X Fence

Elephant Early Warning Laser Fence System

THE ELEPHANT DECODER
Early Warning System

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Current related Product & Researches

- Mostly They are using
  - 1. Seismic Sensors
    - Not accurate enough
  - 2. Cameras(Image Processing)
    - Unit cost is expensive
    - Consume more power
    - Data weight is higher

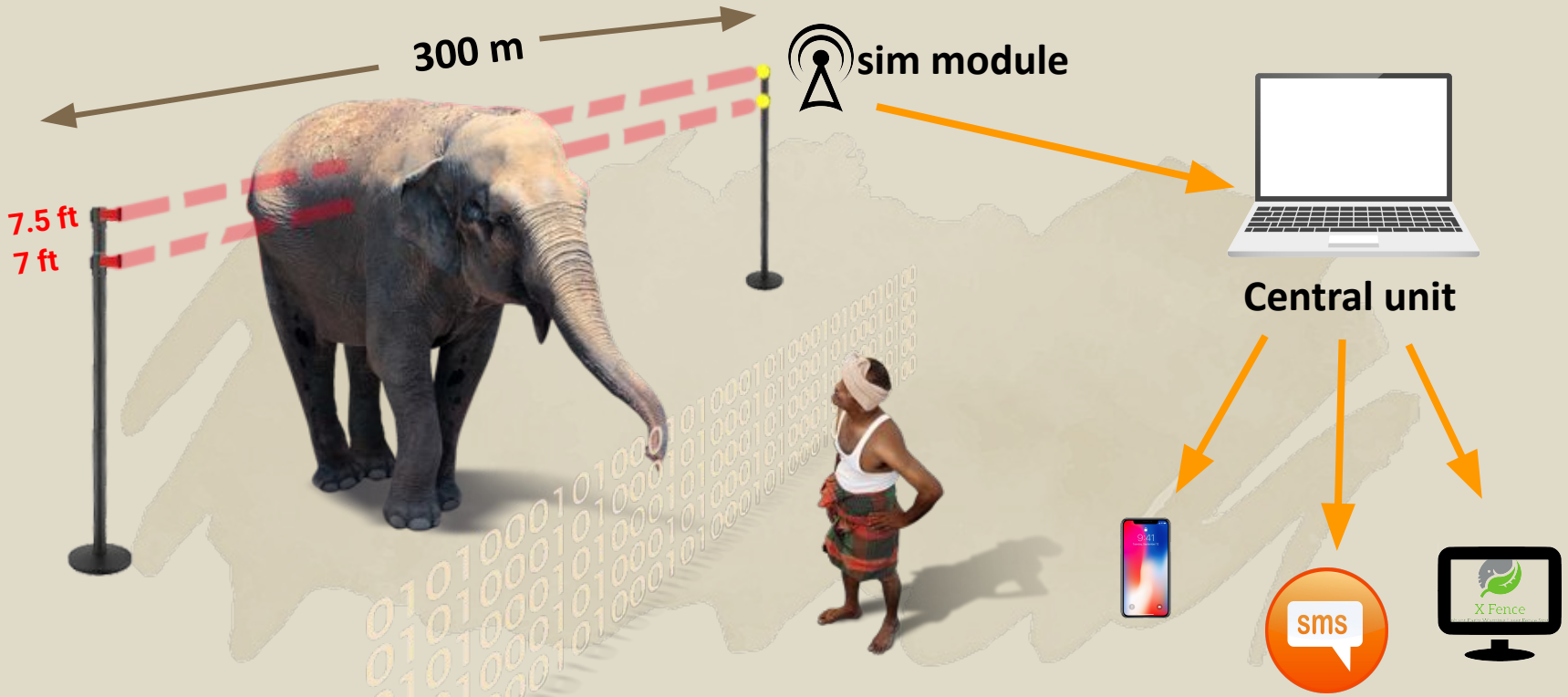
- And most importantly need more number of units to cover an area

