Project Name: AI-Powered Elderly Health Monitoring System

Team members:

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- Hemanth Kumar Reddy Gunnam
- Durga Pravallika Kuchipudi

Table of Contents

Project Overview:

The project aims to develop an AI-powered elderly health monitoring system that leverages advanced algorithms to analyze vital signs, activity patterns, and behavioral data. It includes user-friendly interface design, integration with existing healthcare systems, and wearable devices for real-time monitoring. The system's goal is to bridge gaps in traditional monitoring methods, ensuring timely intervention and support for elderly individuals to enhance their overall health and well-being.
The estimated cost of the project is $100,000, covering development, licensing, integration, and ongoing maintenance expenses.

Milestones of the project:

1. AI algorithm development and interface design – 1 month
2. Integration with existing systems and wearables – 1 month.
3. Pilot program implementation across varied care settings – 15 days.
4. Evaluation of system effectiveness and user feedback analysis – 7 days
5. Ongoing maintenance and updates – 7 days.

Project Goal: Our project's overarching objective is to enhance the quality of care for elderly individuals by providing comprehensive and timely health monitoring solutions. By implementation of AI algorithms and user-friendly interfaces, we aim to empower caregivers and healthcare professionals to deliver personalized support, ultimately improving the health outcomes and quality of life for the elderly population.

Problem Addressed and Potential Impact: The project addresses challenges in elderly healthcare by leveraging AI for proactive monitoring and intervention, aiming to improve well-being and reduce healthcare costs. The project could significantly impact the lives of elderly patients by enabling early detection and personalized interventions, it revolutionizes elderly health monitoring, impacting individuals, caregivers, and healthcare providers positively.

Rationale for Project Selection and Selection Criteria: The AI-powered elderly health monitoring system was selected to urgently tackle healthcare challenges amid the growing elderly population, informed by extensive research and user feedback, acknowledging the pressing shortage of caregivers and the demand for innovative solutions. The project was chosen for its potential impact on elderly health, feasibility, scalability, and ethical considerations, given the shortage of caregivers and regulatory needs.

(Source: GCOA & Home Instead report – Building the Caregiving Workforce Our Aging World Needs) [2]

According to the Global Coalition on Aging report, "Across OECD countries, the number of elder care workers will need to increase by 60% by 2040 to maintain the current ratio of caregivers to older people" In numbers, that is 13.5 million new care workers. In the U.S., where 70% of Americans who reach age 65 will need long-term services and support, there will be a national shortage of 151,000 care workers by 2030, and a 355,000-caregiver shortfall by 2040.[2]

Project Initiation:

Deliverables: The deliverables applicable to this phase include Project Charter, Stakeholder Analysis, Project Management Plan, Business Case, Project Initiation Report, Project Timeline. These deliverables are essential as they establish the project's foundation, scope, stakeholders, management approach, feasibility, and initiation process, ensuring clarity, alignment, and commitment for successful execution. The diagram below illustrates the meticulously planned project timeline followed in our project:

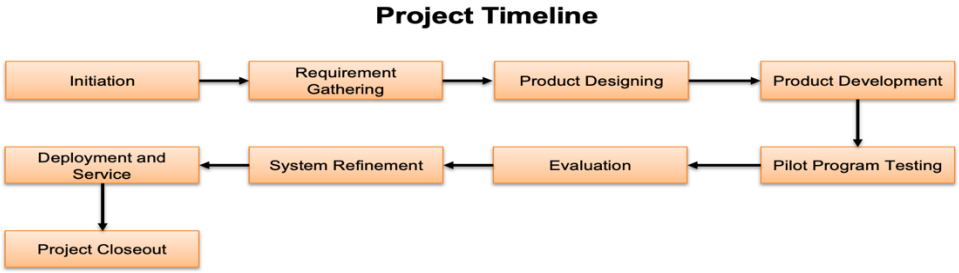

Fig 1: Project Timeline

Crafting a comprehensive timeline not only enhances stakeholder understanding of the project's progression but also facilitates efficient coordination, communication, and decision-making throughout the project lifecycle, ensuring timely delivery of project milestones.

