



Pitch Presentation

Ubiquitous Lab Systems

CUBO

The Companion Robot for Modern Homes

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The Problem !

- Smart home devices are static, emotionless, and often require user input.
- Elderly people and children struggle with technical interfaces.
- Current assistants lack **mobility, emotional interaction, and human-like presence.**
- There might be multiple IOT devices in several rooms, a single IOT controller or repeater may not be usable in case of large installations



The Solution – Meet CUBO

- CUBO is a **OPEN SOURCE** , mobile, **emotionally-aware**, autonomous home **assistant**.
- Think *Alexa with a screen , wheels and feelings.*
- CUBO integrates seamlessly into the family, needing **no ongoing user management**.
- The best thing: You can PET him! (PAT him)
- The robot automatically takes care of itself (charging & connection) as well as your family members schedules.

CUBO

HAPTIC Motion Detector
for you to PET Him

3 Inch Touch
Screen display

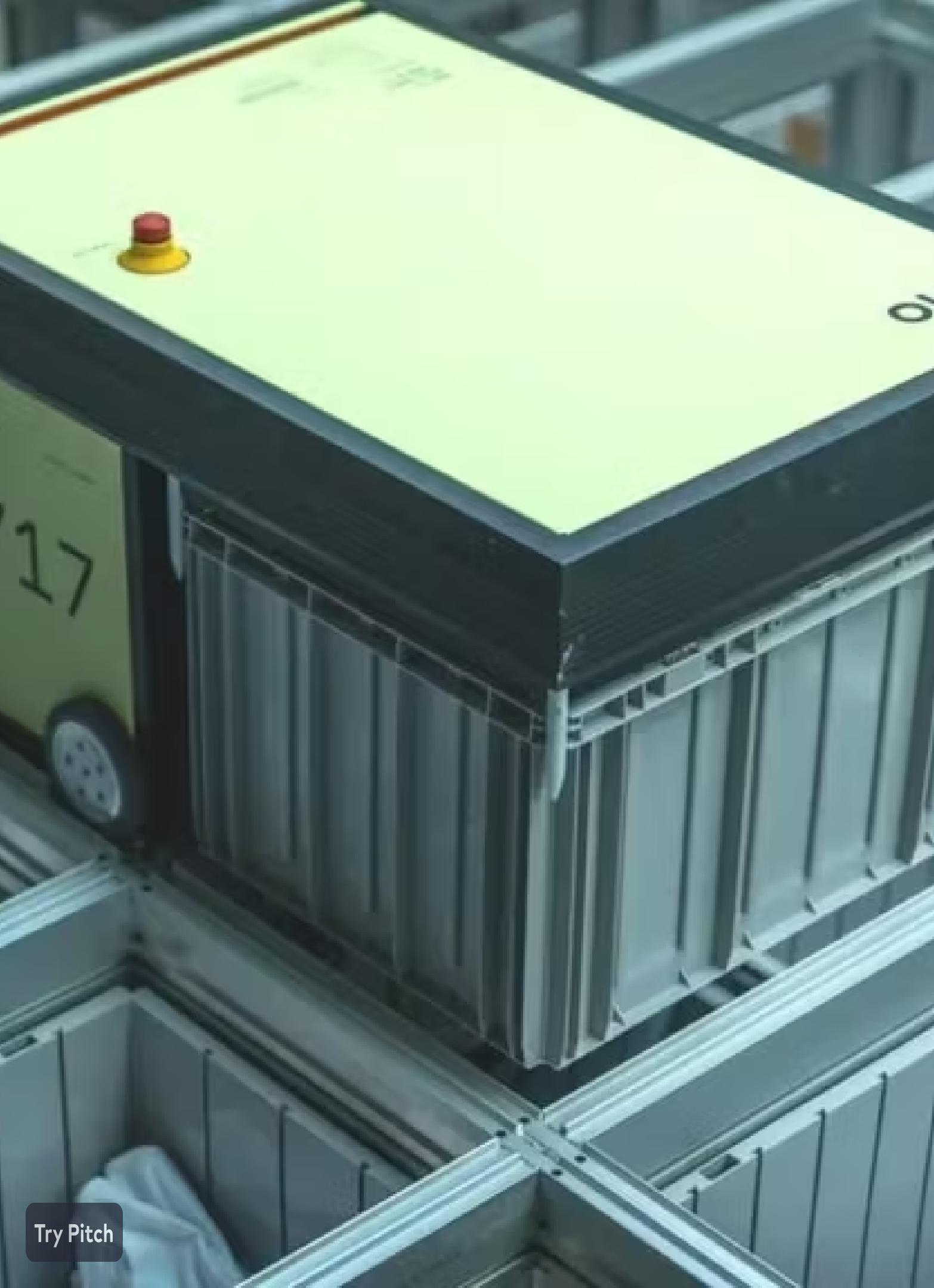
Condenser MIC for cubo to
never miss your talk

