KL PULSE: Employee And Leave Management System

A Project Report

Submitted to the APJ Abdul Kalam Technological University

in partial fulfillment of requirements for the award of degree

Master

of

Computer Applications

by

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C E R T I F I C A T E

This is to certify that the report entitled **KL PULSE: Employee And Leave Management System** submitted by **Sreelekshmi Sunish (TKM19MCA022)** to the APJ Abdul Kalam Technological University in partial fulfillment of the requirements for the award of the Degree of Master of Computer Applications, is a bonafide record of the project work carried out by her under our guidance and supervision. This report in any form has not been submitted to any other University or Institute for any purpose.

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DECLARATION

We hereby declare that the project report **KL PULSE: Employee And Leave Management System**, submitted for partial fulfillment of the requirements for the award of degree of Master of Computer Applications of the APJ Abdul Kalam Technological University, Kerala is a bonafide work done by us under supervision of Prof. Vaheetha Salam

This submission represents our ideas in our own words and where ideas or words of others have been included, we have adequately and accurately cited and referenced the original sources.

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Kollam

20-05-2022

Sreelekshmi Sunish

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Abstract

KL Pulse is an internal application of Knowledge Lens which is designed to track employee's performance, daily tasks, attendance etc.. It also helps the managers to evaluate and monitor their performance. KL Pulse is a combination of both leave management system and employee activity monitoring system.

The Leave Management System of KL Pulse is used to automate the workflow of leave applications and their approvals. The periodic crediting of leave is also automated. There are features like email notifications, automatic approval of leave, report generators etc in this system. Leave Management application will reduce paper work and maintains record in more efficient way.

The Employee monitoring system of KL Pulse helps to track employee's performance and tasks daily. Employees should update all completed task in KL Pulse daily on "What did you accomplish today?" Also, Weekly Goals must be updated in the beginning of every week. If employee fails to update the KL Pulse Status, leave will be deducted for the same. This helps their leads and managers to review their performance and works.

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Chapter 1

Introduction

Knowledge Lens is a US and India based product and services technology company. They builds innovative solutions on niche technology areas such as Big Data Analytic, Data Science, Artificial Intelligence, IoT, Block-chain, AR/VR and Cloud. KL Pulse is the office and leave management system of Knowledge Lens. KL Pulse uses Google SSO Login filtered by user roles to access in to the system. It allows employees to share their work status for each day with their leads. Employees can set weekly goals and work based on that to complete their works. They can also view their goals and the statuses of their works they have added in the system.

KL Pulse also provides Leave Management System for making it easier for both employees and HR to manage leaves. Employees can view their available leave information in the dashboard. They can apply for leave from the KL Pulse System and see the status of their application. HR have the privilege to view the leave requests of employees and then approve or reject them. Admins and leads can review the work status of the employees with the help of the system.

KL Pulse also provides the provision to integrate multiple supporting applications to the system. The IT desk supporting system is integrated with the KL Pulse which will allow the employees to manage their devices. Many other applications are integrated with KL Pulse like Recruitment Management System, Sale Insights, Execution insights etc.

1.1 Objective

The main aim of KL Pulse is to help both the employees and admins of Knowledge Lens. KL Pulse aims to ease the leave application and management of employees and also their performance at work. KL Pulse aims to ease the tracking of employee's work and leave for admins.

The main aims of the project are the following:

- Enable employees to share their work status for each day with their leads.
- Enable employees to set weekly goals and work based on that to complete their works.
- Enable employees to view, update or delete their goals and the statuses of their works they have added in the system.
- Enable employees to view their available leaves and plan their holidays.
- Enable employees to apply for leave or work from home.
- Enable HR to manage employee leave and work from home.
- Enable managers to view and review employee performance.
- Store the details of each employee.
- Enable employees to view and update their profile.
- Enable employees to view other employees leaves.

1.2 Company Profile

Knowledge Lens provides a collection of Lens that automates and simplify the discovery of hidden insights from Big Data. Their mission is to turn the dark data to meaningful business insights. They are Big Data Technology Geeks with extensive Industry expertise with wide range of Big Data Projects ranging from Big Data Engineering to Data Science.

1.2.1 Products

UnifyTwin

- iLens Machine

  Operate seamlessly on the real-time machine edge-based data along with the data from the information systems of the enterprise and the plant operations, and feed AI-driven contextual views to connected workers.

- ILens Assistant

  Serves as a 'digital friend' for frontline connected workers to collaborate more efficiently with each other, and use the AI-assisted insights from iLens Machine to accelerate productivity and safety.

MLens

MLens is an accelerator toolkit from Knowledge Lens which enables Workload Migration, Cloud Data Management Automated Disaster Recovery for Enterprise. They provide migration utilities to migrate data, metadata transform computational workloads in Hadoop environment to Databricks Unified Analytics.

- Workload Migration from On-Premise Hadoop Distributions to Databricks Cloud or Azure HDInsight.
- Data migration from on-prem HDFS clusters to Cloud storage (MS Azure ADLS or AWS S3).
- Unique combination of Edit Log Parser and Data Migrator tool, to achieve full and incremental data migration of Hadoop workloads.
- Perform secure data transfer between multiple Hadoop Clusters (having different distributions, versions and Kerberos realms, with no direct connectivity) and between Hadoop Cloud.

GLens

GLens is Real-Time Data Acquisition, Monitoring and Analytics suite of Products for Industrial Emissions, Effluent Discharges and Ambient Air Monitoring.

GLens DAS Software, GLens Server Platform, GLens Environ Data Logger provides a comprehensive solution for all Industry Environmental needs.

GLens Client data acquisition software provides direct integration with any analyzer (make or model) using RS232/RS485/Modbus/Ascii Protocols etc. GLens Clients provide secured encrypted data communication with Central Server using open REST based API or MQTT based IoT protocols.

GLens Environment provides wireless data logger which eliminates the need for PC for client side data logging and can transmit data using LAN/Wifi/ GPRS etc. The wireless data logger provides capability to integrate with any of the standard industry analyzers using RS232/RS485 interface.

GLens Mobile Application provides up-to the minute information on the data in GLens platform for industry and regulator consumption. The mobile application needs secured login credentials for viewing the data.

GLens Central Server platform provides a common software for pollution board to collect data from various industries using Open API. Apart from this the software provides pre-build reports,alarms and alerts as per the regulatory standards prescribed by various regulatory authorities.The Ad-hoc reporting module provides capability to analyze the data up-to 2 second granularity over the collected parameters and provide forecasting using Holt-Winters forecast models

1.2.2 Services

Big Data Engineering Services

KL provide end to end Architecture, Design, Development, Testing and Deployment of Big Data Protects.

Big Data Security Services

KL is one of the niche consulting companies to provide specialized Big Data Services.

Big Data Analytic Services

KL deliver hidden insights from a wide variety of data sources using our pre-build analytical Lens.

Big Data Competency Development

Without unique Big Data expertise, we provide one of the best Big Data Competency Development programs for the enterprise.

Chapter 2

Literature Survey

A literature survey is a survey of scholarly sources on a specific topic. It provides an overview of current knowledge, allowing you to identify relevant theories, methods, and gaps in the existing research. Literature Survey for KL Pulse summarizes the evaluation of the literature relevant to the Employee Leave Management System and Employee Work Management System.

2.1 Purpose of Literature Survey

The literature survey gives you a chance to:

- Demonstrate your familiarity with the topic and its scholarly context
- Develop a theoretical framework and methodology for your research
- Position your work in relation to other researchers and theorists
- Show how your research addresses a gap or contributes to a debate
- Evaluate the current state of research and demonstrate your knowledge of the scholarly debates around your topic.

2.2 Related Works

Employee leave management system combine number of processes and systems to automate and easily manage employee data, leave request, track and grant leave. In

many institution staff are entitled to different types of leave, these leave are granted according to institution policy. Administrative department is mostly responsible for managing and granting leave request. To this end, most institution used conventional method of requesting, granting and managing leave. In conventional method, leave is manually request by writing letter to head of department. The head of department minutes and forward the request to higher staff for approval. This method is time consuming, prone to error, require more paper work and difficult to manage. Hence the need for an automated leave management system that is faster, error free, less paper work and easy to manage. The system was achieved by developing an automated employee leave management system using the three tier software architectural model. The System is implemented using web based technologies which include CSS, JS, HTML, MySQL, PHP and runs on Windows operating system. Performance evaluation of usability, conveniences and speed of developed system was compared with existing method using 150 staff. The results shows that 94% of responded agreed that the developed system is easy to use, 95% agreed that is most convenient and 98% agreed that it can deliver service in timely manner. The overall functionality of the system shows that it work satisfactory and the result obtained shows that the system is error free, faster and allows staff to request for leave in a timely manner. Hence the system can be used by both academic staff and administrative department of an institution for effective and efficient management of employee leave.[1]

Leave management project is aimed at developing a web-based Leave management system which is important to the college. It is an intranet-based application that can be accessed throughout the college. This system can be used to apply leave applications and their approvals online. There are features like cancellation of leave, approval of leave, forward the leave to HOD. The Student Leave Management System includes the process of managing the student leaves and multiple types of leaves, for example, casual leave, medical leave, restricted holiday, etc. Students will be able to submit the leave form, check the status of leave requests and view completed leave history. The Leave Management System maintains a database of students to leave history.[2]

