

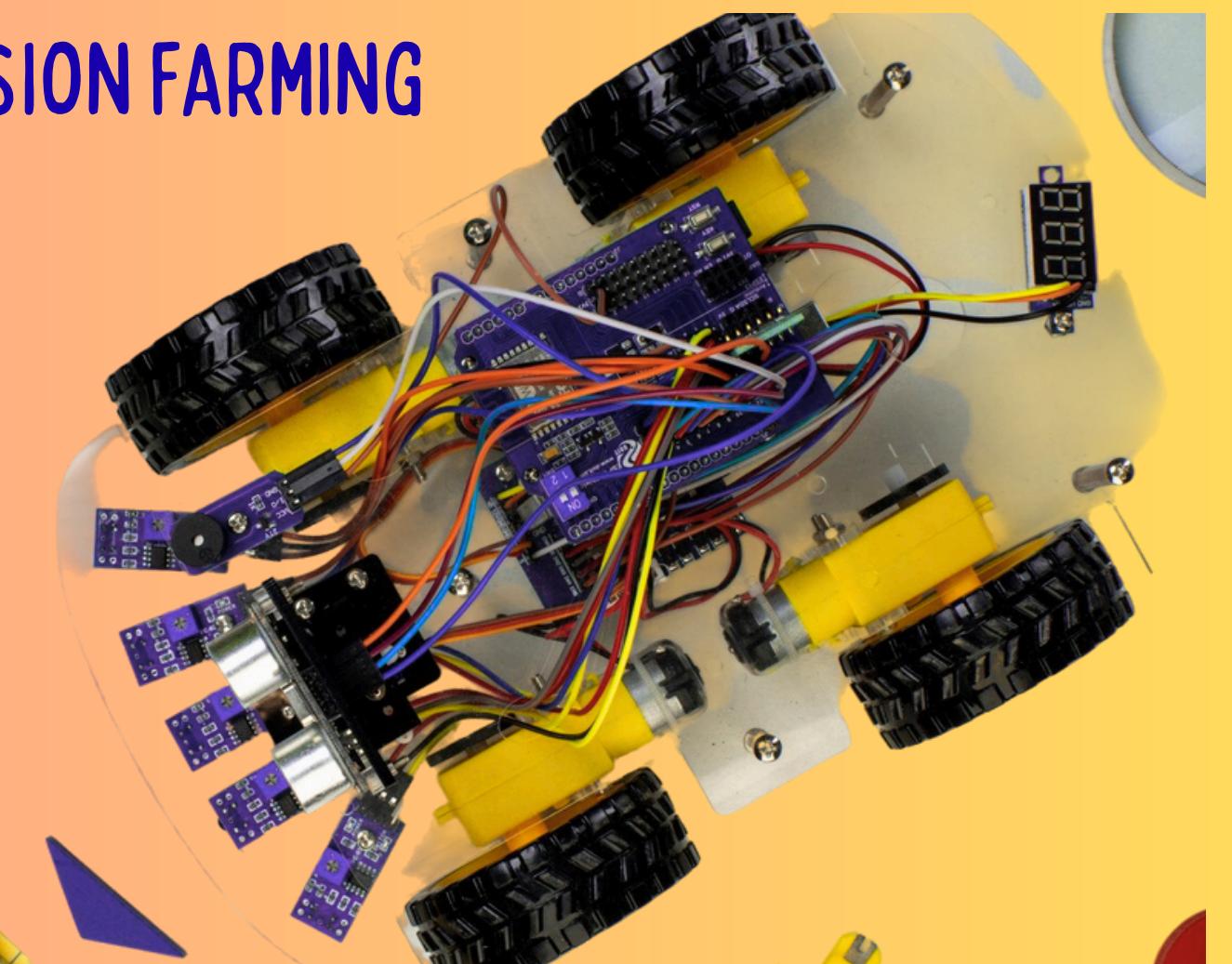
GESTURE CONTROL BOT: THE ULTRA FARMING AID

A ROBOTICS APPROACH TO HANDS-FREE YET PRECISION FARMING

TEAM MEMBERS :



- 1. Spandana Behera (Leader)**
- 2. Dhiren Sahoo**
- 3. Ashutosh Sahu**
- 4. Ashutosh Barik**
- 5. Biswabandita Dash**



GESTURE-CONTROLLED BOT FOR FARMING ASSISTANCE USING ESP32

Why Gesture-Control Bot For Farming?