5MP Camera so that
cubo can see you

Raspberry PI driven
Opensource hardware

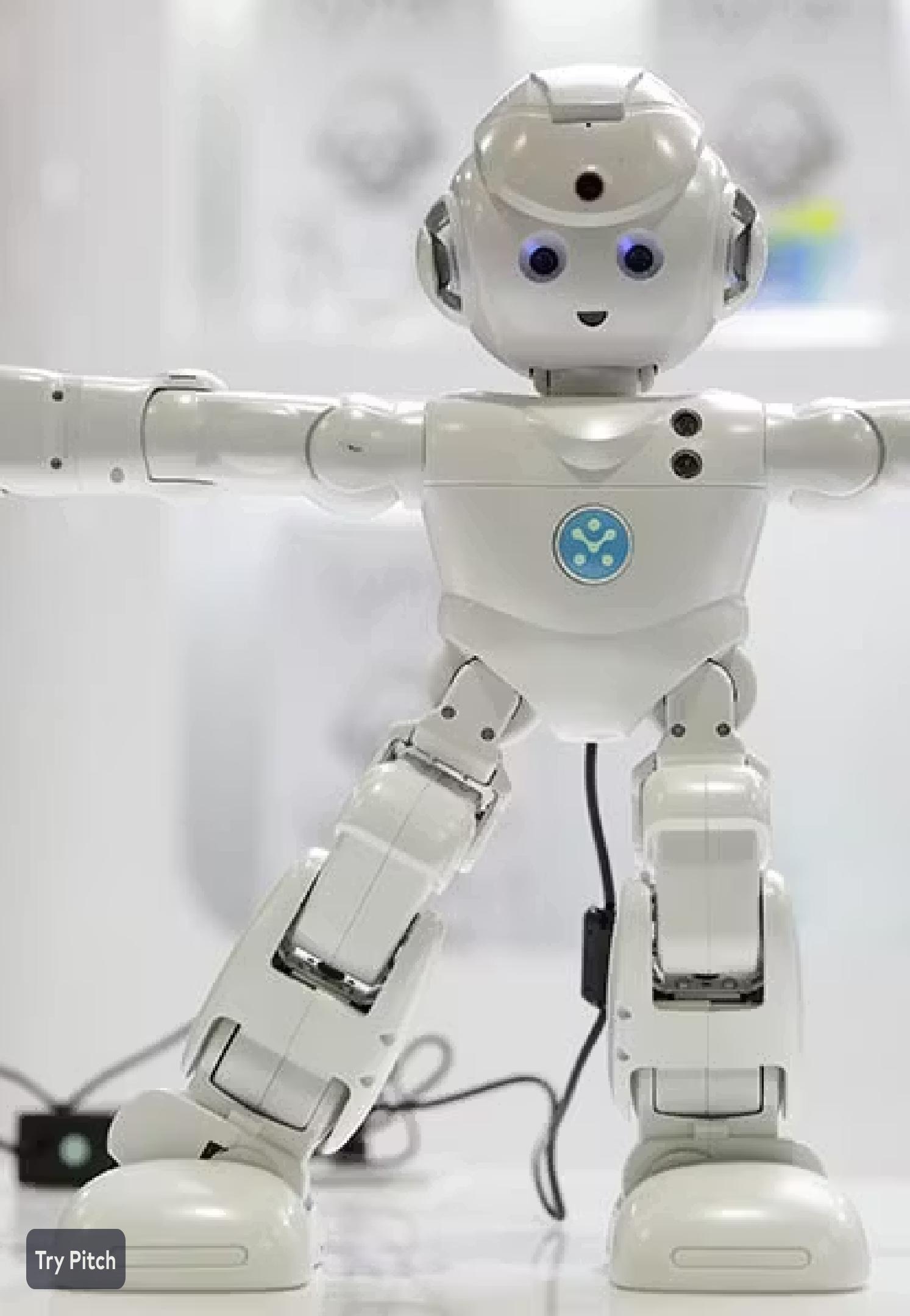
IR Edge detection

Hardware



Applications

- Home automation and control
- Elderly care companion
- Educational assistant for children
- Ambient music, reminders, calendar management
- Mobile surveillance and security interface



Why Now?

