InLoVE

Indoor Localization using Voice Enabled Systems

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MOTIVATION

- Location finding by using wireless technology is one of the emerging and important technologies.
- GPS can be utilized for outdoor areas but it cannot be used for tracking the user inside the building.
- The main motivation is to implement the system which can locate and track the user inside the building

PROBLEMS AND SOLUTION

Current problems

- Guide people inside a shopping mall
- Museum tours : Your phone can be your virtual guide that'll give you contextual information based on your location.
- Warehouses : Improved automation capabilities.
- Airport, Hospitals, Hotels : Benefits are similar to above applications.
- Guidance to visually impaired : With audible & sensory feedback

Our Solutions

✓ Using Magnetic Fields:

Advantage : Finding location using Smart Phone (Inbuilt)

Disadvantage : Magnetic Field Varies because of Moving Object

✓ Using Signal Strength:

Advantages :

*Accurate location than Magnetic Fields

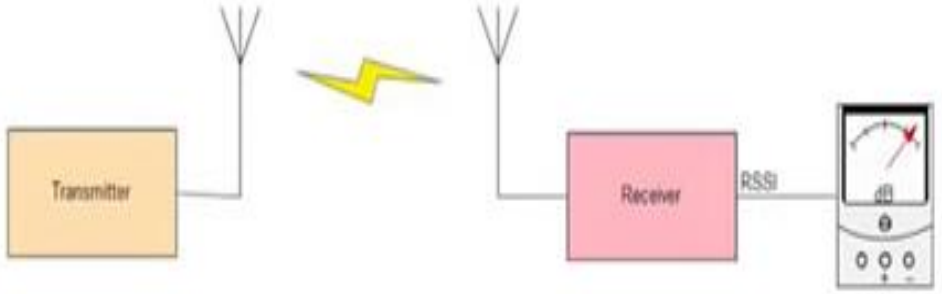
*Low Cost

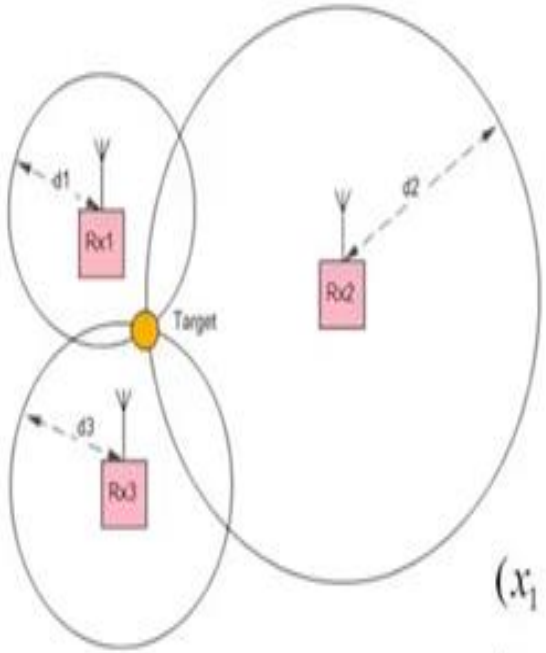
PROPOSAL

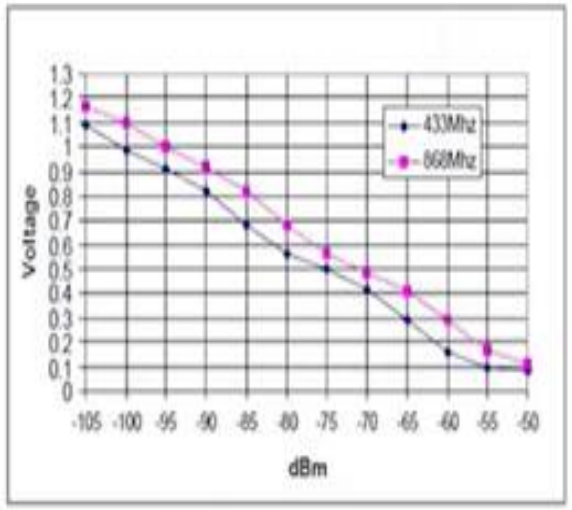
Indoor Localization using Voice Enabled systems

Achieves more accurate location for indoors using Internet of Things and using smart devices.

