Part-Time Employment System for UTM Student

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Abstract—In today's higher-education system, students frequently face financial difficulties due to high tuition fees and living expenses. Additionally, they risk falling victim to scams while searching for employment opportunities, further worsening their struggles. The lack of a centralized platform for job-seeking increases the problems, making it difficult for students to find suitable part-time employment that aligns with their interests and pay well. Employers also struggle to find qualified candidates with the necessary skills for specific roles. This thesis proposes a part-time employment system designed to allow students to find decent, relevant part-time job opportunities. By connecting students with legitimate businesses through this platform, the system reduces the risk of fraud and simplifies the job search process. Additionally, the system makes it easier for employers to hire students, who are ideal for part-time roles requiring flexible schedules. Utilizing advanced technology and a user-friendly interface, the proposed system enhances the efficiency and reliability of the part-time job market, creating a mutually beneficial interaction between students and businesses.

Keywords—Part-Time Employment System, Web Application, Scam

I. INTRODUCTION

As the cost of education continues to rise, university students increasingly face the challenge of supporting themselves financially while pursuing their studies. Part-time employment has become a popular solution, offering flexible schedules that allow students to balance work and academic responsibilities without compromising their academic performance. Beyond financial support, part-time jobs help students develop essential skills such as time management, communication, and teamwork. These jobs also provide practical experience in students' fields of study, giving them an advantage in their future careers.

Financial issues are common among students, added by increased tuition fees, accommodation, and other living expenses. This financial difficulty particularly affects students from low-income families or those without scholarship support, leading to stress and anxiety that can negatively impact their mental health and academic performance [1]. Additionally, the lack of financial knowledge and job search experience makes students vulnerable to employment scams, resulting in financial losses and potential identity theft. These challenges emphasize the need for a centralized, reliable platform to help students find legitimate part-time jobs via this project's suggestion Part-Time Employment System also known as PTES.

The project targets UTM students and part-time employers in the Skudai area. The system allows employers to post part-time jobs, and help job seekers to search for and apply to these positions. A messaging feature is included to enable direct communication between job seekers and employers regarding job opportunities and interviews. This part-time employment system offers flexibility for both employers and students, ensuring that students can find suitable jobs without the need to search extensively. Employers can easily find talented students to fill part-time positions, enhancing the hiring process and reducing mismatches between job requirements and candidates' skills.

The primary aim of this project is to develop a web application that facilitates UTM Johor Bahru students in finding part-time employment opportunities in the nearby area. This system intends to reduce students' financial burdens, enhance their work experience, and encourage the development of their soft skills. By providing a secure and efficient platform for job searching, the system aims to protect students from scams and connect them with reputable employers.

This paper is structured as follows: Section II represents the literature review and methodology in Section III. Result and analysis are illustrated in Section IV. Finally, the conclusion and recommendation were made in Section V.

II. LITERATURE REVIEW

Several existing systems were chosen for analysis, and the results can be used to design a better system. These current systems were chosen from the Internet due to their similar functionality and features to PTES.

A. StudentJob

StudentJob is an online job portal dedicated to providing part-time, temporary, and intern job opportunities for students and recent graduates across several countries, including the UK, Netherlands, Germany, Spain, France, Belgium, and Sweden. It connects young talent with employers seeking candidates for flexible roles that accommodate academic commitments. The platform features a user-friendly interface, enabling students to create profiles, upload CVs, and receive job alerts. Job categories include sales, customer service, marketing, administration, hospitality, and IT. StudentJob partners with various companies to offer a wide range of positions suitable for students looking to gain practical experience alongside their studies [2].

B. GOGET

GOGET, a Malaysian website, links people and companies with "GoGetters" who help with things like grocery shopping, meal delivery, document gathering, and housework. Users submit requests with specific information, time periods, and fees, while GoGetters, the platform's independent workers, accept tasks based on availability and expertise. The website has a rating and review system to assure quality and dependability, and it uses the sharing economy to make everyday living simpler by effectively delegating work [3].

