

Ramu Droid

2016 Hackaday



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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 community experience distill



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

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

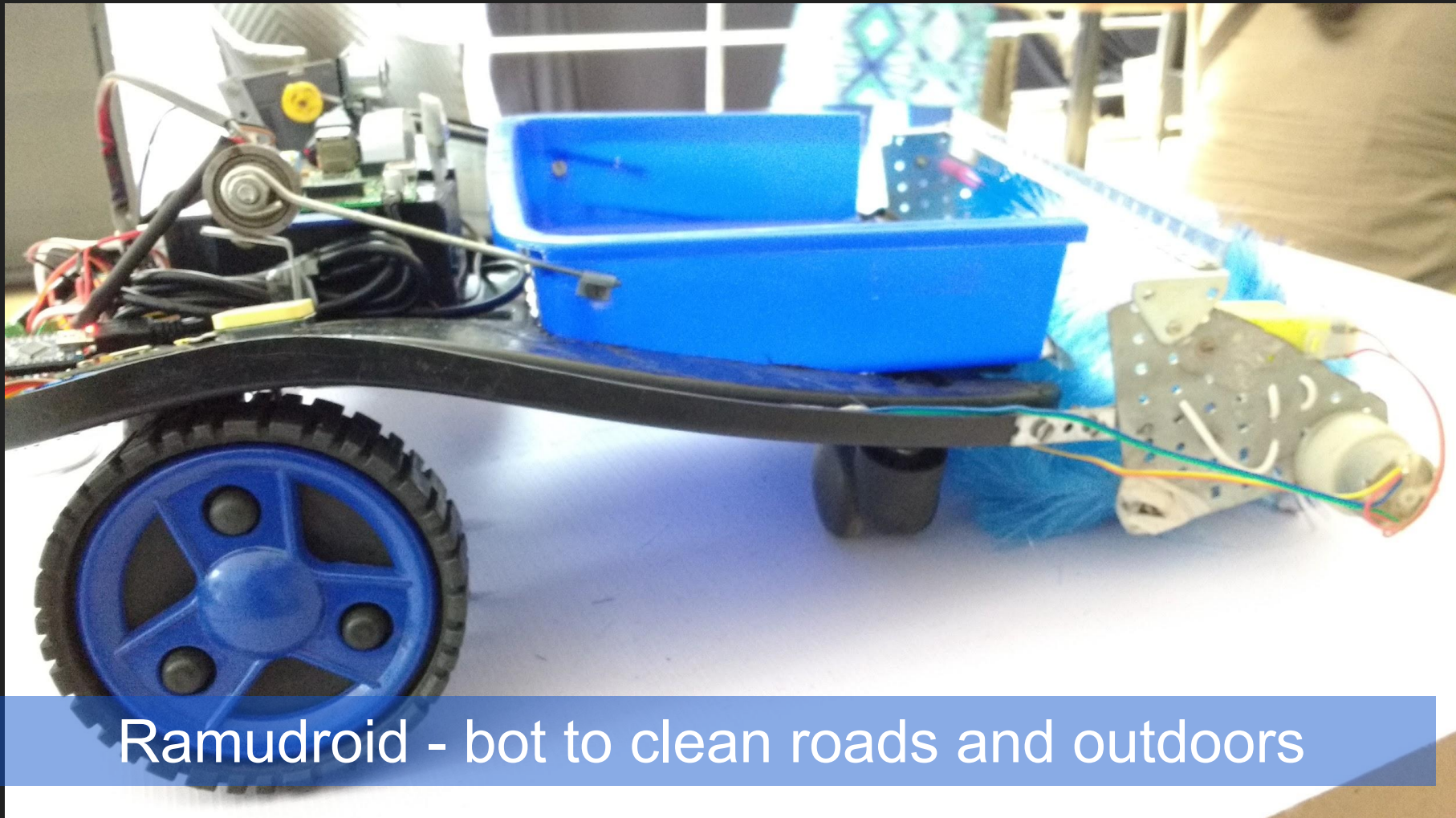
Just Imagine ..

This in place of



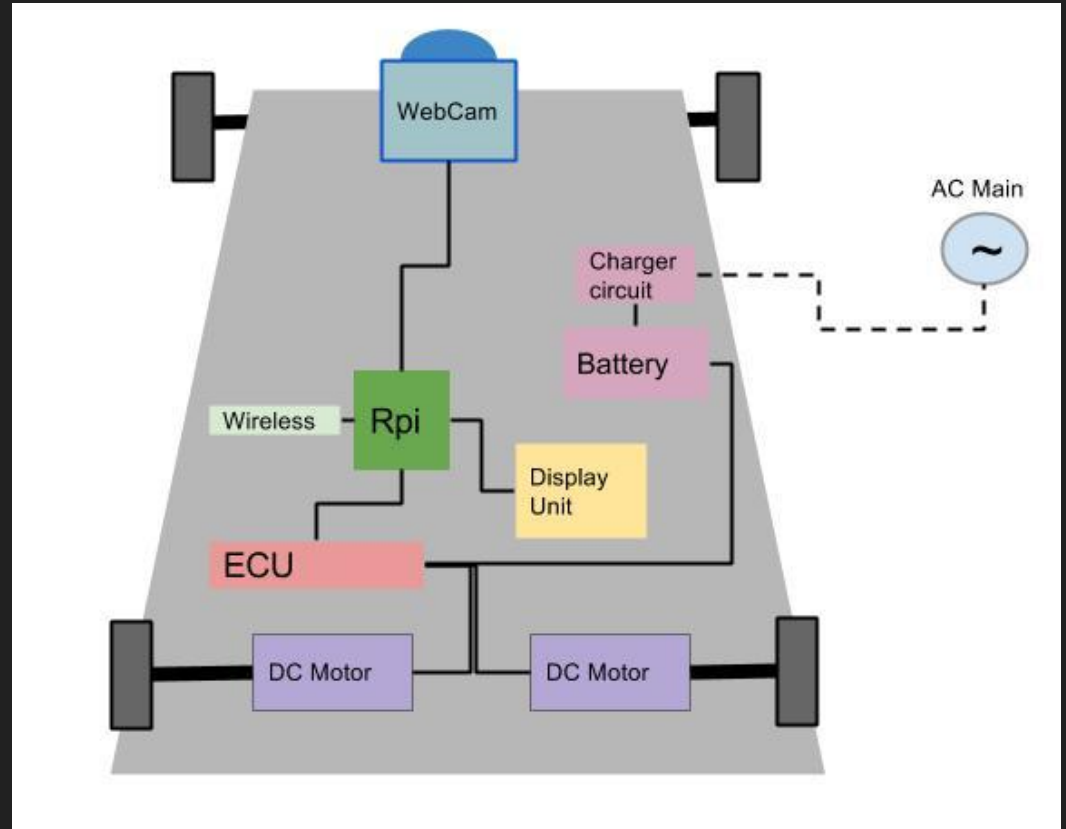
this





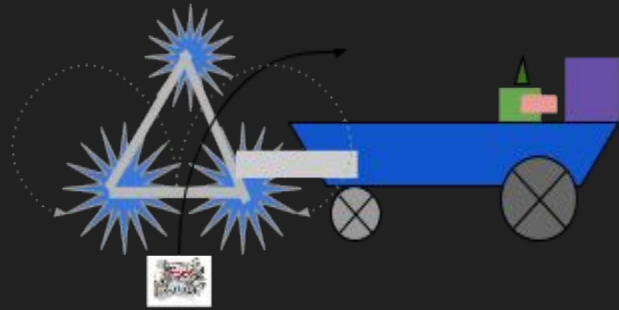
Ramudroid - bot to clean roads and outdoors