- **Labour Crisis In India:** Over 80% of India's small-scale farmers toil manually on tiny plots (<2 hectares), battling fatigue and low yields due to labor shortages and rising costs.
- **Traditional Failures:** Outdated farming methods fail, while pricey large machinery crushes small farms with soil damage and inaccessibility.
- **Remote Control Issues:** Eliminates joystick or app-based bots dilemmas that demand tech skills, leaving farmers overwhelmed.
- **Agribot Advantage:** Unlike bulky machinery, our gesture-controlled bot navigates uneven fields with natural movements (tilt, swipe) with hands-free precision, aiding sowing, watering, etc.
- **Green Revolution:** Reduces risks, targets resources sustainably, and transforms backbreaking work into innovation.



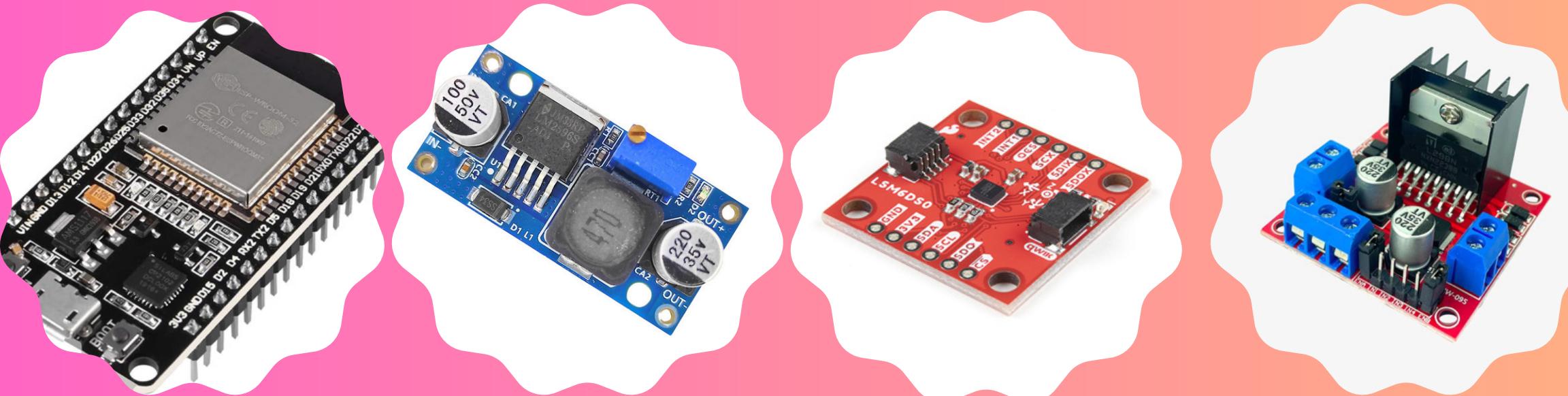
TECHNICAL APPROACH

Hardware :

- **ESP32 Microcontroller** – high-speed processing + Wi-Fi.
- **L298 Motor Driver** – reliable dual-motor control.
- **LSM6DSO Accelerometer** – gesture detection with precision.
- **Modular Dispensing Unit** – for seeds, water, or manure.
- **Sensor Ports** – future soil moisture/salinity add-ons.

Software :