TABLE I. COMPARISON BETWEEN THE SIMILAR EXISTING SYSTEM AND PROPOSED SYSTEM

Functionalities	StudentJob	GOGET	PTES
Offers range of job search	No	Yes	No
Provide Company Review	No	Yes	No
Limited Company & Salary Information	Yes	No	No
Free Job Posting	No	Yes	Yes
Scammer Detection Tool Provided	No	No	Yes
Direct chat between employee and employer	No	No	Yes

III. METHODOLOGY

The methodology chosen for the development of this proposed system was Agile Methodology. Agile software development was suitable for PTES due to its flexibility, collaborative approach, and focus on providing value to customers. Agile's iterative framework enabled the development of the web application by providing workable increments of the system in short sprints, resulting in a shorter time to launch [4]. Fig. 1 below shows the phases of the Agile Methodology used.
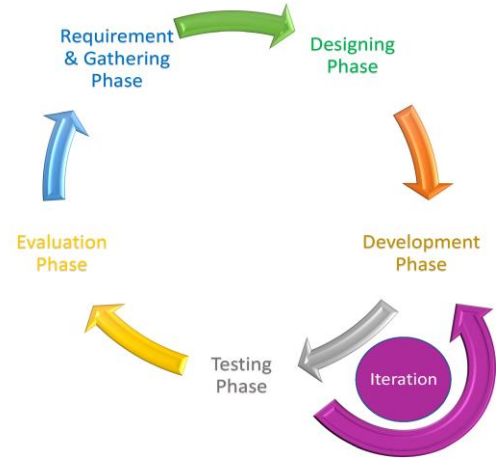

Fig. 1. Agile Methodology

A. Requirement Analysis and Planning Phase

In the initial phase of gathering requirements, a survey targeting UTM students and a business owner from Taman Universiti was conducted. Using a Google Form, students were asked about their interest in part-time jobs, reasons for seeking employment, and challenges faced. A face-to-face interview was also conducted with the owner of JBS Education & Consultancy Tuition Centre regarding the ease of finding part-time employees and their skills. The gathered requirements were then listed and used to define the project's objectives and scope, establishing a foundation for the web development project.

B. System Design Phase

The designing phase within the Agile methodology for web development held significant importance as it aimed to create a well-structured and user-centric design for the part-time employment system. This phase included the creation of various design elements such as Use Case Diagrams, Sequence Diagrams for each use case, Activity Diagrams, and Unified Model Language (UML) Diagrams. These diagrams served as valuable tools in guiding the development of user interfaces for the website. Particularly, Fig. 2 shows the simplified version of the PTES architecture meanwhile Fig. 3 shows the use case of the PTES which has 3 actors including an employer, UTM

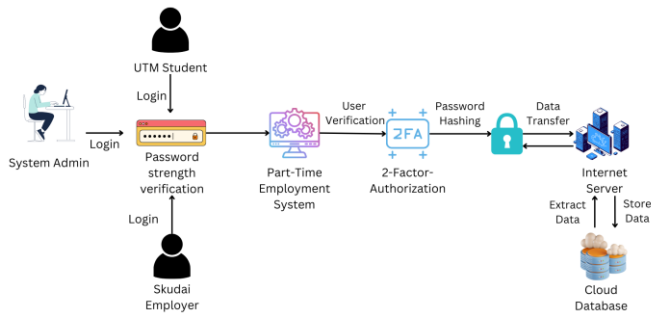student and system admin and Fig. 4 shows the class diagram of PTES.
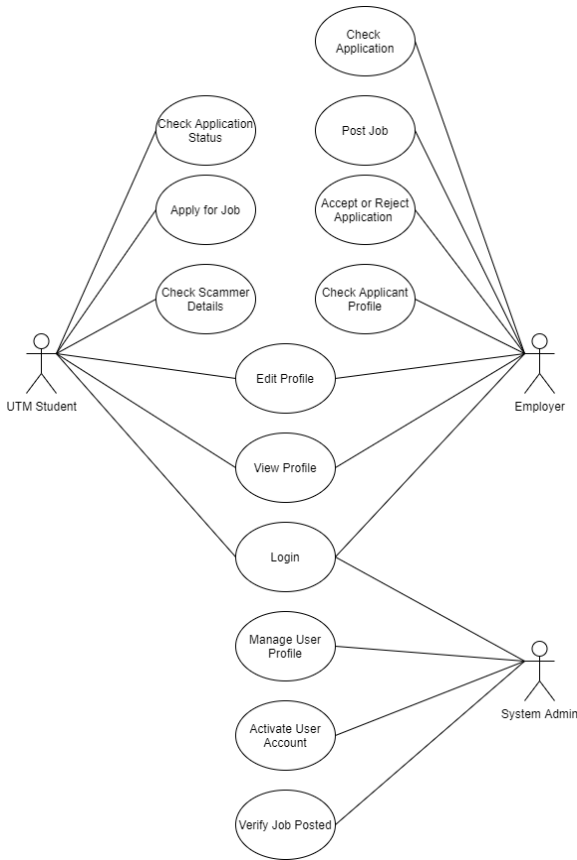

