

# COMPARISON OF VARIOUS AI TOOLS & TECHNIQUES IN SOFTWARE PROJECT MANAGEMENT

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**Abstract**— AI has become a transformative solution in project management. It can automate repetitive tasks, enhance data-driven decision-making, and improve overall project efficiency. This study aims to analyze various AI tools and techniques used in project management, including scheduling, data collection, and resource management. The research also highlights different AI approaches, such as Machine Learning, NLP, deep learning, and Simulation and Modeling, to provide a comprehensive understanding of AI's impact on project management.

The literature review summarize the transformation from traditional methodologies to the adoption of AI in project management. It highlights the growing optimism surrounding AI's capacity to revolutionize project management, particularly in agile methodologies, decision support, and software project management. Furthermore, it anticipates a fundamental transformation in the Software Development Lifecycle (SDLC) driven by generative AI technologies. As the project management landscape continues to evolve, a comprehensive comparative analysis of specific AI tools and approaches is essential to grasp their significance in project management.

## 1 INTRODUCTION

In the fast-changing world of project management, Adding Artificial Intelligence (AI) in different fields has overcome new challenges and problems. In the current era mostly project management is done through manual approaches from data collection to decision making and from development approach to testing all these are done mostly through human interception. Artificial intelligence (AI) is growing as a key component of modern project management techniques that can automate repetitive processes, improve data-driven decision-making, and increase overall project efficiency.

This study paper's main goal is to undertake a thorough analysis of the various AI tools and techniques used in project management. These tools include Automation Tasks such as scheduling, data collection, Resource forecasting to help project managers in predicting future resource allocation. This research also aims to shed light on the many approaches of AI such as implementing Machine Learning, NLP, deep learning, Simulation and Modeling. This study aims to give a comprehensive understanding of the use of AI and how it affects project management.

## 2 LITERATURE REVIEW

The adoption of AI in project management represents a great change from traditional methodologies. Growing optimism surrounding AI's potential to revolutionize pro-

ject management, with discussions centering on the eventual replacement of human project managers. While early iterations of Automated Project Management Systems (APMS) were lack of AI capabilities, contemporary AI-driven approaches have reignited interest [1]. Applications of AI in agile project management, is a paradigm that emphasizes on iterative development and stakeholder involvement. Agile methodologies have gained prominence due to their ability to adapt to changing project requirements. AI technologies, such as machine learning-based project management, are increasingly being used to enhance and accelerate productivity in project management [2].

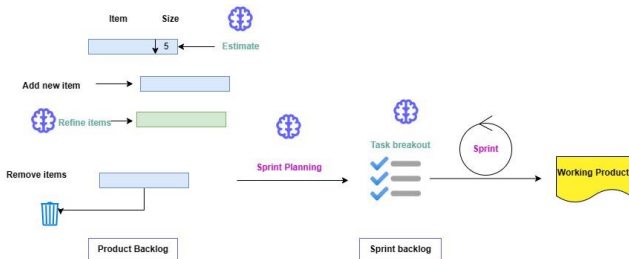


Fig 1: A typical agile process

Effective decision-making is paramount in project management. AI's role in decision support by improves data quality and integrity. Through a combination of secondary and primary research, AI applications lead to improved speed and effectiveness in decision-making across single and multiple project environments [3].each Software development project has unique challenges, and AI is making ease in addressing them. AI supports software project managers in critical areas such as project scheduling and software effort estimation. AI-driven tools provide project managers with valuable insights, enhancing their ability to plan, allocate resources, and mitigate risks effectively [4].

The future of AI in project management is a subject of great interest. [5] Anticipates a fundamental shift in the Software Development Lifecycle (SDLC) catalyzed by generative AI technologies. This changes have the potential to reshape project management practices and workforce dynamics.

In this rapidly evolving landscape, understanding the use of AI tools and approaches in project management is imperative. This literature review sets the stage for a comprehensive comparative analysis, where we will explore the specific AI tools and approaches for project management.

### 3 METHODOLOGY

After analyzing the previous research we conclude that the papers focus on AI topic including AI techniques for Scheduling management and the implementation of AI Algorithms, AI in decision making processes and different tools that involves in project management.

#### 3.1 EXPERT ANALYSIS

Including participants from various software fields, such as software engineers, UX designers, and project managers, is one way to understand the significance of implementing artificial intelligence in software project management. Over two years of experience is possessed by these participants. Through conducting Survey from online google form questionnaire, it is possible to learn how experts from various backgrounds understand the convergence of software project management and artificial intelligence.

#### 3.2 AI APPROACHES FOR SCHEDULE PLANNING

Schedule planning is an optimization problem, utilizing AI approaches like metaheuristics. These algorithms aim to minimize or maximize specific objectives, such as project cost and duration. Different formulations of schedule planning problems were explored, including considerations of task order, employee allocation, and various constraints.

### 3.3 AI TOOL FOR PROJECT MANAGEMENT

In project management, the integration of Artificial Intelligence (AI) tools has become increasingly important. Multiple research articles presented various AI tools designed to enhance different domains of project management. These tools are created to streamline processes, improve decision-making, and optimize resource utilization. Let's explore into the details of some of these significant AI tools:

#### 1. Clickup:

- **Functionality:** Clickup is a flexible software project management tool. Its algorithm facilitates optimal task assignments by considering task complexity and aligning it with individual team members' skill sets.
- **Features:** In addition to task assignment, Clickup provides visual representations of project updates and notifications. This feature helps project managers in tracking project progress and estimating realistic completion timeframes.