Purpose and value: The AI-Powered Elderly Health Monitoring System project leverages AI to address healthcare challenges faced by the elderly, aiming to develop a comprehensive system for early detection, personalized interventions, and efficient stakeholder communication. Revolutionizing elderly health monitoring, the project offers proactive care solutions, prolonging independence, reducing healthcare costs, and enhancing the quality of life for elderly individuals and caregivers.

Stage Gates:

- App feature development & AI algorithm integration – 1 month.
- User testing and feedback iteration – 1 month.
- Quality assurance and system optimization – 15 days.
- Deployment and ongoing maintenance – 15 days.
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Stakeholders:

- Team Members: Aamera Shaikh, Namratha Shivani Chalasani, Mahamadoun Touré, Hemanth Kumar Reddy, Durga Pravallika Kuchipudi.
- Project Sponsor: IUPUI
- Elderly Individuals and Caregivers
- Healthcare Providers and Institutions
- AI Technology Providers
- Regulatory Authorities

Project Sponsor: The Project Sponsor, IUPUI, plays a critical role in providing support, resources, and strategic guidance. Their involvement is essential for securing funding, overcoming obstacles, and ensuring the project's success.

Criteria: The selection of the AI-Powered Elderly Health Monitoring System project was based on specific criteria, including its potential impact on elderly health outcomes, feasibility of implementation, scalability to diverse care settings, sustainability for long-term deployment, and alignment with ethical and regulatory standards. The project's condensed timeline of three months ensures significant results.

Project monitoring and control:

Deliverables: To guarantee that the AI-Powered Elderly Health Monitoring System project is delivered in line with its set scope, time, budget, and quality objectives, there have been identified several critical key deliverables that the project manager needs to pay pivotal attention to in the monitoring and controlling phase of the project. The pie chart depicting budget evaluation is presented below:

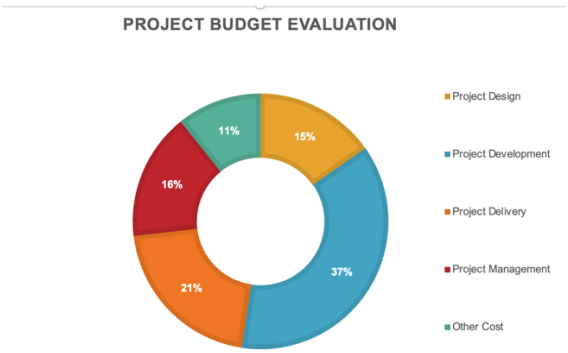

Fig 2: Project Budget Evaluation

Progress Reports and Performance Metrics: Progress Reports and Performance Metrics are documenting that measure, in time, the status of projects and actual project performance against the planned project objectives. This ensures an early correction provided in case of deviation from the plan.

Risk Registers: Documented identified risks, potential impact, and mitigation strategy, thereby instrumental to remain proactive of uncertainties likely to impact the project's trajectory.

Issue Logs: This helps to maintain the log of the issues arising during the development process for systematic tracking and resolution, maintaining continuous process and quality standards.

Change Requests: Since the change management is very important to any scope creep and makes, to a point, even all the stakeholders have an identical view concerning the current state of the project, formal documentation of any change in scope or project objectives should be required.

Purpose and Value: The primary goal of project monitoring and control is to verify that deliverables are consistent with user requirements and project objectives. This phase enables the monitoring of project progress, allowing for the prompt discovery and rectification of any deviations from the project plan. Monitoring and managing activities provide value to the project by allowing the management team to make more informed decisions. These actions guarantee that the project adheres to the set limitations and provide quality assurance throughout the development process.

