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SOFTWARE ENGINEERING

PROJECT PROPOSAL ON

Robo Hatch - A Robotics Development Platform

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1.1 Background of the Problem

The robotics industry shows fast expansion through technological advancements that cover healthcare and manufacturing and agriculture and entertainment purposes in recent years. The rising demand for robotic solutions produces important hurdles during the development cycle. The primary development obstruction in robotics stems from professionals within hardware, software, design and testing fields who work independently in diverse organizations. Multiple developmental stages between teams lead to performance issues and delayed schedules as well as make collaboration throughout the entire project timeline challenging.

Root Cause of the Problem: Robotic technology has progressed notably throughout the years, which caused advancements across automation technology and artificial intelligence along with industrial implementation. The industry persists in confronting substantial problems which produce obstacles toward innovation and commercialization advancement. Product development delays from initial ideas through production stages represent the main limiting factor for the robotics industry. Robotics development fragments naturally because professionals dividing themselves among mechanical design, software development, artificial intelligence and electronic engineering work independently from each other. Without proper integration between teams programming costs become elevated while project completion needs longer durations.

The robotics industry faces a primary challenge because it lacks an organized marketplace which enables freelancer professionals to work hand in hand with startups as well as established companies. Robotics professionals with talent encounter employment difficulties because they face distance restrictions combined with insufficient specialized platforms for their industry. The key process of hardware prototyping for robotics development remains too costly for independent innovators and small companies. Standardized processes aimed at integrating robotics development aspects do not exist which result in project failures.

Impact on the Industry: The parts-based organization of the robotics industry generates significant negative effects. Standing innovation at bay appears as the most critical disadvantage because promising concepts often perish because of insufficient resources combined with a shortage of qualified personnel. Robotic startup failures occur due to financial problems alongside insufficient development guidance during their initial operational period. Groundbreaking research discoveries remain isolated in laboratories since they fail to enter the commercial market as marketable products. The underusage of available talent represents a significant problem amongst robotics professionals. The lack of suitable project assignments for skilled professionals creates career stagnation by diminishing their professional advancement as well as withholding field-related contributions to research.

1.2 Solution to the Problem

Objective: The objective of Robo Hatch is to create an integrated platform that brings together freelancers and companies in the robotics industry. By leveraging state of the art technologies, Robo Hatch aims to streamline the development of robots by facilitating seamless collaboration across different stakeholders.

Proposed Solutions: A structured robotics development marketplace exists as the proposed solution for resolving these challenges. The platform integrates all robotics development

activities by allowing professionals to work with startups and companies who collaborate on planning stages alongside designing and prototyping and programming and testing and deployment and maintenance procedures. The platform applies artificial intelligence functions to provide recommendations about freelancers along with outsourcing partners that fit particular project needs. The platform will assist organizations to discover appropriate candidates which minimizes their expenses in talent recruitment.

The marketplace introduces pricing arrangements to help businesses lower their expenditures for prototype development and hardware testing. Through this process companies can delegate particular development work to expert professionals who will operate under their project oversight. The platform will use an escrow system which protects secure financial transactions between buyers and sellers and avoids fraudulent transactions. The platform develops a research and development hub specific to robotics which enables businesses to work together on innovations and speed up their robot commercialization process.

Functionalities: Through its main offerings the platform enables users to achieve complete collaboration with step-by-step innovation functions.

- **Freelancer Accounts:**

Robotics professionals who are planners, 3D model designers along with software developers can make account registrations that enable them to list their services. Through the platform freelancers can offer their research papers as well as their 3D designs together with software codes and other development assets for purchase to companies which need help in their projects.

- **Team Accounts:** The platform offers registration access for robotics project teams. The minimal team membership must exceed ten members because it enables teams to possess both essential expertise and a large-scale workforce needed for significant robotics development responsibilities. Every team have the ability to provide specialized services while testing and debugging and integrating robotic systems thus enabling their participation in projects without establishing a formal company. The absence of direct product selling rights does not prevent them from delivering essential development and troubleshooting services.

- **Company Accounts:** The robotics research, prototyping and commercialization businesses can open validated accounts through the platform interface. Complete marketplace access will be available to these companies so they can both hire freelancers as well as acquire research and assign robotics development tasks to external providers. Companies through this platform can market their robotics products after innovation development finishes to enable commercial operational expansion of their new technologies.

- **AI-Powered Recommendations:** The matchmaking system for professionals to find projects benefits from artificial intelligence optimization as its primary function. The system uses AI to examine project demands then generate recommendations about the ideal candidates between freelancers and outsourcing partners. The system will allow companies to discover local production centers for prototyping and deployment essentials to decrease their cost structure.

- **Project Lifecycle Management:** Project lifecycle management tools will operate at full transparency and maximum efficiency on the platform. The platform allows teams to track project developments through combination of video logs and reporting features and milestone updates. Platform users will receive features which allow them to embed software programs directly into physical test models for checking integration points and operational needs. Testing teams along with debugging personnel will confirm projects for safe deployment through validation processes thereby reducing the chance of system flaws.

