



AMERICAN INTERNATIONAL UNIVERSITY–BANGLADESH (AIUB)

FACULTY OF SCIENCE & TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE

SOFTWARE ENGINEERING

EVA ANALYSIS AND RISK MANAGEMENT ON

Robo Hatch - A Robotics Development Platform

Supervised By

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Spring 2024-25

Date of Submission: **26 May, 2025**

Effort Table on Project Tasks

No.	Project Tasks	Planned Effort (hrs)	Actual Effort (hrs)
1	Stakeholder Identification	2	2
2	Initial Requirement Gathering	3	3
3	Competitive Analysis	2	2
4	Feature Brainstorming & Categorization	3	3
5	Technical Feasibility Study	2	2
6	Legal and GDPR Feasibility Review	2	2
7	Financial Viability Study	2	2
8	Risk Identification Workshop	2	2
9	Risk Mitigation Planning	2	2
10	Project Charter Finalization	1	1
11	User Role Matrix Design	2	2
12	Functional Requirement Specification	3	3
13	Non-Functional Requirement Spec	2	2
14	Use Case Modeling (All roles)	4	4
15	Flowchart Creation (Process-level)	2	2
16	UI Wireframes (Freelancer side)	2	2
17	UI Wireframes (Company/Team)	2	2
18	UI Wireframes (Admin)	2	2
19	User Journey Mapping	2	2
20	Prototyping (Low-Fidelity)	3	3
21	Prototyping (High-Fidelity)	3	3
22	Feedback Collection (Prototype)	2	2
23	Adjustments from UI feedback	2	2
24	Entity Relationship Diagram (ERD)	2	2

25	Database Schema Design	3	3
26	DB Normalization	2	2
27	Table Indexing & Optimization	2	2
28	Tech Stack Finalization	1	1
29	Backend Framework Setup	2	2
30	Frontend Framework Setup	2	2
31	Version Control (GitHub Repository)	1	1
32	Registration Module – UI	2	2
33	Registration Module – Logic	2	2
34	Email/OTP Verification Logic	2	2
35	Login, Logout, Session Handling	3	3
36	Forgot Password, 2FA Logic	2	2
37	Freelancer Dashboard – UI	2	2
38	Freelancer Dashboard – Backend	2	2
39	Company Dashboard – UI	2	2
40	Company Dashboard – Backend	2	2
41	Admin Dashboard (All Controls)	3	3
42	Research Upload UI	2	2
43	Research Upload Validation	2	2
44	Research Licensing and Pricing	2	2
45	CAD Upload UI	2	2
46	CAD Upload Validation & Parsing	2	2
47	CAD Purchase & Preview Logic	3	3
48	Task Posting by Companies	2	2
49	Task Matching Logic (AI Input)	3	3
50	Freelancer Application System	2	2

51	Company Task Approval System	2	2
52	AI Preference Collection Form	2	2
53	AI Model Development (ML Flow)	4	4
54	AI Matching – Training	3	3
55	Matching Engine – Integration	3	3
56	Matching Result Evaluation	2	2
57	Match Scoring and Ranking	2	2
58	Skill-based Filtering System	2	2
59	Review & Rating Engine	2	2
60	Wallet System (Top-up, Withdrawal)	3	3
61	Transaction History Module	2	2
62	Escrow Logic for Payments	3	3
63	Admin Finance Dashboard	2	2
64	Chat Module (Freelancer, Company)	3	3
65	Message History Storage	2	2
66	Notification Module	2	2
67	Notification Preferences Panel	1	1
68	Community Feed UI	2	2
69	Feed Moderation Logic	2	2
70	Sponsorship Portal – UI	2	2
71	Sponsorship Request Logic	2	2
72	Project Delivery Management Panel	2	2
73	Feedback Collection UI	2	2
74	Feedback Analysis Dashboard	2	2
75	Admin Reports – Usage Metrics	2	2
76	GDPR Compliance Module	2	2

77	Security Audit Tools Integration	2	2
78	File Encryption Logic	2	2
79	Intrusion Detection Alert System	2	2
80	Patch Management Panel	2	2
81	Dynamic Role Permission Logic	2	2
82	Test Case Writing – Unit	3	3
83	Test Execution – Unit	3	3
84	Test Case Writing – Integration	2	2
85	Test Execution – Integration	3	3
86	Test Case Writing – Security	2	2
87	Test Execution – Security	2	2
88	Load Testing & Metrics	2	2
89	Regression Testing Rounds	2	2
90	Final System Testing	2	2
91	Setup – AWS EC2 & S3	2	2
92	Setup – Azure Backup	2	2
93	Setup – DNS & SSL	2	2
94	CI/CD Pipeline via GitHub Actions	2	2
95	Docker Containerization	2	2
96	Kubernetes Deployment (Staging)	2	2
97	Final QA in Staging	2	2
98	Production Deployment	2	2
99	Post-launch Monitoring	2	2
100	Crash Report System	2	2
101	Bug Reporting Portal	2	2
102	Post-launch Patch Deployment	2	2

103	User Training Docs	2	2
104	Live Training Sessions	2	2
105	Tutorial Video Production	2	2
106	Launch Event Planning	2	2
107	Public Relations Content	2	2
108	Social Media Campaign	2	2
109	Newsletter Integration	1	1
110	Early Access Program Management	2	2
111	Onboarding Enhancements	2	2
112	Community Moderation Panel	2	2
113	Project Showcase UI	2	2
114	Freelance Leaderboard & Gamification	2	2
115	Role Upgrade Automation	2	2
116	Sponsor Approval Workflow	2	2
117	Project Revisions Management	2	2
118	Feedback-Based Iterations	2	2
119	Project Archiving System	1	1
120	Documentation Finalization	2	2
121	Final Project Review with Stakeholders	2	2

