

Software Project Information System

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Abstract: Today it is digital world, in every organization Computers are playing vital role. The computers are providing good information and knowledge to business on which important decision are being taken. In today's competitive economy information technology is mandatory. Besides providing information the computer software is imitating humans or mimics humans and doing advanced human activities which we are naming as Machine learning, Artificial intelligence, Data Science etc. These advances are happening because of Software Industry. In every Software Organization various software projects / products / services are being developed or build.

As volume and size of these software projects are increasing, managing these software projects is becoming challenging and complex. Every software project needs several resources which are competitive and organizations cannot underutilize or miss utilize the resources. Here the resources can be time, skilled manpower etc.

Today as per industry information in many times the projects are shooting more than estimated cost, time and other resources and all these are attributed to poor project management and project management information.

Hence, we are trying to develop Software Projects Information System (SPIS) that provides all the information relating to projects in an IT industry, that provides tools to plan, track, control, alert, auto modify project parameters and provide valuable information / knowledge about various software projects and their progress.

SPIS is designed to help businesses and individuals to track software projects, tasks and schedules. The core value of this kind of software is its ability to bring structure to complexity. It's a great tool for staying organized and ensuring that team remains on task and aligned with project objectives.

Keyword's: Software Projects Information System (SPIS), Project management, Artificial Intelligence (AI), Project tracking, Resource optimization.

INTRODUCTION

In today's digital era, computers play an

indispensable role across organizations, driving decision- making through the provision of critical information and knowledge. Information technology has become a fundamental necessity in navigating the competitive economy, enabling businesses to achieve their objectives efficiently. Beyond processing data, advancements in computing have given rise to revolutionary fields such as Machine Learning, Artificial Intelligence, and Data Science— technologies that mimic human cognition and perform complex tasks with remarkable precision. These breakthroughs owe much to the dynamic and ever-evolving software industry.

The increasing scope and complexity of software projects in organizations pose significant challenges to effective project management. Each project demands optimal utilization of critical resources such as time, skilled personnel, and budgets. However, in practice, many software projects exceed their estimated costs and timelines, often due to inadequate project management practices and the absence of robust project management tools.

To address these challenges, the development of a Software Projects Information System (SPIS) is proposed. SPIS aims to provide comprehensive insights into project progress within the IT industry, equipping stakeholders with tools to plan, track, control, and optimize project parameters effectively. The system is designed to automate alerts, modify project parameters as needed, and deliver valuable knowledge to ensure seamless project execution.

SPIS brings structure to the inherent complexity of managing multiple software projects, serving as a vital tool for organizing tasks, schedules, and resources. By fostering alignment and accountability among team members, it ensures that projects remain on track and aligned with organizational goals. With SPIS, businesses can navigate the challenges of modern software project management with confidence, efficiency, and precision.

LITERATURE SURVEY

The management of software projects has become increasingly complex due to the growing volume, size, and diversity of projects in the software industry. Various studies have highlighted the critical role of Software Project Information Systems (SPIS) in addressing these challenges by enabling better planning, tracking, and control mechanisms. Existing solutions often focus on providing generic project management features such as task scheduling, resource allocation, and progress tracking [1], [2]. However, these systems frequently lack adaptive capabilities to handle dynamic project environments and personalized insights tailored to organizational needs.

For instance, Gupta et al. (2019) identified that traditional project management tools often fail to mitigate risks proactively, relying instead on reactive measures that can lead to delays and cost overruns [3]. Similarly, Das and Roy (2020) emphasized the need for real-time project monitoring systems that can provide actionable insights and alert mechanisms to pre-empt project bottlenecks [4].

Recent advancements in Artificial Intelligence (AI) and Machine Learning (ML) have introduced opportunities to enhance SPIS functionalities. As noted by Singh et al. (2021), AI-powered systems can optimize resource allocation and predict project outcomes based on historical data and real-time inputs [5]. Additionally, the use of predictive analytics in project management has proven effective in reducing uncertainty and improving decision-making, as demonstrated by Patel and Mehta (2022) [6]. Despite these advancements, there remains a gap in integrating advanced AI features with user-friendly interfaces, which hinders widespread adoption.

Furthermore, studies have explored the integration of Agile methodologies within SPIS to provide flexible and iterative management solutions. Sharma and Jain (2020) discussed the potential of hybrid models that combine Agile practices with AI-based automation to deliver more responsive and adaptive project management tools [7]. However, as highlighted by Lee and Kim (2021), many existing systems lack comprehensive tools for cross-team collaboration, which is essential for large-scale software projects [8].