Tools and Value: The project was monitored and controlled using the tools and resources like Gantt Charts, Frequent gatherings and status reports, User feedback mechanisms which were selected based on their ability to facilitate decision-making and offer clarity. The project's ability to retain a user-centric development strategy and adapt to changing requirements is evidence of the usefulness of these monitoring and controlling activities. This has been essential in creating a system that satisfies both the technological requirements and the practical requirements of senior participants and their careers.

Permissible Monitor and Control Deviations: To provide flexibility without having a substantial impact on the project's critical path, the acceptable variation limits for this project were set at 5% for the budget and 2 days for the schedule each phase. These boundaries allowed us to accommodate unanticipated circumstances while still controlling the project's course and results.

Project Planning:

The planning phase brings clarity and direction to the project, ensuring that everyone involved understands the objectives, scope, and requirements. It minimizes risks, enhances communication, and enables efficient resource allocation, setting the stage for successful project execution. Investing in meticulous planning upfront saves time, resources, and effort in the long run, contributing significantly to project success.

Deliverables: During the project planning phase, several key deliverables were identified and produced. These included Project Charter, Project Plan and Timeline, Work Breakdown Structure (WBS), Gantt Chart, Risk Management Plan. The Gantt Chart depicting the project timeline is given below:

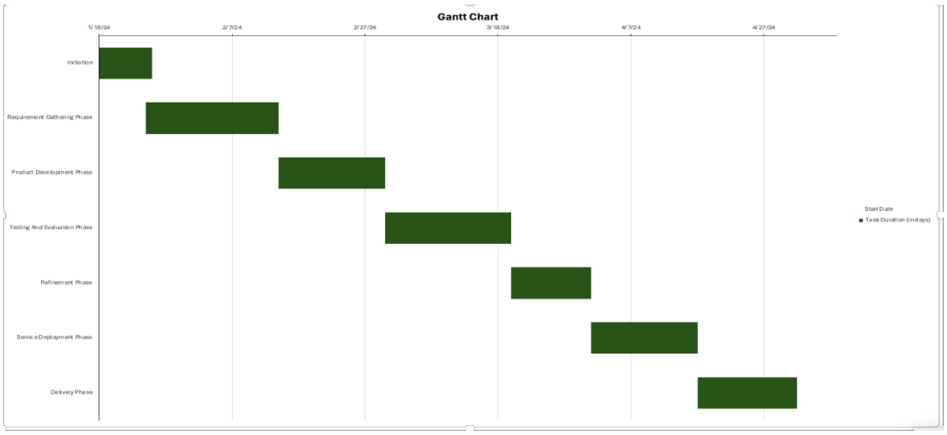

Fig 3: Gantt Chart

Purpose and value: The primary purpose of these deliverables is to provide clear guidance and direction to the project teams and the stakeholders. It also focuses on facilitating straightforward tracking of task dependencies and progress throughout the entire project lifecycle.

Stage Gates: Three critical stage gates have been established to determine the project's progression: Firstly, the completion and approval of key planning deliverables signify the formal conclusion of the planning phase, ensuring stakeholder alignment. Secondly, alignment with stakeholder requirements ensures that project goals and deliverables are in line with stakeholder expectations. Lastly, a readiness assessment before project execution evaluates the project's overall preparedness for transitioning from planning to execution.

Tools and value: Various advanced tools and technologies have been utilized for effective project planning and management, including Microsoft Project for task management and scheduling, communication tools like Slack and Teams for seamless information sharing, document management systems such as Google Drive and SharePoint, and dynamic collaboration platforms like Zoom.

Execution Time: Overall, the planning phase accounted for approximately 20% of the total project duration, ensuring meticulous preparation and alignment before project execution.

Project Execution:

Deliverables: The key deliverables of this phase include Completed project work, Progress reports Change requests, Issue log, Risk Management strategies.

Purpose and Value: The project execution deliverables aimed to build and deploy a functional monitoring system, allocate resources effectively, maintain high-quality standards, ensure effective communication, and manage risks proactively. These deliverables added value by ensuring timely and successful completion of project milestones, meeting project objectives, and delivering a reliable AI-powered health monitoring system to improve healthcare outcomes.

