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ENTITLED

**Design and Development of a Digital platform for Managing
Retirement Files (study case CNR M'Sila)**

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Dedication

First and foremost, all praise and thanks be to Allah,
Who granted us strength, patience, and guidance throughout this journey.

To those who instilled in our hearts a love for knowledge,
To those who were our support and strength through every stage of life,
To those whose prayers lit the path before us...

To our beloved parents,
We dedicate this achievement as a token of love and deep gratitude.

You are the foundation of this success, the pillars upon which we built our dreams.

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The beacons of knowledge and builders of minds,

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grow and succeed.

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Our siblings, colleagues, and dear friends,
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To ourselves,
After all the effort, dedication, and patience,
We now reap the first fruits of our perseverance.

We dedicate this thesis to everyone who believed in us and stood by our side throughout this
memorable journey.

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Abstract

Public administrations in Algeria face major challenges in adapting to digital transformation, especially in managing administrative records. The National Retirement Fund particularly struggles with handling retirement files efficiently due to the absence of a dedicated and integrated information system, leading to delays, lack of transparency, and inefficiencies.

This thesis presents the design and development of a digital platform for the local agency in M'Sila Province, aimed at improving the tracking and processing of retirement files. The approach relies on the analysis and design of information systems using Unified Modeling Language (UML) tools and modern software development techniques.

The proposed platform helps streamline workflow, reduce processing time, and enhance coordination between departments. It also demonstrates the effectiveness of the digital solution in supporting local digital transformation efforts.

Keywords: Digital Transformation – Retirement Files – Digital Platform – Workflow Optimization – UML

الملخص

تواجه الإدارات العامة في الجزائر تحديات كبيرة في التكيف مع التحول الرقمي، لا سيما في إدارة التقاعد. وبعد التحقيق في دواليب الادارة، يُؤيد التوصيات التالية:

للتقيايد ما زرزا العينات التي أعينت ما لسيسيسيوالات في معالجة ملفات التقاعد، حيث أنها خاتمة معلوماً مختص ومتكملاً، مما يؤدي إلى تأخيرات ونقص في الشفافية وكفاءة الأداء.

إن أول هذه التوصيات هي إنشاء منصة数ية رقمية لـ لائحة التقاعد، وذلك بهدف تحسين معالجة ملفات التقاعد، وتحقيق دقة وفعالية البرميات. وهي تهدف إلى تحسين تجربة المستخدمين، وذلك من خلال تطبيق معايير الجودة (UML) وتقنيات تطوير البرمجيات.

أول توصيات هي إنشاء منصة數ية رقمية لـ لائحة التقاعد، وذلك بهدف تحسين معالجة ملفات التقاعد، وتحقيق دقة وفعالية البرميات. وهي تهدف إلى تحسين تجربة المستخدمين، وذلك من خلال تطبيق معايير الجودة (UML) وتقنيات تطوير البرمجيات.

الكلمات المفتاحية: التحول الرقمي - ملفات التقاعد - إدارة التقاعد - تحصيل العائد - لائحة التقاعد.

General Introduction

General Introduction

With the rapid advancement of information and communication technologies, Algeria is increasingly committed to digital transformation across public and private sectors. Integrated information systems are a key pillar of this shift, enhancing administrative efficiency, service quality, and transparency. However, many public institutions still rely on traditional or partially digital procedures, leading to delays and reduced responsiveness.

The National Retirement Fund (CNR), particularly the M'Sila agency, faces challenges in managing retirement files—such as procedural delays, weak tracking, and poor interdepartmental coordination—mainly due to the absence of a unified and secure digital platform.

This thesis addresses the following problem:

How can a centralized, secure, and user-adapted digital platform improve the efficiency, transparency, and traceability of retirement file management in the M'Sila branch of the National Retirement Fund?

To address this, the study proposes a flexible and scalable platform tailored to the agency's operations and user needs. Key objectives include automating file workflows, securing file access and sharing, and enhancing processing speed and accuracy.

The thesis is structured into three chapters:

- Chapter One: Theoretical overview of local administration and retirement system concepts.
- Chapter Two: System analysis and modeling using UML, identifying functional and technical requirements.
- Chapter Three: Platform development, interface presentation, and experimental testing.

By combining theoretical insight with practical implementation, this work contributes to Algeria's digital transformation and proposes a model suitable for national adoption.

Chapter I: Preliminary Study

Introduction

This chapter addresses the fundamental theoretical aspects upon which the project to develop a digital platform for managing retirement files is based. In order to build an effective and integrated information system, it is first necessary to understand the institutional and organizational context of the National Retirement Fund, in addition to becoming familiar with the services it provides, the mechanisms for managing financial resources, and the methods of calculating pensions.

The chapter will also examine the administrative and organizational structure adopted at the level of the local agency of M'Sila province, with the aim of identifying the roles, responsibilities, and processes that will later be digitized.

This chapter provides the conceptual foundation upon which the technical phase of the project is built, and represents a crucial step in understanding the actual needs and accurately defining the requirements.

1. The National Retirement Fund (CNR)

1.1 Definition

The National Pension Fund is a state administrative institution responsible for the management of the pension system in Algeria. It was created by the Decree N° 85-223 of August 20, 1985. It was dissolved and created by decree 07-92 on January 4, 1992 which contains the legal status of the Social Security funds and of the regulation of their administration and their financial management. [1]

1.2 The History of the Establishment and Development

1. **1953:** Old-age insurance was established for all workers.
2. **1956:** Pension insurance was created for non-salaried workers (craftsmen, merchants, farmers).
3. **1958:** Preparing insurance for non-salaried workers
4. **July 1983:** Putting an end to the basic and supplementary retirement systems, and merging all professional systems into one unified system.
5. **2 July 1983:** The National Retirement Fund was created by Decree 85-223

6. **1985:** The National Retirement Fund (CNR) was created as a result of the merger of eight insurance funds that managed the multiple retirement systems in Algeria. it concerns:
 1. **C.A.A.V:** The Algerian old-age insurance fund responsible for the management of pensioners under the general scheme
 2. **C.G.R.A:** The Algerian General Retirement Fund is responsible for managing retirees from the civil service system.
 3. **C.N.M.A:** The national agricultural mutual Fund responsible for the management of pensioners of the agricultural regime.
 4. **C.S.S.M:** The Social Security Fund for Mine Workers, responsible for facilitating pensions for retirees in the mining sector.
 5. **C.A.V.N.O.S:** The old-age insurance fund for the self-employed is responsible for managing retirement grants for the self-employed.
 6. **E.P.S.G.M:** The institution of social coverage for Sea workers and responsible for granting retirement to sea workers
 7. **C.A.P.A.S:** The social security and insurance fund responsible for personnel management of SONELGAZ.
 8. **S.N.T.F:** Retirement Fund for Employees of the National Transport and Communications Company (Railways). [1]

1.3 Administrative and organizational structure

1.3.1 Organizational Structure (National Level)

The administrative organization of the National Pension Fund is based on the principle of decentralization but is actually applied using a deconcentration approach since local agencies do not have legal personality and financial independence. The administrative organization was established, in part, by the ministerial decision of April 16, 1997, and is comprised of:

- **Central Services:** Represent the headquarters of the fund and oversee planning and general management.
- **Local Agencies (51 agencies):** Distributed across 51 provinces, responsible for providing administrative services to beneficiaries at the local level.