- **C++**
- **Arduino IDE**



ESP-32

BUCK CONVERTER

LSM6D50

L298

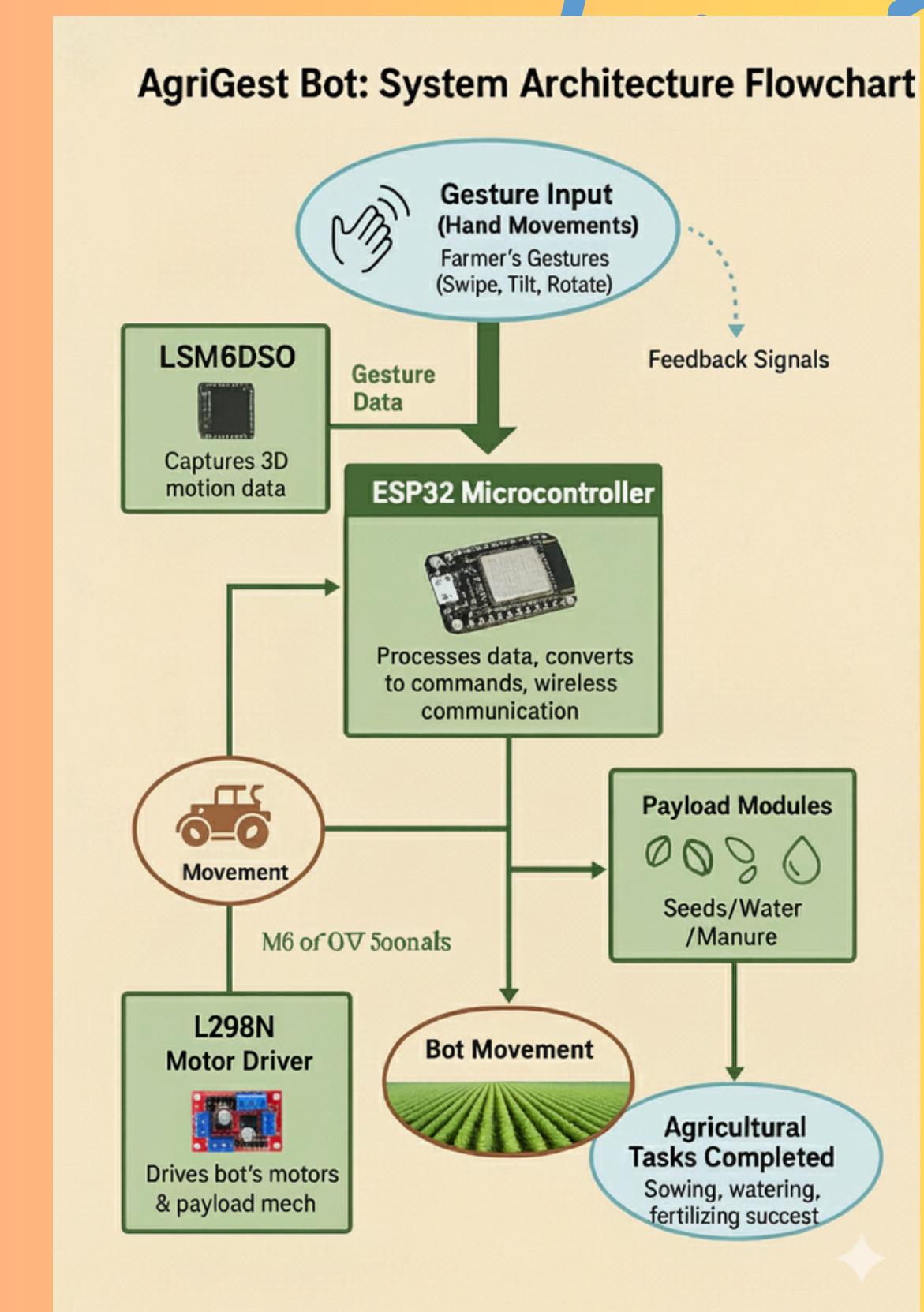
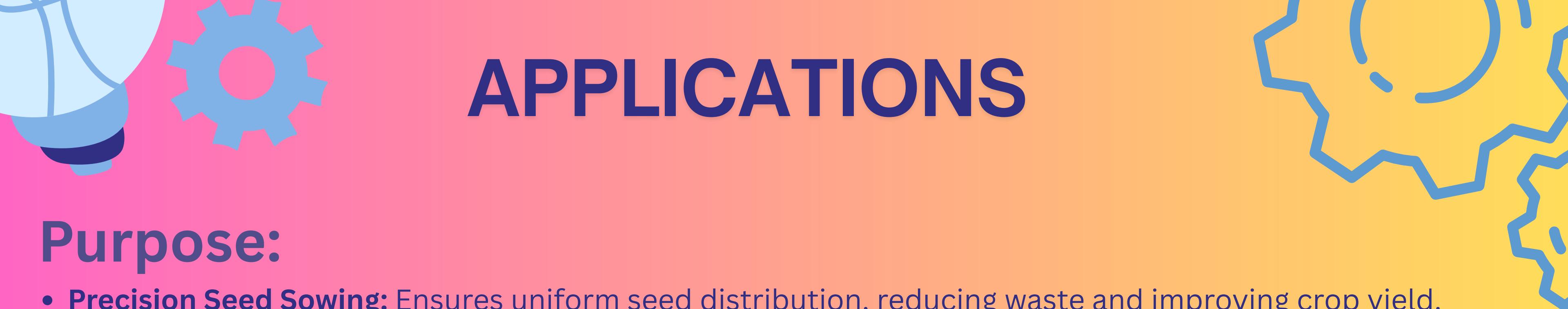


Fig.1 : Flowchart of gesture control bot.



