My profile & understanding on IoT

- I have done my BE in computer science and worked for Fidelity & Oracle for 4 years
- I have a deep interest in electronics so I started my own Company, Innovations Tracking, in the year 2015. I designed & manufactured GPS/GPRS tracking system that includes, Schematic, BOM, Design, IC selection, Firmware coding
- To showcase my knowledge on IoT, I designed the sample block diagram of pet tracker along with notes on battery operation with new emerging technologies.

[**Next 2 slides**]

Design of Pet Tracker

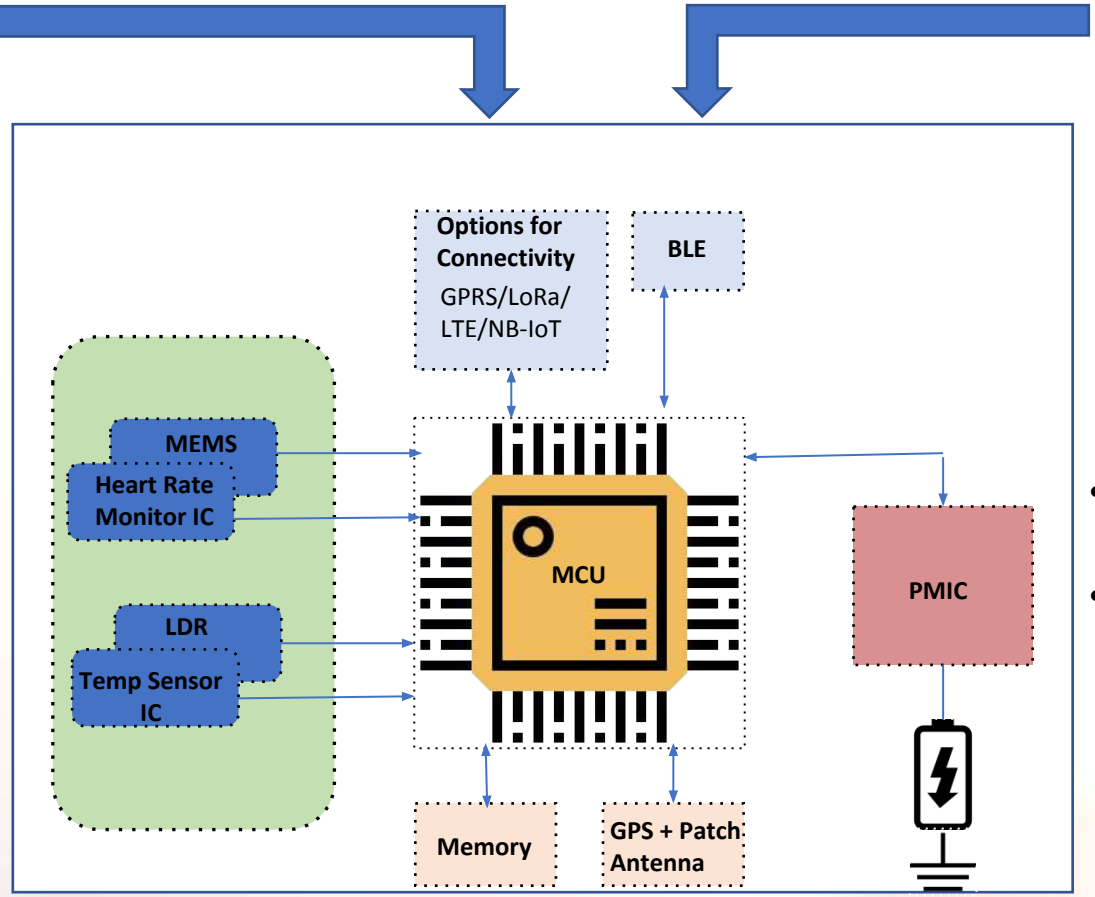
Option for connectivity

- GSM/GPRS (Quad/ Dual Band) module
- LoRa (RE866A1-EU) [Integrated LoRa + BLE + NFC]
- NE866 (NB-IoT)

(Note)* RE866A1-EU pin to pin compatible with xE866 (NB-IoT)

LoRa or NB-IoT can be used without any change in Hardware design.

Companies have their own pin to pin compatible module eg Telit, Quectel.



BLE – Using BLE ,pet health data can be directly transmitted to mobile.[same as smart watch]

Secondary use of BLE- LED ,Buzzer can be added.

- FMP — the "find me" profile
- PXP — the proximity profile

Design of Pet Tracker..

Advantage of using LPWA – Extend battery life, nominal monthly cost compared to 2G

- **PSM** - Power Saving Mode

- **eDRX** - Extended Discontinuous Reception and deep penetration indoor & underground

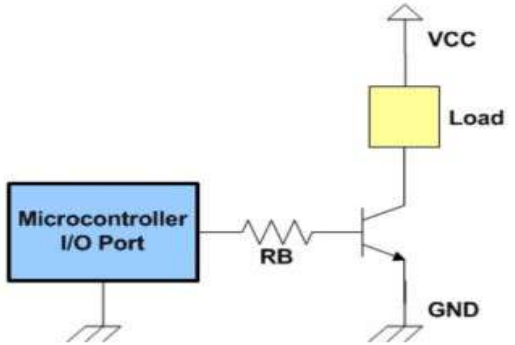
Additional security feature-

Using heart monitor/temp sensor when tracker removed from pet then it give instant alert to user.

Extend battery life-

- Right selection of '*option of connectivity*'
- Power On load eg GPS & GPRS on demands otherwise it's switched off
- Interrupt raise for other module ie MEMS, Heart Monitor, LDR, Temp IC
- Write efficient code so that system takes less current in sleep mode
- Use MEMS smartly for distance/direction computation so that we can minimize use of GPS & GPRS.