Design Blueprint v1.0

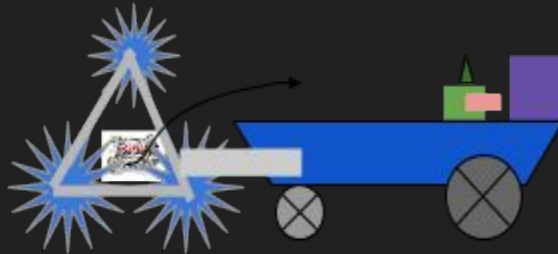


First product blueprint of RamuDroid

Working



1. Litter comes between rotating brushes



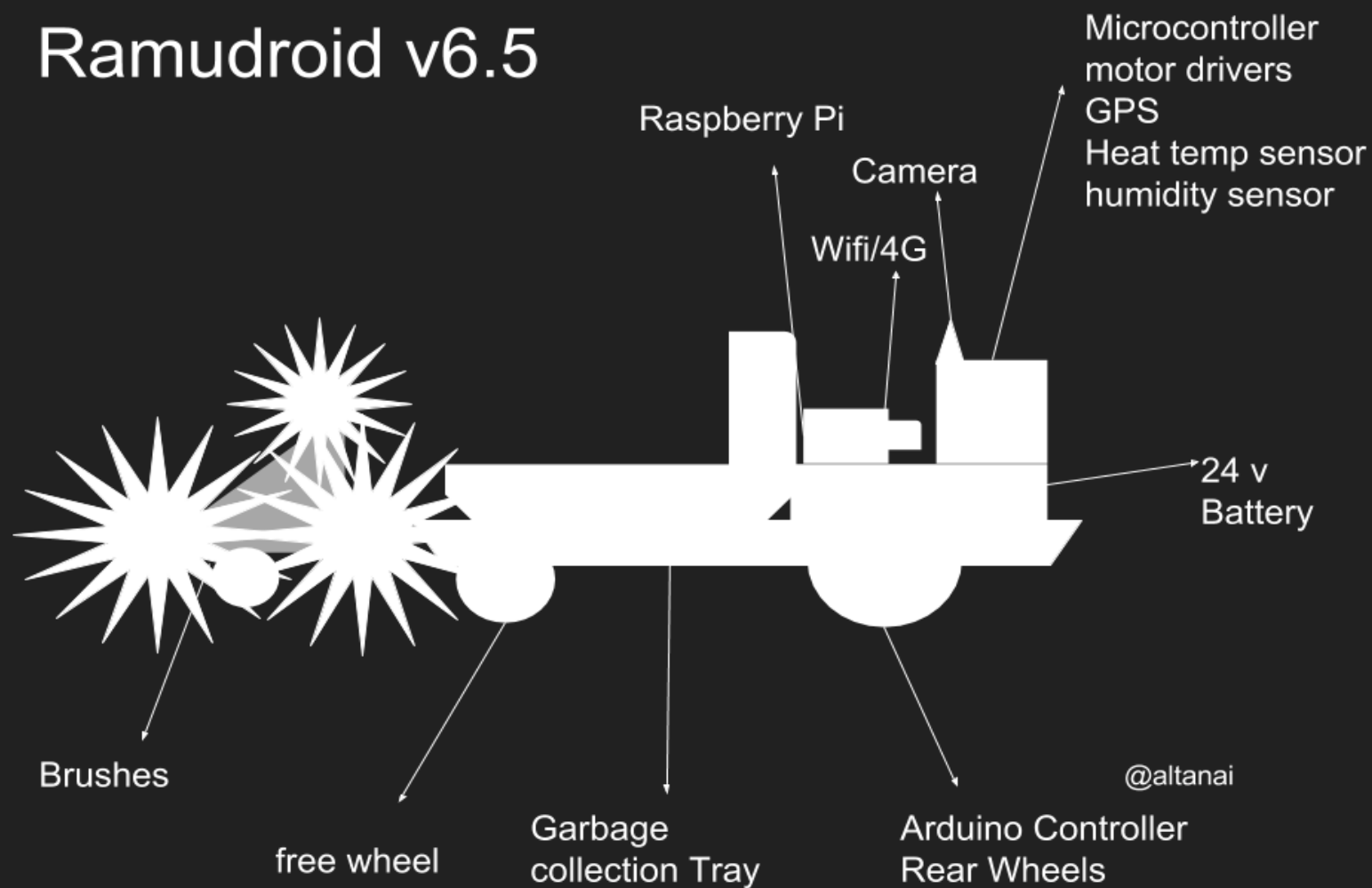
2. Litter is picked by brushes and pushed upwards