- **Regional IT Centers (10 agencies):** Comprising 10 specialized centers for managing and processing digital data to ensure the efficiency of the information system.
- **Regional Archival Centers (5 agencies):** Consisting of 5 centers responsible for preserving and archiving historical files and data related to retirement.
- **Reception and Guidance Centers (52 agencies):** A total of 52 centers aimed at improving service quality by providing spaces for welcoming and guiding retirees and their beneficiaries. [1]

1.3.2 Organizational structure (at the state level)

At the Wilaya Level, the fund operates a network of sub-agencies and local service counters spread across various provinces to bring services closer to citizens

- **Wilaya Agencies:** Classified as (First, Second, Third) based on number of individuals covered, contribution volume, and benefit expenditures. Each wilaya agency is directed by a Director, appointed by the Minister responsible for social security.
- **Branches:** Established at the district or municipal level, each branch is managed by a head appointed by a decision of the fund's Director General.
- **Local Service Counters:** These serve as direct contact points with citizens and are managed by an agent appointed by the fund's Director General. [2]

1.3.3 Administrative structure (at the level of the General Directorate)

The management of the National Pension Fund (CNR) in Algeria is overseen by two main bodies:

- **Board of Directors:** Responsible for oversight and guidance, consisting of 29 members distributed as follows:
 - a. **18representatives of workers**, appointed by the General Union of Algerian Workers.
 - b. **6 representatives of employers**, selected by employers' organizations.
 - c. **5 representatives of the state**, representing various relevant ministries.
- **Director General:** Appointed by a decision of the Minister in charge of social security, responsible for implementing the policies and strategies approved by the Board of Directors, as well as overseeing the fund's daily operations. [1]

1.3.4 Administrative structure (at the local agency level) [3]

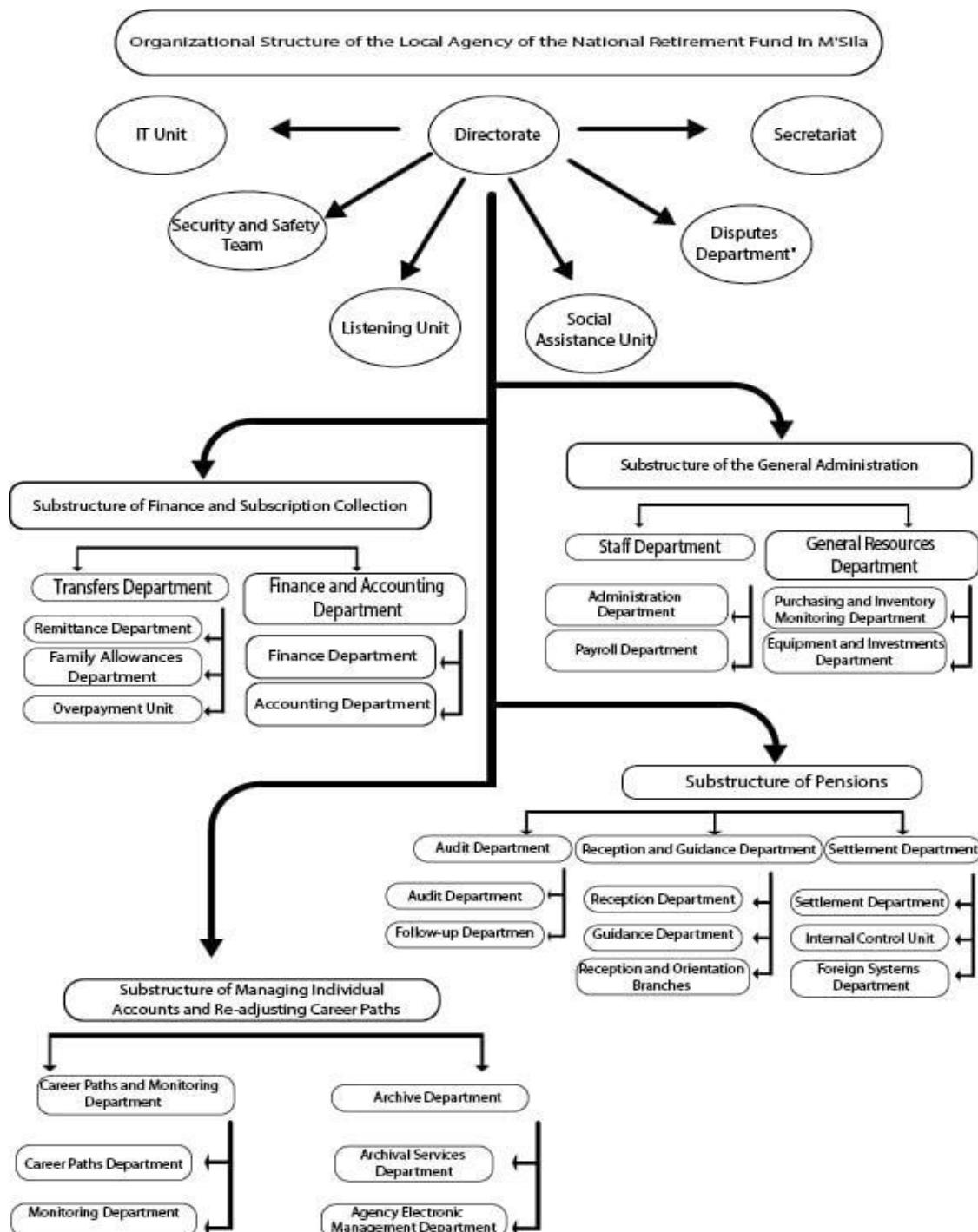


Figure 1.1: Organizational structure at the level of the local agency of M'Sila

- **Agency Director**

- a. Oversees the general management of the wilaya agency.
- b. Implements directives from the central administration and ensures the execution of the fund's general policies.
- c. Ensures coordination between the various departments within the agency.

- **The General Secretariat**

It is a service that acts as an intermediary between the director and the various departments, responsible for sending, arranging, and organizing information

- **Disputes Service**

the entity that monitors pension files for legal or administrative purposes regarding employees. The structure also acts as the legal intermediary between the insured (the retired employee) and the administration (Pension management delegation).

Its functions include :

- a. Following up on court-related correspondence.
- b. Tracking surplus funds from terminated pensions.
- c. Receiving appeals and complaints related to pensions.

- **Social assistance cell**

This department is mainly responsible for:

- a. Intervention to resolve minor disputes or misunderstandings between the retiree and the administration.
- b. Creating a positive communicative environment between both parties.
- c. Handling complex cases (elderly, widows, people with special needs).
- d. Organizing awareness campaigns about the rights and duties of retirees.
- e. Providing guidance on digital services or new procedures.

- **Listening cell**

This department is mainly responsible for:

- a. Enhancing effective communication between the administration and retirees.
- b. Improving the reception of citizens and supporting them psychologically and socially.

- **Security and Prevention Unit**

This department is mainly responsible for:

- a. Protecting the premises and property from any internal or external threat.
- b. Maintaining the security of employees and visitors.
- c. Ensuring respect for order and discipline within the institution.
- d. Immediate intervention in emergency situations.

- **Operations and Information Technology Department**
This department is mainly responsible for:
 - a. Managing and maintaining the center's local network.
 - b. Repairing and maintaining computer hardware and software.
 - c. Developing software tailored to the local needs of the agency.
- **Sub-structure of the General Administration**
This department is mainly responsible for
 - a. Continuity of administrative performance.
 - b. Good management of human and material resources.
 - c. Respect for internal regulations and administrative transparency.
- **Sub-structure of the Finance and Subscription Collection Department**
This department is mainly responsible for:
 - a. Improving the effectiveness of collection and reducing uncollected debts.
 - b. Enhancing financial transparency and providing accurate reports for decision-making.
 - c. Following up on the collection of contributions from various entities (social security bodies, employers, public administrations).
 - d. Handling cases of delayed or evasive payments.
 - e. Preparing contribution schedules and annual discrepancies.
- **Sub-structure of the Pension Authority**
This department is mainly responsible for
 - a. Receiving and reviewing retirement application files (regular, early, medical, etc.).
 - b. Verifying the fulfillment of legal conditions for each file.
 - c. Calculating the pension amount based on the service period and reference salary.
 - d. Preparing payment orders for monthly pensions.

- e. Coordinating with the financial department to ensure payment within the specified deadlines.
- f. Managing pension revisions resulting from status changes (death, marriage, divorce, etc.).
- **Substructure for managing individual accounts and re-aligning career paths**

This department is mainly responsible for

- a. Ensuring the accuracy of pension calculations based on the employee's professional career record.
- b. Assisting employees and retirees in making the most of the retirement system.
- c. Improving the level of transparency in contribution and pension calculations.
- d. Providing professional support to individuals regarding the improvement of their retirement paths. [2]

1.4 Sources of funding for the National Retirement Fund

The National Fund relies on several funding sources, the most prominent of which are:

1. **Contributions:** The main source of funding, collected from workers and employers at legally defined rates.
2. **State Contribution:** The government provides financial support to ensure the fund's financial balance, especially in cases of deficit.
3. **Oil Revenues:** The National Fund receives 2% of oil sales.
4. **Investment Returns:** The fund invests part of its capital in various projects to generate financial returns that support its resources.
5. **Donations and Testaments.** [4]

1.5 Tasks of the National Retirement Fund

1.5.1 Main tasks

Executive Decree No. 92-07 of January 4, 1992 defined the Fund's missions as follows:

1. Managing retirement pensions and allowances, in addition to pensions and allowances for beneficiaries.
2. Managing pensions and allowances granted under previous legislations from January 1, 1984, until beneficiaries' rights expire.

