AMERICAN INTERNATIONAL UNIVERSITY–BANGLADESH (AIUB)

FACULTY OF SCIENCE & TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE

SOFTWARE ENGINEERING

PROJECT PROPOSAL ON

Robo Hatch - A Robotics Development Platform

Supervised By

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Functional Requirements

1. User registration and role selection: New users can register as freelancers (Researchers, Designers, Developers) or as companies / teams (for hardware / software implementation). Verified company status is required to access integration features.

Preconditions:

- User has internet access
- Valid email, password, and identity verification provided
- Companies must submit legal proof and meet minimum member count

Priority: High

2. Login and authentication system: Registered users can log in using their credentials. Accounts are locked after multiple failed attempts and unlocked through an OTP sent to the registered email.

Preconditions:

- User has an existing account
- Email service is functional for OTP delivery
- Credentials are correct

Priority: High

3. Freelancer project idea & research sharing: Freelancers (specifically researchers / planners) can upload documents related to robotics ideas, technical research, and planning strategies for others to view or purchase.

Preconditions:

- User is logged in as a freelancer
- Proper file format and content is prepared
- Research is original or appropriately cited

Priority: High

4. 3D CAD model upload and access: CAD Engineers can upload 3D robot designs and simulations. These can be purchased or requested by companies for prototyping. Engineers can also buy planning documents for reference.

Preconditions:

- User is a CAD Engineer
- Planning/research material is purchased or owned
- Uploaded files comply with platform standards

Priority: High

5. Hardware prototyping access: Verified teams or companies can purchase designs and initiate physical prototyping using their own tools or by outsourcing locally. The platform enforces outsourcing in the same country.

Preconditions:

- Company is verified
- 3D models or research material is available
- Outsourcing company/team is from the same country

Priority: High

6. Software development from freelancers: Freelance developers can view hardware demo videos and submit code for robotics software. The code can later be integrated into robots by teams.

Preconditions:

- User is logged in as a freelancer
- Project is at the software development stage
- Video demos and specs are shared by prototyping team

Priority: High

7. Software integration by verified companies or teams: Verified software teams / companies can integrate freelance-developed code with hardware, perform debugging, and upload test results.

Preconditions:

- Logged in as verified company/team
- Approved source code is available
- Robot hardware is ready for integration

Priority: High

8. Artificial intelligence based task & freelancer recommendation: The platform uses AI to match freelancers with tasks based on their expertise, ratings, activity, and past projects. Companies are also recommended ideal candidates.

Preconditions:

- User activity and profile data exists
- AI engine is operational
- Project requirements are clearly defined

Priority: Medium

9. Task assignment system: Companies can post or assign tasks (design, development, research) to freelancers. Progress is tracked, and deliverables are reviewed upon completion.

Preconditions:

- Task is defined with clear scope
- Freelancer accepts the assignment
- Company account is active

Priority: High

10. Selling robotics projects: Only verified companies can publish completed robotics projects on the marketplace, attach pricing and videos, and sell them to customers or businesses.

Preconditions:

- Project is marked complete
- Legal and financial setup is verified
- Required files and media are uploaded

Priority: High

11. Revenue distribution system: Upon project sale, the platform calculates revenue split, deducts platform fees, pays freelancers based on contribution and sends the remainder to the company.

Preconditions:

- Sale is completed
- Contributors are listed with roles
- Payment gateway is working

Priority: Medium

Non-Functional Requirements

Usability: The platform will have a clean, intuitive user interface with minimal clicks to perform major actions. Tutorials and tooltips will help onboard new users quickly.

Performance: The platform must support at least 1,000 simultaneous users with fast response times < 2 seconds for core actions like logins, uploads and messaging.

Security: All sensitive data (credentials, files, payment info) must be encrypted in transit and at rest. Two-factor authentication and permission-based access will be used to secure accounts.

Reliability: Platform services (Login, Messaging, Task Management, AI Engine) must be available 99.5% of the time monthly. Backup systems and alerts for downtime will be implemented.

Maintainability: The system will follow clean architecture principles with modular components. Each module (Auth, AI, Task management) should be upgradable without impacting the others.

Scalability: Initially hosted on a shared server, the platform should be scalable to cloud infrastructure (AWS / Azure) as usage increases, using microservices and containerization if needed.

Project requirements

- The platform must use MySQL, Selenium and either MERN or ASP.NET (C#).
- Minimum team size of 10 members for verified companies/teams.
- Local outsourcing only hardware/software tasks must stay within national boundaries.
- If a company exits mid project, outsourced teams must be compensated (excluding tool / material costs).
- Must comply with GDPR and regional privacy laws.