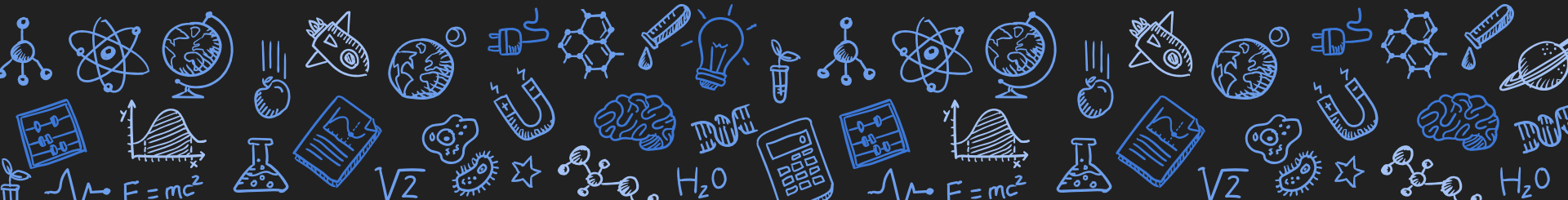
3. Brushes push it towards the tray

Stages of garbage collection

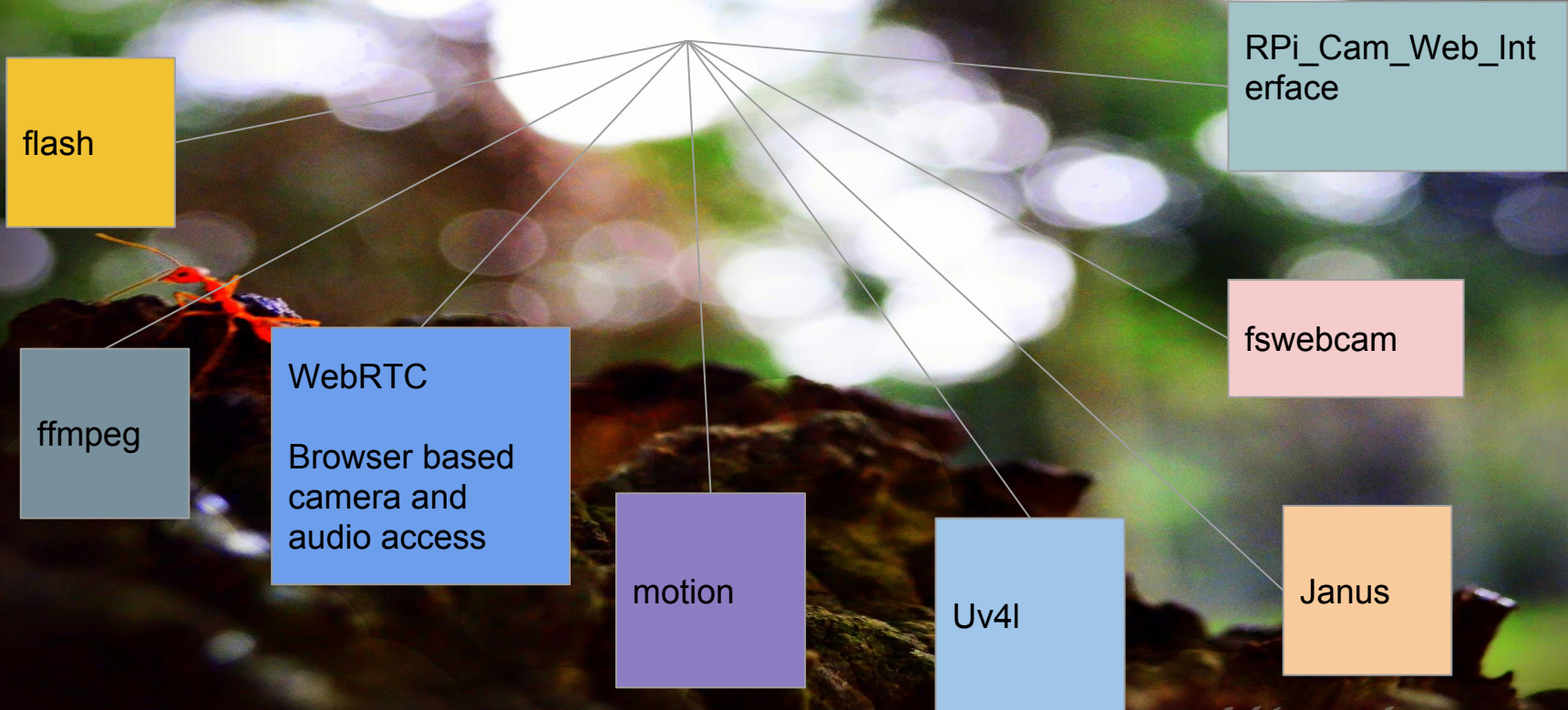
Ramudroid v6.5



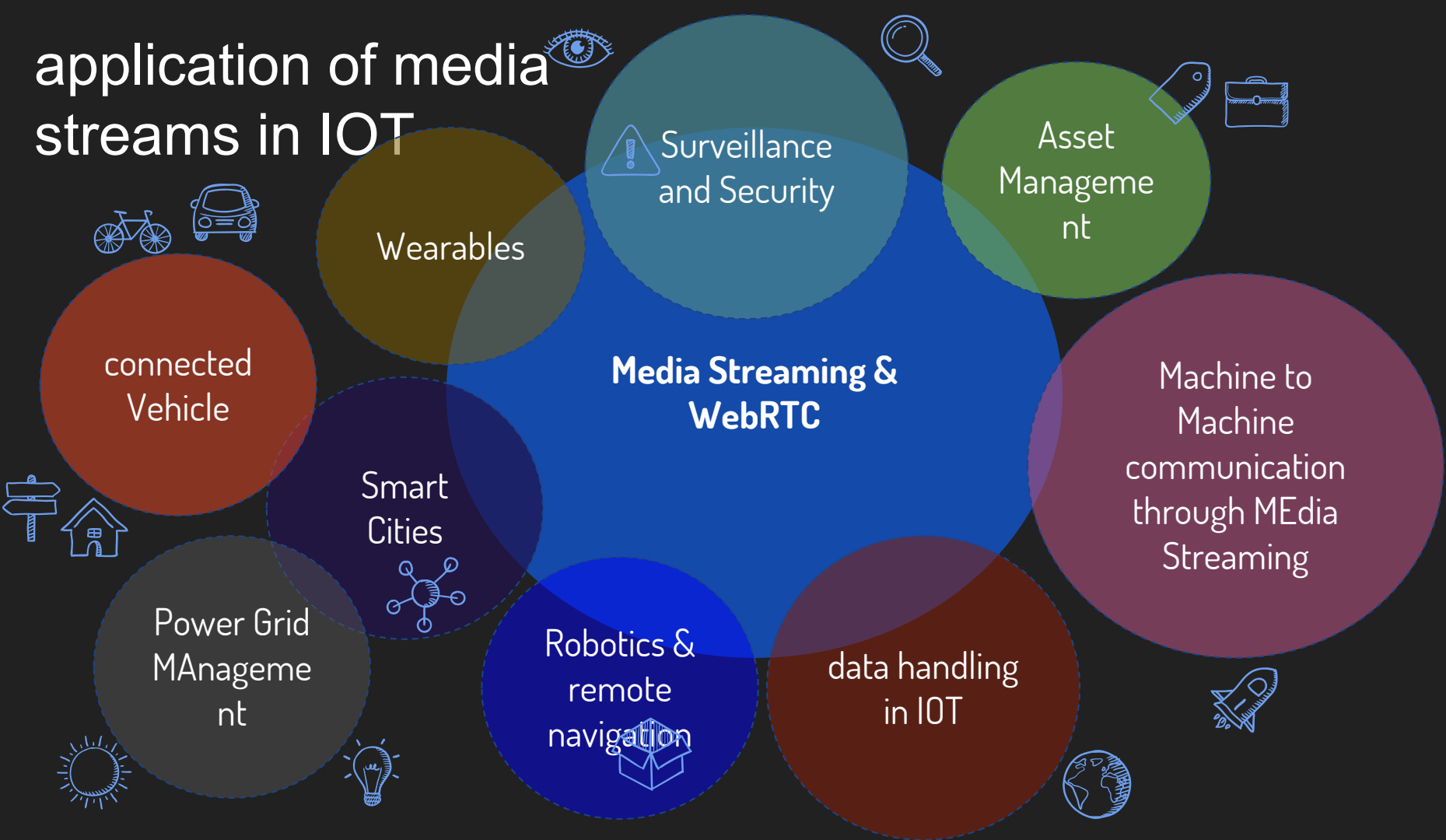
Media Streaming



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

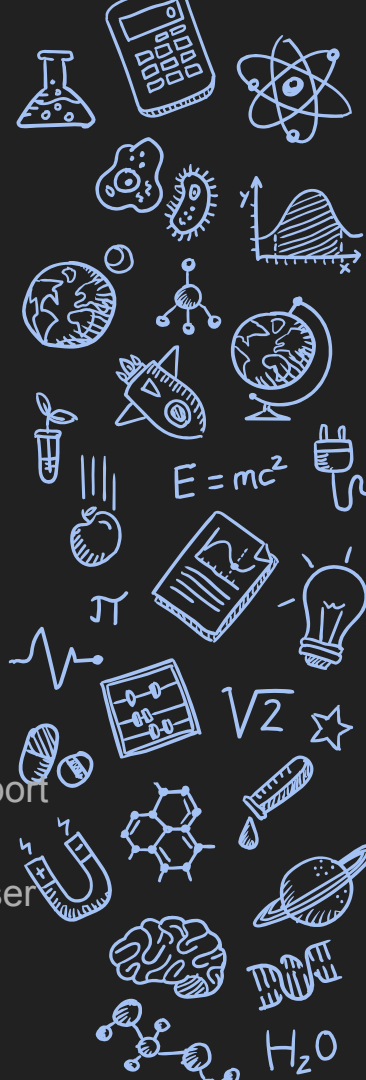
Uv4l - WebRTC

Adv:

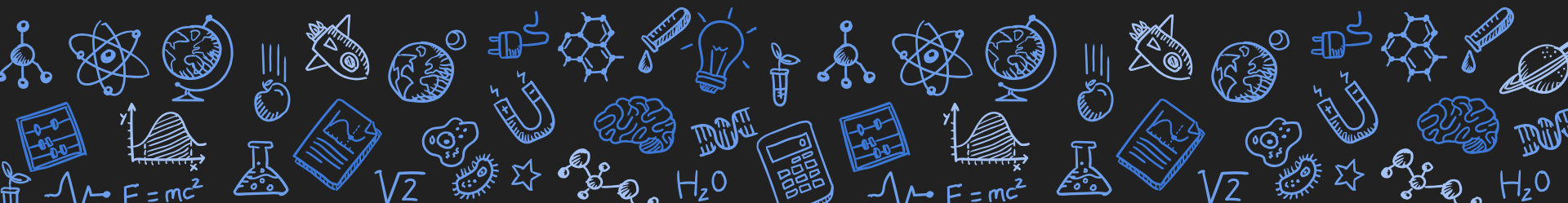
- Fast , no delay
- open codec - vp8

Disadv:

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



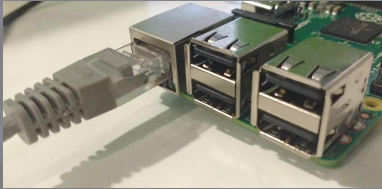
Communication



Modes Of Communication

Ethernet LAN

Wired connection



Bluetooth Low Energy

Range 30 m



Wifi

Range 100 m

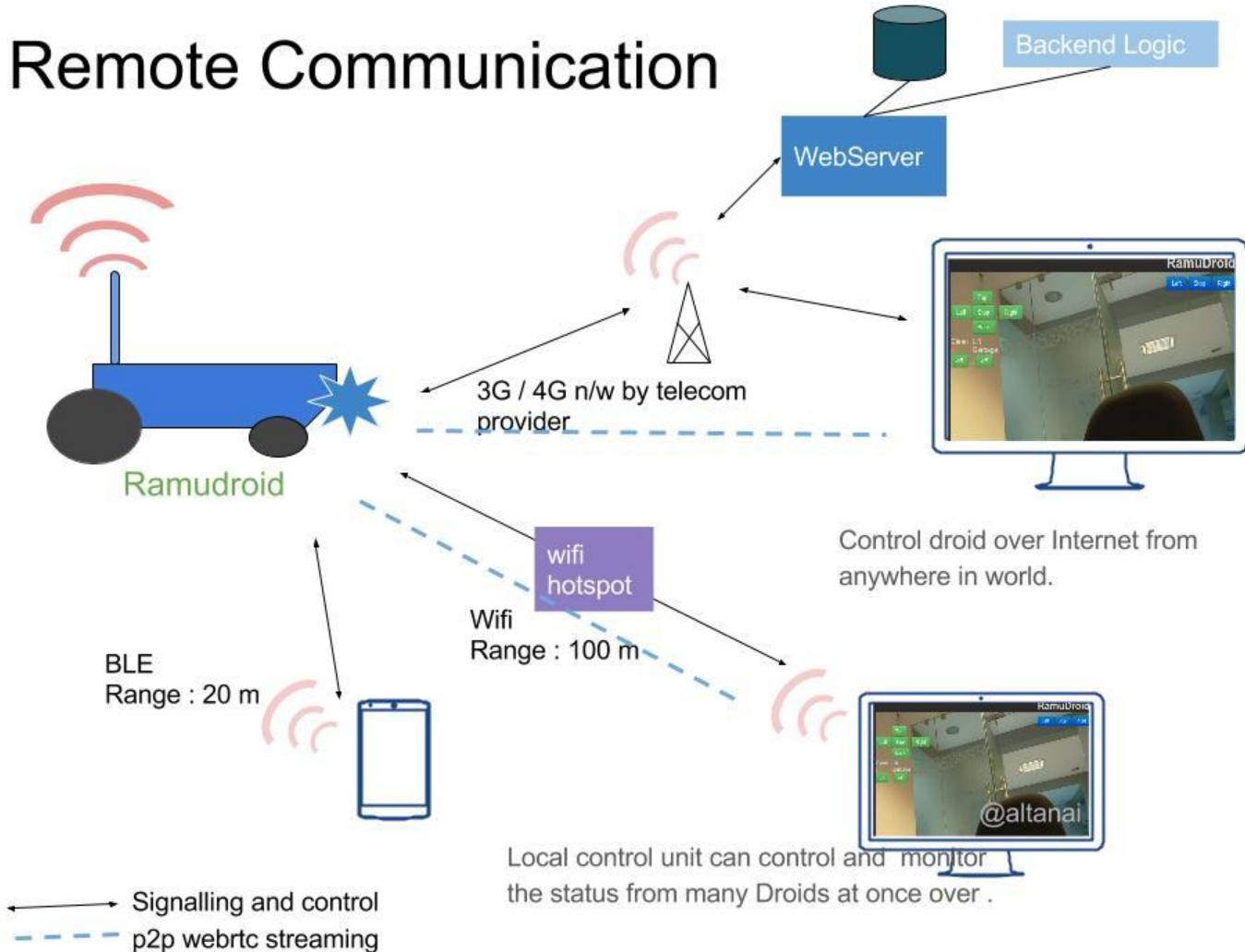


GSM / 3G

Range unlimited



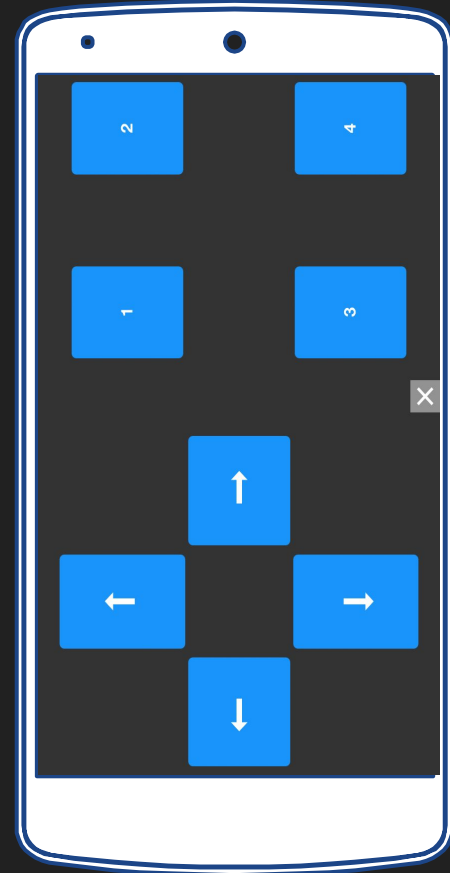
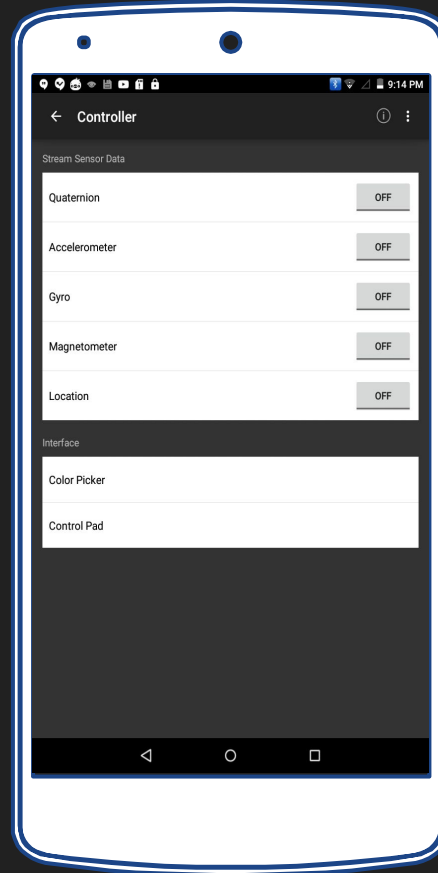
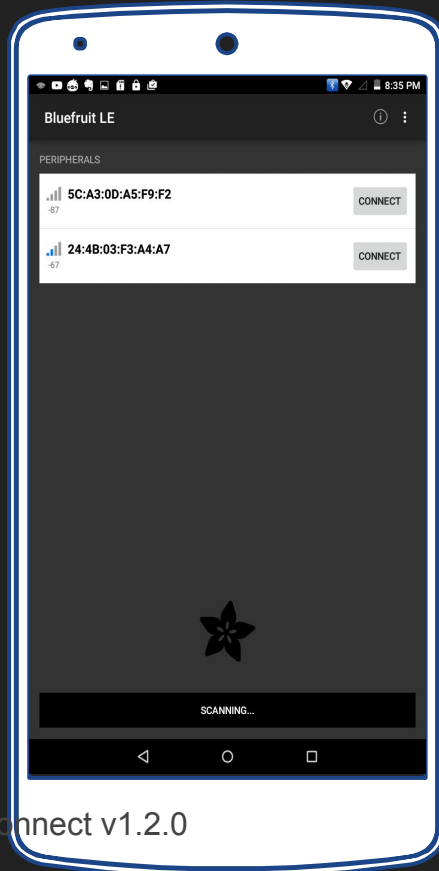
Remote Communication



BLE control

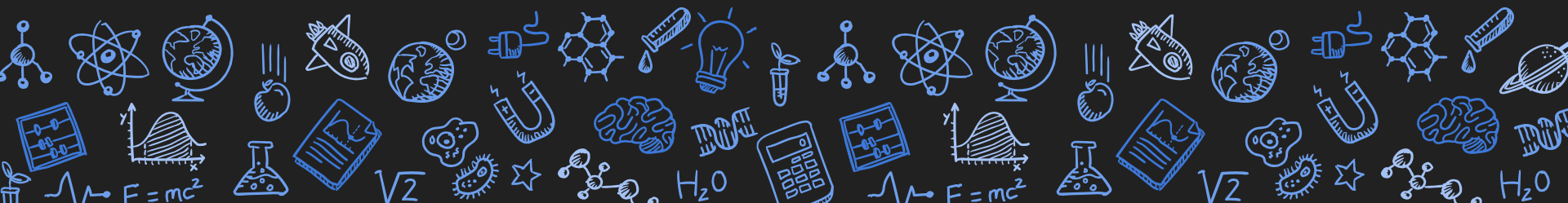
(Bluetooth Low Energy)

[Demo]