Fig. 2. System Architecture of PTES

Fig. 3. System Architecture of PTES

C. Development Phase

During this stage of progress, the software coding was carried out using Visual Studio Code, utilizing the Laravel Framework. Subsequently, the Laravel Framework code was hosted in InfinityFree and connected to the phpMyAdmin database for data storage within the system. Since this project did not require any specialized external Internet of Things (IoT) hardware, the development focus was solely on software-based aspects. Fig. 5 shows one of the interface design of the developed PTES.
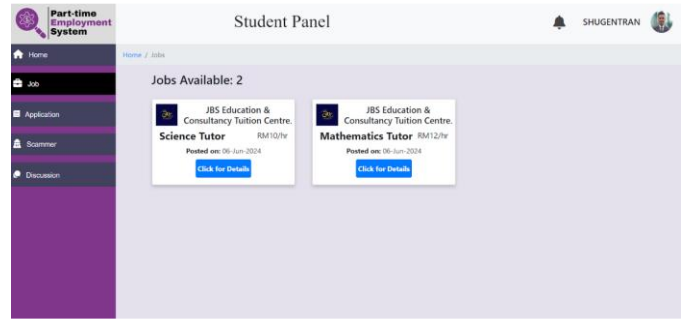

Fig. 4. Student's Job View Page

IV. IMPLEMENTATION AND TESTING

The implementation phase, also known as the development phase, is when actual coding and system construction occur. During this stage of the SDLC, developers write code in the chosen programming language based on the technologies decided upon during the requirement analysis and planning phase to build the entire system.

A. Coding of System Main Functions

During the development process, the Part-Time Employment System for UTM students is built using PHP as the server-side language and Laravel as the back-end framework. The front-end is developed with HTML, CSS, and JavaScript, using Visual Studio Code as the integrated development environment. The system's database is managed with PhpMyAdmin and is connected to the back-end Laravel application, which is hosted on InfinityFree web hosting service.

For the Part-Time Employment System for UTM Students, the system includes functionality to manage job postings and applications. One of the key functions is to accept a job posting, which updates the job's status to verified. The accept_job function allows an admin to accept jobs posted by employers by setting the job's verified status to 1 and saving the changes into the job table, also providing success feedback as shown in Fig. 6.

```
public function accept_job(Request $request)
{
    $jobId = $request->input('AjobId');
    $job = Job::find($jobId);
    $job->verified = 1;
    $job->save();

    $errMSG = '<div class="alert alert-success">
    <span class="closebtn" onclick="this.parentElement.style.display=`none`;">&times;</span>
    <strong>Job Activated Successfully!</strong>
</div>';

    // Flash the error message to the session
    session()->flash('errMSG', $errMSG);
    return redirect()->back();
}
```

Fig. 5. Function for admin to accept jobs posted by employers

Similar to the accept_job function, the verify_scam function allows the admin to verify reported scams by marking them as verified. It updates the scammer's status to 1 and saves the changes to the scammer table as shown in Fig. 7. Once verified, users can view details of the scammer when searched in the system.

```php
public function verify_scam(Request $request)
{
    $scamId = $request->input('AscamId');
    $scam = Scammer::find($scamId);
    $scam->verified = 1;
    $scam->save();

    $errMSG = '<div class="alert alert-success">
    <span class="closebtn" onclick="this.parentElement.style.display=`none`;">&times;</span>
    <strong>Scammer Verified Successfully!</strong>
</div>';

    // Flash the error message to the session
    session()->flash('errMSG', $errMSG);
    return redirect()->back();
}
```

