

TEAM LUMEN | HACKSPRINT

HANDY

AN AFFORDABLE, APP-
CONTROLLED
MYOELECTRIC HAND

Democratizing Bionics: Restoring independence for **India's 500,000+** amputees with a functional, affordable, and app-controlled prosthetic.

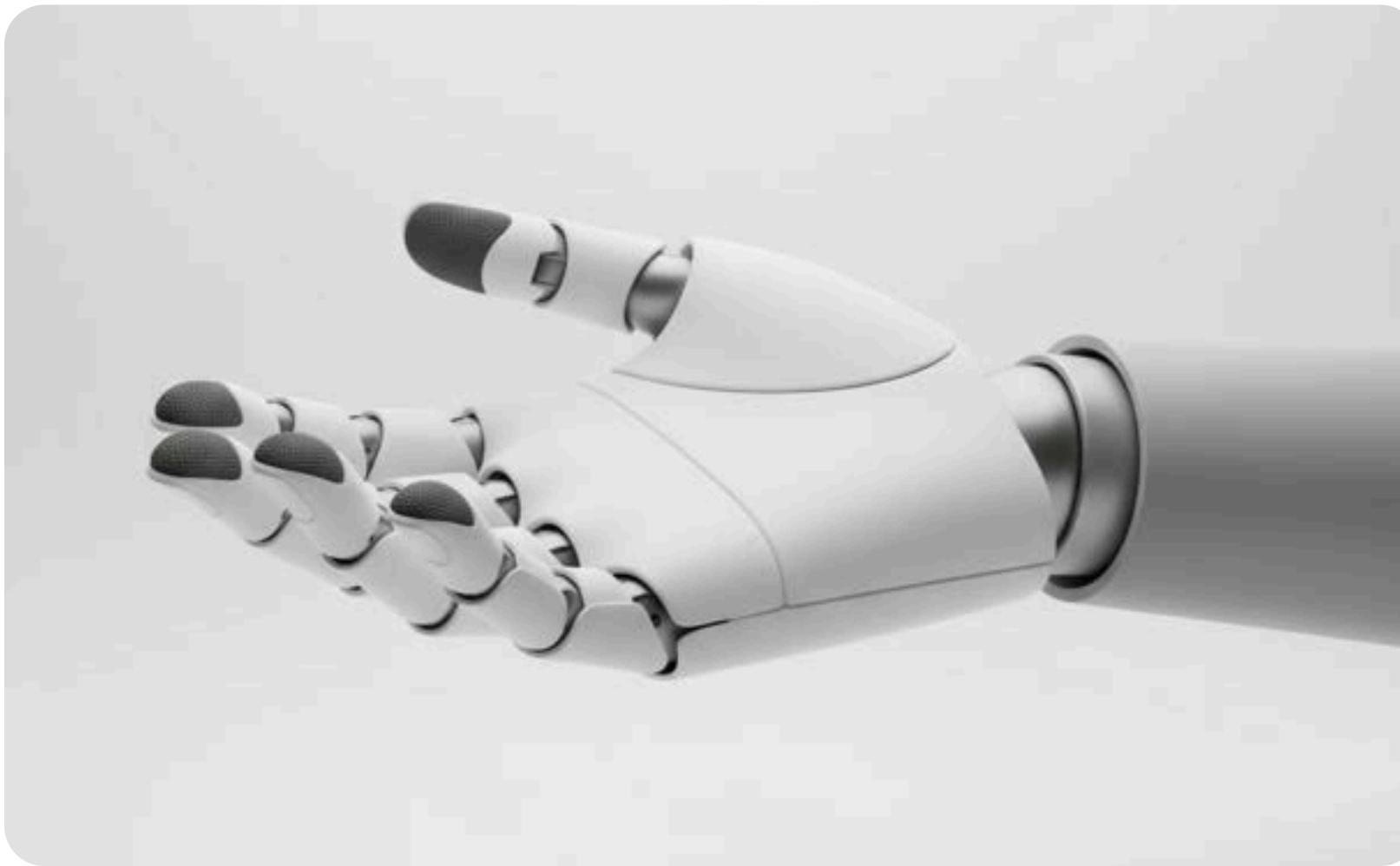
A CRISIS OF ACCESSIBILITY

THE UNSOLVABLE CHOICE

In India, over **500,000** people with upper-limb loss face a heartbreakin choice: basic, non-functional claws or imported bionic hands costing over **₹10 lakhs**. With an estimated **95%** of users unable to afford modern solutions, millions are excluded from employment, independence, and dignity.