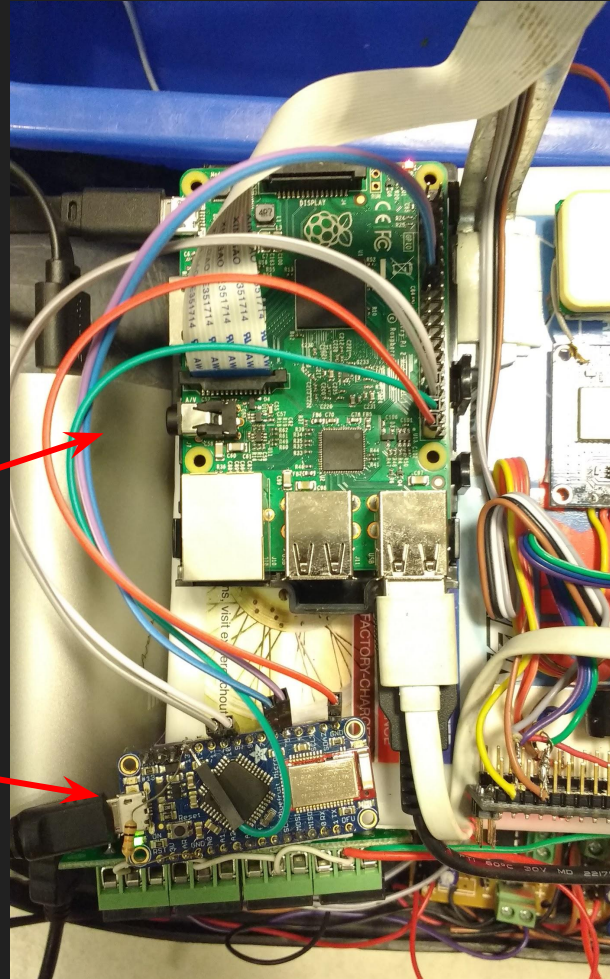


App used : Bluefruit LE connect v1.2.0

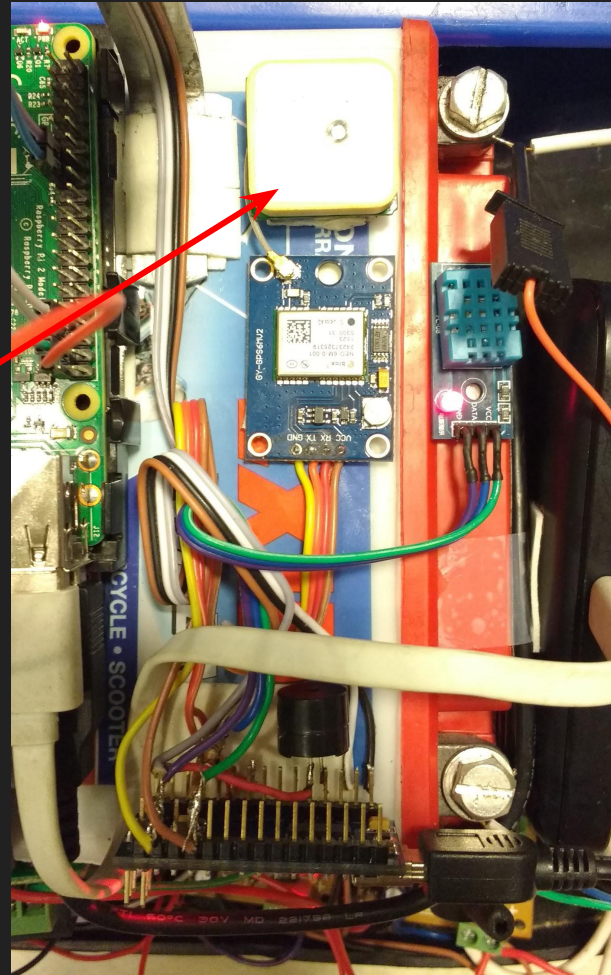
Components of Robot



Raspberry Pi
Arduino

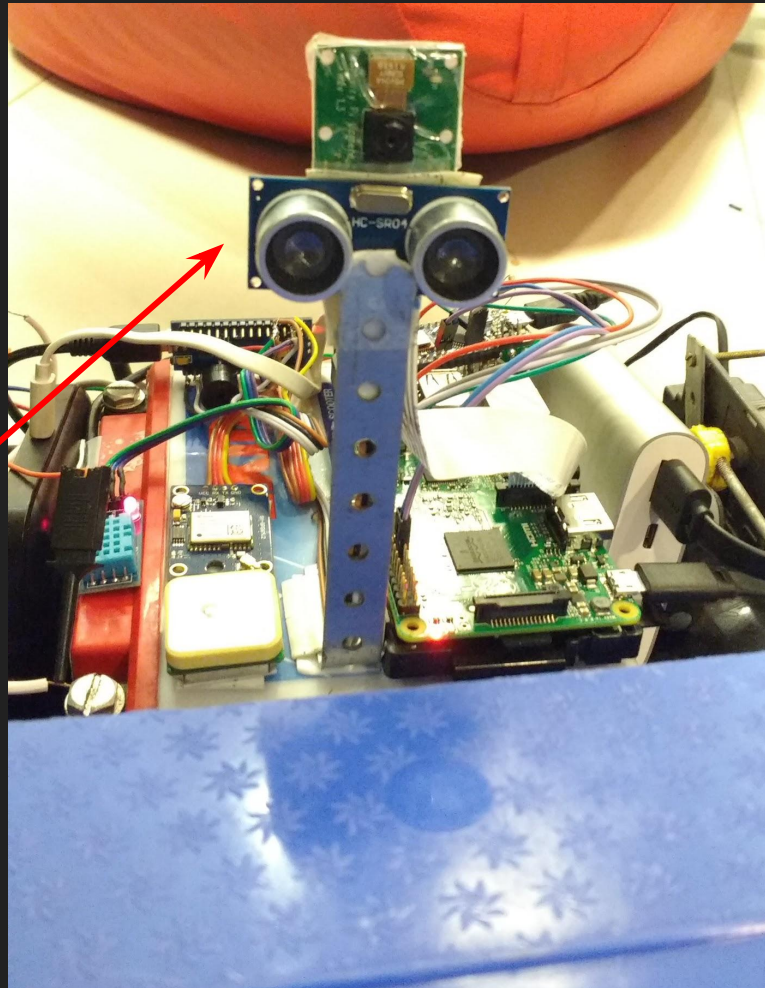


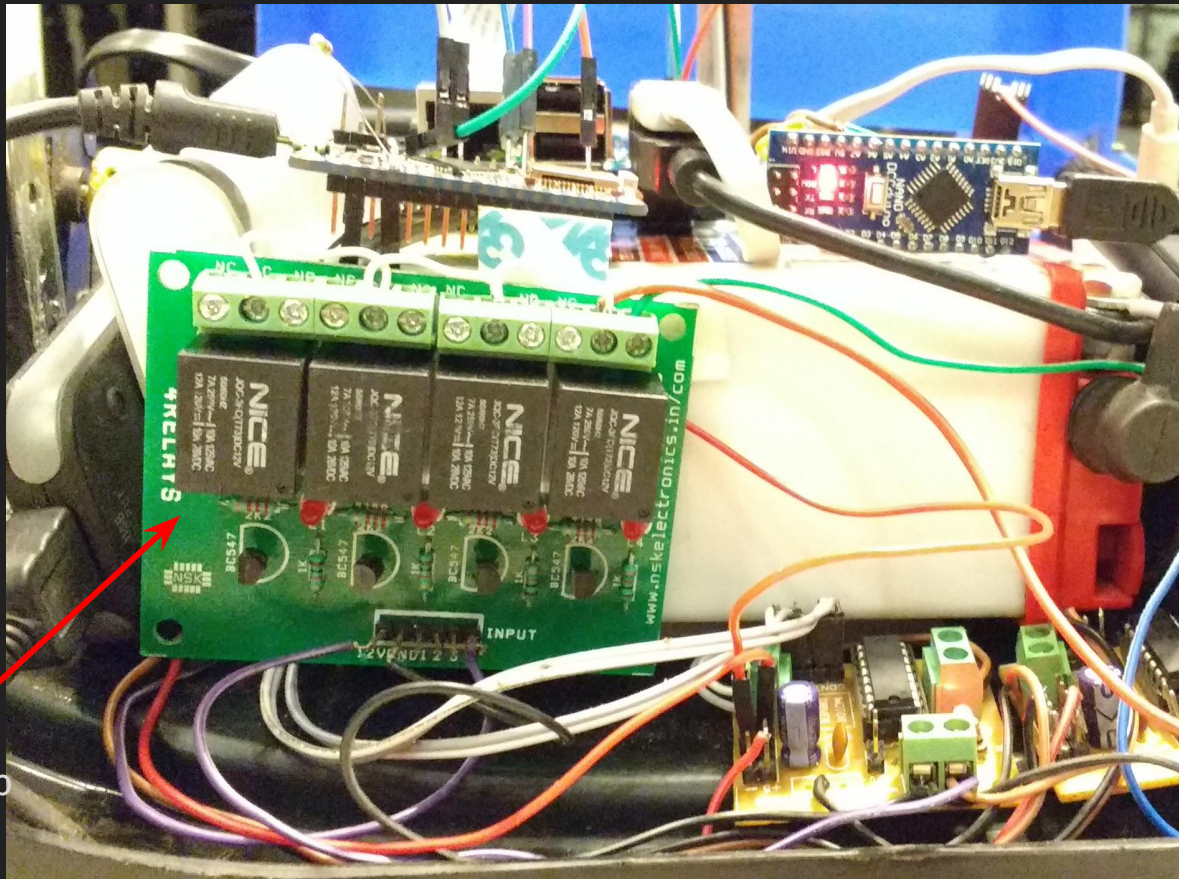
GPS
Temperature sensor



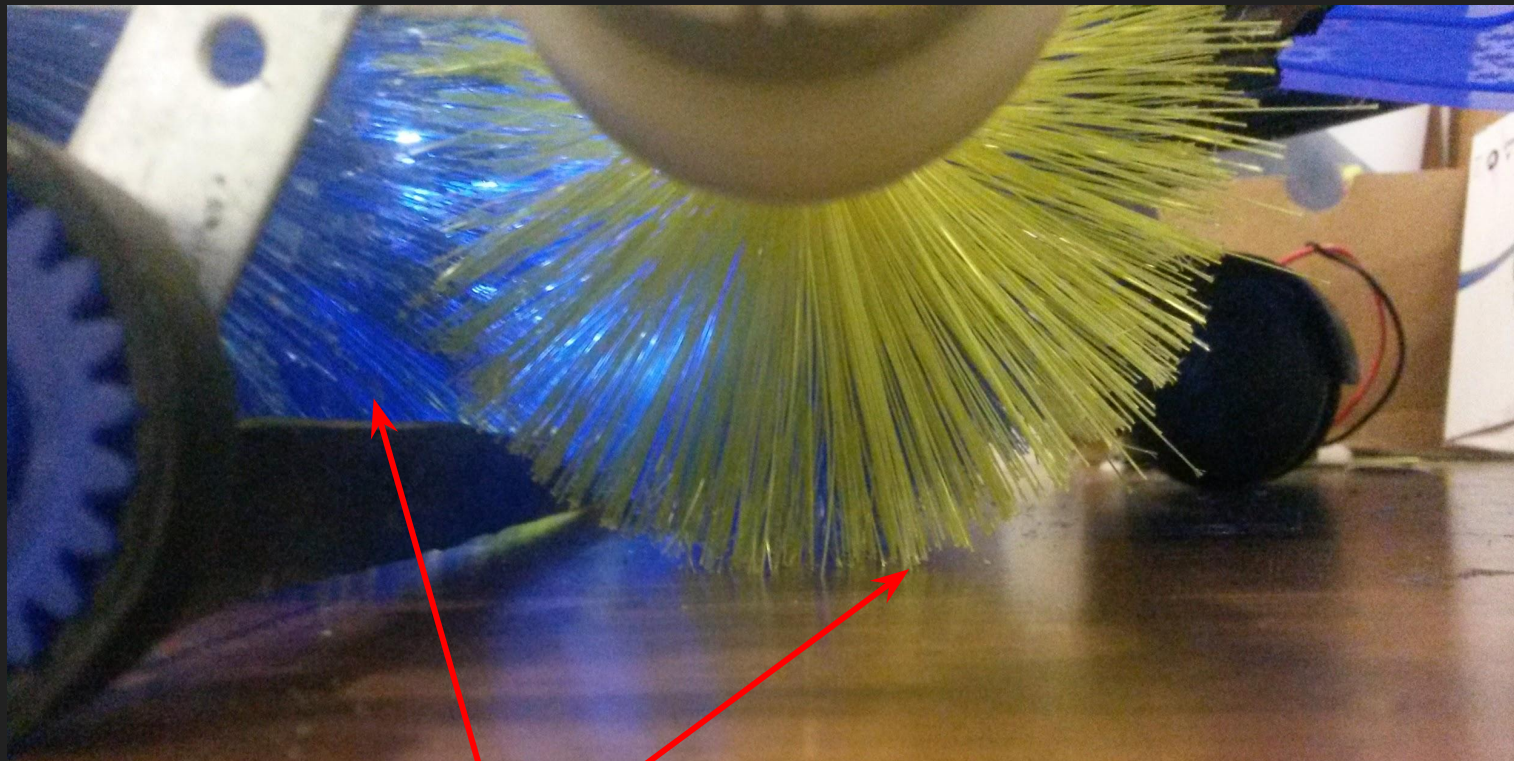
80cm

Camera Module
Ultrasonic

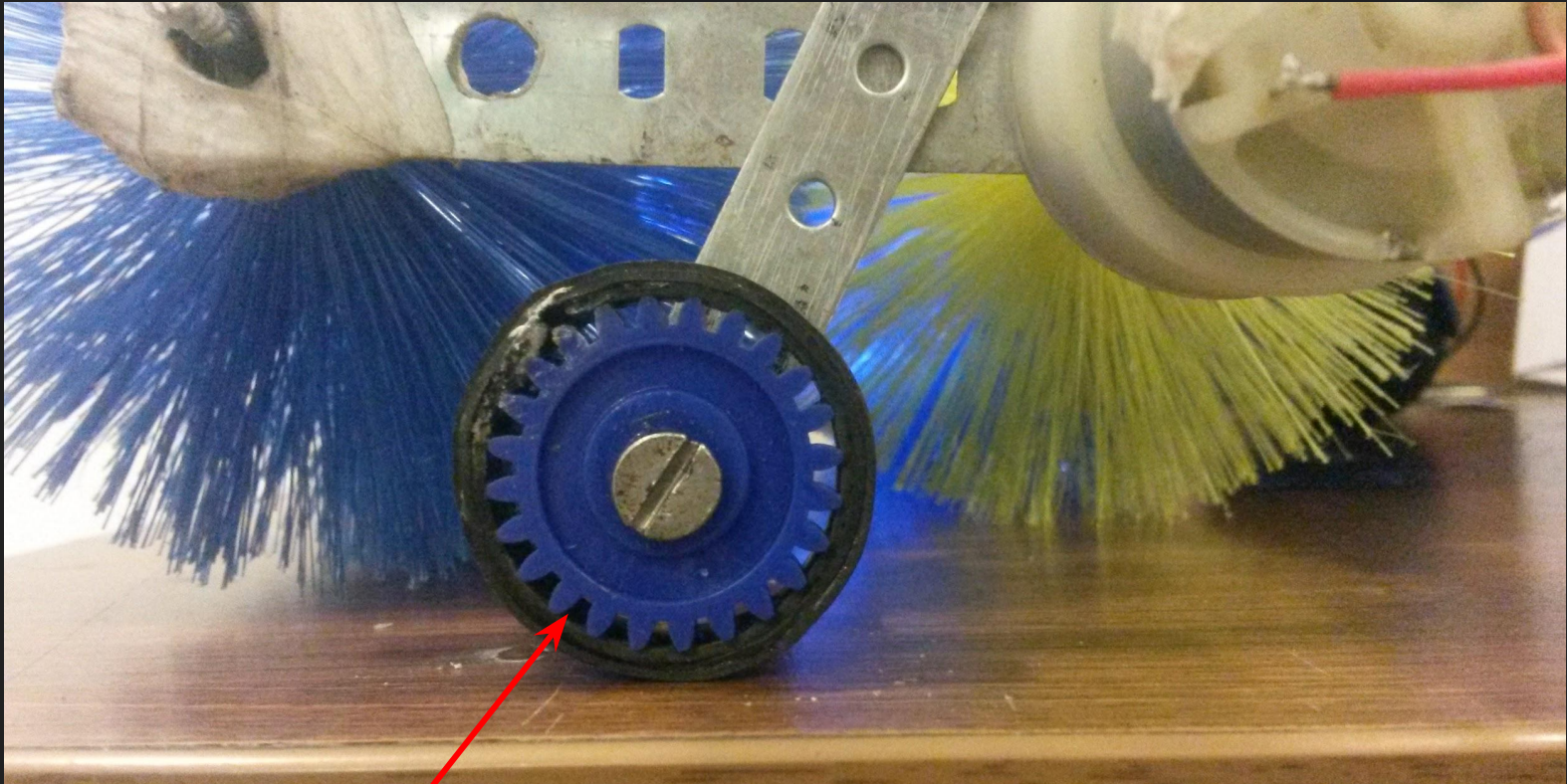




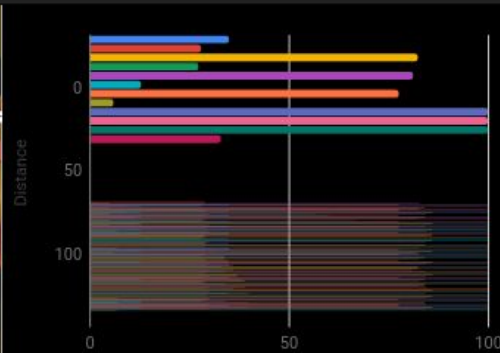
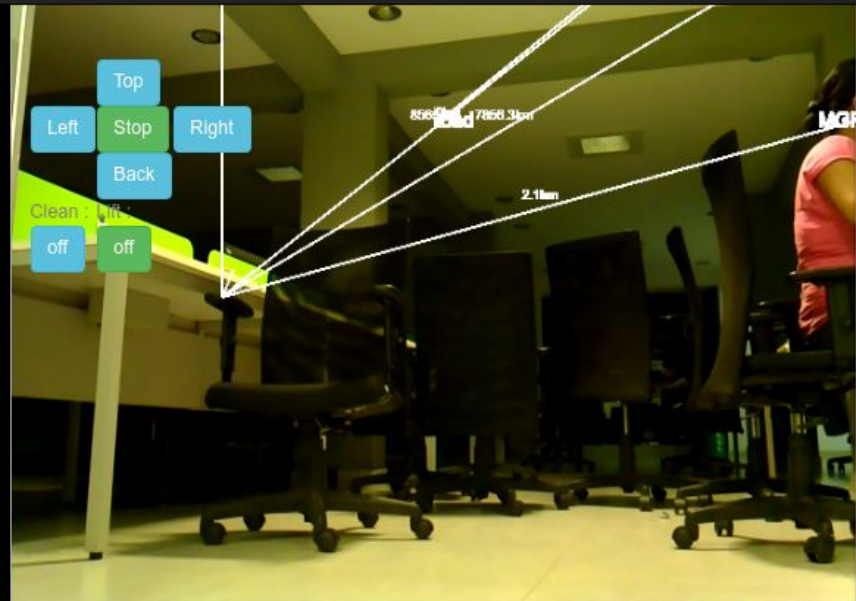
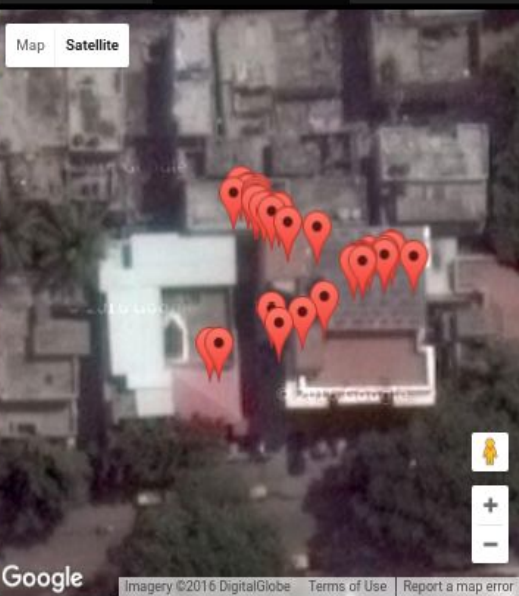
Relay
230 v 7 Amp



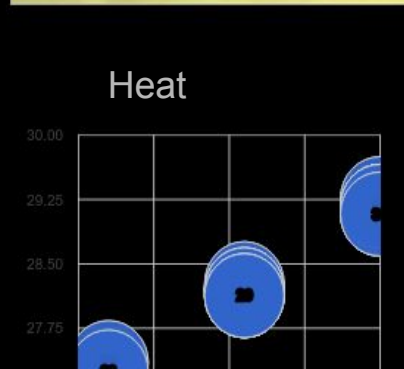
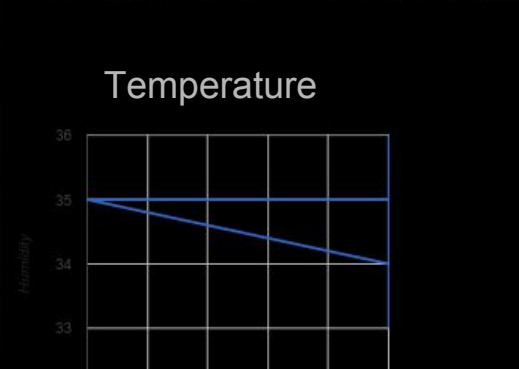
2 Brushes rotating clockwise and anticlockwise



Counter road potholes and uneven surface