Accelerated growth perspectives and global expansion strategies call for internal

departments to remain prepared with up-to-date and sophisticated management systems. Amid others, HR functions have become complex due to the increasing scale of businesses and changing regulations. One system that requires optimum handing in today's business world is leave management. There are multiple ways to manage leaves and track attendance records, either by maintaining an internally developed system, using third-party developed software to work within the intranet or available online solutions. We will be focusing on the Online Leave Management System in 2020. This is an effective concept and recently, cloud-based services have been increasing the efficiency of information transfer and recording. Moreover, the ongoing COVID-19 situation has changed working conditions overall. Many employees have been working from home and this requires efficient attendance and leave management, for completion of tasks within the given time frame and to avoid concerns with payroll. An online system provides the necessary flexibility and control. It does stress further on the effectiveness of an Online Leave Management System in 2020, given the prolonged effects of the pandemic. Open office spaces, multiple branches, and evolving corporate culture that promotes employees to work from desired locations, are part of the emerging trend; for these, an Online Leave Management System is an ideal one-stop solution. Especially when it comes to global businesses, recognizing flaws and encouraging proactive changes within the system are far more effective than taking corrective measures.[3]

The leave management and monitoring system automates the leave request process, allowing employees and management to manage employee leave requests, leave balances, track and grant leave more easily. The human resource development office and the higher authorities at the university are primarily in charge of managing, granting, and recording leave requests. With an increasing number of employees earning leave and leave applications being filed monthly, the university's human resource development office has been experiencing problems in their manual operations, such as difficulties in handling information due to traditional storage of information, and transparency issues because employees have no direct access to their leave records. As a result, an automated leave management system that is faster, error-free, transparent, and simple to manage is considered necessary. The development of a real-time

web-based leave management system by the university changes the way it manages and handles employee leave records. Agile Methodology was used as a software development process framework that utilises an iterative approach, open collaboration, and process adaptability throughout the project's life cycle, reducing overall risk and allowing the project to adapt to changes more quickly. The system is built with web-based technologies such as Bootstrap, CSS, JS, HTML, MySQL, and PHP. The system received a weighted average of 4.47, indicating that the application's appropriateness, functions, and information met the client's requirements. Additional enhancements and developments that can be made include email or mobile leave notifications, a mobile application version of the system, the use of other web application frameworks such as Laravel, and data encryption for security.[4]

Employee management system is an application based system, having two applications developed, one for employers to manage employee details and another for employees to mark their attendance. Every organisation whether government or private uses an information system. to store data of their staff. However, in India it is found that many small scale industries use pen and paper to keep a record. However, there are many advanced technology systems available that can do this work but they all are costly for these low level industries. This paper discusses making a system for solving problems for them at a cheaper cost. This system will mark attendance of each employee and calculate the salary of them at the end of month. It also calculates overtime and total working hours of each employee. As in small scale each company has their own holidays preference and variable week off for employees, so all this power is given to the employer to manage holidays and week days of each employee separately. It saves lots of time and has no error in pay calculation hence preventing clashes between HR Team and employees. So that both employer and employee can focus on their work to develop their company.[5]

Employee management can quickly become a headache without appropriate, efficient, and connected tools. In the era of digital technology, using a human resources management information system (HRIS) has indeed become essential for an HR department: amongst the management of administrative tasks, talent management,

schedule management, or compliance with labor law procedures, you risk losing a lot of time without high-performance software. Employee management is carried out by the human resources department (HR manager), and sometimes the accounting or finance department is also involved in payroll management. Personnel administration covers several aspects:

- various administrative, legal, and mandatory tasks which must be carried out within defined deadlines,
- the strategic dimension of personnel management, with the aim of creating value through each employee,
- the social relationship, which is essential to employees depending on the economic context of the company and the evolution of employees.[6]

A company's employees are its most valuable assets. Companies can attract and keep the best talent with organized business practices and solutions, such as employment management software, which streamlines and automates a company's HR tasks. With these systems, companies can recruit and train employees in the most effective manner and store a wide range of data, such as personal information, salaries, and more.

Employee Management Software: Key Features :

An effective employee management system should include key features, such as time and attendance management (e.g., time tracking by way of employee timesheets), absence and leave management (e.g., time-off requests), an employee database, and an employee self-service portal.

- Time Attendance Management

  Without the right tools, keeping track of employee attendance is time consuming and tedious. Any errors can lead to inaccurate payroll, costing a company thousands of dollars every pay period. Time and attendance management features ensure that payroll reporting is accurate. Time tracking is simplified with employee timesheets, and that data is sent directly to the payroll system. Some software also lets employees access their schedules, view vacation hours,

and submit time-off requests. By ensuring your employees get paid on time for the exact hours they worked, you will keep them happy and productive—and minimize the number of instances your managers and HR staff have to deal with time and attendance issues.

- Absence Leave Management

  Organizations that use the absence and leave management features of their employee management software can reap many benefits. These include easy access to leave details that help employees plan their time off. Employee management software lets employees get all the information they need about absence and leave policies and request time off. Their requests can even be categorized as vacation days, leave for family emergencies, etc. Employers can be automatically notified of any such requests and easily approve or deny them. Leave management tools can also ensure compliance with federal regulations. The software can calculate the time used and remaining for every employee. Staff management software can support intermittent, ADA, concurrent, sequential, and corporate time-off requests.

- Employee Database

  Companies depend on accurate records for the most efficient management of employees, so it's important that all information is accurate. An employee database functions like a digital filing cabinet. It can store employee data that includes name, address, emergency contact information, job title, hire date, salary, and birth date. There are even systems that have the capability to track more detailed information, such as benefits information or time-off details. You can even store custom employee data such as skills, certifications, or even favorite foods in employee databases. An employee database also securely stores your employees' files and mitigates risks posed by traditional paper files. Look for employee management software with specific security measures, such as data encryption and multi-factor authentication, to keep employee information safe.

- Employee Self-Service Portal

  Employee self-service portals, or ESS portals, are typically available in modern employee management suites. These portals enable employees to take care of a

variety of human resources-related issues that may have otherwise needed to be taken care of by an HR employee. Most self-service portals let employees update personal information, such as contact information, address, and bank account information. In addition, some employee self-service portals enable employees to correspond directly and securely with the human resources department outside of office hours, which saves time and creates a written record of communications.[7]

While paper records are a traditional way of managing data there are several drawbacks to this method. Paper records are difficult to manage and track. The physical exertion required to retrieve, alter, and re-file the paper records are all non-value added activities. The implemented system provides a simple interface for the maintenance of student information. It indicates the design and implementation of an interactive World Wide Web based Employee Leave Management System for the Management Department at different institutions and colleges. The Employee Leave Management System automates the process of managing the employee leaves and tracking multiple types of employee leaves for example casual leave, earned leave, restricted holiday, etc. Employees will be able to submit the leave form, cancel previously submitted leave requests, check the status of leave requests and view completed leave transactions. The Employees can even check the number of leaves that are remaining, so that they can organize their leave. The higher authorities like HOD and Principal can view the details of the employees and even check their history of leaves. The Leave Management System maintains a database to keep a running balance of each employee is account, accrues employee vacation and sick credits and provides individual reports on employees leave accruals.[8]

The leave management system has been developed to override the issues prevailing within the active manual system. This software is supported to eliminate and in some cases, cut back the hardships faced by these existing systems. What is more, this technique is intended for the actual want of the corporation to hold out operations in a very swish and effective manner. The application is to reduce the maximum amount as attainable to avoid errors, whereas coming into the info. It additionally provides

an error message, whereas, coming into invalid knowledge. No formal information is required for the user to use this method. Therefore, by this all, it proves it's easy. The leave management system, as represented above, will result in error-free, secure, reliable, and quick management systems. It will assist the user to concentrate on their different activities rather consider the record keeping. Every organization, big or small, has challenges to overcome and manage the information of faculty, leave, report, notification, branch. Each leave management system has completely different leave desires, thus we tend to style exclusive worker management systems that are tailored to your social control necessities. This can be designed to help in strategic designing and can assist you to make sure that your organization is supplied with the proper level of knowledge and details. Also, for those busy executive who is continually on the go, our systems come with remote access options, which can permit you to manage your workforce. These systems can ultimately permit you to higher manage resources.[9]

The Mobile HRM (Human Resource Management) project is aimed at developing an online leave management system which is important to an organization. It is a new concept that is been developed for our management to maintain leave record. The Mobile HRM is an Intranet based application that can be accessed throughout the organization or a specified Department. This system can be used to automate the workflow of leave request and their approvals. There are features like approval of leave, cancellation of leave, report generators in this system. The registered people are to be an employee or a staff of the particular organization. At anytime and anywhere employee or staff can apply their leave using this application. There is no necessity for manual filling of leave form and wait to get higher officials signature. With the help of this application the staff can also view the previous leave applied by them. Then the leave request will be forwarded to the higher official of the organization. In day to day life manual maintenance of leave record became difficult. The advantage of this application is ease of use. The main aim of this application is used to reduce time.[10]

Chapter 3

Methodology

KL Pulse is an internal application of Knowledge Lens for monitoring and managing daily attendance and employee activities. It shows daily attendance data and provide information a bout every employee. It helps to track the employees on leave and work from home. It also helps to track the work done by each employee and evaluate their performance.