To address these limitations, the proposed SPIS introduces key innovations designed to enhance project management capabilities. The system leverages Generative AI to provide personalized project insights and adaptive risk management strategies [9], [10]. Additionally, advanced visualization tools enable stakeholders to monitor project progress, identify critical paths, and simulate various scenarios to anticipate potential challenges [11]. By incorporating automated alerts and self-adjusting parameters, SPIS ensures that project timelines and resources are optimized dynamically, reducing the likelihood of delays and budget overruns [12].

The combination of these advanced features empowers organizations to achieve better alignment with project objectives, improve resource utilization, and foster collaboration across teams. By addressing the gaps identified in previous research, the proposed SPIS represents a significant advancement in the field of software project management systems.

METHODOLOGY

Proposed System: The proposed system outlines the comprehensive development process of the Software Project Information System (SPIS), detailing each stage from system design to feature integration, data management, testing, and deployment. This approach ensures an optimized, scalable, and feature-rich platform for managing software projects.

3.1 System Design & Development : The project began with defining the system architecture and selecting an appropriate technology stack to ensure smooth frontend, backend, and database integrations. The system was designed to handle user registration, project management, and real-time project tracking.

3.1.1 Technology Stack

The selection of technologies was based on performance, scalability, and maintainability: Frontend: HTML, CSS, JavaScript (for responsive UI) , Backend: Java Servlets and JSP (for handling requests and responses) , Database: MySQL (for structured data storage) , Security: Password hashing and user authentication

The architecture follows a modular approach,

separating database access logic, business logic, and presentation layers, ensuring better maintainability.

3.2 Feature Implementation

3.2.1 User Registration and Authentication

Implemented secure user registration with role-based access for Marketing, Project Managers, and Team Members. Passwords are hashed before storing in the MySQL database. Implemented login sessions to track authenticated users.

3.2.2 Project Master Form

Designed a form for project creation with fields such as project name, start date, end date, customer ID, and project value. Auto-generates unique project IDs using the 'project master' table. Data is validated before submission to the database.

3.2.3 Customer Profile Management

Added functionality to manage customer details (customer ID, type, and name). Ensures seamless customer selection during project creation.

3.2.4 Project Tracking and Updates

Allows Project Managers to update project progress (status, milestones, deadlines). Real-time data retrieval using servlets to fetch project details from the database.

3.2.5 Reports and Dashboard

Generates detailed project reports based on project status, timelines, and resource allocation. Displays project summaries and critical metrics on a user-friendly dashboard.

3.3 Data Collection and Processing

The system stores and processes project data in MySQL. It collects inputs from project forms and user profiles, ensuring accurate data entry with field validation. Data is processed through DAO classes, ensuring secure and structured database operations.

3.4 Data Quality Assurance (DQA)

Data validation includes verifying project dates, ensuring customer IDs are correctly linked, and preventing duplicate entries. Regular checks are performed to maintain database integrity.

3.5 Performance Evaluation and Testing

Functional testing validated each module, including user registration, project creation, and data retrieval. Load testing was conducted by simulating multiple users accessing the system concurrently. Security testing focused on password encryption and session handling.

3.6 Comparative Study

A comparative study analysed SPIS against traditional project management methods (manual spreadsheets, email tracking) based on efficiency, error reduction, and data retrieval speed. SPIS showed improved data accuracy and streamlined project management processes.

3.7 Iterative Development and Refinements

Based on user feedback, refinements included enhancing the project form's usability, adding search functionality for projects and customers, and optimizing database queries for faster data retrieval. Version control ensured smooth deployment of incremental updates.

The Software Project Information System (SPIS) was designed and developed using a structured and scalable methodology to ensure efficient project management. By incorporating secure data handling, real-time tracking, and user-friendly interfaces, SPIS provides a robust solution to streamline software project processes.

CONCLUSION AND FUTURE SCOPE

The Software Project Information System (SPIS) successfully addresses the challenges of managing software projects by offering a structured and centralized platform. It enhances project tracking, resource management, and data accuracy while providing user-friendly interfaces for seamless interaction. With its secure design and modular architecture, SPIS effectively reduces manual errors, improves productivity, and streamlines project workflows.

Future enhancements for SPIS could include the integration of advanced reporting tools for predictive analysis, real-time collaboration features for project teams, and mobile app support to facilitate project tracking on the go. Additionally, incorporating cloud storage solutions can improve data accessibility and backup options. Continuous user feedback and

iterative improvements will further strengthen SPIS, making it a comprehensive tool for effective project management in the software industry.

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