RSSI TRIANGULATION







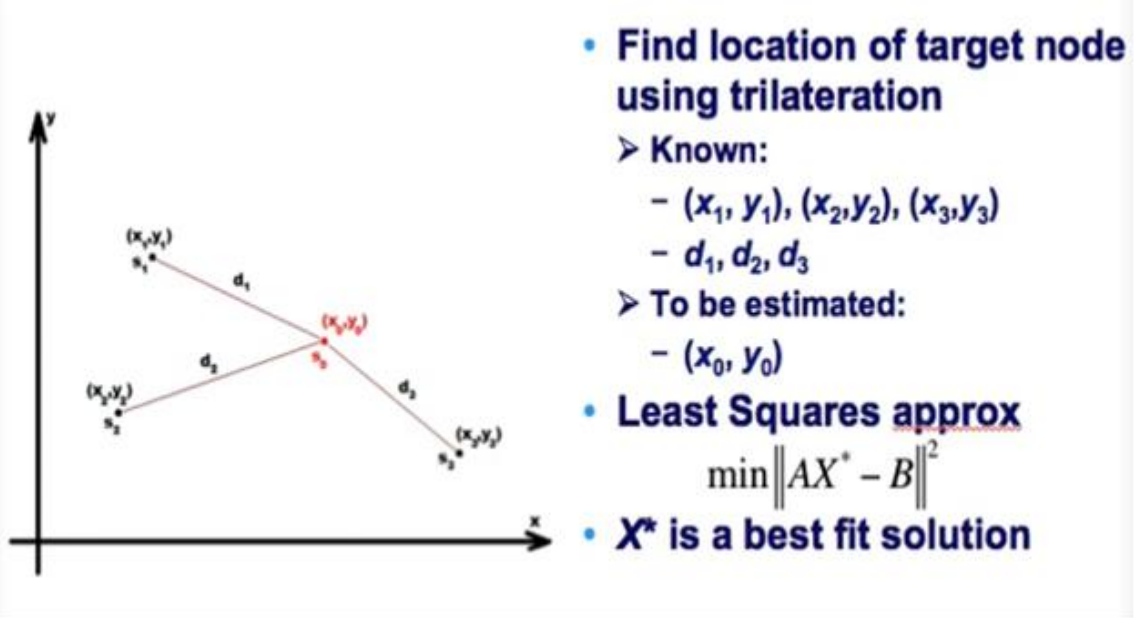
$$(x_1 - x)^2 + (y_1 + y)^2 = d_1^2$$

$$(x_2 - x)^2 + (y_2 + y)^2 = d_2^2$$

$$(x_3 - x)^2 + (y_3 + y)^2 = d_3^2$$

- Received signal strength indication (RSSI) is a measurement of the power level received by sensor.
- Units: dBm
- Triangulation is the process of determining the location of a point from known points.

RSSI TRIANGULATION



- **Find location of target node using trilateration**
  - **Known:**
    - $(x_1, y_1), (x_2,y_2), (x_3,y_3)$
    - d_1, d_2, d_3
  - **To be estimated:**
    - (x_0, y_0)
- **Least Squares approx**