KL Pulse uses Google SSO Login filtered by user roles to access in to the system. Users are the employees and admin are the HR and the managers. Employees can create leave requests. HR will be able to view the leave request by each employee and has the ability to approve or reject the leave request. The system automatically credits the monthly leave for each employee. HR can view the leaves availed by each employee and make necessary changes in their salary. Managers and leads can view the statuses updated by each employee under them by logging in into their portal.They can thus evaluate the performance of each employee. The employees have the privilege to update their details and also view their attendance history.

3.1 Module Description

3.1.1 Login Module

The login module uses Google SSO (Single Sign-On) login filtered based on user roles. The different roles in the system are User, Admin, HR and Managers. Admin can control the working of the application. HR can view and take necessary actions

on the employee requests. Managers can view and analyze the employee performance and generate employee reports. The users are the employees.

3.1.2 Status Module

The Status Module contains four parts. User can add, update, view or delete weekly goals and under it user can add, update, view or delete status. The managers can view and evaluate the works and status of the employees by logging in into their portal.

3.1.3 Leave Management Module

In the leave management module, user can view his/her total leaves, available leave, taken leaves and work from home in the leave dashboard. The user can apply for a leave. the module also enables the user to view the status of his leave and cancel the leave if necessary. The HR can view leave request of each employee and accept/reject it. They can also view the leave history of each employee. The users can view the holiday list in their location by selecting their location. The users can also view the different employees on leave or work from home in a calendar format. They can also apply filters to the view.

3.1.4 Profile Module

In this module user, admin, HR and managers can view their profile and has the provision to update it. It contains the summary of attendance on each day for every employee. It also contains the leave history of the employees.

3.1.5 Employee Data Module

This module contains the database of all the employees, their roles or positions and their contact details.

3.1.6 Apps Module

In this modules different other applications are integrated with the system through links.

3.1.7 Logout Module

This module facilitates the user to logout from the system.

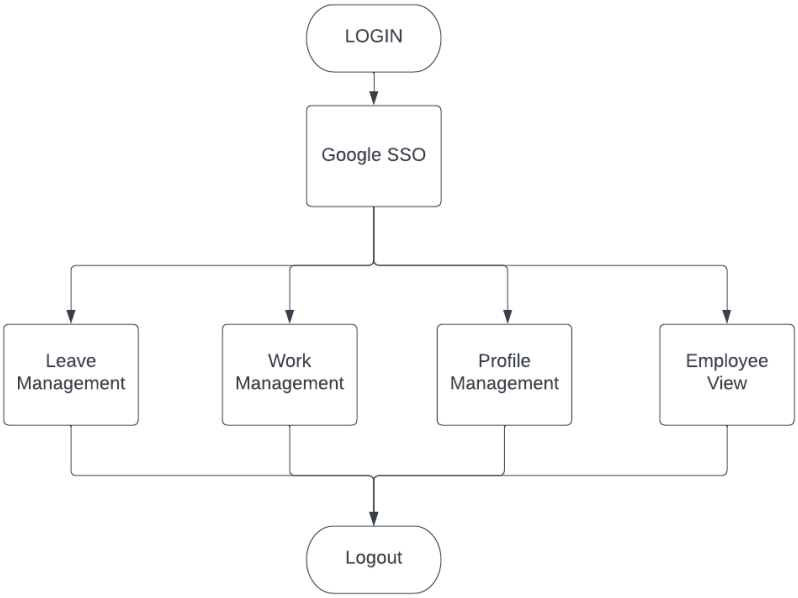


Figure 3.1: Flow diagram of KL Pulse

3.2 System Specifications

3.2.1 Software Specification

- Programming Language : Python
- Designing tool : React Js
- Web server : Apache
- Web Browser : Any web browser
- Backend : Fast Api

3.2.2 Hardware Specification

- Processor: 64-bit, four-core, 2.5 GHz minimum per core
- RAM: 24 GB for developer and evaluation use

3.2.3 Software Description

Python

Python is a high-level, interpreted, general-purpose programming language. Its design philosophy emphasizes code readability with the use of significant indentation. Python is dynamically-typed and garbage-collected. It supports multiple programming paradigms, including structured (particularly procedural), object-oriented and functional programming. It is often described as a ”batteries included” language due to its comprehensive standard library. Guido van Rossum began working on Python in the late 1980s as a successor to the ABC programming language and first released it in 1991 as Python 0.9.0. Python 2.0 was released in 2000 and introduced new features such as list comprehensions, cycle-detecting garbage collection, reference counting, and Unicode support. Python 3.0, released in 2008, was a major revision that is not completely backward-compatible with earlier versions. Python 2 was discontinued with version 2.7.18 in 2020. The reasons to choose python are:

– Compatibility

– Readability

– Maintainability

– Interactive

– Robust and Standard library

Fast API

FastAPI is a modern, fast (high-performance), web framework for building APIs with Python 3.6+ based on standard Python type hints.

The key features are:

- Fast: Very high performance, on par with NodeJS and Go (thanks to Starlette and Pydantic). One of the fastest Python frameworks available.
- Fast to code: Increase the speed to develop features by about 200 percent to 300 percent.
- Fewer bugs: Reduce about 40 percent of human (developer) induced errors.

- Intuitive: Great editor support. Completion everywhere. Less time debugging.
- Easy: Designed to be easy to use and learn. Less time reading docs. Short: Minimize code duplication. Multiple features from each parameter declaration. Fewer bugs.
- Robust: Get production-ready code. With automatic interactive documentation.
- Standards-based: Based on (and fully compatible with) the open standards for APIs: OpenAPI (previously known as Swagger) and JSON Schema.

React JS

React (also known as React.js or ReactJS) is a free and open-source front-end JavaScript library[3] for building user interfaces based on UI components. It is maintained by Meta (formerly Facebook) and a community of individual developers and companies.[4][5][6] React can be used as a base in the development of single-page, mobile, or server-rendered applications with frameworks like Next.js. However, React is only concerned with state management and rendering that state to the DOM, so creating React applications usually requires the use of additional libraries for routing, as well as certain client-side functionality.

- JSX:

  JSX stands for JavaScript XML. It is a JavaScript syntax extension. Its an XML or HTML like syntax used by ReactJS. This syntax is processed into JavaScript calls of React Framework. It extends the ES6 so that HTML like text can co-exist with JavaScript react code. It is not necessary to use JSX, but it is recommended to use in ReactJS.

- Components:

  ReactJS is all about components. ReactJS application is made up of multiple components, and each component has its own logic and controls. These components can be reusable which help you to maintain the code when working on larger scale projects.

- One-way Data Binding:

  ReactJS is designed in such a manner that follows unidirectional data flow or one-way data binding. The benefits of one-way data binding give you better control throughout the application. If the data flow is in another direction, then it requires additional features. It is because components are supposed to be immutable and the data within them cannot be changed. Flux is a pattern that helps to keep your data unidirectional. This makes the application more flexible that leads to increase efficiency.

- Virtual DOM:

  A virtual DOM object is a representation of the original DOM object. It works like a one-way data binding. Whenever any modifications happen in the web application, the entire UI is re-rendered in virtual DOM representation. Then it checks the difference between the previous DOM representation and new DOM. Once it has done, the real DOM will update only the things that have actually changed. This makes the application faster, and there is no wastage of memory.

- Simplicity:

  ReactJS uses JSX file which makes the application simple and to code as well as understand. We know that ReactJS is a component-based approach which makes the code reusable as your need. This makes it simple to use and learn.

- Performance:

  ReactJS is known to be a great performer. This feature makes it much better than other frameworks out there today. The reason behind this is that it manages a virtual DOM. The DOM is a cross-platform and programming API which deals with HTML, XML or XHTML. The DOM exists entirely in memory. Due to this, when we create a component, we did not write directly to the DOM. Instead, we are writing virtual components that will turn into the DOM leading to smoother and faster performance.

3.3 System Design

System design is the phase that bridges the gap between problem domain and the existing system in a manageable way. This phase focuses on the solution domain, i.e. "how to implement?" It is the phase where the SRS document is converted into a format that can be implemented and decides how the system will operate. In this phase, the complex activity of system development is divided into several smaller sub-activities, which coordinate with each other to achieve the main objective of system development.

3.3.1 Input Design

System design takes the following inputs

- Statement of work
- Requirement determination plan
- Current situation analysis
- Proposed system requirements including a conceptual data model, modified DFDs, and Metadata (data about data).