Feasibility of the Solution: As it makes use of modern technologies such as artificial intelligence, cloud computing, and secure online transactions, the proposed approach is theoretically feasible. Financially, the platform will enable freelancers, teams, and organizations to make money by providing services while also earning commissions on good transactions. The system is also extremely expandable, since it can enable worldwide collaboration, reach new industries, and connect other features like robotics certifications.

Impact on Societal, Health, Safety, Legal, and Cultural Issues: The platform will be very important in several different areas. From a society point of view, it will open employment for robotics experts and help robotics innovation expand. Regarding health and safety, it will encourage the creation of automated solutions to lower human intervention in dangerous environment so improving workplace safety. Legally, it will create a disciplined framework to control contracts, protect intellectual property, and control transactions. Culturally, the platform will support worldwide cooperation by grouping experts from many backgrounds to work on innovative robotics projects. The impact of Robo Hatch will be deep-seated in many ways.

- **Social Impact:** By facilitating it to be easier for freelancers to collaborate with corporations, Robo Hatch can make the global robotics industry expand, allowing for quicker breakthroughs and robots at affordable prices. It can enable individuals to become capable of selling their expertise remotely, their advantage as well as the corporations with whom they collaborate.
- **Health & Safety:** Robots are being applied more and more in areas like healthcare (surgical robots, elderly care robots) and industrial automation. Robo Hatch's platform will ensure quality and safety standards are upheld, helping to create robots enhancing human life while minimizing risks.
- **Legal and Cultural Issues:** The platform will be based on international labor laws to provide an ethical and transparent work culture. Besides, it will allow cross-cultural interaction through uniting companies and freelancers from different countries and helping them share knowledge.

Target Group of Users: The platform is designed for different numbers of users, including freelancers working with robotics planning, 3D modeling, and software development. It also will serve teams engaged in robotics research, prototyping, testing, deployment, and maintenance. The products of the platform will also help companies obtaining market-ready robotics solutions.

Benefits to Users: Freelancers working on a worldwide marketplace in which they can sell their skills and research, while companies will benefit from a streamlined development process without a huge overhead. Teams will have the ability to work together, within the context of robotic projects, without needing to invest significant resources up front. Because it will help customers with pre-tested, validated and ready-to-employ robotics solutions.

Scientific Contribution: The platform supports scientific developments through standard operating procedures for robotic development. Different engineering disciplines will improve collaboration through the platform alongside AI-based project optimization by matching engineering teams. The platform enables fast prototyping along with testing support which stimulates emerging technology development leading to the quickest possible innovation in robotic systems.

Literature Review: The robotics development sector has witnessed considerable expansion with a lot of platforms that facilitate interaction between professionals and companies. Most existing solutions primarily address freelancing services as a whole, such as Upwork and Fiverr, that provide a platform for the hiring of talent. These platforms lack a dedicated system for robotics development, wherein there is in-depth technical cooperation over multiple stages, from designing to deployment. Certain industry-specific platforms, such as GrabCAD for 3D modeling and GitHub for software development, mitigate certain aspects of robotic development but fail to provide a complete integrated workflow for both hardware and software integration.

Robo Hatch seeks to fill this vacuum by offering a specialist platform that simplifies the whole robotic development process. Unlike traditional freelancing websites, it facilitates structured project collaboration such that companies can transition from concept to launch with ease by engaging the appropriate specialists at each step. Through AI-driven suggestions, team building, and real-time collaboration tools, Robo Hatch extends the scope of existing solutions and provides a more efficient and scalable method of robotics project management.

Existing Software Solutions: There exist several software solutions that are presently available to address different areas of robotics development. Computer-aided design software like AutoCAD and SolidWorks is usually used for designing robot parts, while freelance sites like Upwork and Fiverr allow companies to look for specialists in many areas. Further, project management software like Trello and Asana help to monitor progress and workflow management. But these solutions are independent of each other, resulting in inefficiencies in collaboration and coordination. Robo Hatch seeks to build upon these available solutions by creating a single platform that integrates freelance services with corporate collaboration seamlessly so that there is improved coordination in all phases of robot development. It will introduce AI-driven matchmaking to pair the right professionals with projects, incorporate expert tools tailored for robotics development, and offer local services to allow companies to scale production efficiently.

Conclusion: The proposed platform serves the purpose of connecting robotics planning activities to prototypes through software development before releasing products for commercialization. The implementation of AI recommendations together with secure

transactions and outsourced support functions will develop a cost-efficient robotics development environment. The established collaboration approach provides assistance to freelancers and corporations along with teams and supports robotic innovation worldwide.

References:

1. IEEE Robotics and Automation Society. "Advancements in Robotics Development Platforms." 2023.
2. Smith, J. "AI-Powered Marketplaces and Their Impact on Engineering Collaboration." Journal of Robotics Research, 2022.
3. European Union. "Legal Framework for Robotics and AI-Based Transactions." 2021.
4. McKinsey & Company. "The Future of Robotics Development: Trends and Challenges." 2023.
5. International Journal of Automation and Computing. "Scalability in Robotics Development Platforms." 2023.