OUR SOLUTION: DEMOCRATIZING BIONICS



Introducing Handy: A functional, **app-controlled myoelectric hand** that directly solves the accessibility crisis. It's the first step in our mission, **delivering functional independence** at a price point that is accessible to all.

01

APP-CONTROLLED FUNCTIONALITY

A user selects a desired grip (e.g., "Palmar", "Pinch") in our custom mobile app. A **simple muscle flex**, read by an **sEMG sensor**, then commands the hand to perform the action.

02

RADICAL AFFORDABILITY

By using **low-cost components** like the ESP32, servo motors, and **3D printing**, we achieve a target component cost of under ₹5,000—a 95%+ reduction on commercial devices.

HOW IT WORKS:

APP-CONTROLLED MYOELECTRICITY

01

GRIP SELECTION VIA APP

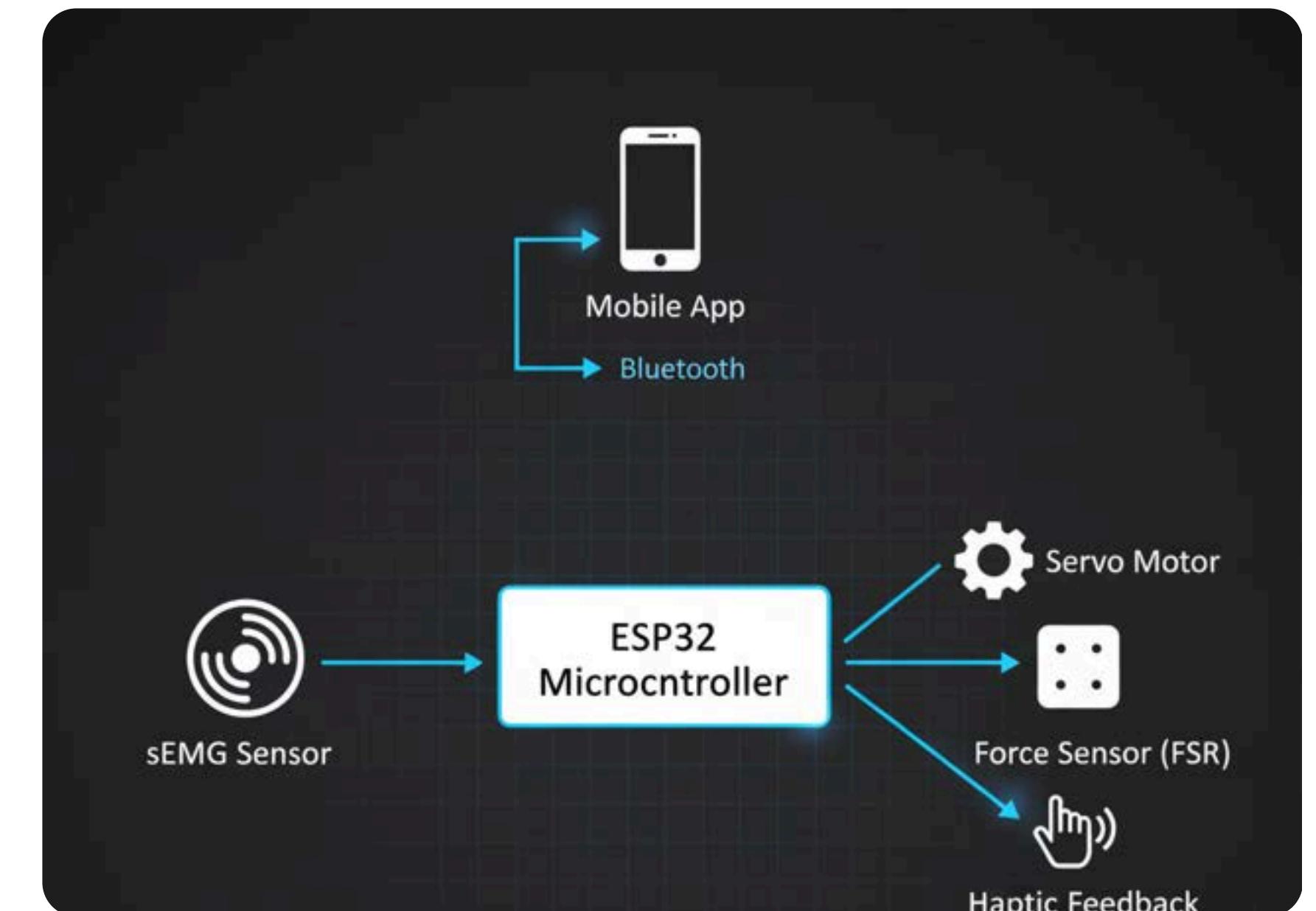
The user selects a desired functional grip, like "Palmar" or "Pinch," from our **custom mobile app**. This command is sent to the hand's ESP32 microcontroller via **Bluetooth** and "arms" the hand for the action .