Fig. 6. Function for admin to verify scams added by users

The addjob function allows an employer to add a job and its details associating the job with a specific company ID linked to the employer as illustrated in Fig. 8.

```php
public function addjob(Request $request)
{
    $companyId = $request->input('companyId');

    $job = Job::create([
        'name' => $request->input("jobname"),
        'salary' => $request->input("salary"),
        'mode' => $request->input('mode'),
        'desc_resp' => $request->input('desc_resp'),
        'desc_skill' => $request->input('desc_skill'),
        'company_id' => $companyId
    ]);

    if ($job) {
        $errMSG = '<div class="alert alert-success">
            <span class="closebtn" onclick="this.parentElement.style.display=`none`;">&times;</span>
            <strong>Job added successfully!</strong>
        </div>';
        $statusCode = 200; // Success status code
    } else {
        $errMSG = '<div class="alert alert-danger">
            <span class="closebtn" onclick="this.parentElement.style.display=`none`;">&times;</span>
            <strong>Error adding job!</strong> Please try again.
        </div>';
        $statusCode = 500; // Internal server error status code
    }

    // Return the error message as JSON response
    return response()->json(['errMSG' => $errMSG], $statusCode);
}
```

Fig. 7. Function for employer to post jobs

The apply_job function allows students to submit applications for desired jobs. It retrieves the student's details from the session, creates a new application with the student's qualifications and the job ID, and saves it to the database before redirecting to the job list page as shown in Fig. 9.

```php
public function apply_job(Request $request)
{
    $response = $this->empl_session();
    if ($response) {
        return $response; // If there is a redirect response, return it
    }

    $userid = session('userid'); // Assuming you have set the userid in the session
    $user = User::find($userid);
    $notificationData = $this->notification();
    // Retrieve the receiver details and total message count from the return array
    $receiverDetails = $notificationData['receiverDetails'];
    $totalMsg = $notificationData['totalMsg'];

    $stu = Student::where('user_id', $userid)->first();
    $app = new Application();
    $app->qualification = $request->input('qualification_hidden');
    $app->status = 0;
    $app->student_id = $stu->id;
    $app->job_id = $request->input('jobid');
    $app->save();

    return redirect()->route('empe_joblist');
}
```

Fig. 8. Function for student to submit the application

B. Job Categorization and Matching System

The Part-Time Employment System (PTES) categorizes job posts by business, skill, and job type. Customer service, sales, technical, and other jobs fall under these areas. When posting jobs, employers select the right area.

The approach matches job seekers' profiles with various job categories. It involves talents, interests, and availability. The matching method prioritizes jobs that match the user's abilities and preferences, presenting the most relevant options first.

The platform utilizes categories to assist job searchers and organizations find better matches faster.

C. Technical Details of Features

The Messaging Feature in PTES allows companies and job seekers to interact real-time. Once a conversation is started, the system facilitates immediate messaging with Pusher, a real-time communication tool. Pusher guarantees that messages are sent and modified in real-time without page refreshing needed. Both parties may securely chat about employment details, arrange interviews, and send information. Pusher is connected with the messaging interface to provide flawless, responsive communication, therefore smoothing out the interaction and improving the user experience generally.

PTES uses encryption to protect sensitive information including user communications and personal information, therefore protecting sensitive data. The platform also combines anti-scam systems by cross-refining employment seeker and employer profiles. The system notes and warns suspicious activity like job postings with conflicting information or people with past questionable behaviour. Users' reported scams are also verified and blacklisted, therefore creating a safer environment for all users.

D. Testing

Three different methods of testing have been used to verify that all system components perform according to plan and fulfill user requirements. The testing used are black-box testing, white-box testing, and user acceptance testing (UAT).

1) Black Box Testing

Black Box Testing is a software testing approach in which the tester has no knowledge of the application's internal structure or function. The tester focuses on testing the software's functioning by giving inputs and studying the outputs, without considering how the code works internally[5].

Table II shows black box testing for user registration passwords. Passwords must include at least one digit, one lowercase letter, one uppercase letter, one special character, and be at least 8 characters long. An error message will display if criteria are not met.