APPLICATIONS

Purpose:

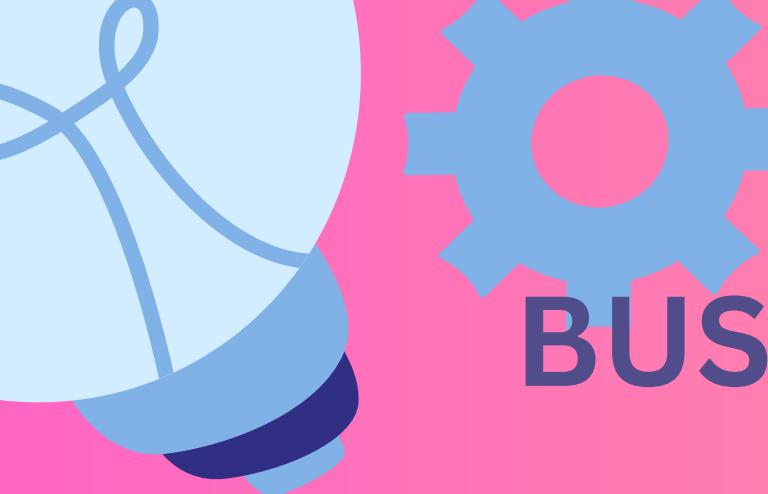
- **Precision Seed Sowing:** Ensures uniform seed distribution, reducing waste and improving crop yield.
- **Efficient Watering:** Controlled water dispensing minimizes overuse in water-scarce regions.
- **Manure Application:** Targeted fertilizer delivery through gesture-controlled restrictions enhances soil fertility without manual spreading or over-spraying.
- **Ease for Farmers:** Reduces physical strain and unease during summers, especially for small-scale farmers, by automating repetitive tasks.
- **Cost-Effective:** Affordable alternative to expensive machinery, designed for rural and small-farm use.
- **Scalable Design:** Modular attachments allow customization for diverse crops and terrains.

Impacts :