02

EXECUTION VIA MUSCLE FLEX

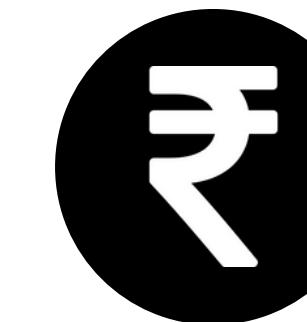
When the user is ready, a **simple flex** of their muscle (e.g., bicep) is **detected** by the **sEMG sensor**. The ESP32 reads this signal as the "go" command and actuates the servo motors to perform the **pre-selected grip** .

Handy uses a robust and reliable system that combines a simple mobile app with proven **sEMG** sensor technology. This allows for precise, pre-selected grip patterns to be executed with a simple, intuitive muscle flex.



OUR IMPACT: FROM PROHIBITIVE COST TO EMPOWERING POSSIBILITY

Handy isn't just a device; it's a **catalyst for change**. By making functional prosthetics **radically affordable**, we directly **address the socio-economic barriers** that exclude millions, creating a tangible impact on individual lives and the national MedTech landscape.



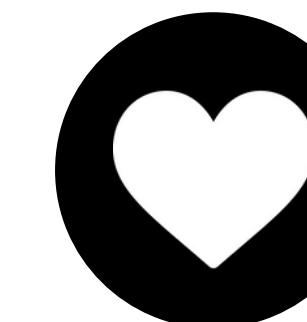
RADICAL AFFORDABILITY

Delivers the dexterity of a ₹10L+ limb at a **95%+** cost reduction, making advanced technology accessible for the first time.



RESTORED INDEPENDENCE

Empowers users to **perform complex daily tasks** with confidence, increasing the chances of rejoining the workforce by up to **3x**.



ENHANCED DIGNITY & WELL-BEING

Provides a functional, lifelike prosthetic that restores not just ability, but also **self-respect, identity, and psychological well-being**.



