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JOB MARKET INFORMATION SYSTEM USING EXTREME PROGRAMMING

Agustian William Soen Sirait[1)], Benny Pinontoan[2)], Wisard Widsli Kalengkongan[3)], Eliasta Ketaren[4)]
Program Studi Sistem Informasi
Universitas Sam Ratulangi Manado
Jl. Kampus Unsrat, Bahu Kleak, Manado 95115
email: agustiansirait106@student.unsrat.ac.id[1)], bpinonto@unsrat.ac.id[2)]
wisardkalengkongan@unsrat.ac.id[3)], eliasketaren@unsrat.ac.id[4)]

Abstract
This study presents the development of a web-based job vacancy portal aimed at streamlining employment information access for job seekers and employers. Using the Extreme Programming (XP) methodology, the system was built iteratively with frequent stakeholder feedback to ensure agility and adaptability. The research involved requirement gathering through interviews and observations, followed by designing, coding, and testing cycles. The system features user registration, job posting, search functionalities, and admin management. The results indicate that XP enhanced collaboration, reduced development risks, and delivered a system that meets user needs effectively
Keywords : Job portal, web-based system, Extreme Programming, agile methodology, system development

1. Introduction

The rapid advancement of information technology is a hallmark of modern civilization, profoundly impacting social structures across the globe, including Indonesia. From streaming platforms to virtual reality integration, these developments have reshaped how communities consume content and interact digitally. However, such transformation also brings challenges in data privacy and digital literacy, necessitating wise adaptation to build a connected and resilient society in the digital age [1].

In this context, human resources serve as essential assets for institutions, ranging from governmental bodies and private companies to educational organizations. Technological innovation, especially in information systems, has enabled more efficient data handling, transparent communication, and improved access to employment opportunities [2]. Job vacancy systems, in particular, bridge the gap between employers and job seekers by simplifying recruitment processes and enhancing candidate targeting.

A job vacancy represents an open role in an organization that requires specific competencies and qualifications. Digital job portal systems empower applicants by offering real-time access to opportunities aligned with their skills, while organizations benefit from streamlined hiring procedures and cost-effective talent acquisition strategies [3].

This study aims to design and implement a web-based job vacancy portal using the Extreme Programming (XP) methodology, tailored to the employment landscape of North Sulawesi. XP, as an agile framework, facilitates iterative development and active user involvement, ensuring the system evolves responsively to real-world needs. By focusing on usability, transparency, and accessibility, the proposed platform contributes to improving employment information infrastructure in the region.

Prior research has explored various development approaches for job vacancy systems. Yuda et al. proposed an Android-based application model using the Waterfall method, while Nitu and Sejati adopted the Prototype approach to develop a mobile-friendly portal for vocational school graduates 4][3]. These references underscore the growing necessity of adaptive digital solutions for employment services and inform the design principles of the current research.

2. Literature Review

Website Technology

A website consists of interconnected pages displaying various forms of information such as text, images, sound, and video. These pages can be static or dynamic and are accessible via domains on the World Wide Web. Websites are generally built using Hyper Text Markup Language (HTML) as the core structure for content presentation [1].

Information Systems

Information systems encompass the interaction between data, procedures, and technologies—including hardware and software—to produce actionable information that supports organizational decision-making. These systems function across strategic, tactical, and operational levels and play a vital role in streamlining business activities through structured data management [2].

Job Portals

Job portals are specialized websites that aggregate employment opportunities across various industries. They provide advanced search functionalities enabling job seekers to filter vacancies by criteria such as field, experience, and location. Additionally, job portals offer support resources like résumé guidance and interview preparation tools, making the job search process more efficient [3].

PHP

PHP (Hypertext Preprocessor) is a widely adopted server-side scripting language tailored for web development. It enables dynamic website functionality and integrates seamlessly with databases like MySQL. Its ease of use and versatility make it a popular choice for building scalable and interactive web systems [4].

MySQL

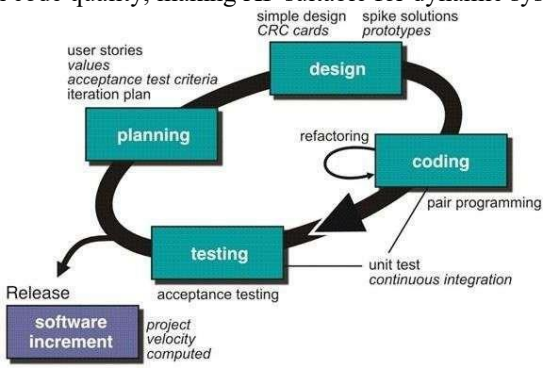
MySQL is a relational database management system that allows efficient handling of structured data using a table-based architecture. It is frequently paired with PHP to create robust backend infrastructures in web applications. MySQL's scalability and reliability make it ideal for developing job portal systems used across varying project scopes [4].