3. Ensuring the collection and monitoring of contributions and handling disputes related to collection.
4. Implementing retirement provisions stipulated in international social security agreements.
5. Managing the Assistance and Relief Fund.

1.5.2 Other tasks

1. Citizen reception cell, communication and social listening.
2. Establishing a listening and hearing cell in all local agencies of the Fund in order to handle complaints from socially insured persons (active and retired).
3. Analyzing petitions to identify discrepancies and propose solutions to improve social security services. [1]

1.6 Services and benefits provided by the fund

The National Retirement Fund provides a range of services and benefits to beneficiaries, including:

1.6.1 digital services

1. Green Number 3011: Free service that allows retirees and rights holders to get information and help directly by telephone.
2. Retirement application: A dedicated smartphone app that gives retirees easy access to the Fund's services
3. Pensioner's Space "e-retraite": an online portal enabling retirees to extract pension certificates and follow up on retirement referral applications submitted electronically by employers

1.6.2 Traditional services

1. Payment of monthly pensions to beneficiaries
2. Grants for persons with disabilities and persons with special needs
3. Provision of grants to survivors and persons with rights in the event of the beneficiary's death.
4. Provide social and health assistance to beneficiaries when needed. [1]

2. Retirement system concept

2.1 Definition

The National Retirement Scheme currently in place was created under Law No. 83/12 dated July 2, 1983, with effect from January 1, 1984, as a contributory insurance scheme established with solidarity among active and inactive workers, and the retiree, and therefore, the principle of distribution. This scheme is characterized by the scope of the protection it protects that is, the concerned employee. [1]

2.2 The provisions of this law

Upon the death of the pension holder, the survivor's pension shall be granted to:

- The surviving spouse
- The children
- The parents [1]

2.3 Types of retirement and its systems

2.3.1 regular retirement

- **Legal age:** 60 for men and 55 for women.
- **Required length of employment:** At least 15 years of actual work.
- **Additional benefits for women:** Working women can benefit from a one-year reduction in retirement age for each child, up to a maximum of three years, provided they have raised the child for at least 9 years.

2.3.2 Early (Proportional) Retirement

Early retirement has been suspended since 2016. However, it was allowed in the following cases:

- **Required age:** 50 years for men and 45 years for women.
- **Working period:** At least 20 years of actual work.
- **Social security contributions:** At least 10 years of social security contributions.

2.3.3 Retirement for Health Reasons (Disability Retirement)

- **Age:** No specific age required.
- **Working period:** At least 8 years.

Requirements

- Submission of a medical file approved by the competent medical committee.
- Proof that the disability is permanent and prevents the worker from performing their duties.
- Issuance of a final decision from the Retirement Fund confirming the state of disability. [1]

2.4 Retirement pension

2.4.1 Definition

Under Algerian legislation, any employee exercising a professional activity in the country, regardless of whether they are employed by one or more employers or working through union organizations, can earn a retirement pension. However, the conditions of eligibility must be fulfilled. [1]

2.4.2 Conditions for Granting

1. Age status:

The legal age for receiving a retirement pension is:

- **60 years** for men.
- **55 years** for women.

There is no age requirement for granting a pension in the following two cases:

- When the worker suffers from permanent total disability.
- When the worker is a mujahideen fighter.

2. Work Condition:

- To be eligible for a pension, the worker must have worked for at least fifteen (15) years.
- This period must include actual work and the payment of contributions for a period of at least seven and a half years.

The validation of the years of work is based on the following criteria:

- A year of insurance is considered and counted when it corresponds to at least 180 days or 1440 hours of work.
- A quarter is validated when at least 45 days or 360 hours of work are completed during that quarter.

Note:

- Algerian nationals living abroad who are engaged in professional activities outside the national territory are allowed to voluntarily join the national retirement system.
- This right is granted under Executive Decree No. 22-351 dated October 18, 2022, which outlines the specific conditions and procedures for voluntary affiliation to the national retirement system.
- Heavy Labor Occupations: Early retirement is possible under the conditions mentioned above. [1]

2.5 Proportional Retirement Without Age Requirement

After the signing of Executive Order No. 97-13 on May 31, 1997, which effectively relaxed the conditions under which a retirement could be granted, it then became possible to receive an immediate retirement pension without having to wait until the age described in Article 6 of Law No. 83-12 of July 2, 1983, in the following cases and under the following conditions:

- **With no age requirement** :if the salaried worker has completed at least thirty-two (32) years of actual work, during which social security contributions were paid.
- **Starting from the age of fifty (50)** :a salaried worker who has completed at least twenty (20) years of actual work with corresponding social security contributions may request to benefit from a proportional retirement pension. [1]

2.6 Calculation of Pension

Retirement pensions within the Algerian system are computed according to precise rules where the length of service and the reference salary of the employee are taken into full consideration. The basic formula is:

$$\text{Retirement pension} = \text{Reference salary} \times \text{Number of Working Years} \times 2.5\%$$

Where it is meant:

- **Reference Salary** :This is the average of the best salaries earned by the worker over a period of 5 years during their professional career.
- **Number of Working Years**: This refers to the total number of years during which the worker contributed to the retirement fund.

- **2.5% Rate:** This is the coefficient adopted by the National Retirement Fund. It is multiplied by the number of working years to determine the percentage of the reference salary the pensioner is entitled to.

Note:

Pension Rate Cap: Regardless of the number of years of service, the pension amount may not exceed 80% of the reference salary. Additionally, the amount calculated is subject to an annual cap with a minimum and maximum recognized by public authorities in order to provide retirees with a reasonable standard of living.

- Minimum retirement pension amount:

- a. **Employees :**

Equivalent to 100% of the national minimum guaranteed wage, estimated at 15,000 DZD.

- b. **Mujahideen:**

The pension is set at an amount equal to two and a half times the national minimum wage, which currently amounts to 45,000 DZD. [1]

2.7 transferred pension

2.7.1 Definition

A transferred pension is a pension that is passed on to qualified beneficiaries eligible for the pension (generally the spouse, child or in some cases, the parents) upon the death of the retiree. The transferred pension provides the family with income going forward. [1]

2.8 Creating a retirement file (Direct – Transferred- For the Parents)

2.8.1 Direct retirement

1. Filling the retirement request form
2. Family certificate of civil status
3. Proof of wages.
4. Certificate of employment and wages for the last five years or the best years.
5. Bank Identity Statement (RIB) or Postal Identity Statement (RIP).
6. Copy of the biometric national identity card.
7. Proof of national service period:
8. Copy of the national service card.

- **Child of a martyr in active status:**

1. Certificate proving the status of "Child of a Martyr."
2. Proof of internship/training periods (ENS, ENA, ITE, CFA, etc.):
3. Apprenticeship certificate and proof of contribution payments.

2.8.2 Transferred Retirement

1. Spouse (husband or wife) still alive:
2. Filling the transferred pension request form.
3. Family certificate of civil status.
4. Bank Identity Statement (RIB) or Postal Identity Statement (RIP).
5. Copy of the biometric national identity card.

- **Adult orphans**

1. Filling the transferred pension request form.
2. Family certificate of civil status.
3. Bank Identity Statement (RIB) or Postal Identity Statement (RIP).
4. Copy of the biometric national identity card.

- **Adult Male Children :**

1. Filling the transferred pension request form.
2. Family certificate of civil status.
3. Bank Identity Statement (RIB) or Postal Identity Statement (RIP).
4. Copy of the biometric national identity card.
5. School certificate or apprenticeship certificate.
6. Medical certificate specifying the disability percentage.