Total Effort: BAC (Planned Effort) = ~250 hours

EVA Calculations:

Metric	Value
BAC (Budget at Completion)	250 hrs
BCWP (Earned Value)	215 hrs
BCWS (Planned Value)	230 hrs

ACWP (Actual Cost)	200 hrs
SPI (Schedule Performance Index)	0.935 (BCWP / BCWS)
SV (Schedule Variance)	-15 hrs (BCWP - BCWS)
CPI (Cost Performance Index)	1.075 (BCWP / ACWP)
CV (Cost Variance)	15 hrs (BCWP - ACWP)

Performance Indicators

Indicator	Status	Meaning
$SPI < 1$	Behind Schedule	You're delivering less value than planned in the same time.
$CPI > 1$	Under Budget	You're spending less than planned to deliver the earned value.
$SV < 0$	Negative	You're 15 hours behind your original plan.
$CV > 0$	Positive	You're saving 15 hours' worth of cost.

Completion Percentages

Metric	Value
% Schedule Completion (BCWS / BAC)	92% (230 / 250)
% Work Completed (BCWP / BAC)	86% (215 / 250)

Explanation of EVA for Robo Hatch

The Earned Value Analysis (EVA) reveals how the Robo Hatch project is performing in terms of schedule and budget:

- The total planned effort (BAC) is 250 hours.
- 230 hours of work were scheduled to be completed (BCWS), and 215 hours of actual value was earned (BCWP).
- This means the project is behind schedule, with a Schedule Performance Index (SPI) of 0.935, and a Schedule Variance (SV) of -15 hours.
- The actual cost incurred (ACWP) is 200 hours, meaning the team is under budget.

- The Cost Performance Index (CPI) is 1.075 and the Cost Variance (CV) is 15 hours indicating efficient resource utilization.

Risk Management

Risk	Category	Probability	Impact	Risk Mitigation, Monitoring, Management
1. Underestimation of development effort	Project Scope	65%	3	Mitigation: Break down tasks in detail with buffer. Monitoring: Weekly progress reviews against milestones. Management: Add flexible sprint backlog for overflows.
2. Hardware team delay (due to supply chain issues)	Technical Execution	60%	3	Mitigation: Pre-order critical parts and define alternate vendors. Monitoring: Track shipping timelines. Management: Maintain buffer in hardware phases.
3. AI model accuracy fails for task-user mapping	AI and Data	50%	2	Mitigation: Use hybrid rule-based fallback logic. Monitoring: Measure success rate in live testing. Management: Retrain model and allow manual override.
4. Security vulnerability in freelancing module	Compliance and Security	70%	3	Mitigation: Perform code audits and threat modeling. Monitoring: Set up intrusion detection, audit logs. Management: Regular patching and pen-testing.
5. User adoption resistance (new platform behavior)	Business/User	50%	2	Mitigation: Early user demos and onboarding flows. Monitoring: Track usage behavior analytics.

				Management: Incentivize usage, update based on feedback.
6. Cloud infrastructure scalability bottleneck	Deployment and Environment	40%	2	Mitigation: Use scalable cloud services (K8s, autoscaling). Monitoring: Cloud dashboards & load tests. Management: Adjust resources based on load metrics.
7. Misalignment between freelancer and company expectations	Business/User	55%	3	Mitigation: Define clear task requirements and contracts. Monitoring: Project manager moderates task delivery. Management: Add milestone payments and conflict resolution features.
8. GDPR or local compliance gaps in data handling	Compliance and Security	50%	2	Mitigation: Data encryption and pseudonymization. Monitoring: Conduct audits and maintain logs. Management: Align platform with legal advisor review.
9. Multiple team dependencies cause bottlenecks	Project Scope	60%	3	Mitigation: Use dependency maps and cross-team sync-ups. Monitoring: Blocker tracking in task boards. Management: Adjust task sequencing and ownership quickly.
10. Talent availability gap for specialized AI tasks	Human Resources	40%	3	Mitigation: Hire early or outsource niche AI work. Monitoring: Skill matrix tracking and training schedules. Management:

				Maintain freelancer bench or backups.
11. Server cost overruns (esp. in testing and deployment)	Compliance and Security	55%	2	Mitigation: Use test environments and reserved instances. Monitoring: Track billing and resource usage. Management: Set hard budget alerts and limit resource-intensive tasks.
12. Poor cross-platform UX performance	Technical Execution	50%	2	Mitigation: Cross-device testing from day one. Monitoring: Browser/device testing logs. Management: Refactor with adaptive design components.
13. Delay in sponsor payouts or payments	Business/User	45%	3	Mitigation: Use escrow or milestone payment plans. Monitoring: Automate payment tracking. Management: Lock work delivery to payment fulfillment.
14. Version conflicts during rapid module updates	Technical Execution	60%	2	Mitigation: Set code freeze dates before major merges. Monitoring: CI/CD version logs. Management: Enforce semantic versioning and rollback tools.
15. Misuse of community features (abuse, spam)	Business/User	40%	2	Mitigation: Use content moderation tools. Monitoring: Flag reports and suspicious activity. Management: Set up moderation team or AI auto-flagging.