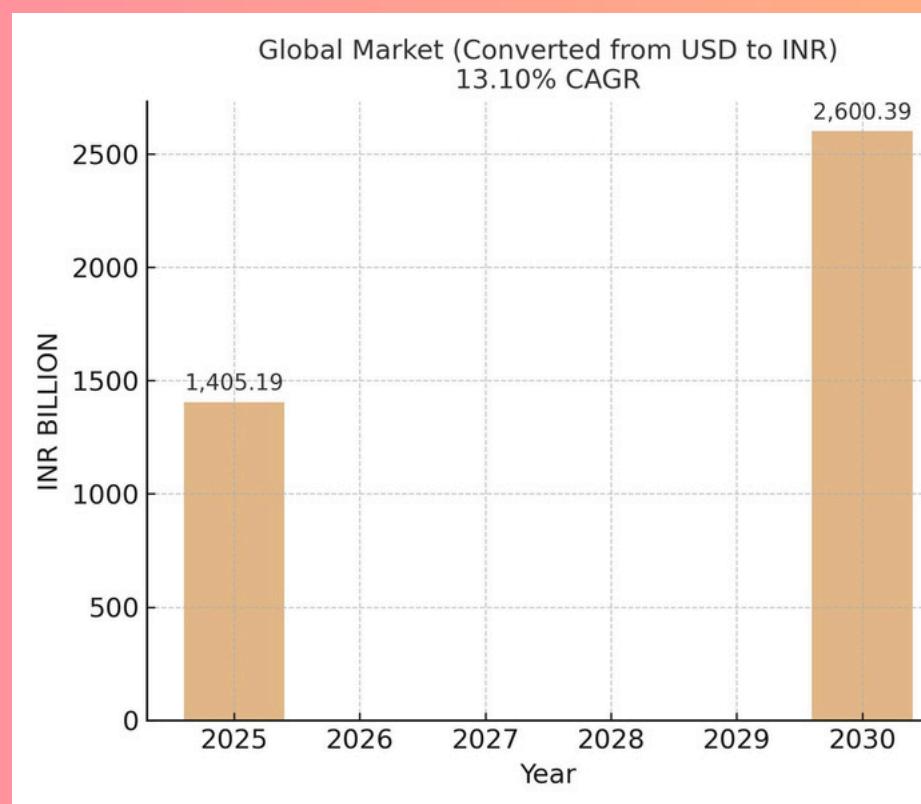
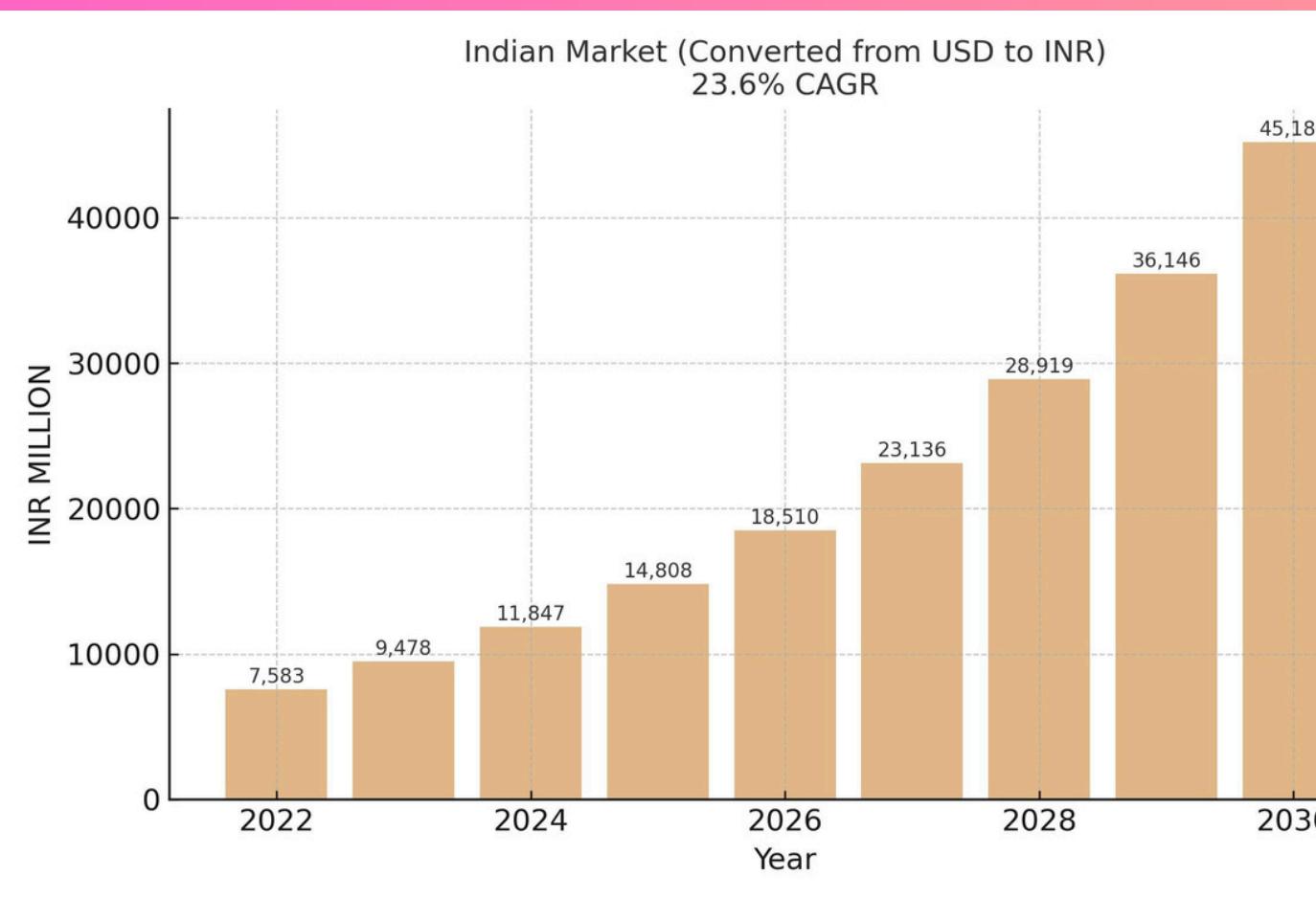
- Empowers small-scale farmers with cutting-edge technology.
- Promotes sustainable farming by optimizing resource use.
- Gesture control makes it intuitive, requiring minimal training.