Unified Modeling Language (UML)

UML offers a suite of diagramming tools that assist in software system design and documentation. Use case diagrams illustrate user interactions with system features, while activity diagrams map workflow sequences and decisions. These tools enhance clarity during system development and promote effective stakeholder communication [5].

Extreme Programming (XP)

Extreme Programming is an agile methodology designed for flexible and rapid software development. XP incorporates iterative phases including planning, design, coding, and testing, with techniques such as pair programming and continuous integration. These practices enable developers to adapt to changing user requirements and maintain high code quality, making XP suitable for dynamic systems like job portals [6].



Picture 1. Extreme Programming Phases and Processes

3. Research Methods

This research was conducted from October 2024, beginning with proposal preparation and progressing toward system development. The development activities took place at the author's residence.

Data Collection Techniques

To gather relevant information for designing the web-based job portal, two primary techniques were employed:

- Observation: The researcher analyzed existing job portal applications to identify commonly adopted features, interface designs, and navigation patterns. This comparative analysis served as the foundation for proposing enhancements and innovations tailored to user needs.
- Interviews: Semi-structured interviews were conducted with job seekers, human resource personnel, and employment service representatives. These sessions provided qualitative insights into the challenges and expectations of different user groups, directly informing the system's functional design and usability.

System Development Method

The system was built using the Extreme Programming (XP) methodology, which supports iterative development, user-driven refinement, and flexible adaptation to changing requirements. The XP approach in this study included the following phases:

- Planning: User requirements were collected through stakeholder engagement. Key features were prioritized to support efficient job searching, vacancy publishing, and applicant management.

- Design: System architecture and workflows were designed using UML tools, including use case and activity diagrams. Database schemas were developed to manage user profiles, job listings, and application data.
- Coding: Development followed structured programming practices, including implementation of planned features using PHP and MySQL. Code quality was maintained through collaborative development and version control.
- Testing: Black-box testing was employed to validate functionality without inspecting internal code structures. Tests focused on system responses to user inputs and ensured reliability across core features.

4. Results

Planning

In the planning phase, user needs and system requirements were identified through interviews with key stakeholders, including job seekers and company representatives. The interview aimed to assess the relevance and necessity of a digital job portal system in facilitating employment access.

Interview Results

A total of 14 individuals participated in the interview, consisting of both job seekers and employers. As shown in Table 1, the majority of respondents (13 out of 14) expressed positive views on the increasing availability of job vacancy information via digital platforms such as websites, mobile apps, and social media. Only one respondent preferred traditional word-of-mouth approaches, highlighting that some segments still rely on conventional methods.

This strong positive response validates the importance of developing a digital job portal system tailored to user expectations.

Table 1. Interview Result

Name or Company	Graduate/Owner	Yes or No	Reasons
Company 1	Sastra Pratama	Yes	Due to the increasing availability of job vacancy information—whether through websites, applications, social media platforms, or word-of-mouth communication opportunities are now more widely accessible.
Company 2	Alvin Bogar	Yes	If it pertains to employment-related information, comprehensive and accurate details would be highly valuable to individuals actively seeking job opportunities.
Company 3	Rohaya	Yes	The growing accessibility of job vacancy information facilitates timely and efficient recruitment processes for companies.
Job Seeker 1	Bachelor's degree (S1)	Yes	Making it easier for job seekers because various information related to jobs can be applied directly to many places that can increase the percentage of getting a job.
Job Seeker 2	Senior High School (SMA)	Yes	The more and more information about vacancies makes it easier for job seekers.
Job Seeker 3	Senior High School (SMA)	Yes	Making it easier for job seekers to find jobs that match their qualifications.
Job Seeker 4	Vocational High School (SMK)	Yes	It makes it easier for job seekers because of the variety of information obtained starting from social media, social media ads, brochures, and websites that are being worked on by

			the author.
Job Seeker 5	Vocational High School (SMK)	No	In my opinion, for high school and vocational high school education, it is more effective to get information by word of mouth.
Job Seeker 6	Bachelor's degree (S1)	Yes	The increasing amount of information about job vacancies, be it from websites, applications, advertisements and others can make it easier for job seekers and the percentage accepted is getting bigger.
Job Seeker 7	Senior High School (SMA)	Yes	In this age of technology, website development like this can change people's awareness of the importance of technology.
Job Seeker 8	Bachelor's degree (S1)	Yes	Diverse information about job opportunities makes it very easy for job seekers because job seekers do notonly apply for one job but can be more in line with their qualifications.
Job Seeker 9	Bachelor's degree (S1)	Yes	The more information on job vacancies, the more diverse the options.
Job Seeker 10	Senior High School (SMA)	Yes	The increasing and varied information regarding job opportunities is very helpful for job seekers.
Job Seeker 11	Bachelor's degree (S1)	Yes	In my opinion it is very good because the diverse information about the job is very easy for job applicants.

