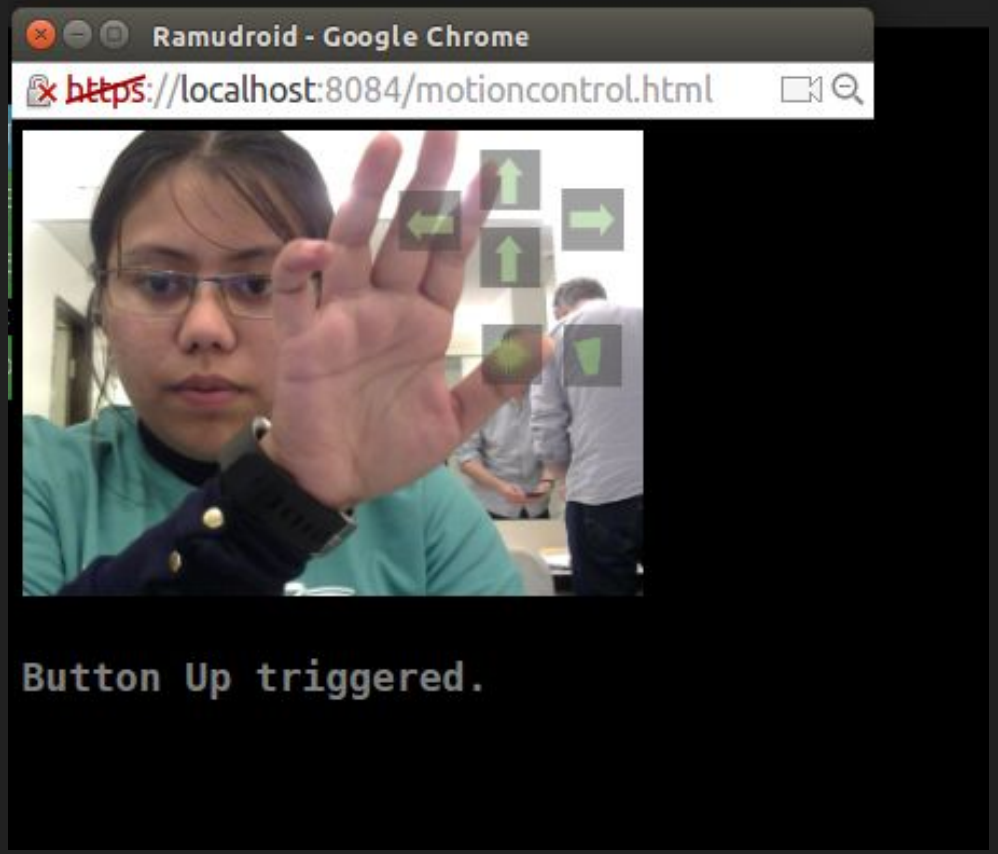
Library : apidoc.js

Edge Detection

[Demo]