BUSINESS & REVENUE MODEL:



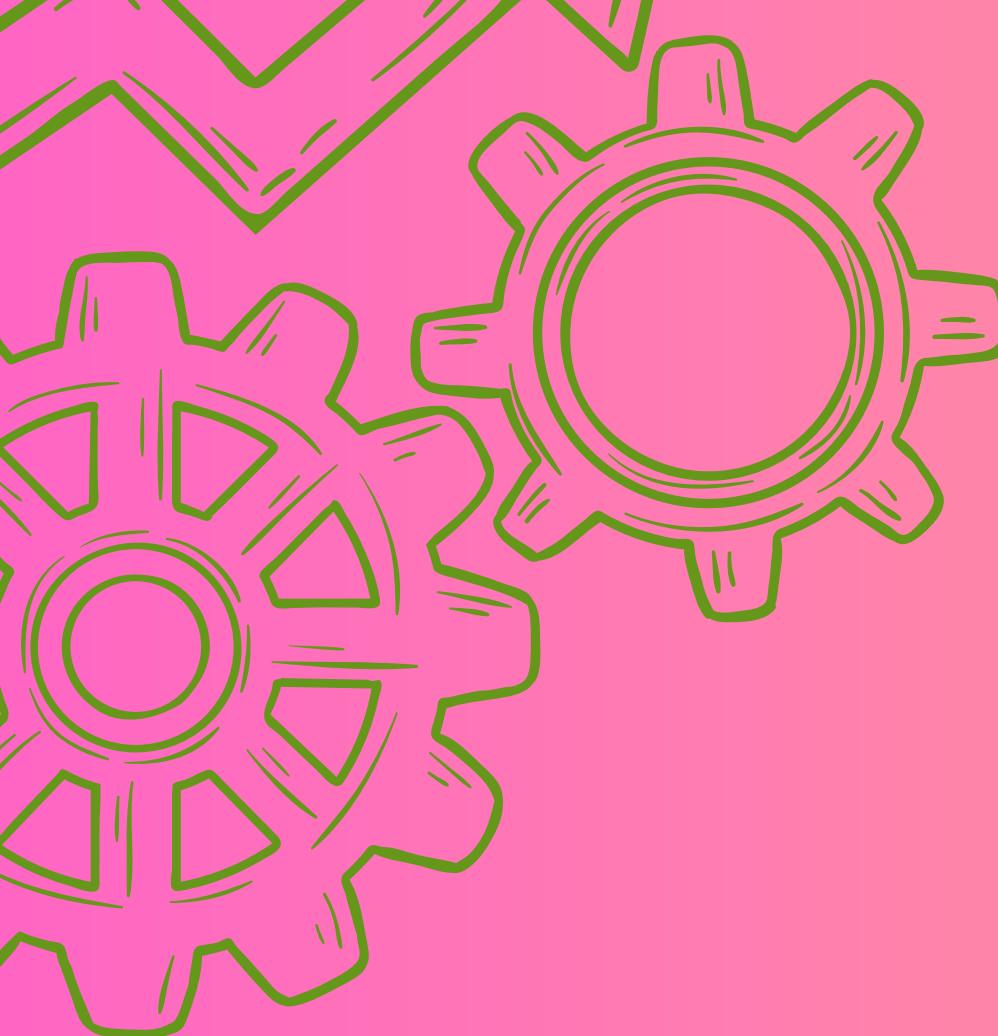
The Indian agricultural robot market was valued at **USD 91.36 million** in **2022** and is projected to reach **USD 544.35 million** by **2030**, with a CAGR of **23.6%** during the forecast period from 2023 to 2030. **India** is seeing a consistent **rise** in the adoption of agricultural robots, driven by their growing integration into various farming practices.



FUTURE VISION & SCOPE:

- **Soil Health Monitoring:** Integrate sensors to measure soil data in real-time.
- **Autonomous Navigation:** Add GPS and obstacle detection.
- **AI Integration:** Implement ML to optimize sowing patterns and predict crop needs.
- **Multi-Bot Coordination:** Enable multiple bots to work in sync for large-scale farms.
- **Renewable Energy:** Install solar panels for eco-friendly operation.
- **Global Reach:** Adapt to diverse agricultural practices in varied climates and terrains.

Fig 2 & 3 : Agricultural robot market analysis



LINKS TO VISIT

Working of bot:

Github:

References:

1. https://www.iari.res.in/en/files/divisionalPublications/The_Rise_of_AgriBots_Content_v2_09042025.pdf
2. <https://www.datainsightsmarket.com/reports/agriculture-robots-industry-499>



Thank You