Web Control Dashboard



- Pause/Resume
- Mute/Unmute
- Fullscreen
- WebRTC Settings
- Robot's CPU

REST APIs to control Droid

[Demo]

The screenshot displays the Ramudroid API documentation interface. On the left is a sidebar with three categories: CLEAN, DATA, and MOVE. The main content area is titled 'Ramudroid API' with a version dropdown set to '0.3.0'. Below this, the 'clean' section is highlighted, with a sub-section 'clean - getCleanBrushes' and a version dropdown set to '0.0.0'. The endpoint is identified as 'Brushes' with a 'GET' method. The URL path is shown as '/clean/brushes'. A 'Send a Sample Request' section contains a text input field with the URL 'https://localhost:8066/clean/brushes' and a 'Send' button. Below this, another endpoint 'clean - getCleanTray' is shown with a version dropdown set to '0.0.0'. The endpoint is identified as 'Tray' with a 'GET' method. The URL path is shown as '/clean/tray'. A 'Send a Sample Request' section is partially visible at the bottom.

CLEAN

- getCleanBrushes
- getCleanTray

DATA

- getDataGPS
- getDataUltrasonic

MOVE

- getMoveBack
- getMoveFront
- getMoveLeft
- getMoveRight
- getMoveStop

Ramudroid API

0.3.0 ▾

clean

clean - getCleanBrushes

0.0.0 ▾

Brushes

GET

/clean/brushes

Send a Sample Request

url

clean - getCleanTray

0.0.0 ▾

Tray

GET

/clean/tray

Send a Sample Request

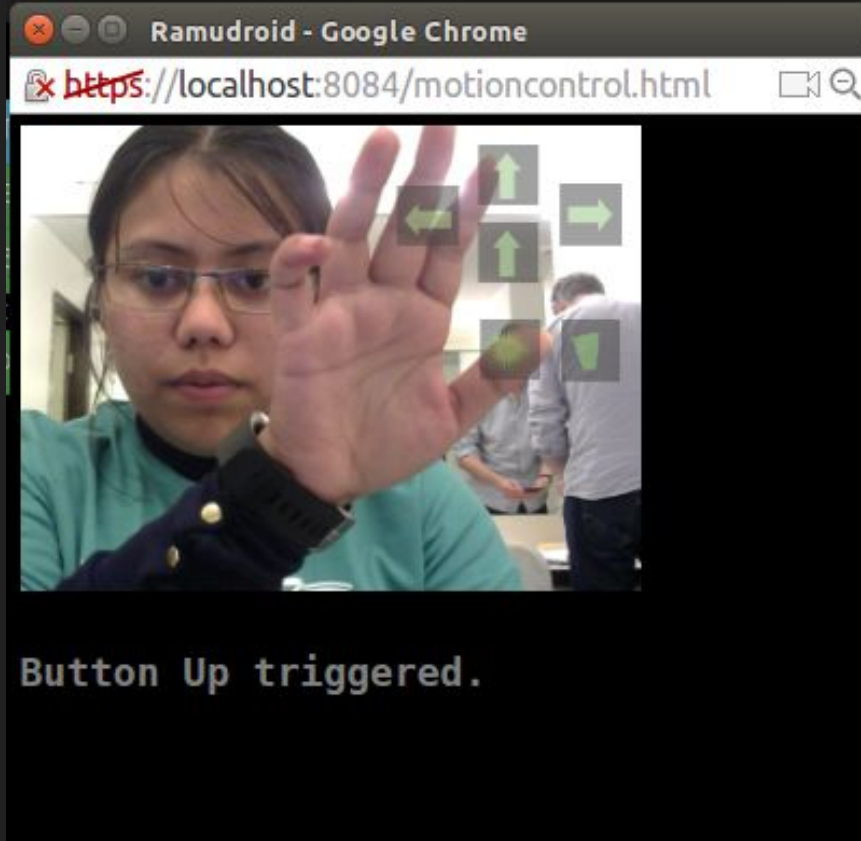
Edge Detection

[Demo]



