



# PANIMALAR ENGINEERING COLLEGE

An Autonomous Institution

## [JAISAKTHI EDUCATIONAL TRUST]

Approved by AICTE | Affiliated to Anna University | Recognized by UGC

All Eligible UG Programs are Accredited by NBA

Bangalore Trunk Road, Varadharajapuram, Poonamallee, Chennai- 600 123

### INDIA'S WOMEN CENTRIC NATIONAL LEVEL 24 – HOUR HACKATHON **TECHDIVATHON – 2.0**

**She blooms. She leads. She conquers**



**Domain: ROBOTICS**

**Problem Statements:**

S.No	Title	Problem Statement	Description
1	AI-Powered Robotic Exosuit for Construction	Construction workers face fatigue and injury due to repetitive heavy lifting.	Develop a smart robotic exosuit with sensors and AI that detects posture, provides real-time ergonomic support, and prevents lifting injuries on site.
2	Robotic Swarm for Disaster Response	Search-and-rescue missions in hazardous environments are slow and risky for humans.	Engineer a swarm of small autonomous robots to rapidly locate, map, and relay data from disaster zones inaccessible to humans.
3	Soft Robotic Gripper for Food Sorting	Traditional grippers damage delicate food items in automated packing.	Invent a soft robotic gripper that uses flexible, adaptive materials to sort and handle delicate produce in food processing plants.
4	Robotic Satellite Debris Collector	Space debris poses threats to satellites and missions.	Design a robotic satellite capable of detecting, capturing, and deorbiting various-sized debris in low Earth orbit.
5	Autonomous Graffiti-Removal Robot	Graffiti removal from large public spaces is labor-intensive and costly.	Build a vision-guided robot that detects graffiti on complex surfaces and cleans/paints over it autonomously.
6	Robotic Pollinator for Greenhouses	Decline of natural pollinators affects indoor crop yields.	Develop a drone or ground robot that reliably identifies flowers and pollinates greenhouse plants on schedule.
7	Robotic Mobility Assistant for Airports	Passengers with reduced mobility find airports challenging and disorienting.	Create a mobile robot that guides and transports passengers, adapts to individual needs, and communicates in multiple languages.
8	Micro-Robot for Water Pipeline Inspection	Underground water pipelines are hard to inspect for leaks and clogs.	Invent a small, sensor-rich robot that autonomously maps and checks water pipelines, reporting damage or buildup in real time.

9	Self-Configuring Warehouse Robot Grid	Sudden surges in e-commerce orders strain static warehouse setups.	Design a fleet of modular robots capable of dynamically reorganizing warehouse zones and forming temporary conveyor paths based on demand.
10	Bio-Inspired Wall-Climbing Robot	Maintenance of tall buildings and structures is dangerous and expensive.	Develop a robot that mimics gecko or insect adhesion, enabling safe, autonomous climbing and repair on vertical surfaces.
11	AI-Enabled Personal Safety Escort Robot	Individuals feel unsafe walking alone in certain areas at night.	Create a compact robot equipped with sensors, cameras, and AI that can accompany users, alert authorities, and provide deterrents if necessary.
12	Robotic Process Automation for Smart Farming	Modern farms handle large data and logistics workloads inefficiently.	Build a multi-robot system that integrates crop data collection, soil analysis, irrigation, and harvesting under one autonomous platform.
13	Self-Healing Swarm Robots for Hazardous Exploration	Robots exploring remote or dangerous sites risk damage and mission failure.	Invent swarm robots with self-repair capabilities, allowing groups to maintain collective function even after partial unit failures.
14	Autonomous Classroom Disinfection Robot	Classroom hygiene is critical but hard to maintain manually.	Design a mobile robot that navigates classrooms autonomously, identifies high-touch surfaces, and disinfects them using UV or mist.
15	Modular Robotics for Customizable Elderly Assistance	Elderly care robots are often "one size fits all".	Engineer a modular robot platform that family members can customize for different daily tasks and cognitive/physical support for seniors.
16	Robotic Assistant for Smart Libraries	Manual management of books and media is time-consuming.	Build a robot that sorts, finds, and transports library materials, supports users with directions, and integrates with digital catalogues.
17	Underwater Inspection Robot for Renewable Installations	Offshore wind and solar farms require frequent underwater inspection.	Create an autonomous robot for submerged infrastructure inspection, with real-time video and fault reporting, reducing human diver risk.
18	Swarm Robotic Ocean Plastic Cleanup Fleet	Ocean plastic pollution cleanup is slow, costly, and covers limited areas.	Develop a coordinated swarm of autonomous surface and underwater robots that use AI vision to detect, collect, sort, and process microplastics and floating debris while avoiding marine life
19	Edge AI-Powered Retail Robot	Physical stores struggle with real-time inventory and restocking.	Develop a robot with edge AI to patrol retail aisles, detect out-of-stock items, notify staff, and assist in customer navigation.
20	Robotic Assistants for Urban Gardening	Urban farmers have limited access to advanced gardening.	Design a robotic kit that automates garden care—including watering, pruning, and crop health monitoring—for urban balcony and rooftop setups.
21	Remote-Controlled Archaeological Site Robot	Archaeological digs are often in hazardous, delicate environments.	Invent a robot for non-invasive exploration, mapping, sampling, and artifact recovery at sensitive archaeological sites.

22	Cognitive Rehabilitation Robot for Stroke Survivors	Stroke rehab is costly and hard to personalize at home.	Create a home-assist robot that develops custom cognitive/physical therapy plans, monitors progress, and motivates patients interactively.
23	AI-Powered Trash Segregation and Sorting Robot	Improper waste sorting leads to low recycling rates.	Engineer a vision-based robot that identifies waste categories, auto-sorts recyclables, compost, and landfill items in public bins.
24	Autonomous Urban Road Quality Mapper	Road damage detection by cities is slow and inefficient.	Design an autonomous ground robot or drone to survey road networks, detect surface damage, and report geotagged data for city repairs.
25	Privacy-First Elderly Monitoring Companion	Elderly living alone need monitoring, but value privacy.	Build a robot that provides safety and health checks using privacy-first sensors—such as thermal imaging and non-intrusive audio—alerting caregivers only on urgent need.

## Reviewer's Digital Signature

**Reviewer's Name:**

**Position:**

**Organization:**

**Date:**

**Digital Signature:**