  [Using Accelerometer and gyroscope we can do computation of distance moved, if pet not moved much then no need to switched on GPS and GSM, this algorithm can save battery a lot.]



My observation for India/Asian Market

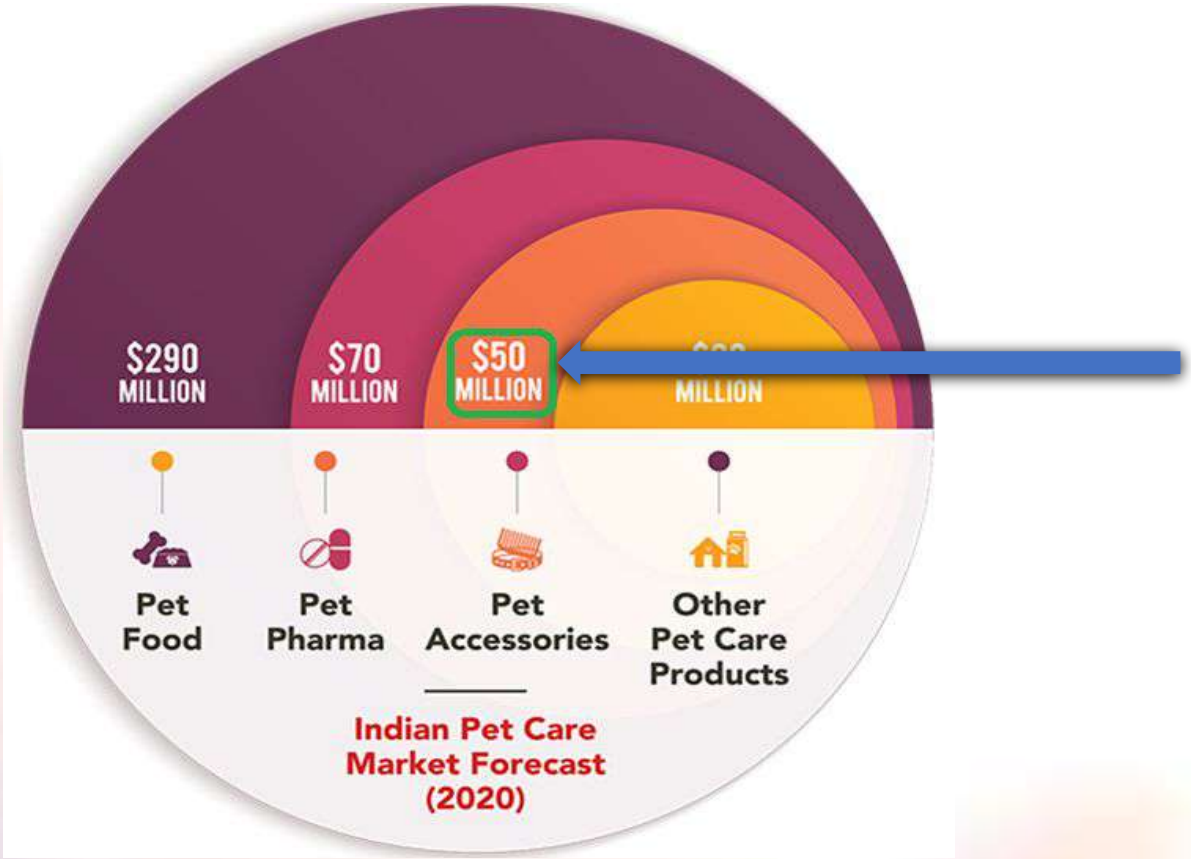
Next few slides talk about

- The growing Indian market for pet tracker
- Details of manufacturing work we can do in India
- Manufacturing cost analysis

Overview of Indian Pet Market and product

India pet care market is expected to grow with a CAGR of more than 20% in the forecasted period of FY 2017-18 to FY 2020-21.

20% CAGR



Market to be tapped

Entry and expansion of many players into the pet care industry forecast a positive view for the market in India.

In house manufacturing support

Gerber Files

Assembly drawings

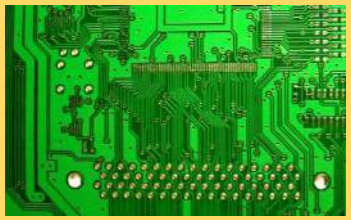
Schematic

BOM

PCB

Vendor Selection

PCB Fabrication



- High Quality PCB
- 50 ohm impedance matching for antenna trace

Soldering

Firmware Burning

Functional Testing

Integration Testing

Packaging

- Plastic enclosure for device
- Company label packaging carton

Warehousing & Distribution

amazon

flipkart

ebay.in

snapdeal

Sim Procurement

Cost Estimation of manufacturing in India for Asian market

Fixed Cost

Stencil Cost(One time)
€ 120

Fixed cost per unit* € 1.2

*Considering initial 100 units of production ,may decrease with economies of scale

Variable Cost

PCB Fabrication
€ 2 - € 3 per unit

Soldering
€ 1.5 - € 2 per unit

Sim/Data
€ 0.8 per unit /month

IC & Enclosure
To be Decided

Variable cost per unit € 4.2 to € 6

Fixed Cost (Labor and overheads costs)

Salaries
(To be Decided)

Rent
(To be Decided)

Miscellaneous
(To be Decided)

Fixed Cost :To be decided

Variable Cost Packaging cost/Distribution Cost

Packaging material cost
To be provided by company

Distributor Margin
To be decided

Variable Cost: To be decided