Stage Gates: Stage gates included completion and approval of system development, resource allocation plans, quality assurance tests, communication protocols, and risk management strategies.

Tools and Resources: During project execution, we utilized project management tools like Jira and Trello for task tracking, and platforms such as Slack and Microsoft Teams for seamless communication. Additionally, we employed risk management software to monitor and mitigate project risks effectively. Human resources included a dedicated project team, subject matter experts, and external consultants, while technology resources comprised software development tools, cloud services, and hardware infrastructure. This streamlined resource management contributed to project success.

Execution Time: Approximately 60% of the project timeline was dedicated to the execution phase, covering system development, quality assurance, resource allocation, communication, and risk management activities.

Project Closing:

Deliverables: The key deliverables of this phase included Final Project Report, Project Documentation, Stakeholder acceptance, and Project Closure Form.

Purpose of Closing Deliverables: These deliverables served to conclusively document the completion of the project, ensuring that all goals were met, and that the system was fully operational and ready for ongoing use. They facilitated the formal decommissioning of the project team and resources, allowing stakeholders to reallocate assets to new initiatives.

Value Added by Closing Deliverables: The closing documents encapsulated the entire project lifecycle, providing a definitive end and formal closure. They serve as a vital reference for assessing the project's success, understanding its impact, and guiding future projects. Additionally, they ensure that all learning is documented, which is crucial for continuous improvement in technology deployment and project management practices.

Approvals Required: Project closure required final approvals from stakeholder and their signature on the final project report.

Tools and Resources Utilized: Throughout the project's closing phase, we utilized various tools and resources, including collaboration platforms, communication tools, and project management software. These technologies enabled us to effectively monitor project documentation and ensure that all stakeholders had provided approval for the deliverables.

Importance of Formal Closure: A formal closure was critical to ensure that the project did not continue to consume resources beyond its useful life. It provided a clear transition point from project completion to operational maintenance, securing the sustainability of system benefits over the long term.

Project Impact and Reflection: Our project achieved its core goal of enhancing elderly healthcare through AI-driven innovations. The system has shown potential in improving patient outcomes and operational efficiencies. Lessons learned include the importance of adaptive project management to incorporate user feedback and the critical nature of thorough testing in diverse care settings.

Fulfillment of Goals: The AI-Powered Elderly Health Monitoring System successfully achieved its objective of enhancing elderly health outcomes by leveraging advanced AI technology. By providing proactive monitoring and personalized interventions, the system empowers elderly individuals to prioritize their well-being and maintain optimal health.

Key Lessons Learned: Throughout the project, we learned the importance of stakeholder engagement at every stage, effective risk management strategies, and the crucial role of clear communication and teamwork among project members. These lessons have enhanced our understanding of project management practices and will guide our approach to future initiatives.

Knowledge Gained: Through this endeavor, we delved into the complexities of elderly health monitoring, understanding the root causes of health issues and the significance of early intervention. Additionally, we gained insights into the methodologies and therapies essential for supporting elderly individuals in managing their health effectively. This project provided valuable experience in project management techniques and resource utilization, enriching our capabilities for future endeavors in addressing public health concerns. Moreover, we have expanded our understanding of the ethical considerations and regulatory requirements surrounding healthcare technology implementation, ensuring the responsible and compliant deployment of future monitoring systems.

References:

The project was successfully developed by referring to class modules, presentations provided, and the book listed below:

1. Schwalbe, K. (2019). Information Technology Project Management (9th Edition). Course Technology, Cengage Learning. ISBN-13: 978-1-337-10135-6.

2. Global Coalition on Aging. (2021, July). Building the Caregiving Workforce Our Aging World Needs [PDF]. https://globalcoalitiononaging.com/wp-content/uploads/2021/06/GCOA_HI_Building-the-Caregiving-Workforce-Our-Aging-World-Needs_REPORT-FINAL_July-2021.pdf