3.3.2 Output Design

System design gives the following outputs

- Infrastructure and organizational changes for the proposed system.
- A data schema, often a relational schema.
- Metadata to define the tables/files and columns/data-items
- A function hierarchy diagram or web page map that graphically describes the program structure.
- Actual or pseudocode for each module in the program.
- A prototype for the proposed system

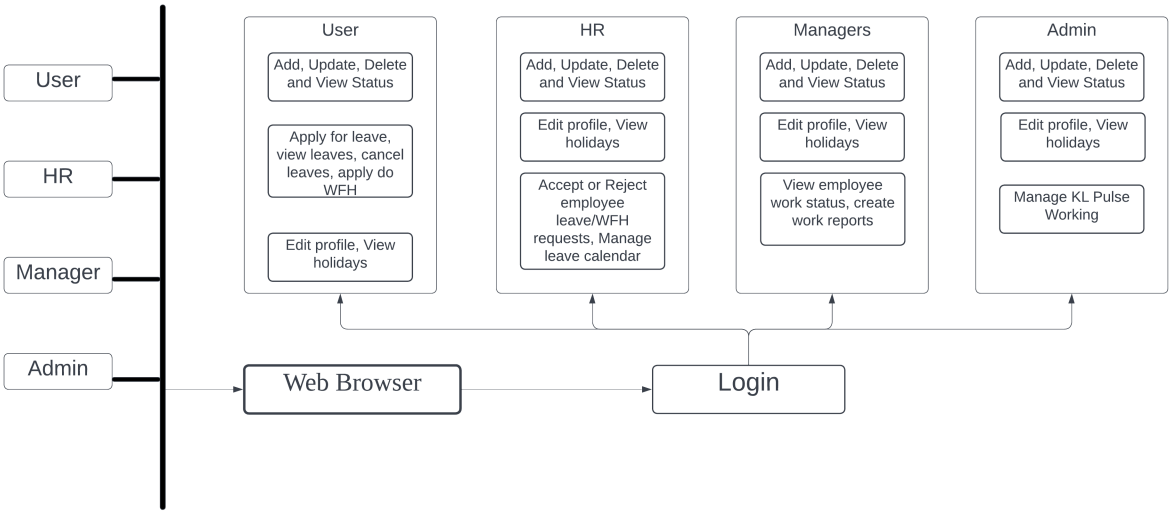


Figure 3.2: System Design of KL Pulse

3.3.3 Types of System Design

Logical Design

Logical design pertains to an abstract representation of the data flow, inputs, and outputs of the system. It describes the inputs (sources), outputs (destinations), databases (data stores), procedures (data flows) all in a format that meets the user requirements.

While preparing the logical design of a system, the system analyst specifies the user needs at level of detail that virtually determines the information flow into and out of the system and the required data sources. Data flow diagram, E-R diagram modeling are used.

Physical Design

Physical design relates to the actual input and output processes of the system. It focuses on how data is entered into a system, verified, processed, and displayed as output. It produces the working system by defining the design specification that specifies exactly what the candidate system does. It is concerned with user interface design, process design, and data design. It consists of the following steps

- Specifying the input/output media, designing the database, and specifying backup procedures.
- Planning system implementation.
- Devising a test and implementation plan, and specifying any new hardware and software.
- Updating costs, benefits, conversion dates, and system constraints.

Architectural Design

It is also known as high level design that focuses on the design of system architecture. It describes the structure and behavior of the system. It defines the structure and relationship between various modules of system development process.

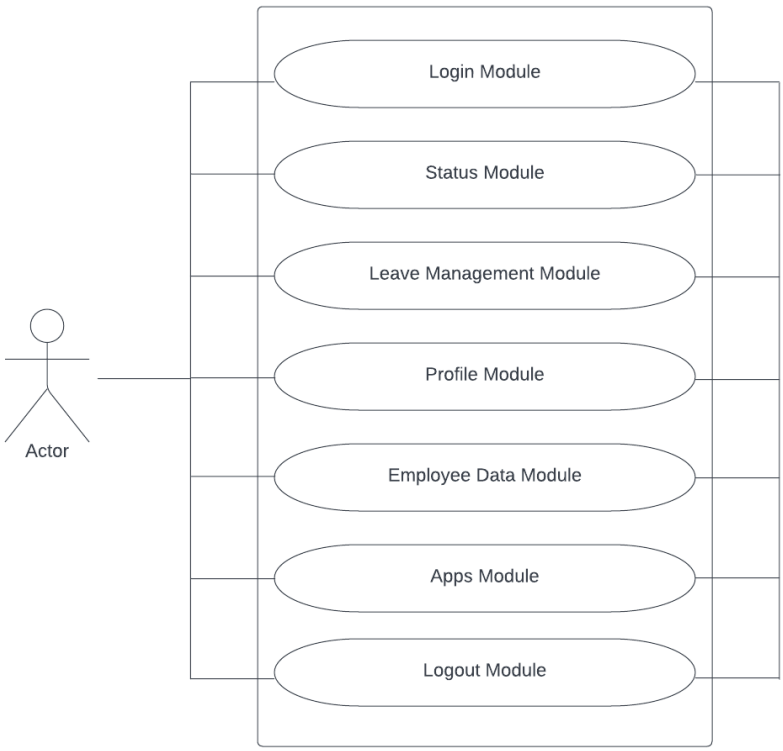


Figure 3.3: UML Diagram For KL Pulse

Chapter 4

Results and Discussion

Testing can be stated as the process of verifying and validating that software or application is bug-free, meets the technical requirements as guided by its design and development, and meets the user requirements effectively and efficiently with handling all the exceptional and boundary cases. The process of software testing aims not only at finding faults in the existing software but also at finding measures to improve the software in terms of efficiency, accuracy, and usability. It mainly aims at measuring the specification, functionality, and performance of a software program or application.

Different testing methods like manual testing and automation testing had been done for KL Pulse.

4.1 Testing Methods

4.1.1 Manual Testing

The main testing method used in KL Pulse is Manual testing. It is a software testing process in which test cases are executed manually without using any automated tool. All test cases executed by the tester manually according to the end user's perspective. It ensures whether the application is working, as mentioned in the requirement document or not. Test cases are planned and implemented to complete almost 100 percent of the software application. Test case reports are also generated manually.

Manual Testing is one of the most fundamental testing processes as it can find both visible and hidden defects of the software. The difference between expected output and output, given by the software, is defined as a defect. The developer fixed the defects and handed it to the tester for retesting.It is mandatory for every newly developed software before automated testing. This testing requires great efforts and time, but it gives the surety of bug-free software. Manual Testing requires knowledge of manual testing techniques but not of any automated testing tool.

Types of Manual Testing

There are various methods used for manual testing. Each technique is used according to its testing criteria. Types of manual testing are given below:

- White-box testing:

  The white box testing is done by Developer, where they check every line of a code before giving it to the Test Engineer. Since the code is visible for the Developer during the testing, that's why it is also known as White box testing.

- Black box testing:

  The black box testing is done by the Test Engineer, where they can check the functionality of an application or the software according to the customer /client's needs. In this, the code is not visible while performing the testing; that's why it is known as black-box testing.

- Gray Box testing:

  Gray box testing is a combination of white box and Black box testing. It can be performed by a person who knew both coding and testing. And if the single person performs white box, as well as black-box testing for the application, is known as Gray box testing.

4.1.2 Automation Testing

After Manual testing, Automation testing is also done in KL Pulse. It is the process of using some specific tools to execute the test scripts without any human

interference. It is the most acceptable way to enhance the efficiency, productivity, and test coverage of Software testing. With the help of an automation testing tool, we can easily approach the test data, handle the test implementation, and compares the actual output against the expected outcome.In automation testing, the test automation engineer will write the test script or use the automation testing tools to execute the application.

Different Approaches of Automation Testing Done for KL Pulse:

- GUI (Graphical user interface) Testing:

  In this approach, we can implement that software or an application, which contains GUIs. So, that the automation test engineers can record user actions and evaluate them many times.The Test cases can be written in several programming languages like JAVA, C, Python, Perl, etc.

- Code-Driven:

  The code-driven technique is the subsequent methodology used in automation testing. In this method, the test engineer will mainly concentrate on test case execution in order to identify whether the several parts of code are performing according to the given requirement or not. Hence, it is very a commonly used method in agile software development.

- Test Automation Framework:

  Another approach in automation testing is test automation framework. The test automation framework is a set of rules used to generate valuable results of the automated testing activity. Similarly, it brings together test data sources, function libraries, object details, and other reusable modules.

4.2 Test Plan

A Test Plan refers to a detailed document that catalogs the test strategy, objectives, schedule, estimations, deadlines, and the resources required for completing that particular project. Think of it as a blueprint for running the tests needed to ensure the software is working properly – controlled by test managers. A well-crafted test

plan is a dynamic document that changes according to progressions in the project and stays current at all times. It is the point of reference, based on which testing activities are executed and coordinated among a QA team.

The test plan is also shared with Business Analysts, Project Managers, Development teams, and anyone else associated with the project, This mainly offers transparency into QA activities so that all stakeholders know how the software will be tested. The plan is built by QA managers or leads based on input from QA (and sometimes, non-QA) team members. Creating it should not take more than 1/3rd of the time allocated for the entire project.

4.3 Test Cases

A Test Case is a set of actions executed to verify a particular feature or functionality of your software application. A Test Case contains test steps, test data, pre-condition, post-condition developed for specific test scenario to verify any requirement. The test case includes specific variables or conditions, using which a testing engineer can compare expected and actual results to determine whether a software product is functioning as per the requirements of the customer.

The below mentions are some of test cases which are tested in KL Pulse.

4.3.1 Login Test Case

The login test has 2 cases. The login test is same for all modules such as admin, user, HR and managers. All employees including admin, HR and managers are saved in the database with their email ID based on their roles. In the first test case, when a valid user logs in, the Google SSO login is performed and based on the roles set, the user will be redirected to their specific KL Pulse portal. In the second test case when an invalid user tries to Login using Google SSO, he will be redirected back to the Login page and error message is displayed

4.3.2 Status Test Case

There are 2 test cases for work status update of the employee. In the first test case, if the user tries to input an empty status error message will be displayed. In the second test case, if the user tries to update status for a day before the current week or after the current date, he will not be able to do so.