- AI is mature enough to deliver real-time emotional interaction
- COVID and post-pandemic lifestyle changes increase need for home automation
- Affordable hardware (Raspberry Pi, camera modules) makes it viable

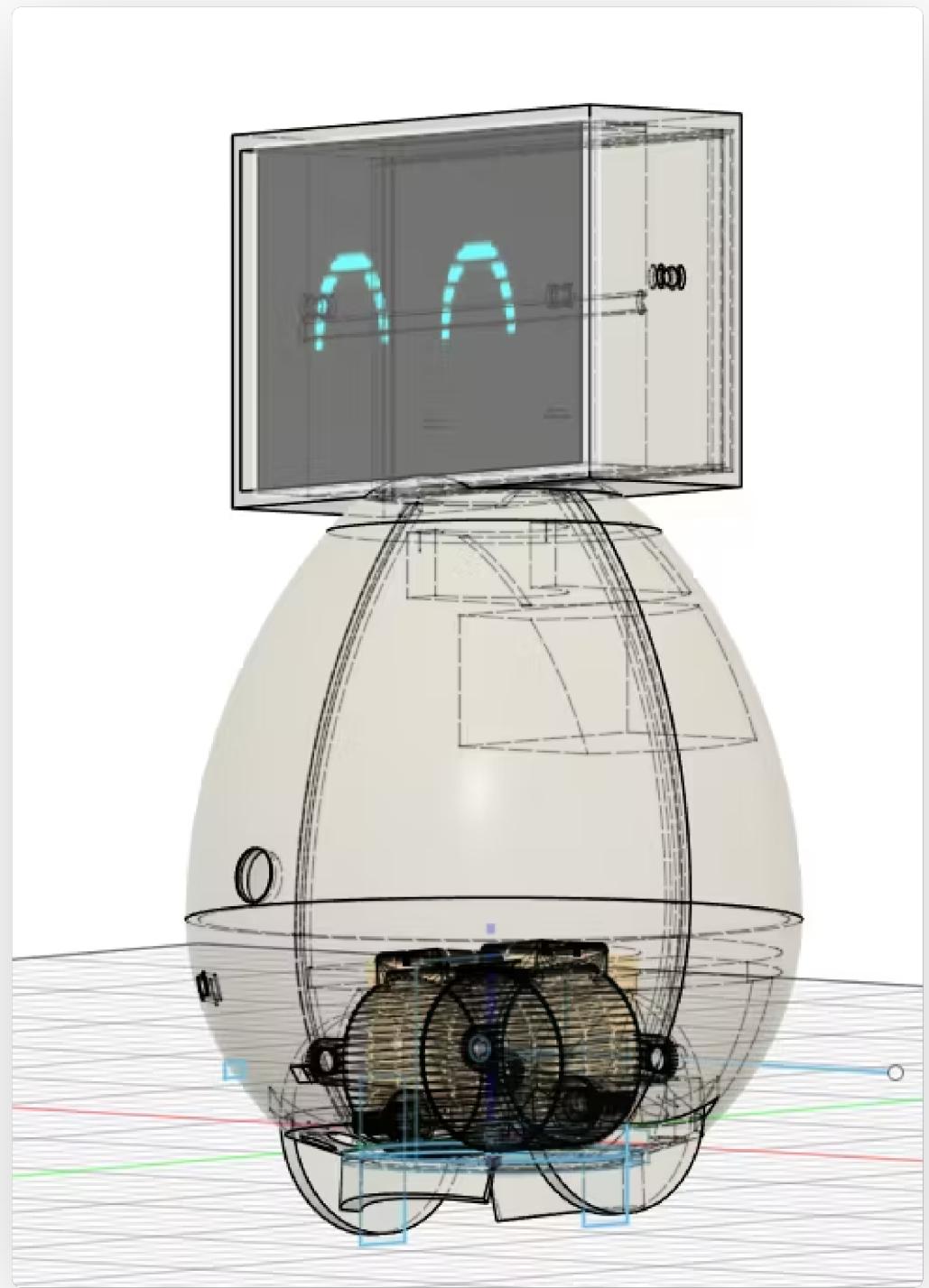
Market Potential

- Growing demand for emotionally intelligent assistants
- Combines multiple products: Alexa, mobile robot, home monitor
- Open-source nature opens up community contributions and DIY market

- **Haptic Motion Detector** – Pet Cubo to interact emotionally.
- **3" Touchscreen Display** – Displays expressions, menus, feedback.
- **Condenser Microphone** – Always hears your commands clearly with surround sound.
- **5MP Camera** – For facial recognition and interaction.
- **Raspberry Pi Core** – Open-source and hackable platform.
- **Two-Wheel Driving** – Agile, stable navigation.
- **Edge Detection** – Detects Edges to prevent falloff
- **Auto Charging** – Cubo docks and recharges on its own.

Key Features

AI Powered Emotional Intelligence!