TABLE II.   PASSWORD VALIDATION BLACK BOX TESTING

Test Case	Input	Output
Valid password	Valid password	Valid password
Password@123	Password@123	Password@123
Valid	Valid	Valid
Missing digit	Missing digit	Missing digit
@Password@	@Password@	@Password@
Error: Must contain at least one digit	Error: Must contain at least one digit	Error: Must contain at least one digit

2) White Box Testing

White box testing is a software testing technique that focuses on the internal structures and workings of an application. Unlike black box testing, which evaluates the software from an end-user perspective, white box testing requires a deep understanding of the code, algorithms, and architecture of the system. This approach helps in identifying hidden errors, optimizing code efficiency, and ensuring the software meets its intended design and functionality[6]. Table III lists the PHP code files needed to run the Part-Time Employment System.

TABLE III.   LIST OF PHP CODE FILES IN PTES

No	File Category	File Name	Result
1	Admin View Pages	login adminhome view_profile edit_profile manage_user view_employee_profile view_employer_profile activate_employee activate_employer act_employee_profile act_employer_profile verify verify_job view_job scam add_scam chat	No Error
2	General User View Pages	login register forget_pass activate-email policy qr_scan broadcast receive	No Error
3	Employer View Pages	home loginqr view_profile edit_profile qr_scan change_pass manage_job add_job	No Error

No	File Category	File Name	Result
		edit_job manage_app app_profile scam add_scam chat	
4	Student View Pages	home loginqr view_profile edit_profile qr_scan change_pass joblist apply_job manage_app app_progress scam add_scam chat	No Error
5	Controller Pages	JobController AdminController GeneralController EmployerController EmployeeController PusherController	No Error
6	Model Pages	user student employer company job application scammer chat_message	No Error
7	Route Pages	api channels web	No Error

3) User Acceptance Testing (UAT)

The Part-Time Employment System is finally tested by actual users in this section of user testing to make sure all system objectives are achieved. Several user acceptance tests have been conducted with target users, including UTM students and employers. These tests aim to verify that all functionalities work as intended and that the system provides a satisfactory user experience. The results, along with the inputs and outputs, have been carefully documented and an UAT for admin system function is shown in the Table IV.

TABLE IV.   USER ACCEPTANCE TEST FOR ADMIN SYSTEM FUNCTION

Test Case ID: 002	**Test Conductor:** Shugentran
Test Priority (LOW/MEDIUM/HIGH): HIGH	**Test Created Date:** 29 May 2024
Test Title: Admin System Function Testing	**User:** Kabilashwaran
Description: Evaluating the admin's ability to navigate and utilize system functions to ensure comprehensive functionality.	**Test Date:** 30 May 2024
Precondition: Admin is already logged into the system.	
Condition: Admin can manage users, activate employers, activate students, verify jobs, and verify scams.	
Comment: Admin has full access to all functionalities within the application.	

Test Case	Input	Expected Output	Actual Output	Result
Manage Users	Display list of users and allow management	Users are managed successfully	Users are managed successfully	Success
Activate Employer	Display list of employers and allow activation	Employers are activated successfully	Employers are activated successfully	Success
Activate Student	Display list of students and allow activation	Students are activated successfully	Students are activated successfully	Success
Verify Job	Display list of jobs and allow verification	Jobs are verified successfully	Jobs are verified successfully	Success
Verify Scam	Display list of added scams and allow verification	Scams are verified successfully	Scams are verified successfully	Success
Click Logout Button	N/A	Admin is signed out	Admin is signed out	Success

V. CONCLUSION

In a nutshell, the Part-Time Employment System for UTM Students is a web-based platform designed to streamline the process of connecting students with part-time job opportunities. Developed with PHP, Laravel, HTML, CSS, and JavaScript, the system allows students to search for and apply to part-time jobs, while employers can post job openings and verify job applications. Additionally, the system includes features for reporting and verifying scams, ensuring a secure environment. Admins can manage job postings and verify reported scams, which are then accessible to users. By automating these processes, the system simplifies job searches and applications, replacing the need for manual methods with an efficient, user-friendly digital solution.

CONFLICTS OF INTEREST

The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

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