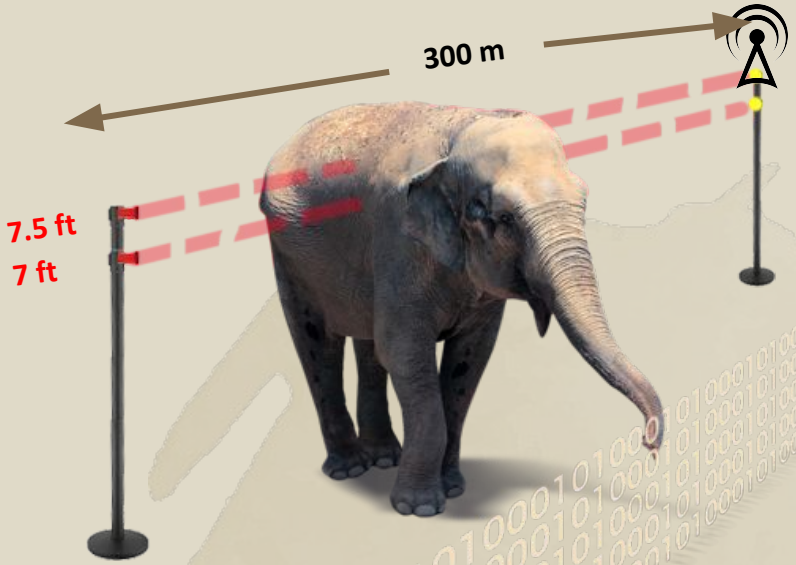
Our goals

- **Build a system,**
  - **Make it cheaper to produce a Unit cost**
  - **consuming low power**
  - **Give good enough accuracy**
  - **Easy to install and maintain**

  - **And most importantly decrease the number of units to cover an area**

X Fence
system solution


300 m
sim module
7.5 ft
7 ft
Central unit
sms
X Fence



Microcontroller Unit

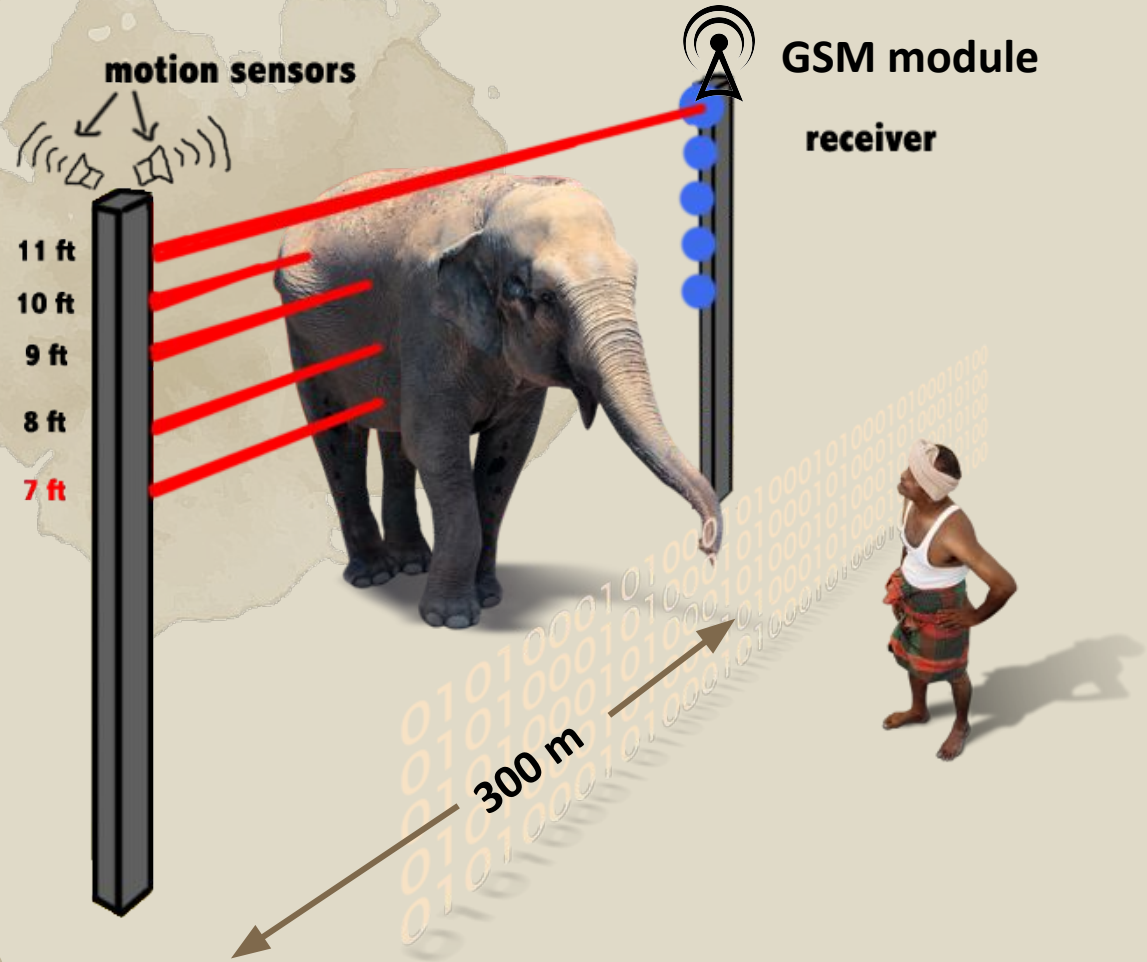
- Design around ESP32 SIM800L microcontroller
  - 3mW lasers
  - Photoresistors as laser beam receiver
  - Rain sensor
  - Sensor detect light intensity
- Powered with solar panels with the battery pack