4.3.3 Leave Application Test Case

When an employee apply for leave, he should go through the leave format and apply for the leave, If he fails to apply leave in the specified format, his leave will be rejected. This is the first test case for Leave Application. In the second case, if the user fails to give an end date while selecting the date range, his leave application will not be submitted.

4.3.4 Leave Approval Test Case

The leave applied by the respective employees will be processed by HR Team and they have the supreme authority either to accept or reject a leave. When an HR hits on the approve button, the status of the employees leave will be changed from 'Pending' to 'Approved'.

4.4 Validation

Validation is determining if the system complies with the requirements and performs functions for which it is intended and meets the organization's goals and user needs. Validation is done at the end of the development process and takes place after verification is completed. It answers the question like: Am I building the right product? It is a High level activity. Performed after a work product is produced against established criteria ensuring that the product integrates correctly into the environment. Determination of correctness of the final software product by a development project

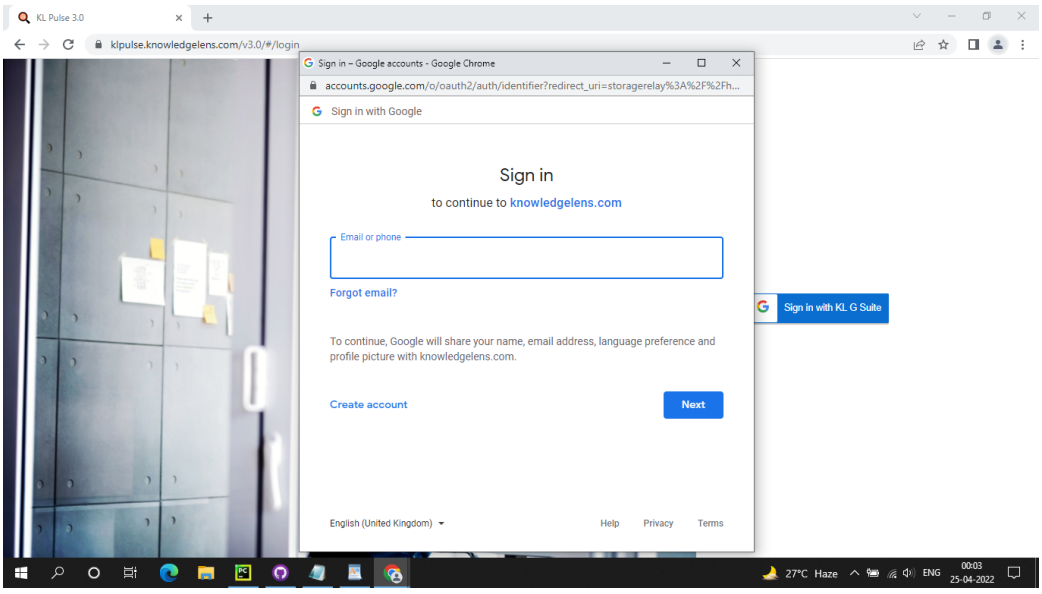
with respect to the user needs and requirements.

During verification if some defects are missed then during validation process it can be caught as failures. If during verification some specification is misunderstood and development had happened then during validation process while executing that functionality the difference between the actual result and expected result can be understood. Validation is done during testing like feature testing, integration testing, system testing, load testing, compatibility testing, stress testing, etc. Validation helps in building the right product as per the customer's requirement and helps in satisfying their needs.

4.5 Output Screens and Results

1. Login Page:

   When User hits the URL the Login Page is loaded. Login button in the page redirects to Google SSO Login.

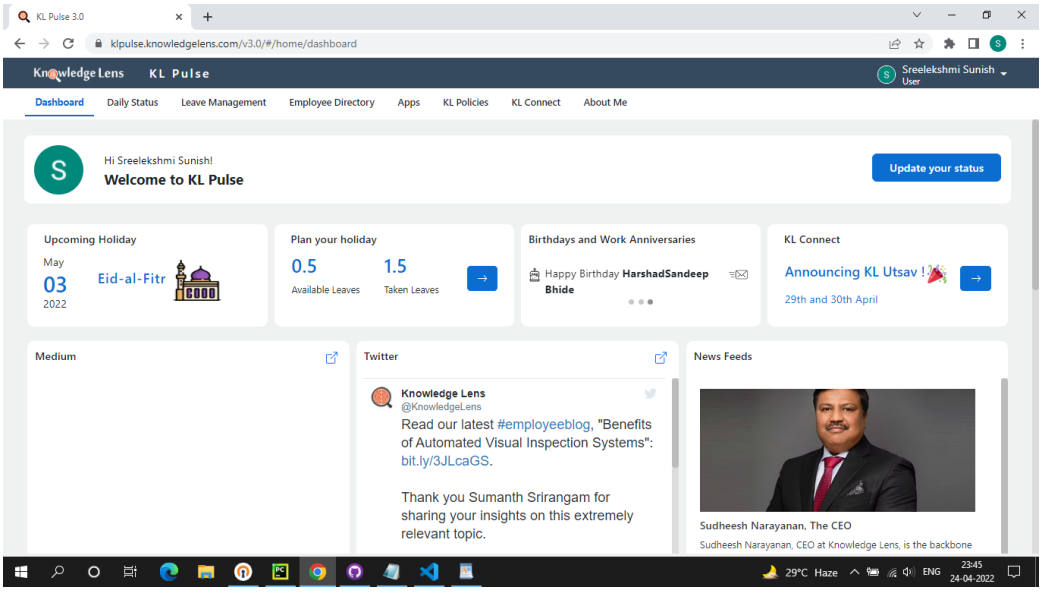


2. Landing Page:

   The landing page is divided into different pages.

   - Dashboard: Contains summary of the main parts.

- Daily Status: Contains four parts ; Add Status, View Status, Add Weekly Goals, View Weekly Goals
- Leave Management: Contains four parts: Leave Dashbaord, Apply for leave, Holiday List, Leave Calendar
- Employee Directory: Contains details of all employees
- Apps: Contains the links of different applications integrated with KL Pulse
- KL Policies: Contain the description of different policies of the company
- About Me: Contain the details of the user and 2 other parts; Attendance History and Leave audit



Chapter 5

Conclusion

KL Pulse Leave Management System automates the leave request process, making it hassle-free for both the management and the employees. The solution of your choice should be robust enough to seamlessly handle all the stages involved in a leave management process: application, approval/rejection, filing leaves, managing leave balance, and analysis. It reduces the time and effort your HR staff spend on paperwork, centralizes the leave and holiday information for easy accessibility, lowers any chance of time-off abuse, and boosts the productivity of the overall organization.

KL Pulse Employee Management System helps the managers to evaluate and monitor their performance. It makes the process of employee valuation and report generation for the team leads and managers much easier. The system also encourages employees to work effectively to achieve the goals set by them. They can get a clear idea how their work pattern and skills are.

KL Pulse helps in maintaining the records of the employees which will help human resource team to manage work status, leave approval, leave cancellation and report generation. It is useful in organisations with large number of employees. It's a faster approach as it takes less time when compared to a manual process.There is a proper management of database as the one handled by manual system is not always accurate and even there is a misplacement of databases which could cause a severe problem in near future.It is very reliable and it leads to an efficient report generation.

5.1 Future Enhancements

KL Pulse is designed in such a way that different new modules can be easily added to it. It also provides the provision to integrate multiple supporting applications to the system. Different internal applications to facilitate the working of the company can easily be integrated with the system. It can include features like online attendance marking using QR code Detection in which employees in Work From Home can just scan the QR code in their Identity Card to mark their attendance. Several other enhancements can easily been added to the system.