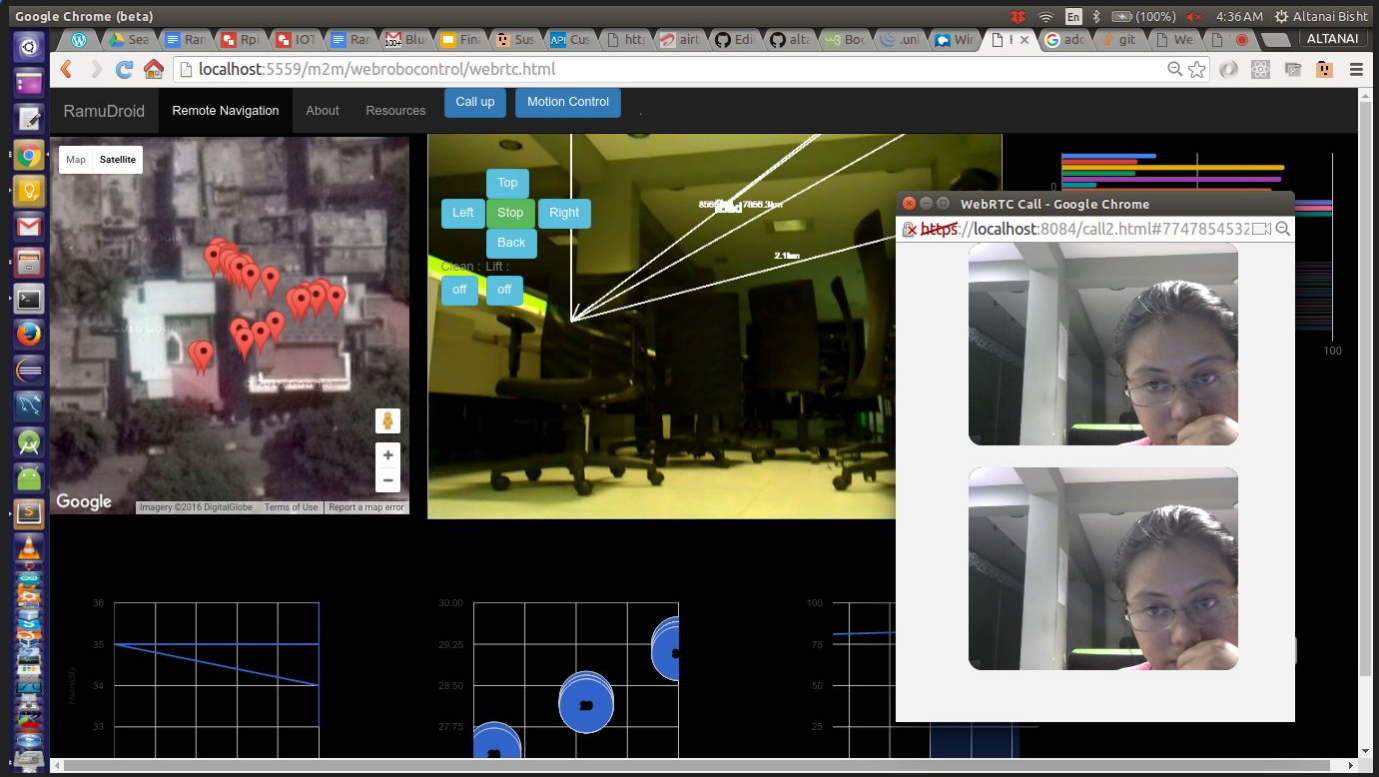
Motion Tracking

[Demo]