BOOSTING INDIAN INNOVATION

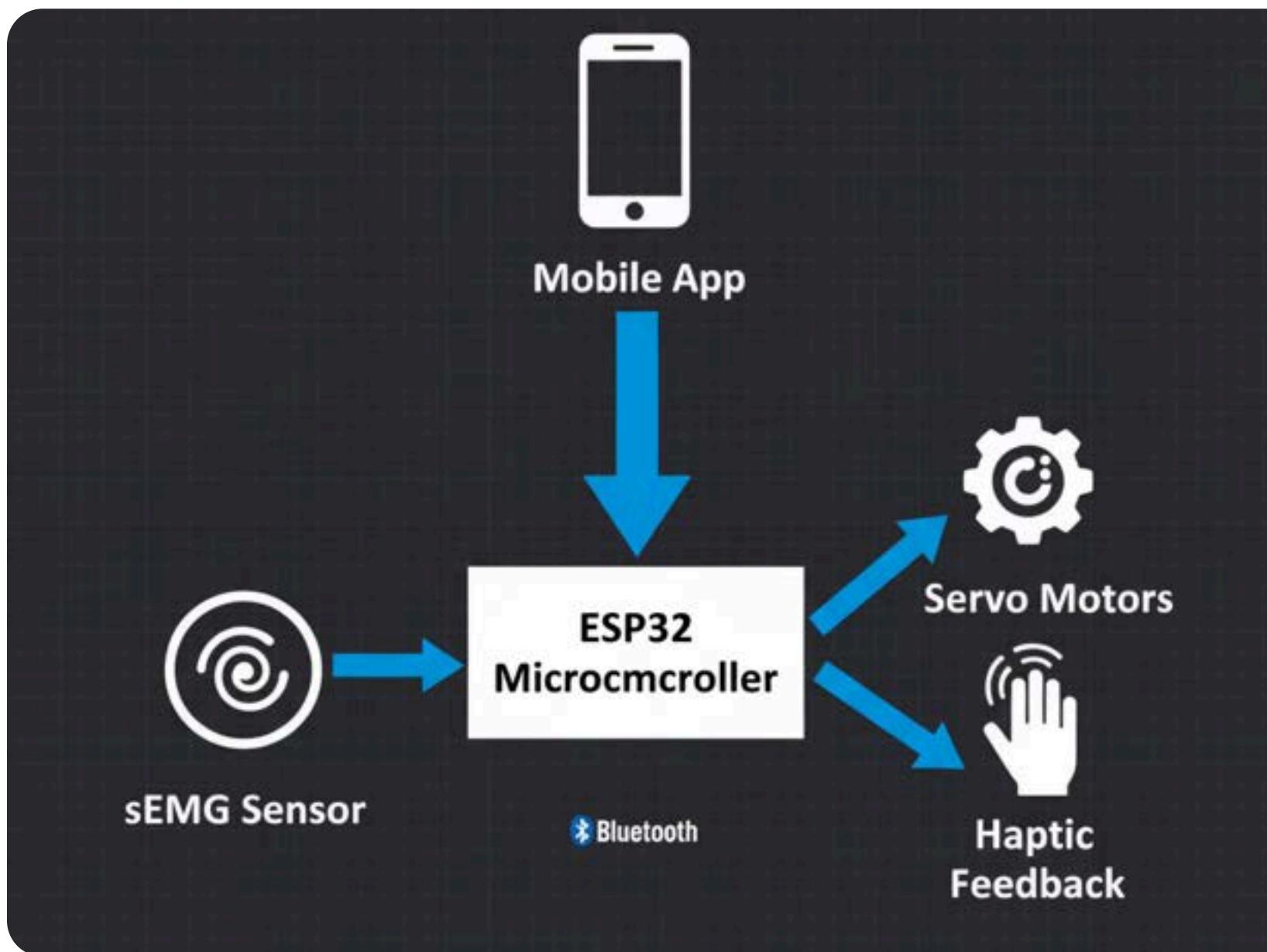
Strengthens **India's Atmanirbhar Bharat** mission in **MedTech** by developing a world-class, scalable, and locally manufactured solution.



OUR PROGRESS: FROM CONCEPT TO VALIDATION

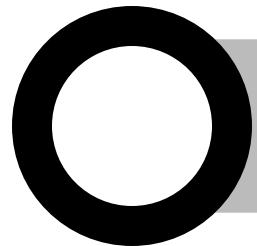
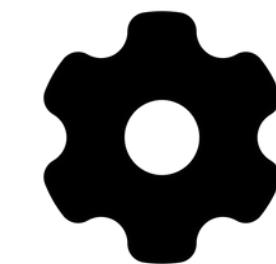
Our project is built on a validated foundation. We have **already developed and tested** the core systems for **Handy**: a physical prototype with functional joints , a working mobile app for grip selection , and successful sensor integration. This existing work proves our concept is feasible and that we are ready to build a complete, functional demonstration during this 24-hour Hacksprint.

TECHNICAL ARCHITECTURE: OUR HACKSPRINT BUILD



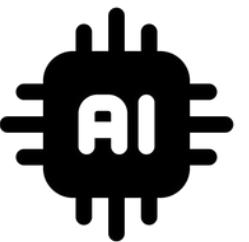
Our system for Handy is built on a modular, **low-cost architecture** perfect for **rapid prototyping** in 24 hours. The ESP32 microcontroller is the central hub, receiving grip commands from our mobile app via **Bluetooth**. It then waits for a **simple trigger** from the **sEMG sensor** to execute the action, driving the servo motors with precision.