2.8.3 For the Parents (Ascendants)

1. Filling the transferred pension request form.
2. Family certificate of civil status.
3. Bank Identity Statement (RIB) or Postal Identity Statement (RIP).
4. Copy of the biometric national identity card.
5. Monthly income statement (salary slip, income report). [1]

3. Criticisms and Proposed Solutions

3.1 Problems

- Absence of an integrated digital system for managing retirement files.
- Lack of effective electronic communication channels for retirees.
- Absence of an electronic mechanism to accurately track the status of each file from start to finish.

3.2 Proposed Solutions

- Design and develop an integrated digital platform for managing retirement files.
- Improve internal coordination by merging and updating data within a unified database.
- Establish an electronic tracking system for file statuses.
- Provide effective electronic communication channels for retirees.

Conclusion:

We will now advance to the next step after completing the first step in which we detailed the different administrative concepts related to the National Retirement Fund and the local agency of M'Sila province. The next phase will focus on the technical aspects of developing the system, accounting for best-practices and recognized standards in the field of information system design. Particular attention will be placed on creating the best case for users with efficient interfaces and a clear organization of information, striving for a platform that is easy-to-use, responsive, and fit-for-purpose for users in several user categories.

Chapter II: Platform design

1. Introduction

To design complex information systems effectively, it is necessary to follow organized and carefully planned steps in the software development process. Model-based design is regarded as being one of the most significant of these processes since it aids in the conversion of requirements into a comprehensible format that can be programmatically implemented.

In this context, we have progressed to the design stage of our digital platform to manage retirement files. The process started by collecting and analyzing specifications, and identifying the stakeholders or users that will utilize the system. From that point, we created a number of illustrative diagrams that represented the structure of the system and the flow of input and information between different components. One of the most important illustrative diagrams is the Class Diagram, which demonstrates the key elements of the system and the relationships between them.

At this point, we used a specialized modeling tool, such as StarUML, which supports the UML modeling language. This tool provides visual capabilities that help better conceptualize the system's technical components and improve the quality of the design through a clearer and more organized representation.

2. System Context Analysis

2.1 Objective

Understand the environment surrounding the system and identify the entities (actors) that interact with it and the processes that take place between them.

2.2 Actors Identification

1. system administrator → IT Staff (IT)
2. Retired Data Entry Clerk → Reception Staff (RC)
3. File Creator (Liquidator) → Liquidation Staff (LS)
4. File Reviewer (The verifier) → Verification Staff (VS)
5. Agency Director → General Administration (GA)
6. Pension Officer → Follow-up / Pension Staff (FS)
7. Archivist → Archive Staff (AS)
8. Retired Person (*or simply: Retiree*)

2.3 Actors and Their Roles

The following table presents the main system actors and their responsibilities

Actor	Description / Role	Main Permissions and Tasks
System Administrator (Admin)	Responsible for managing the entire system	<ul style="list-style-type: none"> - Manage user accounts (create, update, delete, activate/deactivate) - Manage retirement files (view, edit, delete) - Monitor system activity logs - Supervise statistics and reports
Reception Staff Employee	Initial contact for retirees	<ul style="list-style-type: none"> - Add a new retiree - Update retiree data - Forward file to the Liquidation Department
Liquidation Staff Employee	Responsible for creating retirement files and managing their status	<ul style="list-style-type: none"> - Create retirement file - Update file status (in specific cases) - Edit file (in case of retiree's death) - Forward file to Review Department
Review Staff Employee (Vérification)	Verifies data and reviews files	<ul style="list-style-type: none"> - Change file status after review - Send notifications to retirees to renew documents - Forward file to the next department
Agency Director	Has the final decision regarding retirement files	<ul style="list-style-type: none"> - Approve or reject retirement files - Return rejected files to previous department for reevaluation
Pension Staff Employee	Responsible for calculating pensions after final approval	<ul style="list-style-type: none"> - Calculate pensions based on file data
Archive Staff Employee	Manages and maintains archived files	<ul style="list-style-type: none"> - View archived files - Return archived files to previous departments for modifications if needed
Retiree	The end-user of the system	<ul style="list-style-type: none"> - View file details - Download pension document - Upload renewal documents when required

Table 1: Actors and their roles in the system

3. Requirements Analysis

3.1 Functional Requirements

This section outlines the core functionalities that the system is expected to provide in order to support the retirement file management workflow efficiently:

3.1.1 User Management

- The system allows the administrator to create, update, delete, deactivate and reactivate user accounts.
- The system implements role-based access control (RBAC) to assign permissions based on each user's responsibilities.

3.1.2 Retired Persons Management

- The system shall allow authorized personnel to register new retirees.
- The system shall support updating retiree information when necessary.
- Retirees will be able to access and view their personal data securely through a dedicated interface within the platform.

3.1.3 Retirement Files

- The system shall provide the functionality to create new retirement files.
- It shall support file modifications in exceptional cases (e.g., in the event of the retiree's death).
- Each file shall progress through a structured workflow with predefined statuses such as: "pending", "Under Review", "Approved", "Rejected", and "Suspended".
- The platform shall automatically handle the routing of files through the required processing steps, ensuring orderly and consistent progression based on workflow rules.

3.1.4 Approval and Review

- The platform shall enable authorized users to review and validate submitted retirement files.
- Retirees shall receive automated notifications if supporting documents are missing or incomplete.
- The system shall allow designated personnel to approve or reject files.
- In the event of rejection, the platform shall return the file to the previous processing stage for revision.

3.1.5 Archive and Pension Department

- Finalized files shall be archived securely within the system.
- The platform shall support the retrieval and restoration of archived files if necessary.
- Pension amounts shall be calculated automatically based on the verified data contained within each file.

3.1.6 Reports and Statistics

- The system allows for the generation of reports in various formats (such as PDF and Excel) to track file status, the number of cases processed, and other performance metrics.
- The platform provides an advanced statistical system that enables the admin to monitor detailed information through more than 15 types of statistical visualizations.
- The system maintains a comprehensive activity log to ensure transparency and traceability of all user actions.

3.1.7 Notifications

- The system shall provide real-time internal notifications to inform users of updates at each processing step.
- Email alerts shall be sent automatically via PHPMailer when relevant actions occur or attention is required.

3.2 Non-Functional Requirements

3.2.1 Security

- The platform provides a two-factor authentication system for login.
- Data protection using encryption techniques.
- The platform provides a mechanism for controlling access through specific roles.

3.2.2 Usability

- The platform offers a simple and user-friendly user interface design using Bootstrap 5
- Compatibility with various devices (Responsive Design).

3.2.3 System Configuration

- The platform will run on an Apache, PHP, and MySQL-based environment.

4. platform Modeling

4.1 Why Modeling?

Modeling transforms the needs of a project and its functional and technical solutions into visual and graphical forms, helping to develop a shared understanding among the people involved (analyst, developer, user, etc.). It is an important component of system analysis and ultimately helps to build software systems that are stable and based on the defined requirements. [6]

4.2 Advantages of Modeling

- **Modularity:** Dividing the system into independent components that are easier to understand and develop.
- **Abstraction:** Hiding unnecessary details to focus on the essentials.
- **Encapsulation:** Separating internal functionalities from external interactions.
- **Structured Design:** Organizing relationships between functions and data in a logical manner [6]

4.3 What is a UML Diagram?

A UML diagram is a type of dynamic template description based on the Unified Modeling Language (UML) which allows processes and sequences to be visualized. This allows for an accurate representation of the essential aspects of a system like actors, roles, actions. [5]

4.4 Using UML Diagrams in the Retirement File Management System

In the case of the digital retirement file management system, we utilized UML Diagrams to capture the internal architecture and interactive behavior of the system. This made it possible to gain a complete picture of the connections between different entities, including employees, retirees and retirement file processing paths. I also used it to define workflows between the various departments (e.g., reception, liquidation, verification, general administration, pensions, archive), to support accurate tracking of files, and to manage permissions and tasks pertaining to each functional role.

The diagrams used include, for example:

- **Use Case Diagram:** To define the interaction of actors with the system.
- **Class Diagram:** To represent the structure of entities and their relationships.
- **Sequence Diagram:** To show the flow of messages between objects during function execution.
- **Activity Diagram:** To depict the flow of operations within the system according to logical sequence.

4.5 Use Case Diagram

4.5.1 Definition

A Use Case Diagram is a visual representation that outlines the various functions of a system from the viewpoint of users. It captures the multiple actors that will interact with the system as well as the use cases (or tasks/functions) the system is expected to undertake once a user is involved.