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Appendix A

Screenshots

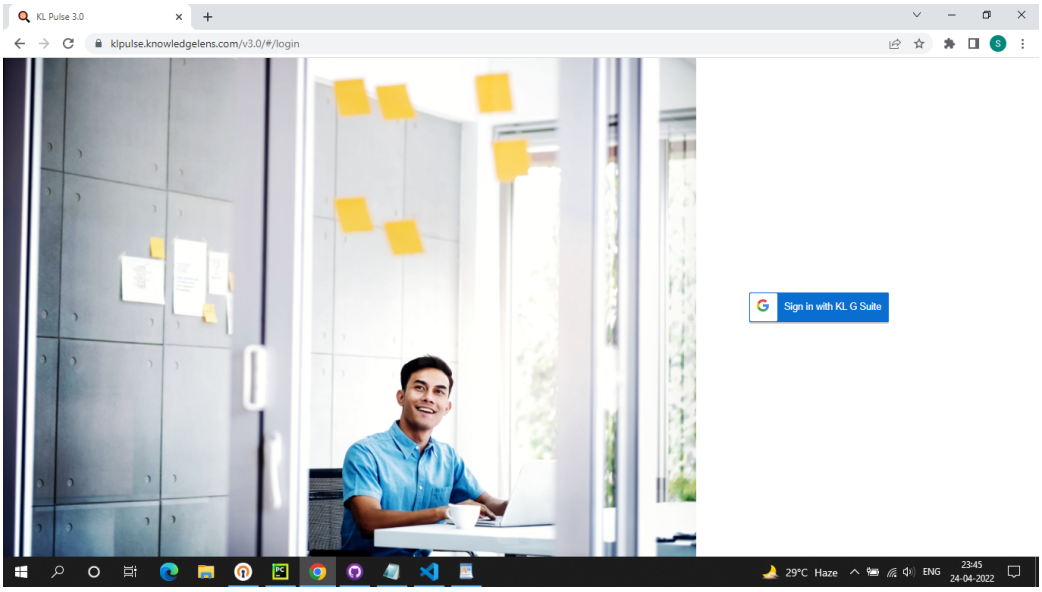

Figure A.1: Login Page

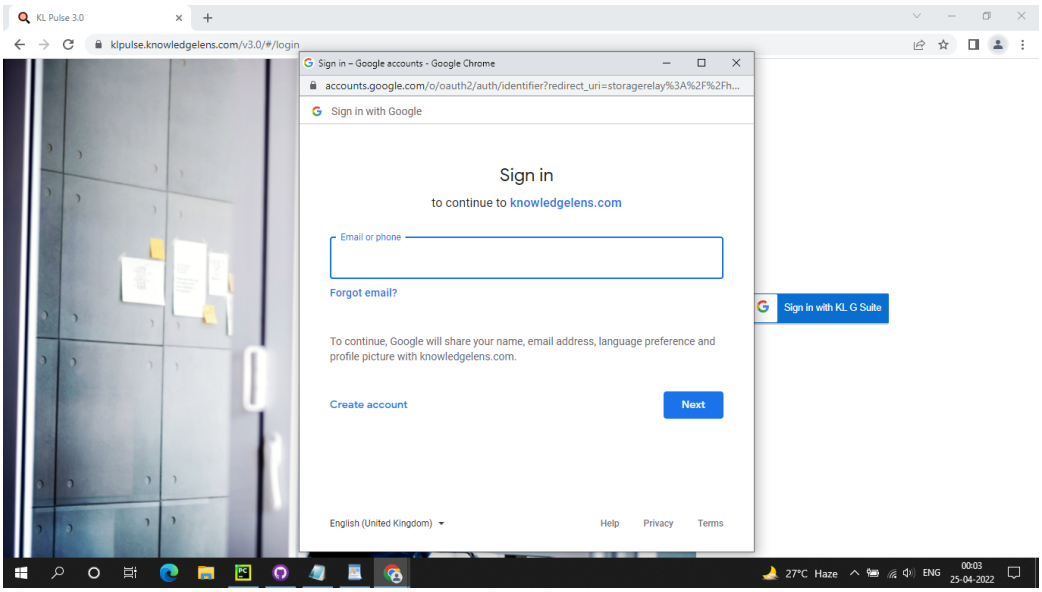

Figure A.2: SSO Login

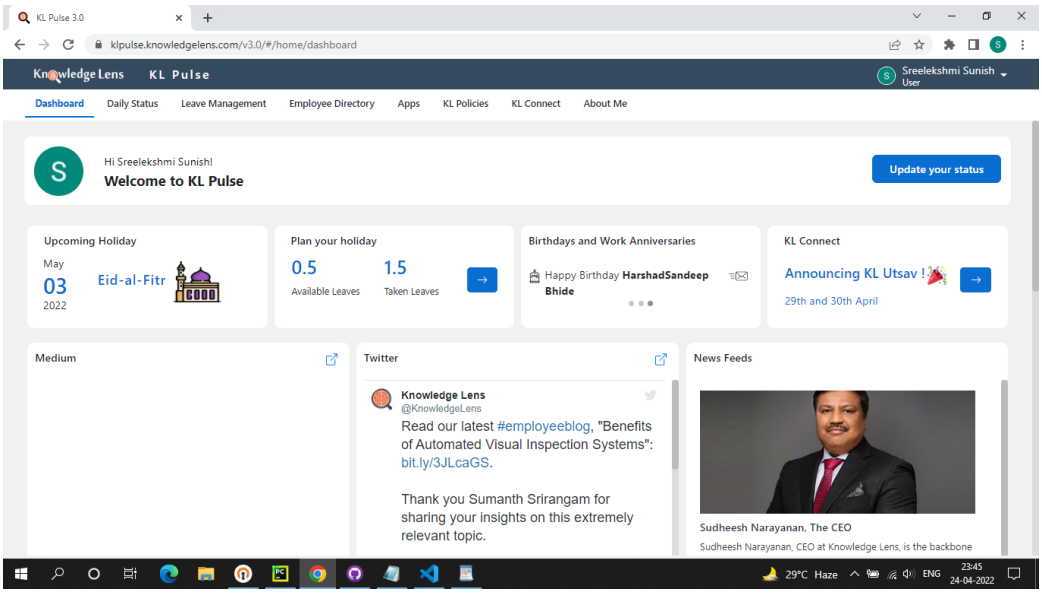

Figure A.3: Dashboard

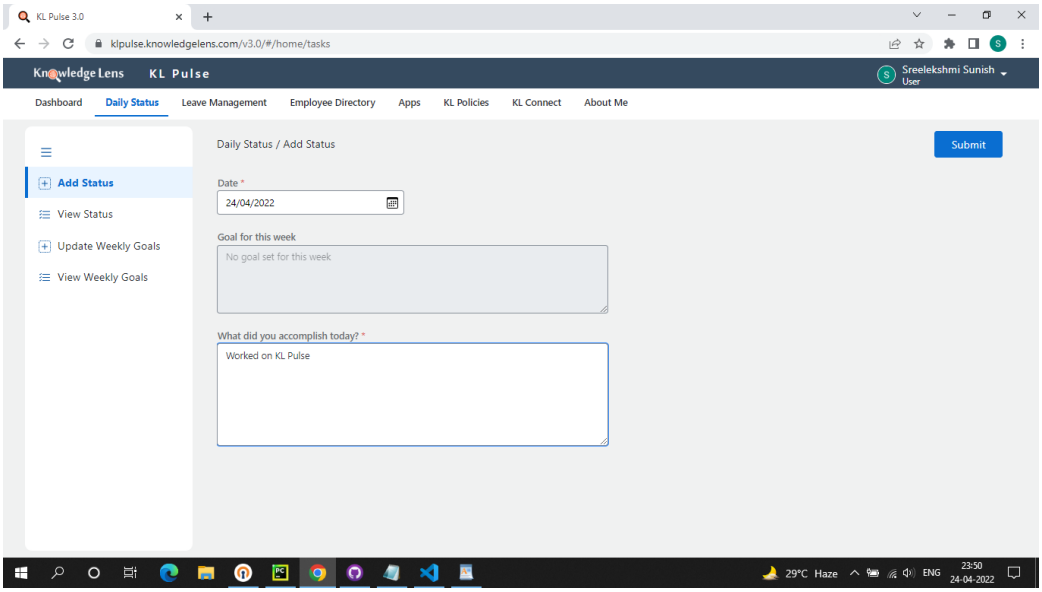

Figure A.4: Add Status Page

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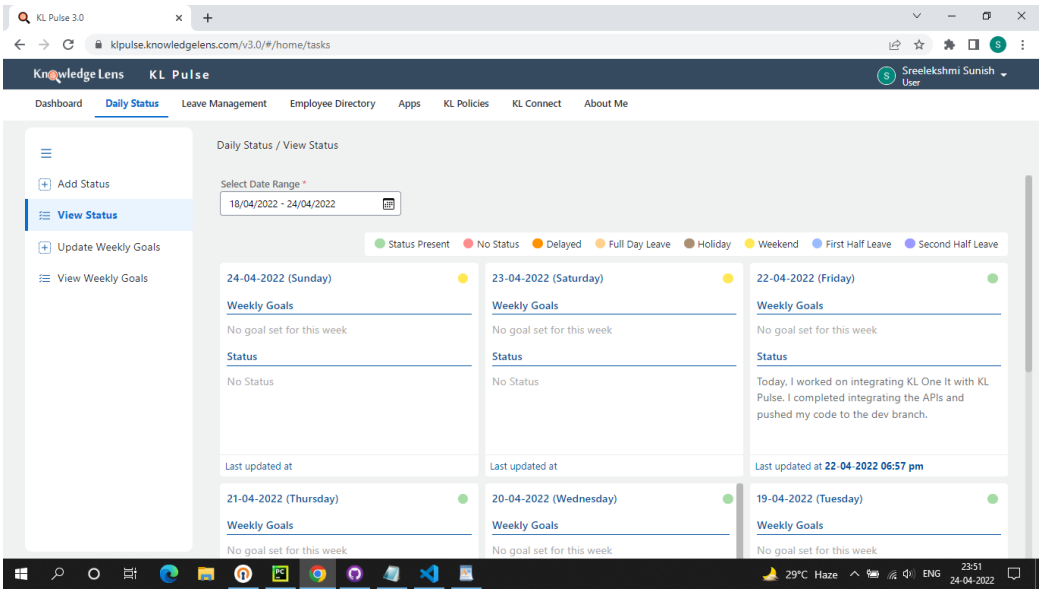