$$\min \left\| AX^* - B \right\|^2$$

- **X^* is a best fit solution**

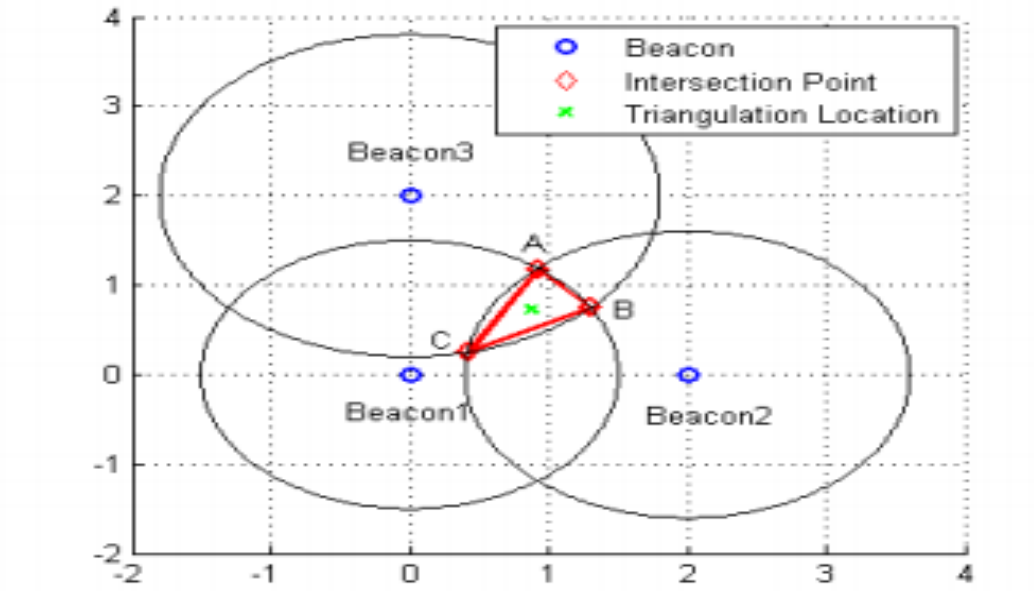


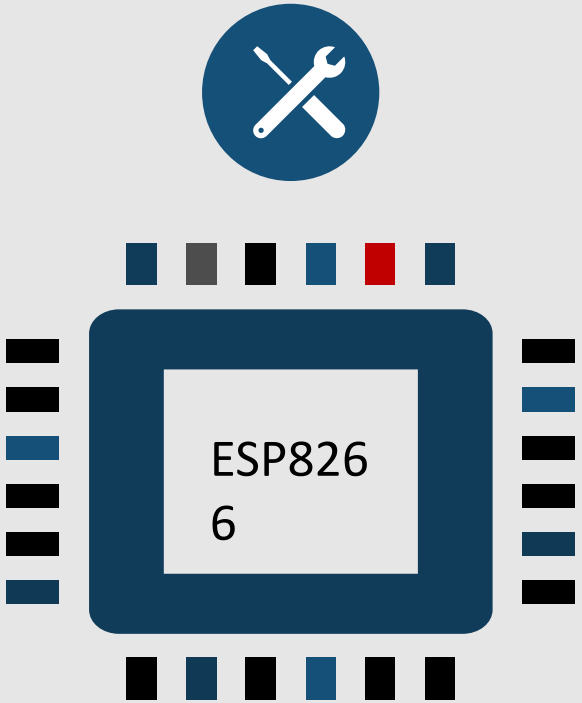
FIGURE III. TRIANGULATION USING 3 BEACONS

- Received signal strength indication (RSSI) is a measurement of the power level received by sensor.
- Units: dBm
- Triangulation is the process of determining the location of a point from known points.

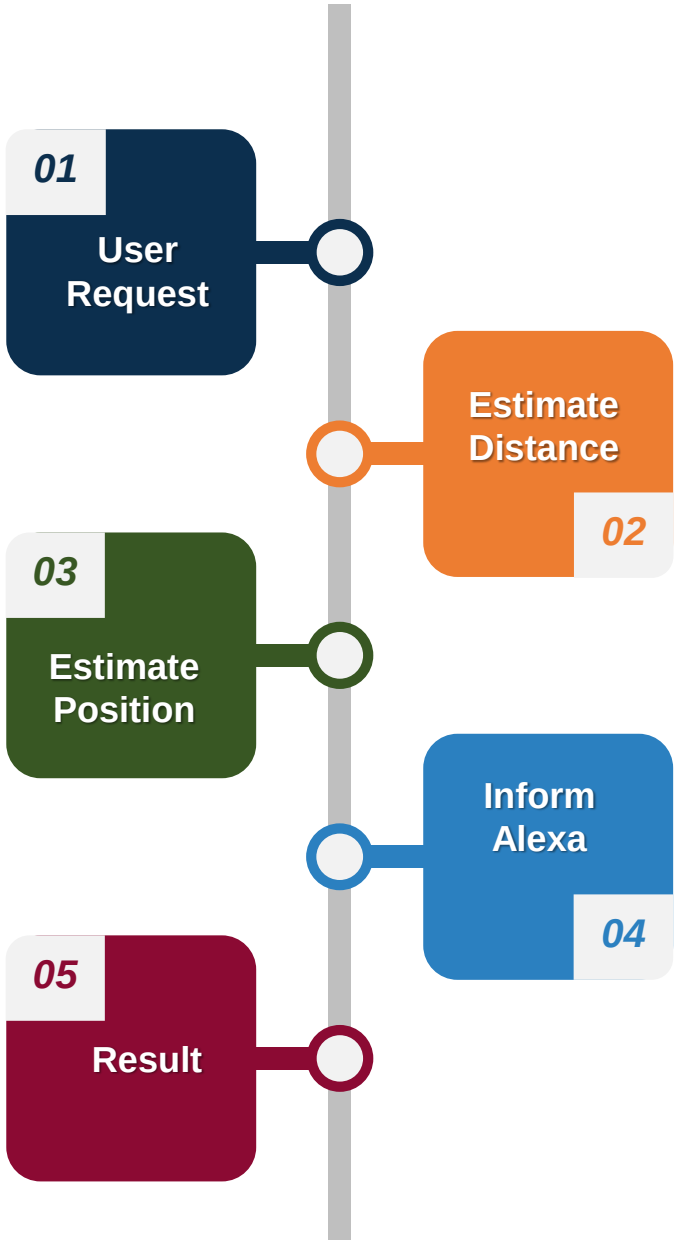
APPLICATION USES

- ✓ Indoor navigation
- ✓ Controlling robots or forklifts in a warehouse
- ✓ Rescue operation