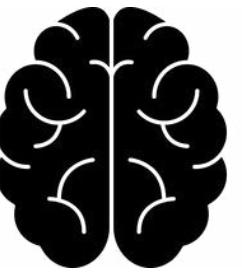
Handy

- AFFORDABLE & FUNCTIONAL
- ADL CONTROL VIA APP
- ACCESSIBLE DESIGN
- DURABLE DESIGN



Handy 2.0

- AI CO-PILOT
- SEAMLESS ADL CONTROL
- IMPROVED DEXTERITY
- HAPTIC FEEDBACK (VIBRATION)



Handy 3.0

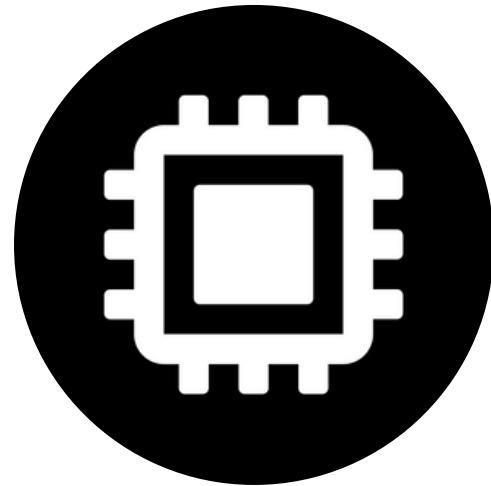
- FULLY BIONIC INTEGRATION
- REAL-TIME SENSORY FEEDBACK
- ADVANCED AI CAPABILITIES
- ENHANCED INDEPENDENCE

OUR ROADMAP: THE PATH TO FULL BIONIC INTEGRATION

"**Handy**" (our app-controlled myoelectric hand) is the critical first step of our three-phase mission. Our goal for this 24-hour Hacksprint is to **build and demonstrate** this functional, affordable device. This provides the validated hardware foundation for our future vision: **Handy 2.0** with agentic AI and **Handy 3.0** with full neural integration.



WHY HANDY WINS: A SUMMARY



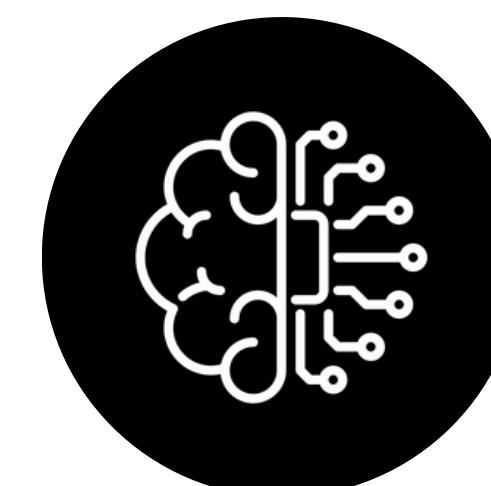
TECHNICALLY FEASIBLE

Built with **low-cost, off-the-shelf components** like the ESP32 and 3D-printed materials, achieving a functional component cost of just **₹4,200**.



FINANCIALLY VIABLE

Targets a **₹700 Cr+** Indian market. **Capturing just 1%** of this need represents a massive opportunity for a self-sustaining social enterprise.



HIGHLY INNOVATIVE

Our **App-Controlled Myoelectric System** is the core innovation for this build. It provides intuitive, multi-grip functionality at a **95%+ cost reduction**, making it a truly disruptive and accessible platform.



IMMENSELY IMPACTFUL

Dramatically **reduces cost** by over **95%** and can increase a user's chances of rejoining the workforce by **3x**, restoring dignity and independence.

Handy is a rare combination of practical innovation and immense impact. It is **built on a validated, ultra-low-cost hardware** foundation, targets a massive and underserved market, and delivers life-changing benefits.

THANK YOU

"Handy" is more than a 24-hour hackathon project; it's the first step in our mission to **restore independence and dignity** by making functional bionics accessible to all. We believe in building a more equitable future, one hand at a time, and are excited to continue this journey.



SCAN / CLICK TO SEE OUR
PROJECT IN ACTION