A Use Case Diagram focuses on the outside of the system and does not focus on the implementation. During the requirements analysis phase use case diagrams are important in understanding "who does what" in the system. [7]

4.5.2 Actors

An actor is any external entity that interacts with the system, either as:

- **A human user** (such as a Reception Employee, Liquidation Officer, Director, Retiree...)
- **An external system** that integrates with the platform

This interaction typically involves sending or receiving information, or causing changes in the system state.

4.5.3 View use case diagrams

4.5.3.1 Login & Authentication Use Case

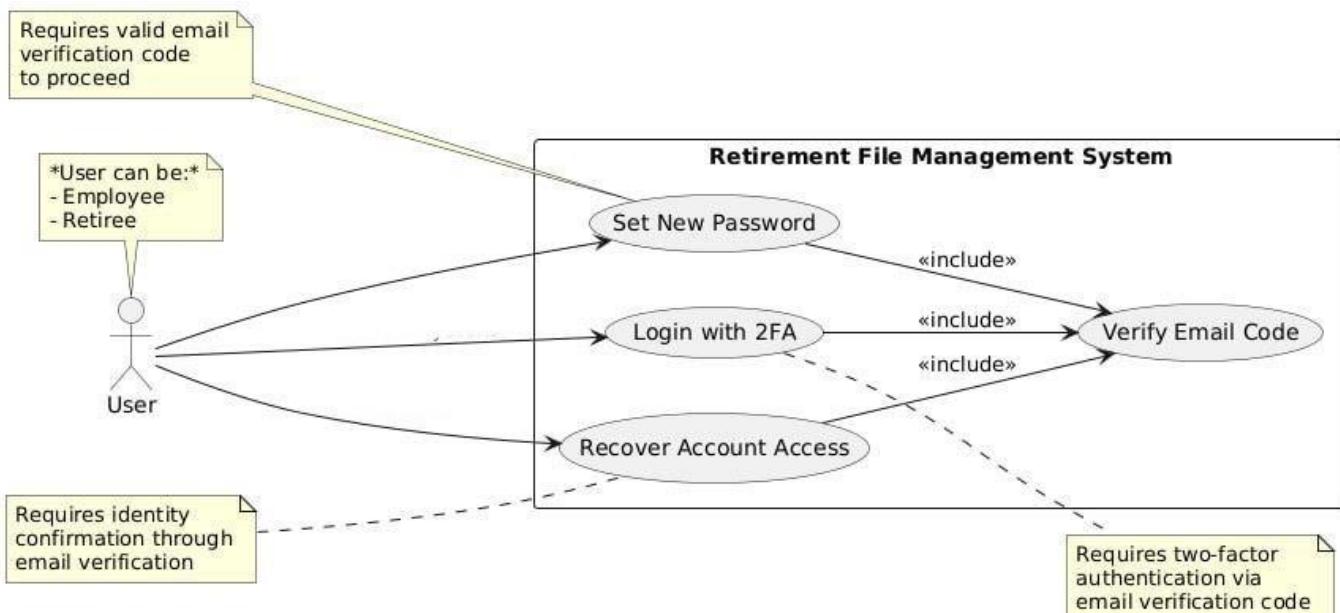


Figure 2. 1 : Authentication and system login use case

Goal and result

- **Objective:** Enable users to securely access the system through a verification process based on two-factor authentication (2FA).
- **Expected Outcome:** Access to the system is granted according to the user's permissions, or access is denied with a clear notification stating the reason.

4.5.3.2 processing a new retirement request

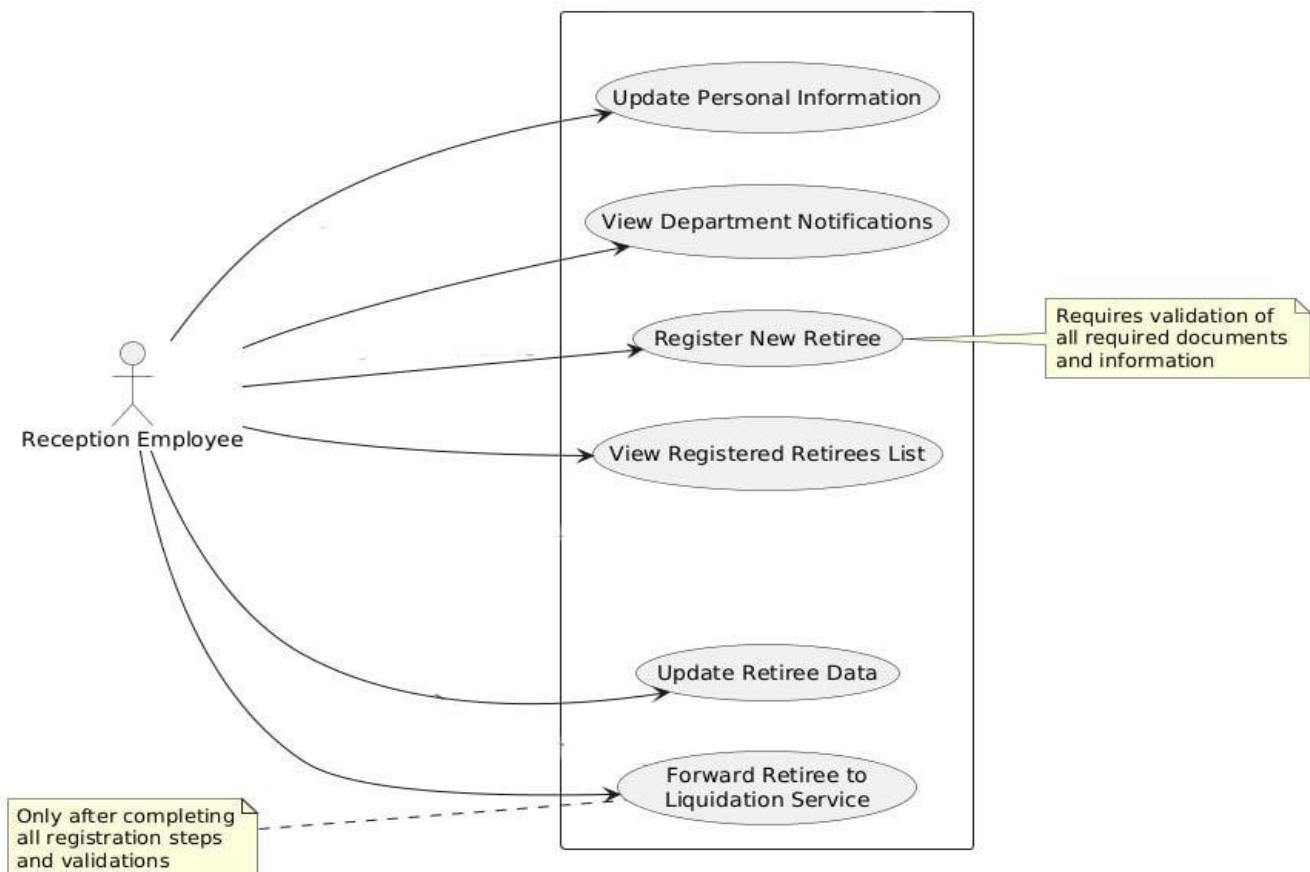


Figure 2. 2 :use case diagram for processing a new retirement request

Goal and result

- **Objective:** To clarify the basic functions performed by a receptionist within the digital platform for managing retirement files.

- **Expected Outcome:** The new retiree is correctly registered in the system, and their data is transferred through the appropriate path to the next employee.