Identified User Requirements

From the interviews, the following functional requirements were prioritized:

- Job seekers should be able to register, manage their profile, and apply for jobs.
- Companies should be able to post job openings and manage applications.
- A centralized system should support real-time interaction and information access for both user types.

Design

In this phase, the system's architecture and workflow were designed based on the requirements collected. Thedesign was centered around usability and efficient interaction between job seekers and companies.

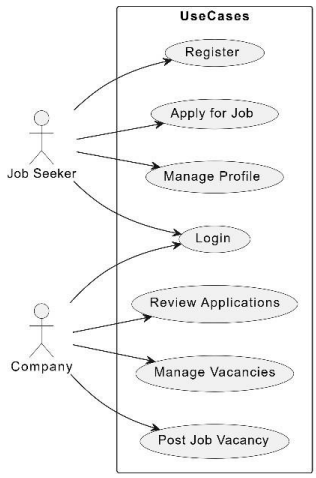
Use Case Diagram

The use case diagram outlines two main actors: Job Seekers and Companies. Job Seekers can register, log in, manage their profile, browse job postings, and submit applications. Companies can register, post job vacancies,view applicant data, and manage their job listings.

Picture 2 *Use case diagram*

[1] **Entity Relationship Diagram (ERD)**

The ERD illustrates the relationships among three main entities: Job Seeker, Company, and Job Posting. Each job seeker can apply for multiple jobs, and each company can post multiple vacancies. This relational model effectively represents the operational structure of the job portal.



Picture 2. *Use case diagram*

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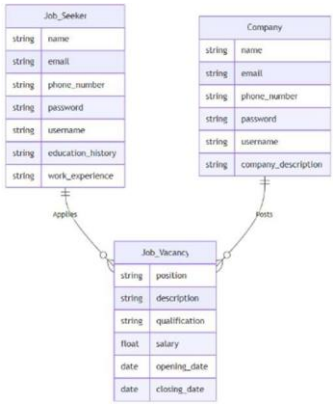
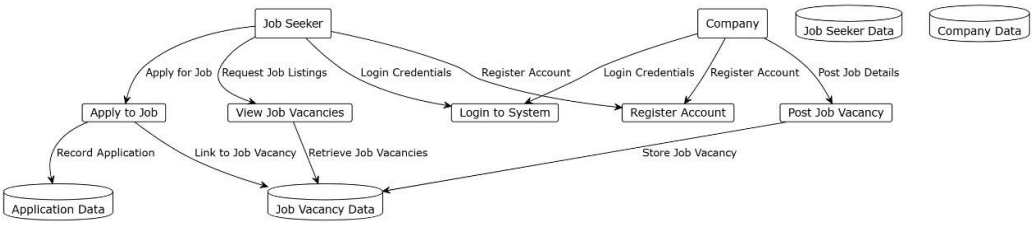
Picture 3. *Entity Relationship Diagram*



Data Flow Diagram (DFD)

The DFD shows the flow of information within the system, from registration and login to job posting and application submission. External entities such as Job Seekers and Companies interact with internal processesand data stores, creating a clear map of data movement throughout the system.

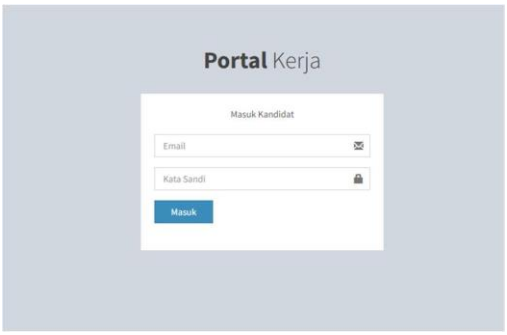


Picture 4. *Data Flow Diagram*

Interface Design

Several interface designs were developed and implemented:

- Login Page: User authentication for both job seekers and companies.

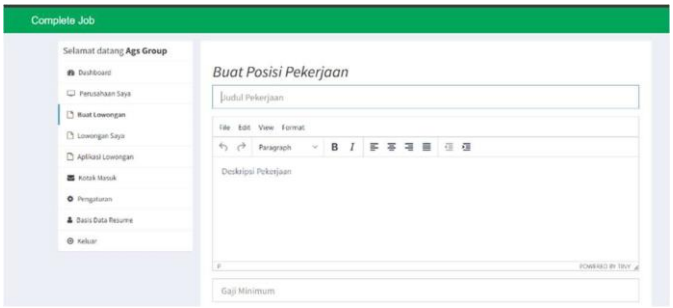


Picture 5. Login

- Company Dashboard: A dedicated panel for companies to manage their profile and job postings.