CORE TOOLS USED IN BUILD

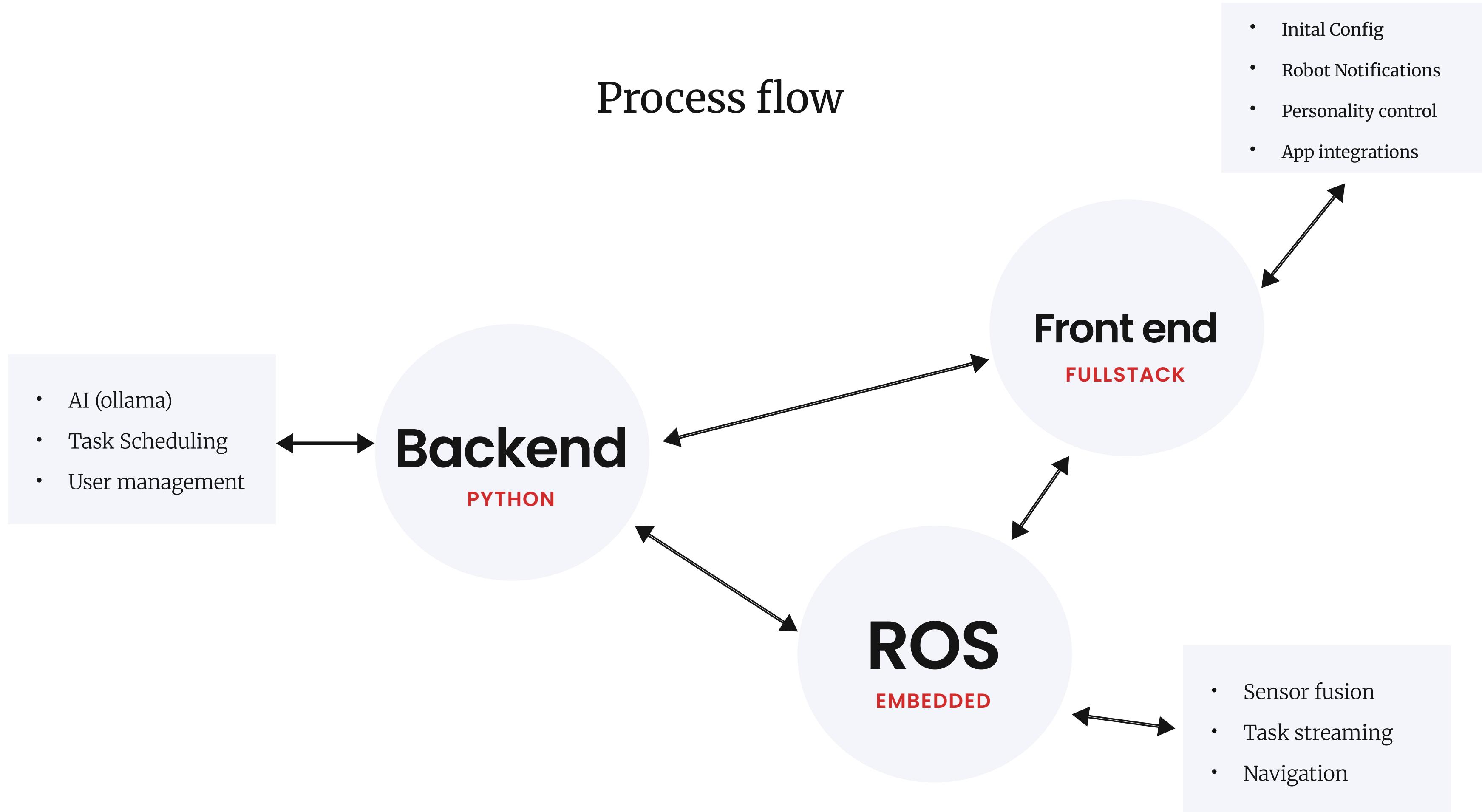
- C++ , Cmake
- ROS - Sensor control
- Python - Backend and AI
- ORBSLAM - Autonomous Navigation
- Fusion 360 - Cad Development
- KiCad - Electronics Dev
- Flutter - Android App (MINIMAL)

CORE HARDWARE USED IN BUILD

- Stepper (ULN28BYJ) for precise movement
- 5MP OVA2650 Camera
- 3inch RMLX1578 LCD Touch screen
- LIDAR Sensor - VL53L0X object distance detection
- 3x condenser Microphone
- LCD Display
- ESP32C106
- Wireless charging Mechanism

Technology Stack

Process flow



Work Division

SURYASARADHI

- UI Implementation
- Authentication and Access
- Kicad Hardware design
- Fusion 360 Modeling
- Printing and Testing

LEENA KASHYAP

- Sensor library Integartion
- LLM Integration
- Third party Application Integration
- Hardware Assembly



Deliverables

- **Working Moveable Hardware – Camera, Mic , Sound, Lidar ,IR edge detector and wheels**
- **Bare bone LLM Integration Ollama**
- **Bare bone Mono camera Orbslam Navigation**
- **Minimalistic Android App and Web UI Integration**

Timeline



- Already Started - ROS Implementation
- Finished and printed 2 Robot demos
- Tested Movement with servo



Stay Tuned!



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