4.5.3.3 Retirement file processing

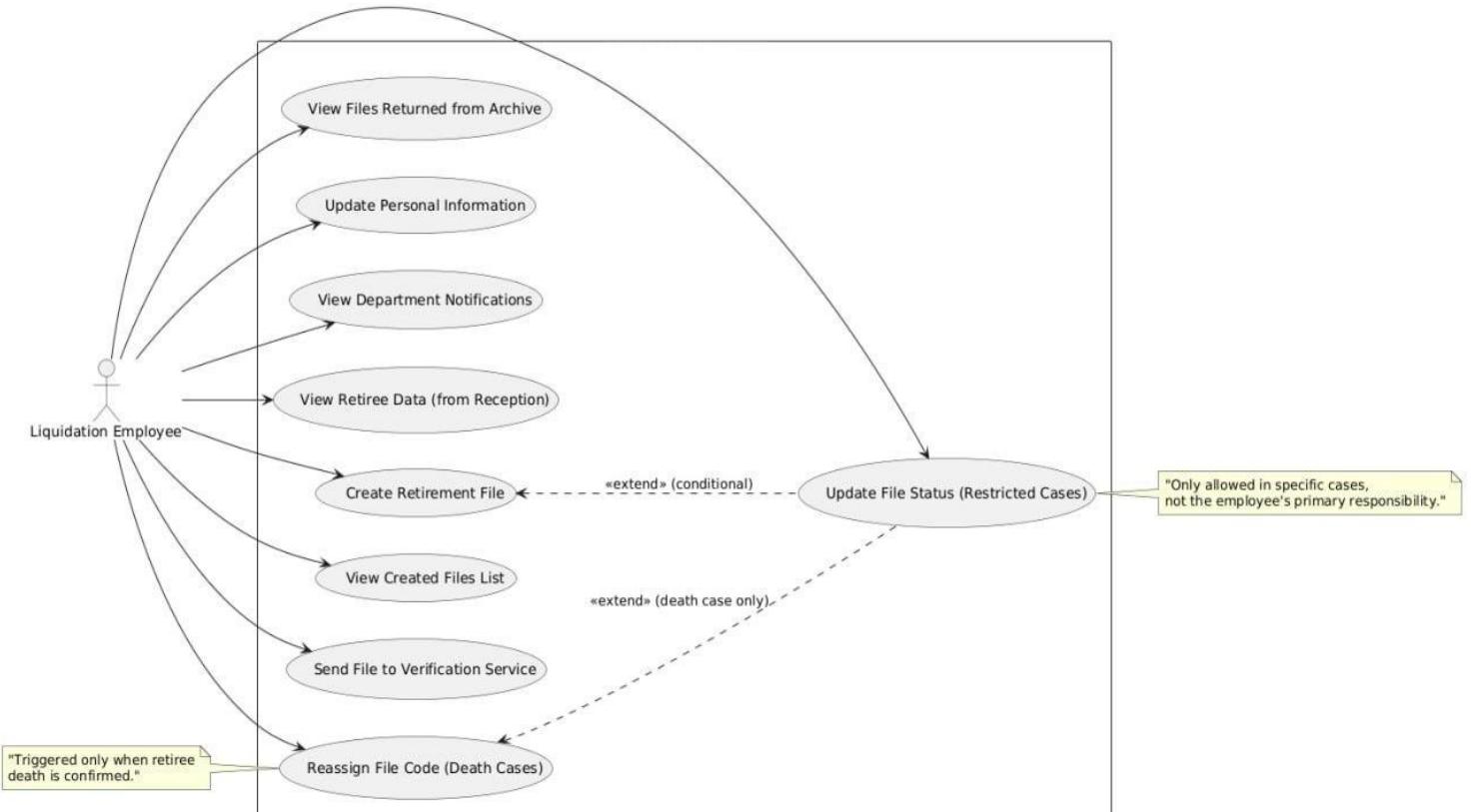


Figure 2. 3 : Use case diagram for retirement file processing

Goal and result

Objective: This chart illustrates the primary responsibilities of an employee responsible for processing retirement files.

Expected Outcome: Correctly prepare the retirement file for review.

4.5.3.4 Review retirement file

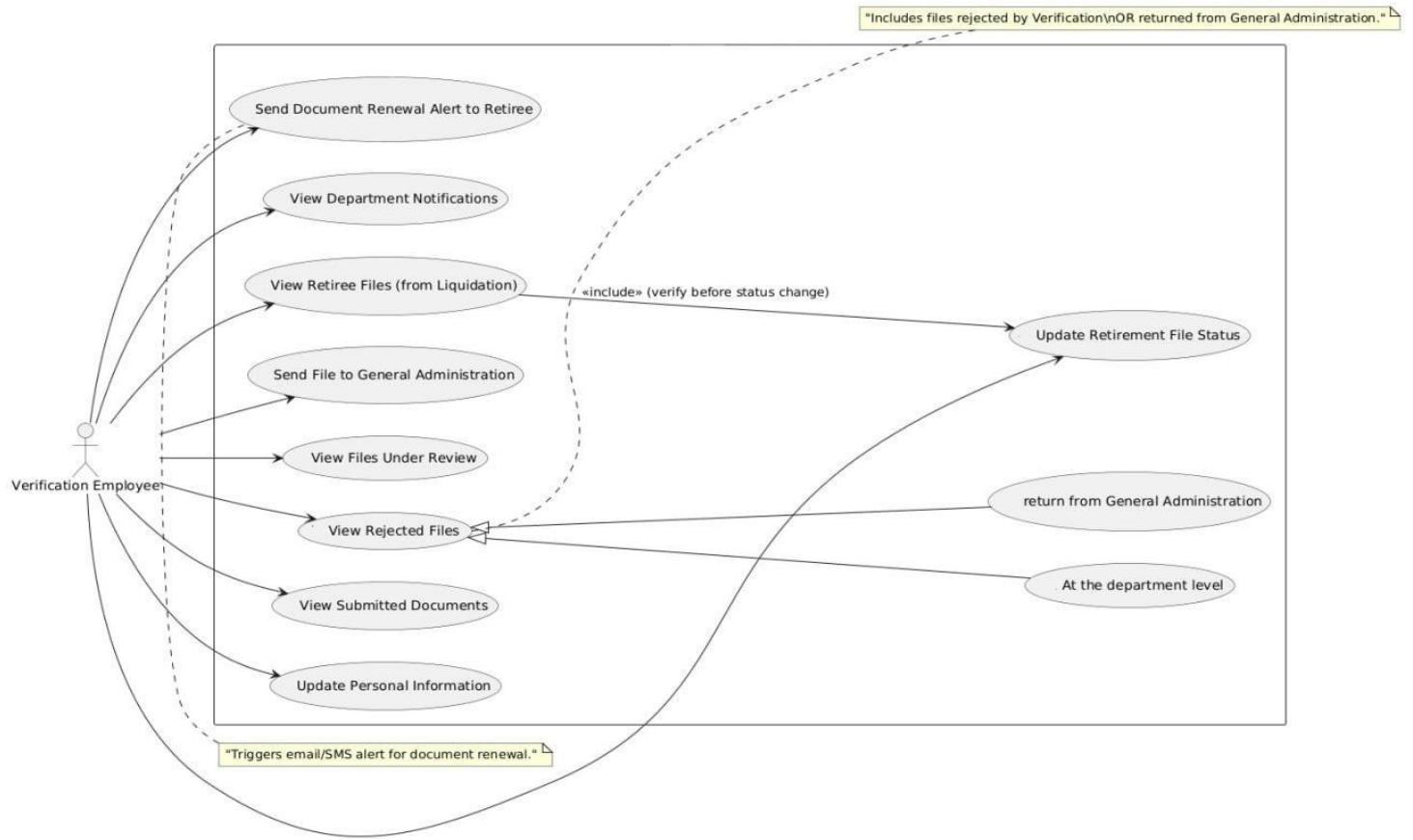


Figure 2. 4 : Use case diagram for review retirement file

Goal and result

Objective: To highlight the role of the review officer in auditing and verifying retirement files.

Expected Outcome: An approved file ready for final decision-making.