Motion Tracking

[Demo]



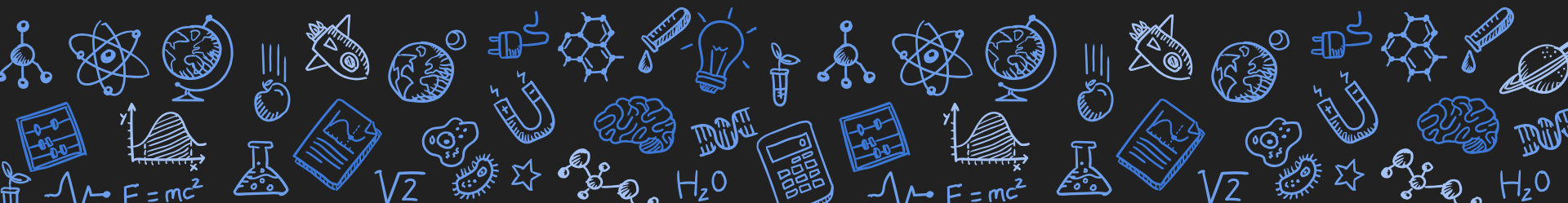
The screenshot shows a web browser window titled "Ramudroid - Google Chrome" with the address bar displaying "https://localhost:8084/motioncontrol.html". The main content area features a video feed of a person's hand held up. Overlaid on the hand are several green arrows pointing in different directions (up, down, left, right) and a central green circle, indicating motion tracking. Below the video feed, the text "Button Up triggered." is displayed in a monospaced font.

WebRTC call from dashboard + screen-sharing

The screenshot displays a Google Chrome browser window with the following elements:

- Address Bar:** `localhost:5559/m2m/webrobocontrol/webrtc.html`
- Navigation:** Buttons for "Call up" and "Motion Control".
- Map:** A Google Map showing a satellite view of a building with several red location pins.
- Control Panel:** A central area with buttons for "Top", "Left", "Right", "Stop", "Back", and "off".
- WebRTC Call:** A video call window titled "WebRTC Call - Google Chrome" showing a woman's face. The URL bar of the call window is `https://localhost:8084/call2.html#7747854532`.
- Performance Graphs:** Three graphs at the bottom showing "Frequency" over time.

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

Sep 2015



Define the technical architecture and build the bot

Oct 2015



Add communication modules, streaming and cloud server

Nov 2015



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

Jan 2016



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

Now



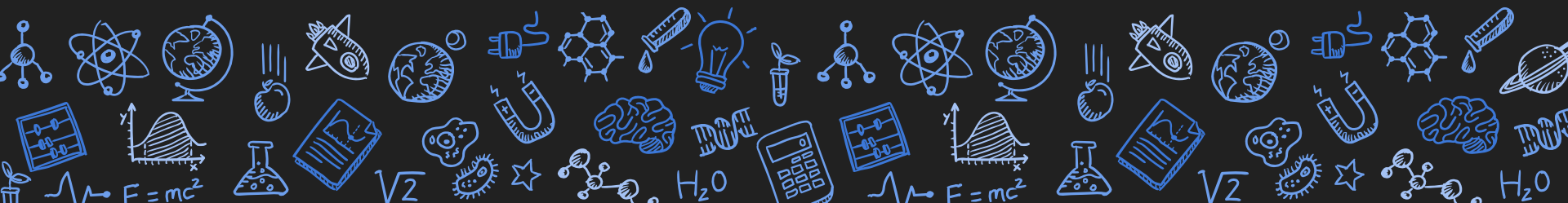
Advantages

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



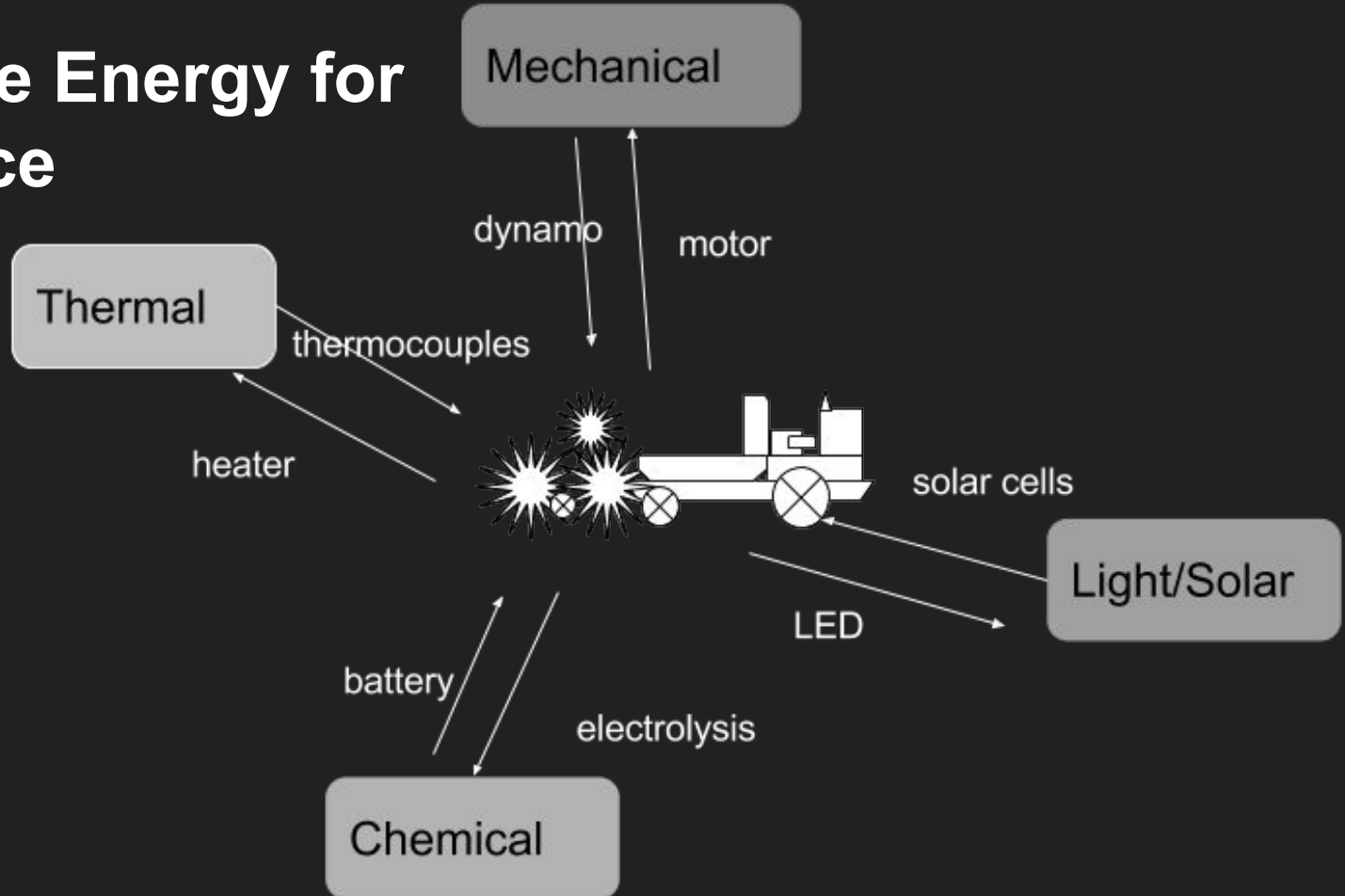
4th International
Vintage Car Rally
& Auto Show

Mr. Madan Mohan
MG TD
1991

GJD 1679

@Altanai

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