#### 2. Chatbots:

- **Purpose:** AI-powered chatbots simplify the communication between project managers and team members.
- **Benefits:** These bots autonomously gather information, such as work progress and completed tasks, directly from team members. This automation simplifies the information-gathering process for project managers.

#### 3. Zivebox:

- **Functionality:** Zivebox serves as a back-end AI tool, offering task duration predictions and generating productivity reports for team members.
- **Database Management:** Beyond task prediction, Zivebox contributes to the organization and sorting of enterprise-level databases, leveraging AI for efficient data management.

#### 4. Rescoper:

- **Predictive Management:** Rescoper specializes in predictive management, providing solutions for complex management aspects. It assists project managers in scheduling tasks based on individual workloads and remaining assignments.

- **Decision Support:** Offering deep understanding into AI software functionality, Rescoper aids project managers in making informed decisions regarding project timelines and resource allocation.

#### 5. Polydone:

- **Automation:** Polydone powers AI and machine learning to automate budget and time management for projects. This automation ensures optimal resource utilization and provides project managers with intuitions into scheduling and task allocation.

#### 6. Clarizen:

- **Cloud-Based Automation:** Clarizen focuses on automating business processes through cloud-based applications. It facilitates data sharing and tracking, enabling project managers to access valuable information for decision-making across various scenarios and workflows.

#### 7. Trello:

- **Visual Task Management:** Trello utilizes boards, lists, and cards to visually organize tasks and projects.
- **Collaboration:** Its user-friendly interface promotes collaboration, making it easy for teams to coordinate on different tasks.

#### 8. Jira:

- **Agile Project Management:** Jira is widely used for agile project management, providing tools for planning, tracking, and releasing software.
- **Integration:** It seamlessly integrates with various development tools, creating a centralized hub for project management and development.

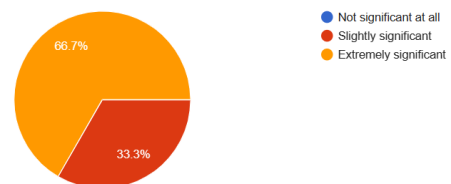
#### 9. Asana:

- **Project Planning:** Asana excels in project planning, allowing users to create tasks, set deadlines, and track project progress.

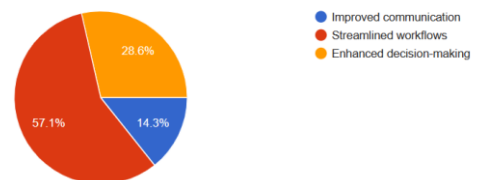
- **Communication:** Its features facilitate communication within teams, ensuring everyone stays informed about project developments.

## 4 RESULT AND FINDING

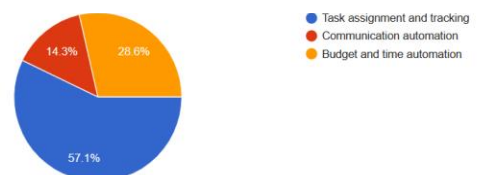
- This finding is based on the proposed method in section (3.1) conclude that mostly experts think it is most significant to implement AI in Software Project Management. While others are slightly significant:



- The below result show that how industry experts think about the AI collaboration in different roles of Software Project Management. People with interest in automated streamlined workflows have a higher ratio.



- The below result show the targeted areas in which people have greater interest of involving AI. Task assignment and project tracking have more interest.



After analyzing various AI tools and algorithms, we conclude that the different stages of the project management life cycle can be improved and made more efficient by integrating AI. The table below shows the different management functionalities and the challenges in these functionalities before AI and the improvements after AI.

Functionality	Challenges/Problems Before AI	Change/Impact After AI Implementation
Task Assignment, Progress Tracking	Manual assignment, Lack of real-time updates	Automated assignment, Real-time tracking
Communication Automation	Manual communication, Delayed responses	Automated communication, Instant updates
Task Duration Prediction	Inaccurate estimations, Overruns	Precise predictions, Reduced overruns
Predictive Management	Limited foresight, Reactive strategies	Proactive decision-making, Risk reduction
Budget and Time Automation	Manual budgeting, Time-consuming	Automated budgeting, Time-efficient
Cloud-Based Automation	On-premise limitations, Data silos	Cloud-based collaboration, Data centralization
Visual Task Management	Complex tracking, Information overload	Simplified visualization, Enhanced clarity
Agile Project Management	Limited flexibility, Inefficient iterations	Enhanced agility, Iterative efficiency
Project Planning	Time-consuming planning, Resource conflicts	Automated planning, Improved resource allocation

Table 1: AI Tools and their impact on SPM

insights, empowering them to plan, allocate resources, and navigate risks with enhanced efficacy.

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## 7 CONCLUSION

Artificial Intelligence (AI) is increasingly being used in project management to enhance productivity and efficiency. AI technologies are particularly useful in agile project management, which is characterized by iterative development and stakeholder involvement. AI-driven approaches are used to support decision-making by enhancing data quality and integrity. AI applications contribute to accelerated and more effective decision-making across both single and multiple project environments. In software development projects, AI provides substantial support to project managers, particularly in critical areas like project scheduling and software effort estimation. AI-driven tools furnish project managers with invaluable

## 8 APPENDIX

Questionnaire:

1. How familiar are you with the concepts of artificial intelligence in software project management?
2. In your opinion, how significant is the integration of artificial intelligence in software project management?
3. How do you think AI can impact the efficiency of software project management processes?
4. How do you believe AI can enhance collaboration among different roles in software development?
5. In which areas of software project management do you see the most potential for AI applications?
6. How open are you to providing feedback for AI-driven software project management tools for continuous improvement?