4.5.3.5 Accept or reject the retirement file

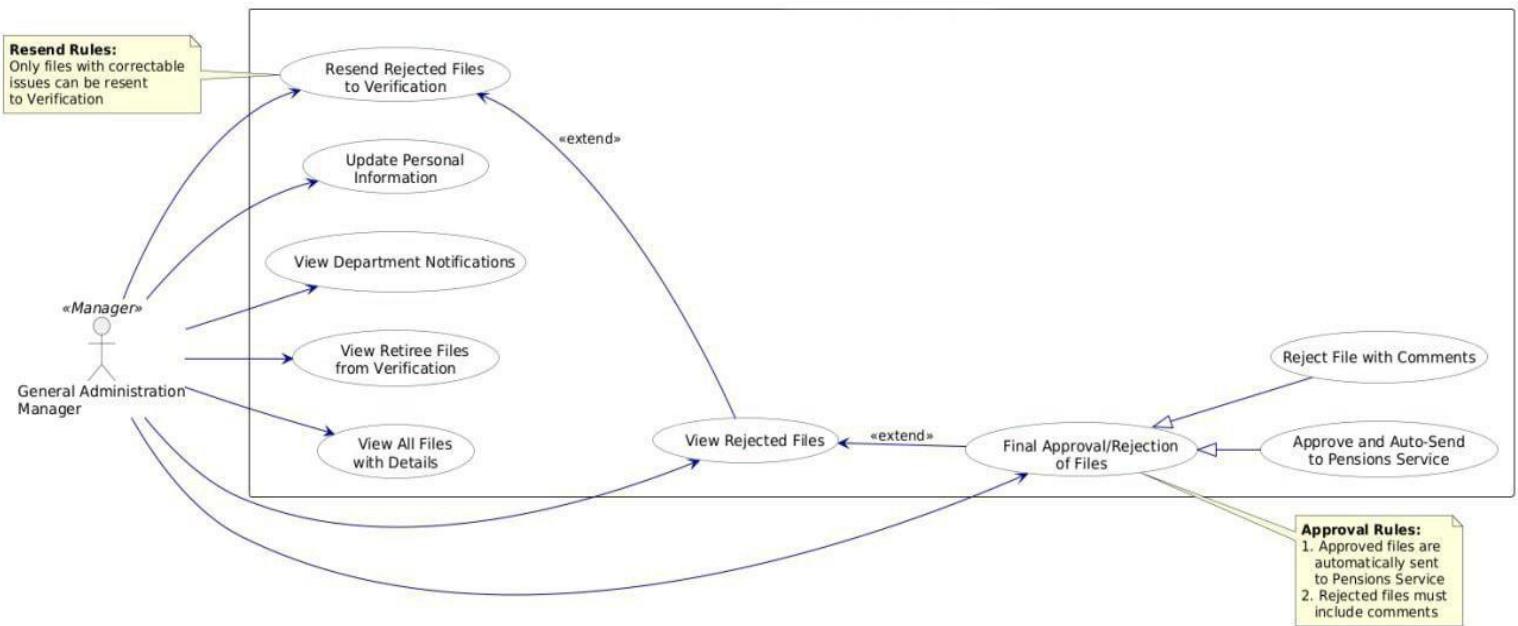


Figure 2. 5 : Use case diagram accept or reject the retirement file

Goal and result

Objective: To illustrate the decision-making process regarding retirement file approval.

Expected Outcome: Accurate final decision on the retirement request.

4.5.3.6 pension calculation

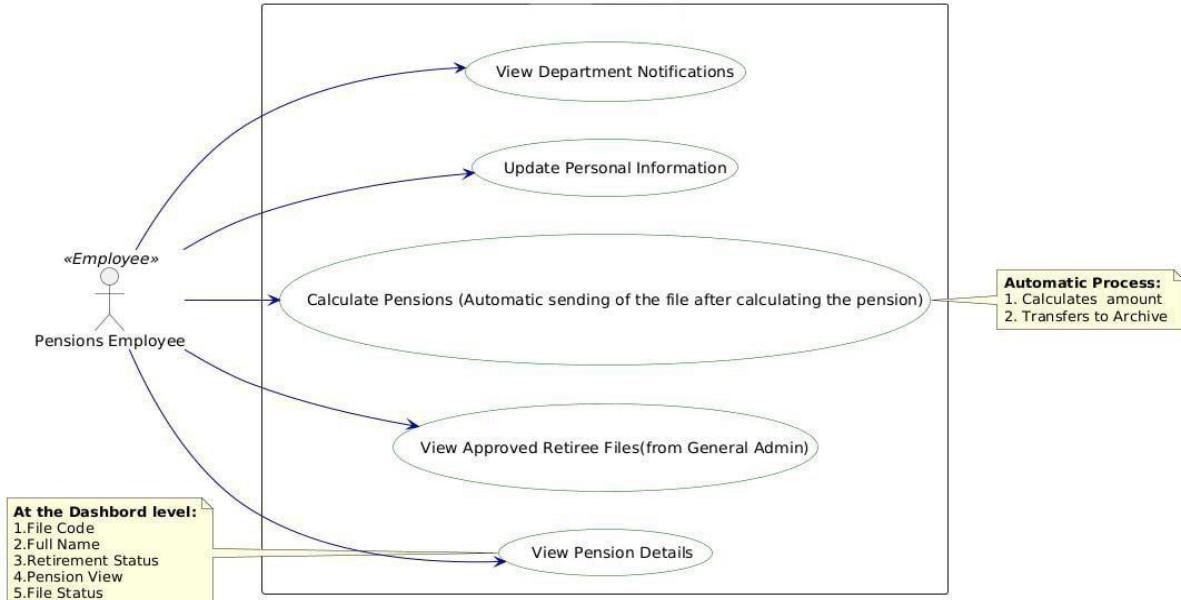


Figure 2. 6 : use case diagramme for pension calculation

Goal and result

Objective: To handle pension calculations for approved retirees.

Expected Outcome: Accurate pension calculation for the retiree.

4.5.3.7 Archiving processed retirement files

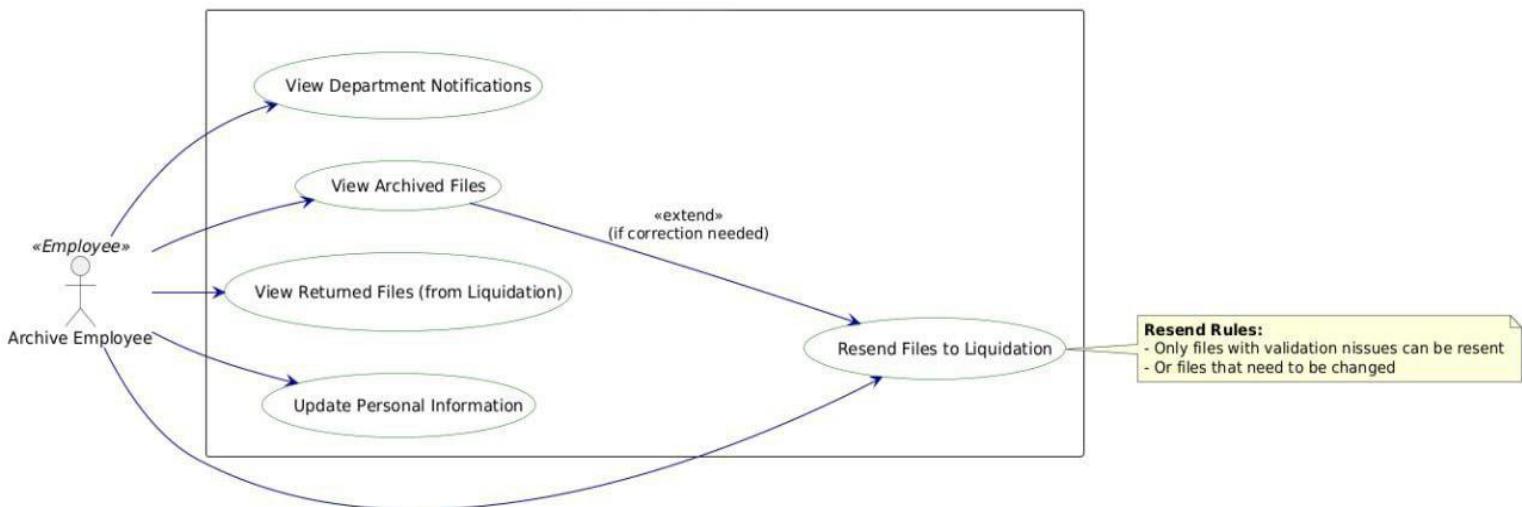


Figure 2. 7 : Use case diagram for archiving processed retirement files

Goal and result

Objective: To ensure proper storage and retrieval of finalized retirement files.

Expected Outcome: Efficient file archiving and retrieval.