Central unit

- **To detect the elephant:**
  - **Have 2 lasers in different height levels**
    - **By processing patterns of interrupted light beams.**
    - **Fuzzy logic will be used to detect elephants**
- **Can cover 300m with a unit.**
- **GPRS will be used to send signals to server**
  - **Time and unit number(Position)**
- **Central server is used to warn everyone**

Centralized Server

- For the data transmission protocol we planned to use MQTT.
- Simple protocol, Unlike HTTP, this didn't consume much data.
- which is perfect for this scenario.



Central unit

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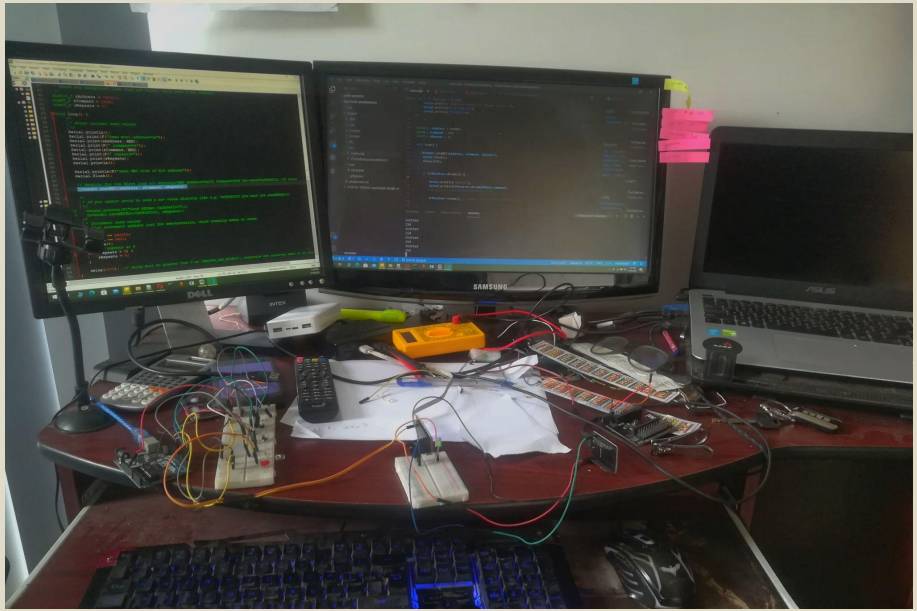
Challenges

- When raining - Can detect rain by rain sensor and change the elephant detecting mode.
- Day and night - Can detect day and night by photorester and change the elephant detecting mode
- Vibrations of and movement of the units can be give error readings
    - Make Mounting structure of the unit stronger
    - Can ignore vibrations with programming
    - Planned mount focus lens in the laser beam detecting photo resisters
        - So small movements can be avoided



IMPLEMENTATION

- Idea stage

IMPLEMENTATION

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Chip and Server

TTGO T-Call ESP32 SIM800L GSM/GPRS module

- the SIM800L works on 2G networks
- Also we can increase the network availability using good antenna for the module.
- We can easily use the sim module with nano sim card with a data plan.

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COST

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Components	LKR per Unit	No of Units	Total (LKR)
Microcontroller	1200	1	1200
Laser 3 mw	200	2	400
Solar panel with battery pack	2500	1	2500
Rain sensor	200	1	200
Laser receiver	150	2	300
Photoresistor	10	2	20
		Total	**4620**

Thanks

Do you have any questions?

X Fence 14

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