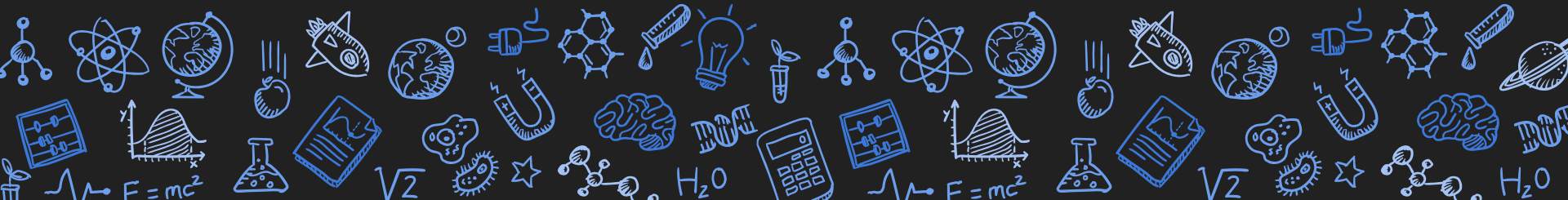


https://stemkoski.github.io/Three.js/Webcam-Motion-Detection.html

WebRTC call from dashboard + screen-sharing



Feasibility analysis



Cost

Rs 8000

Circuit , communication module , camera , body

---

2 member

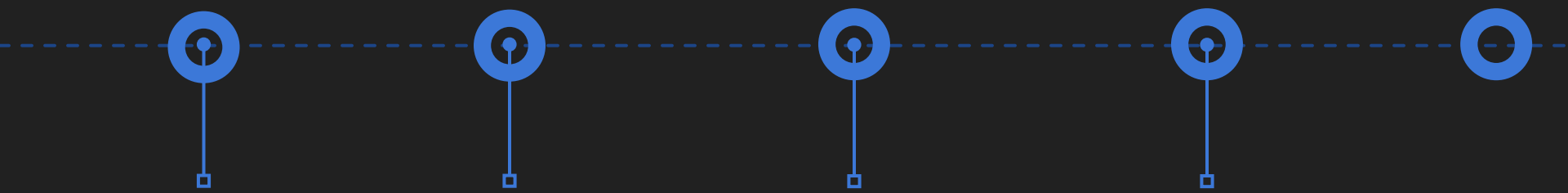
And a lot of feedback and support

---

6 months

To come up with a successful prototype!

Timeline



Define the technical architecture and build the bot

Add communication modules , streaming and cloud server

Power conversion principles and decision building in the bot to make it autonomous

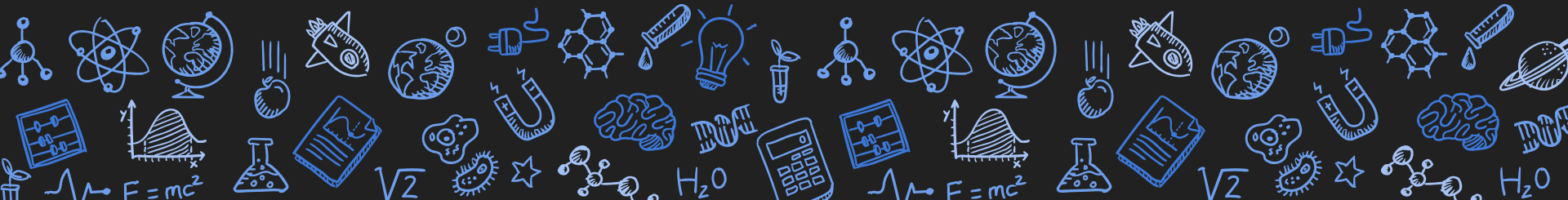
BLE module , GPS , Sensors to collect data as it passes by an area

Advantages

1. Modularity of the platform
2. Reusable components (ie can be applied to drones , kiosks , surveillance camera etc)
3. Scalable (with cloud storage)
4. Open Source components (WebRTC , Nodejs etc)