Figure A.5: View Status Page

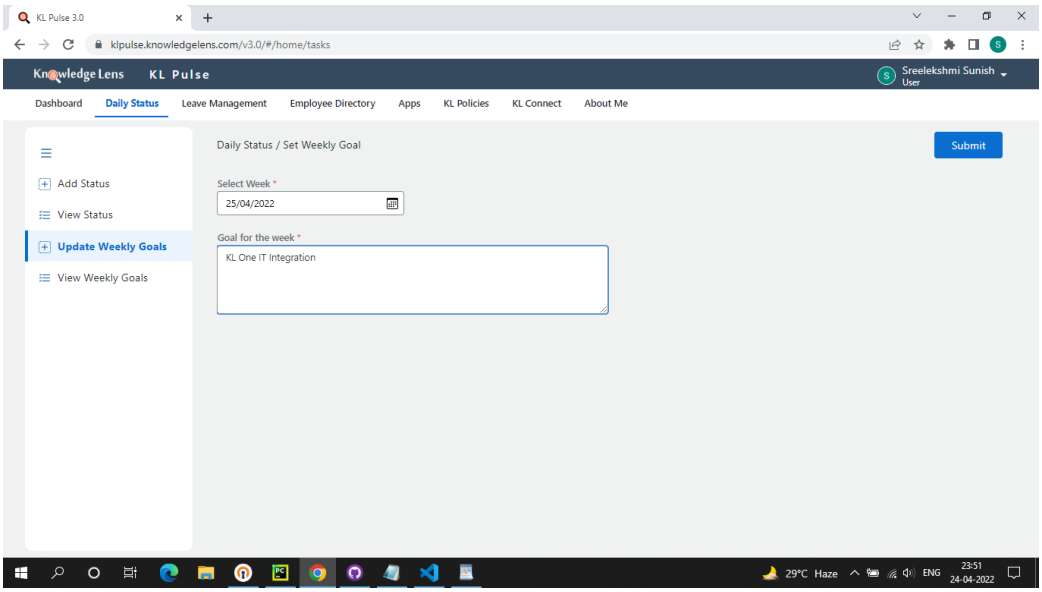

Figure A.6: Add Weekly Goal Page

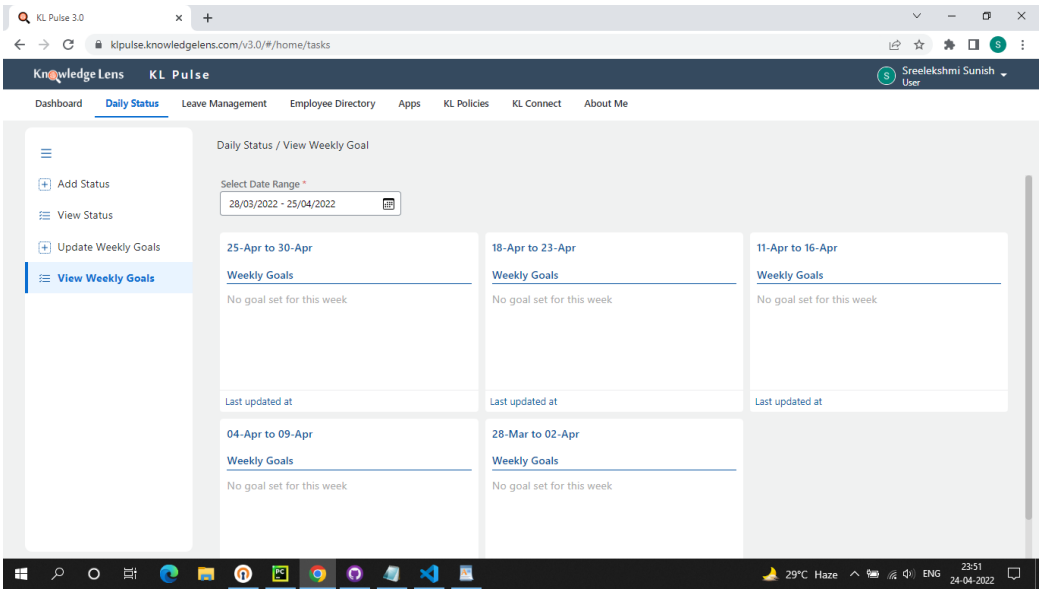

Figure A.7: View Weekly goals Page

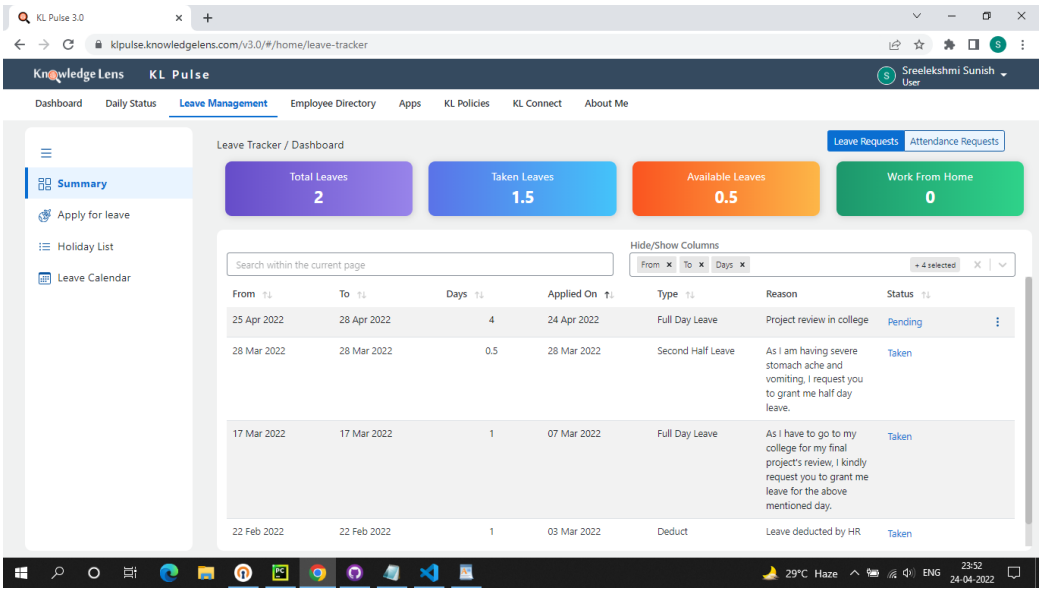

Figure A.8: Leave Dashboard

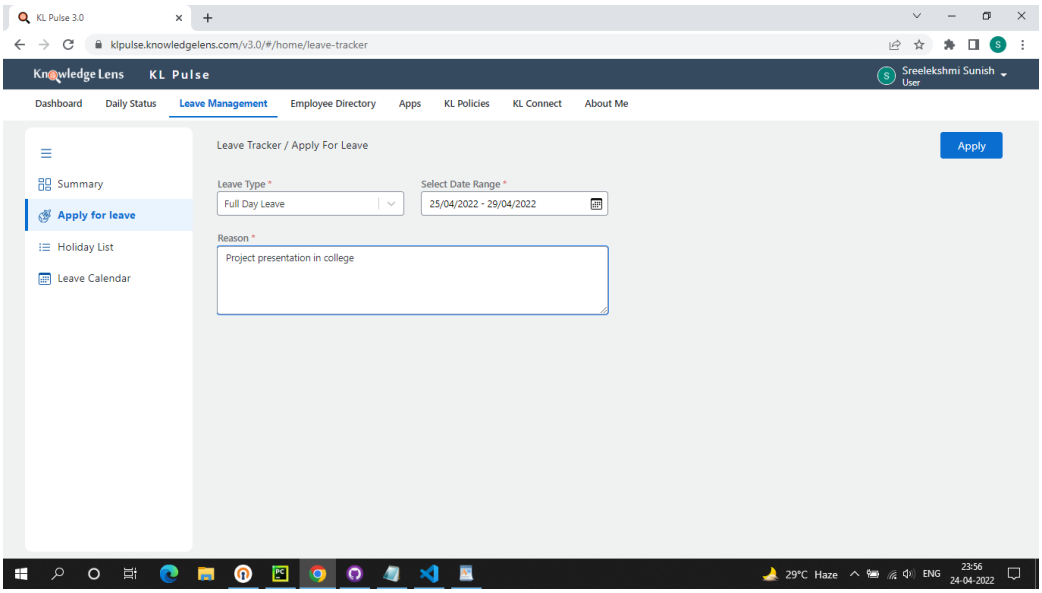

Figure A.9: Apply for leave page