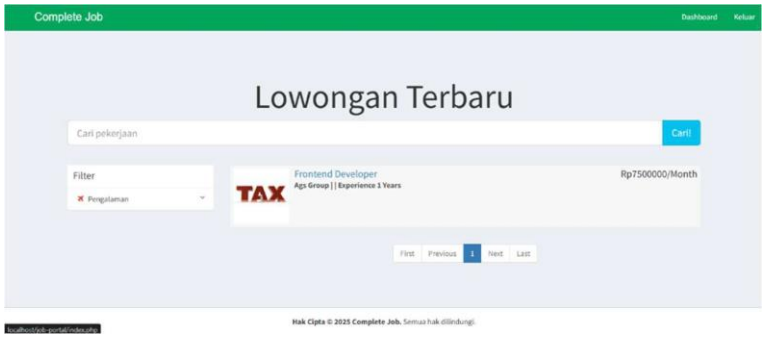
Picture 6. Dashboard Company

- Job Posting Page: Interface for companies to create and update job openings.



Picture 7. Creating a Company Vacancy

- Job List and Application Status Pages: Views for job seekers to explore job opportunities and track theirapplication statuses.



Picture 8. List of Vacancies

- Homepage (Index Page): Public-facing main page displaying key statistics, navigation menus, and thelatest job posts.

Picture 9. Index Page

- **Coding**
  The coding stage involved translating the system design into functional software. Development was conductedincrementally, aligned with XP practices.

- **Job Posting Feature**
  The system enables companies to submit job postings by filling out fields such as job title, description,qualifications, salary, and posting period. This data is then stored and made accessible to job seekers.

- **Job Browsing Feature**
  Job seekers can browse all available job listings, filtered by criteria such as location and job category. Eachlisting provides detailed information and an option to apply directly through the platform.

- **Testing**
  The testing phase employed Black Box Testing under Alpha Testing conditions to verify that each systemfunctioned as expected from the user's perspective.

Table 2. Admin Page Test Table

Scenario Name	Activities	Input	Output	Result
Login Successfully	Fill out the *login form*	*Powered by E-Mail*	The system will move to the *admin* dashboard page	Succeed
Login Failed	Fill out the *login form*	Filling in the *wrong username or password input*	The system will display an error message	Succeed
Approve/reject company resgits	Enter the admin page on the company menu	*Approve* or *reject*	The system will approve or reject the registration of the companyab	Succeed

Table 3. Page Test Table Company

Scenario Name	Activities	Input	Output	Result

Login Successfully	Fill out the *login form*	*Powered by E-Mail*	The system will moveto the *admin* dashboard page	Succeed
Login Failed	Fill out the *login form*	Filling in the*wrong username or password input*	The system willdisplay an errormessage	Succeed
Company Registratio n	Fill out the company registration form	Company name, email, password	The system will create an account and redirectto the login page	Succeed
Edit Company Profile	Change your companyprofile information	New profiledata	The system will savethe profile changes	Succeed
Post Job	Fill out the form to post ajob vacancy	Job title, description, criteria	Job vacancies successfully postedand displayed	Succeed
View Applicatio n Job	View a list of applicantsfor a job	No input	The system displays alist of applicants and application details	Succeed
Mailbox	Access messaging features on your companyaccount	Message text	The system displays a list of received messages	Succeed

Table 4 Candidate Page Testing Table

Scenario Name	**Activities**	**Input**	**Output**	**Result**
Login Successfully	Fill out the *login form*	*Powered by E-Mail*	The system will moveto the *admin* dashboard page	Succeed
Login Failed	Fill out the *login form*	Filling in the*wrong username or password input*	The system willdisplay an errormessage	Succeed
Candidate Account Registratio n	Fill out the candidate account registration form	Full name, email, password	The system will create an account and redirectto the login page	Succeed
Apply Job	Apply for a job throughthe portal	Application documents	The system will sendyou an application application	Succeed

5. Conclusion

This study demonstrates that the implementation of the Extreme Programming (XP) methodology effectively supported the structured and iterative development of a web-based job vacancy portal. The system successfully meets the needs of job seekers and employers by offering key features such as job searching, user registration, direct application submission, and job vacancy management. These functionalities collectively enhance the efficiency of the recruitment process and improve public access to employment information, contributing to a more connected and responsive job market ecosystem.

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