Ramudroid – bot to clean roads and outdoors

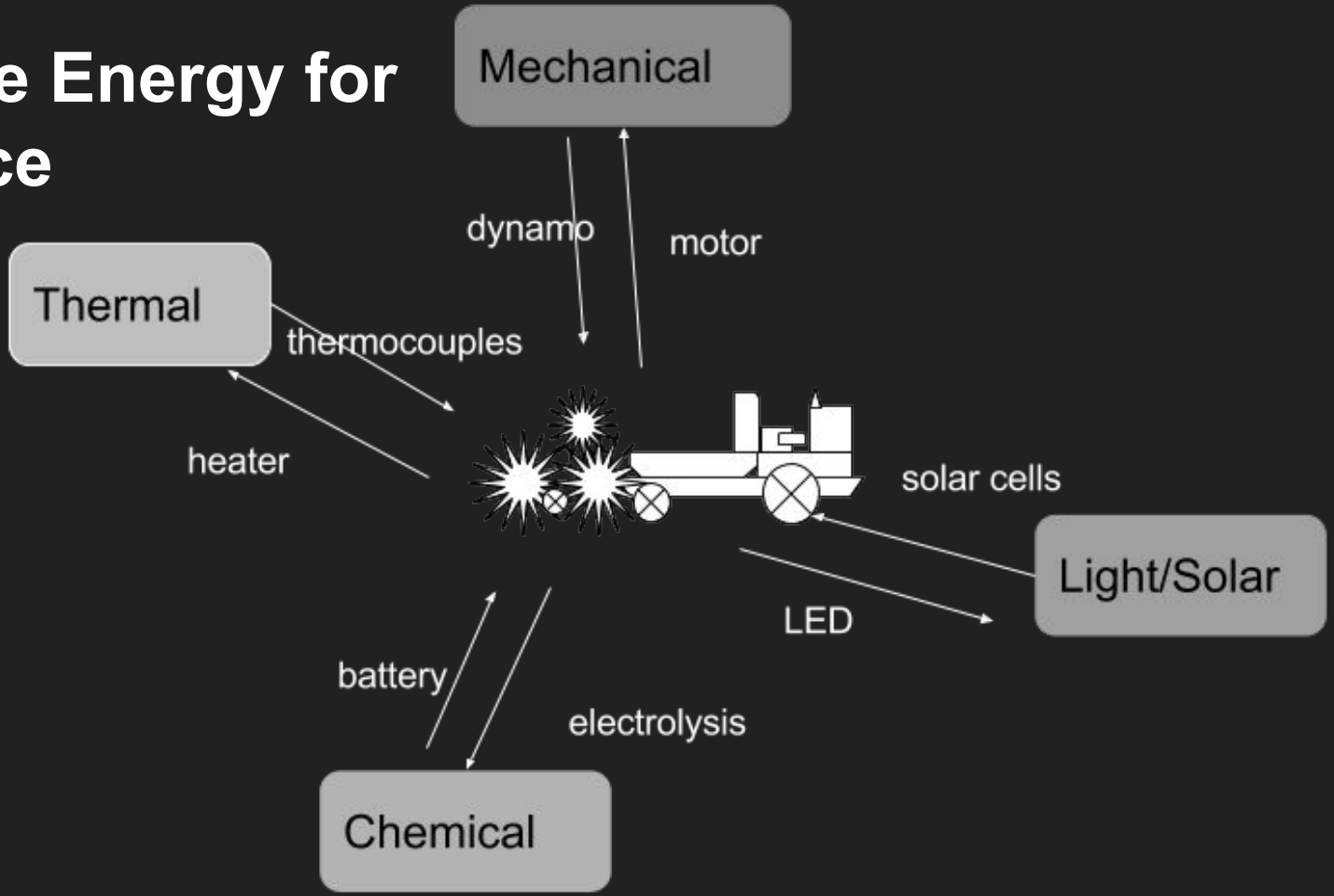
Next areas of R&D in RamuDroid



Garbage Segregation from waste collected from Bots

Autonomous Driving Without Manual Control

Regenerate Energy for self reliance



Credits

WebRTC

- http://tools.ietf.org/wg/rtcweb/
- https://www.w3.org/2011/04/webrtc/
- https://webrtc.org/
- http://www.html5rocks.com/
- http://www.tutorialspoint.com/webrtc/index.htm
- http://caniuse.com/#search=webrtc
- http://webaudiodemos.appspot.com/
- https://github.com/webrtc/samples

IOT ref :

- http://www.instructables.com/id/Simple-and-intuitive-web-interface-for-your-Raspbe/

Augmented Reality

- http://stemkoski.github.io/Three.js
- https://dontcallmedom.github.io
- requestAnimationFrame polyfill by Erik Möller & Paul Irish et. al.
- http://auduno.com/post/25125149521/head-tracking-with-webrtc

Resources

Github source code

- https://github.com/altanai/m2mcommunication

Demo :

- https://www.youtube.com/watch?v=wHQMVP_WOLs

Instruction and Tutorial :

- https://altanaitelecom.wordpress.com/2016/03/18/ramudroid/

This is a 100% self funded , open source project . It is build with the sole intention of making the world a better place .

Any comments , feedbacks , suggestion or help is welcome :)

Twitter @altanai , @Ramudroid
Email : tara181989@gmail.com

Thank you