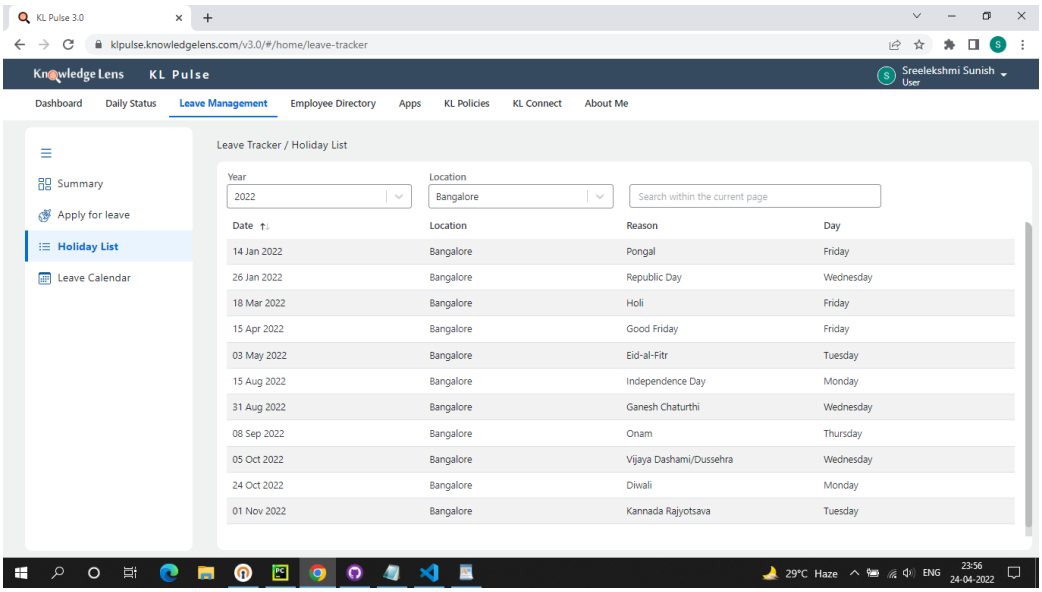

Figure A.10: Holiday List Page

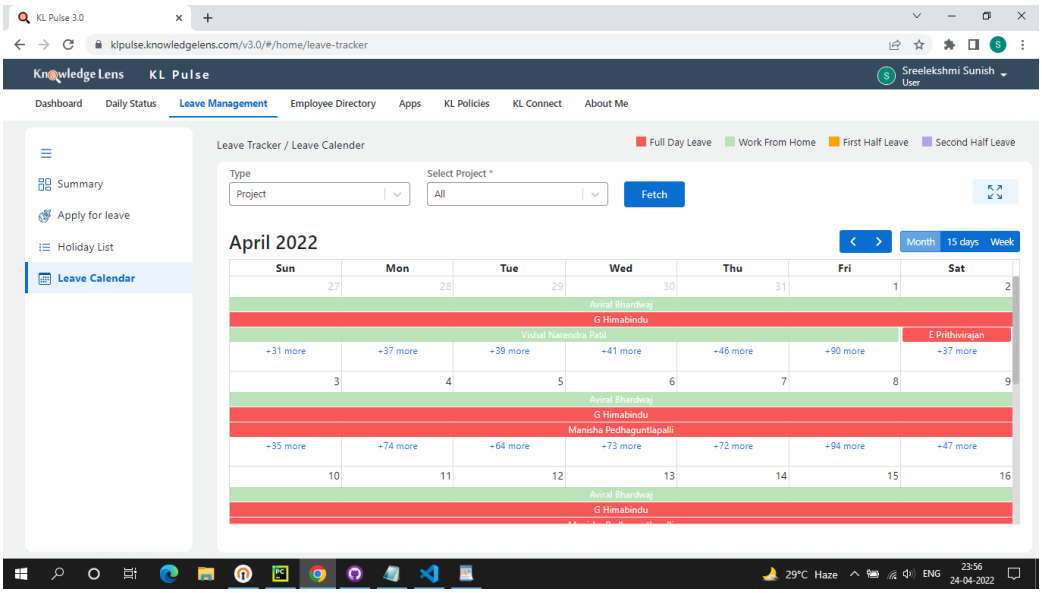

Figure A.11: Leave Calendar Page

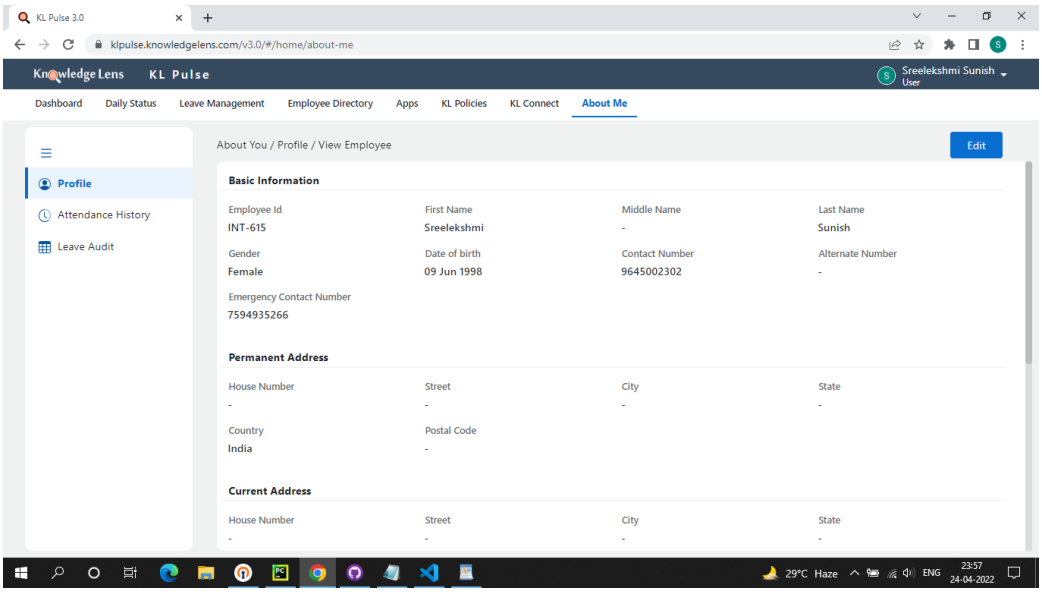

Figure A.12: About me Page

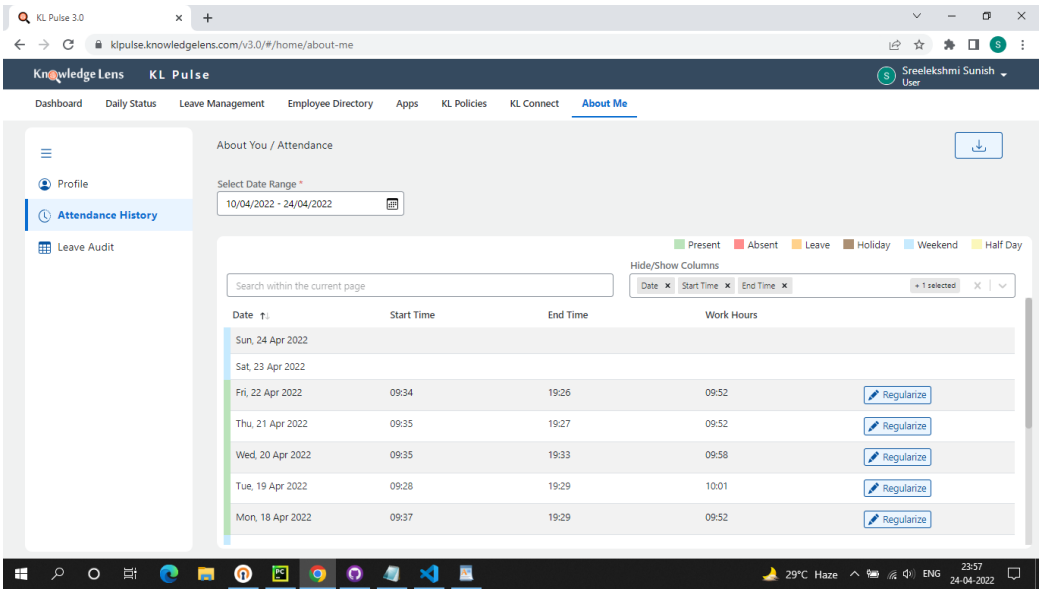

Figure A.13: Attendance History Page

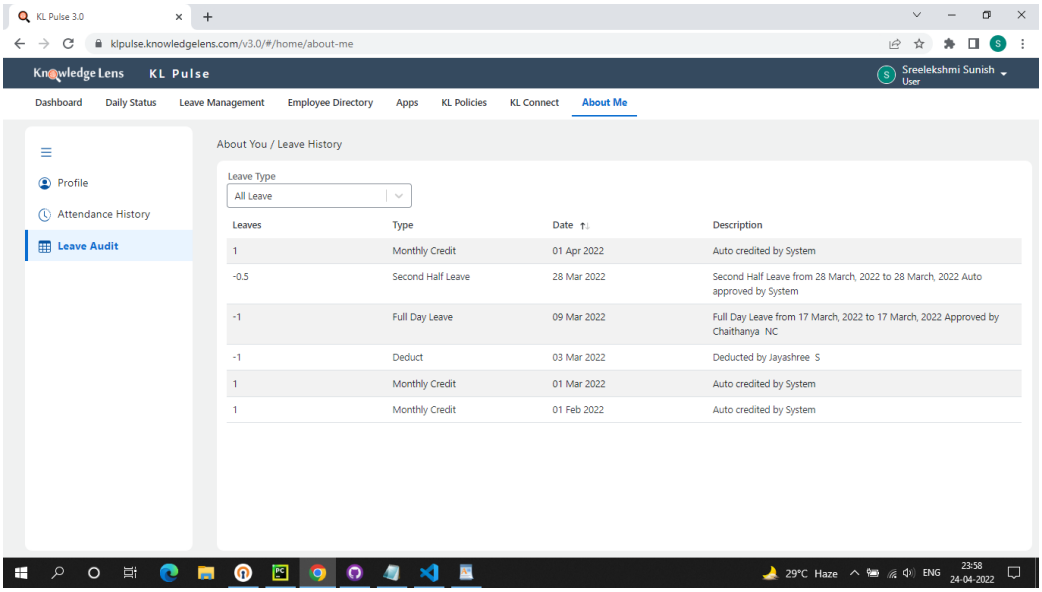

Figure A.14: Leave Audit Page