TECHNOLOGIES



Phases



User gives voice request to Alexa

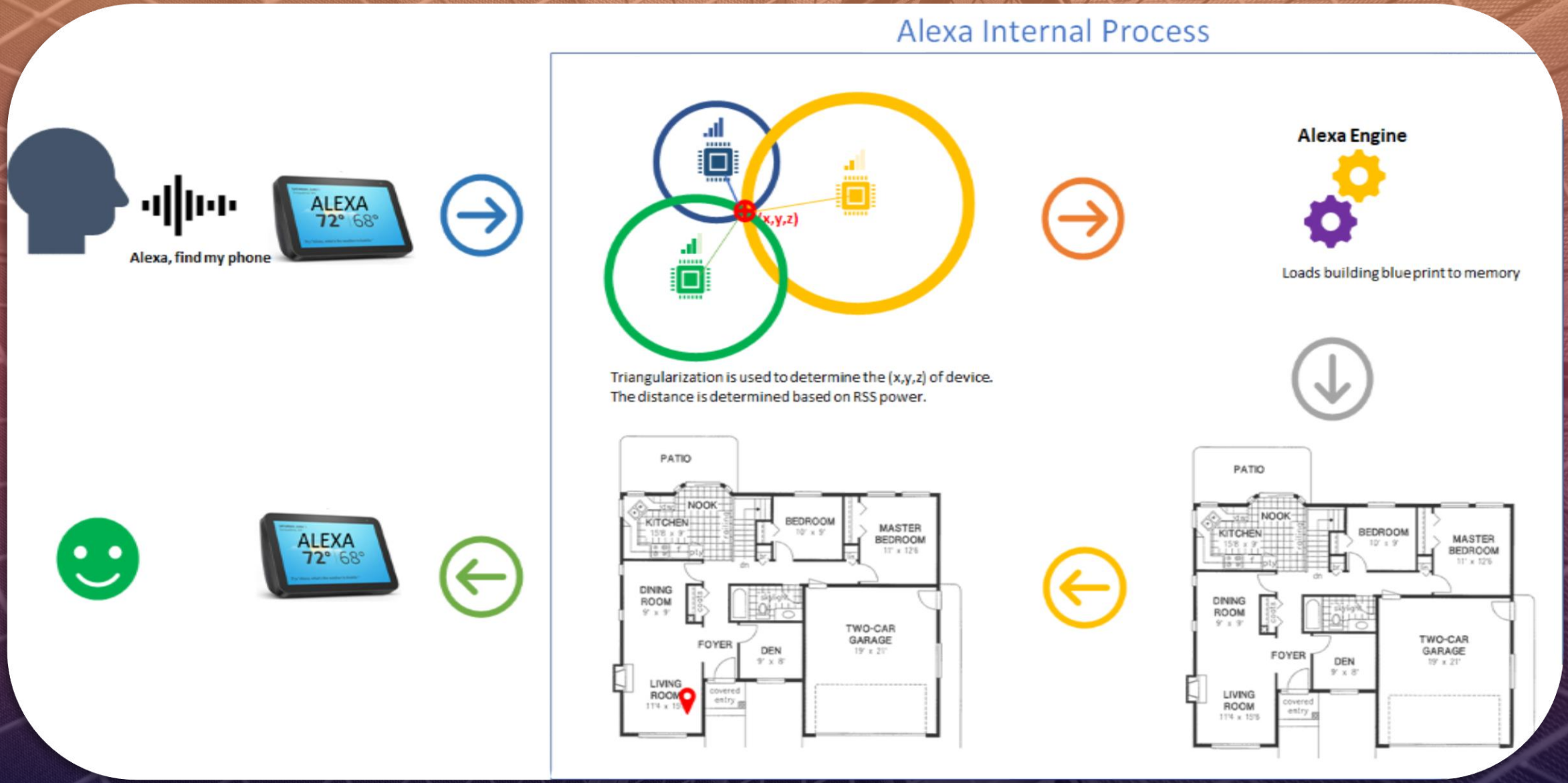
Sending Beacons and Measuring Signal Strength.

Locating accurate location using triangulation

Sending Location Information to Alexa

Display bird view on user device

Block Diagram



ANTICIPATED PROBLEMS

- Non-stationary objects such as doors, furniture, and people can pose an even greater problem, as they can affect the signal strength in dynamic, unpredictable ways.
- Low Accuracy


THANK YOU
With Love from
InLoVE team