Job Title: Engineer – Product Development
Location: IITM Research Park- Chennai

Role Summary
Design and develop advanced electromechanical and biomedical systems for assistive devices and humanoid robots. Work on mechatronics, embedded control, actuation, haptics, and multimodal sensing to enable universal accessibility and human-centric design. Collaborate with clinicians, AI teams, and roboticists to create safe, adaptive technologies that enhance mobility, dexterity, and independence.

About IITM Research Park
 Innovation thrives when faculty, students and industry professionals interact in a formal or informal environment. The IIT Madras Research Park, promoted by IIT Madras, is India's first University based Research Park epitomising what can be achieved by this confluence - bringing unlike minds together. The Research Park provides over 1.2 million square feet of collaborative workspace for R&D companies and deep-tech start-ups to nurture, promote and sustain innovation and entrepreneurship through Industry - Academia interaction. The innovation ecosystem enables quick and easy formal and informal exchange of ideas leading to collaboration and commercialization of R&D, delivering strategic value by reducing the cycle time for innovation. IIT Madras Research Park is the top-most research and innovation ecosystem in the country - a bustling campus with about 6,000 professionals across 250 plus Corporate R&D Units, Multinational Research Centres, Public Sector, Government Research bodies, IIT Madras Centres of Excellence, Laboratories and Start-ups. IIT Madras Research Park is a Section 8 not-for-profit company.

Key Responsibilities
1. Mechatronics & Biomedical System Design
  ● Design electromechanical subsystems for robotic joints, actuators, and assistive devices.
  ● Develop biomedical sensing modules (EMG/IMU/force/pressure) for disability assessment and user interaction.

2. Control Systems & Embedded Engineering
  ● Implement motor control (BLDC/FOC/PID), embedded firmware, and safety mechanisms for human–robot interaction.
  ● Integrate biosignals and sensor data into control loops for assistive functionalities.

3. Disability Screening & Clinical Support Tools
  ● Build hardware for functional evaluation: ROM measurement, grip-force assessment, gait/balance analysis, and motor-coordination tracking.
  ● Translate clinical and rehabilitation insights into engineering specifications for user-safe robotic motion.

4. Prototyping, Testing & Validation
  ● Develop prototypes, test rigs, and perform validation for accuracy, safety, endurance, and biomechanical alignment.
  ● Support pilot tests and clinical evaluations of assistive modules and humanoid components.

5. Digital Fabrication Equipment
  ● Work with CNC machines for additive and subtractive manufacturing, like 3D printers, CNC mills, and lathes

● Identify and implement the best manufacturing methods/materials

6. Documentation, Compliance & Standards
● Prepare engineering documentation, safety reports, and medical-device compliance records (CDSCO/ISO 13485/IEC 60601).
● Maintain traceability for disability-assessment tools and patient-facing robotic systems.

7. Cross-Functional Collaboration
● Work closely with clinicians, physiotherapists, roboticists, and AI teams to ensure human-centric design.
● Incorporate feedback from medical partners to refine humanoid behavior and biomedical device ergonomics.

Qualifications
Education
● Bachelor's or Master's in Mechanical Engineering, Electrical/Electronics Engineering, Mechatronics, Robotics, or related fields.

Experience
● 2-5 years of hands-on experience in robotics, mechatronics, electromechanical design, or embedded systems.
● Experience building robotic arms, humanoid joints, grippers, exoskeletons, or other multi-DOF actuator systems is highly desirable.
● Experience with CAD/CAM softwares ,M-Code/G-codes
● Experience in working with Proto Lab environment and handson experiences with CNC mills (3-5 axis machines,lathe,waterjet cutters,Wire EDM, FDM/SLA/SLS/Polyjet 3D printers
● Strong exposure to sensors, motor drivers, embedded controllers, and control algorithms.

Skills & Competencies
Core Technical Skills
● Strong foundation in mechatronics system design
● BLDC/Stepper/Servo motor control & tuning (FOC, PID, S-curve, trapezoidal profiles)
● Embedded systems (ESP32, STM32, ARM)
● CAD (SolidWorks/Fusion 360) & rapid prototyping
● Sensor integration (IMU, ToF, hall sensors, force sensors)
● Kinematics, dynamics, and basic motion planning
● Wiring, harnessing, PCB-level electronics(Altium) familiarity

Desired Skills
● Experience with humanoid/exoskeleton robotics/wheeled robots
● Understanding of biomechanics and human–robot interaction
● Hands-on experience with sensor fusion
● Familiarity with ROS 2, Gazebo/CoppeliaSim, or real-time control frameworks

Soft Skills
● Strong problem-solving and prototyping mindset

- Ability to convert research insights into practical engineering solutions
- Excellent documentation and cross-disciplinary communication
- Comfort working in fast-paced, high-innovation environments

In case you are interested please forward resume to careers@respark.iitm.ac.in with subject line "**Application for Post of Engineer- Product Development".**