4.5.3.8 System Administration

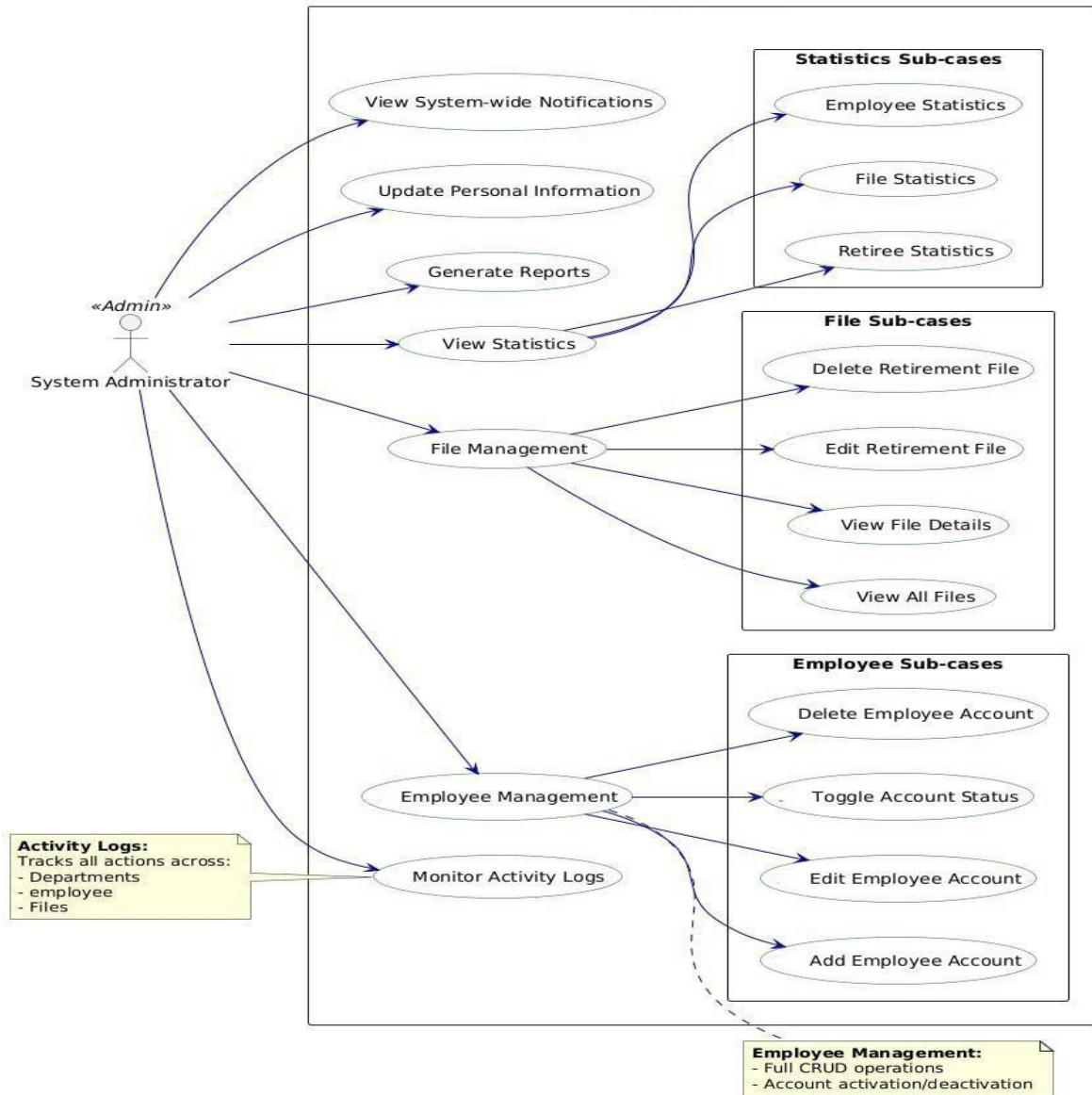


Figure 2. 8 : Use case diagram for system administration

Goal and result

Objective: To show the administrative control over the system's users and data.

Expected Outcome: System remains secure, organized, and well-supervised.

4.5.3.9 Follow up on file status

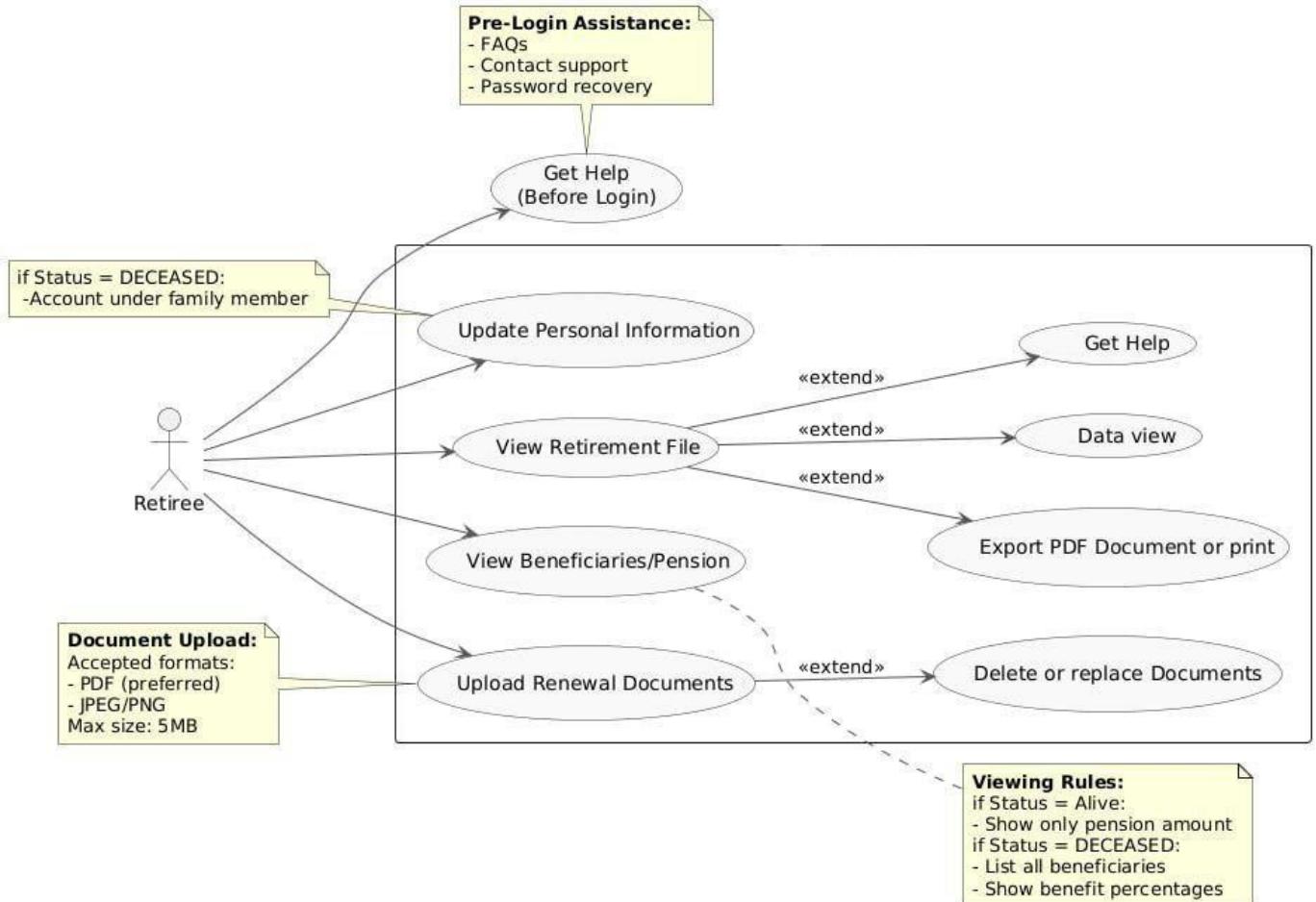


Figure 2. 9 : Use case diagram for Follow up on file status

Goal and result

Objective: To define the external user's (retiree) role within the platform.

Expected Outcome: Improved user experience and transparency for retirees.

4.6 Class Diagram

4.6.1 Definition

A Class Diagram is a form of static structure diagram used to represent the internal structure of a system, by illustrating the classes (which compose the system), the attributes, the operations or methods, and the different relationships between the objects within the system. [16]

4.6.2 View Diagram

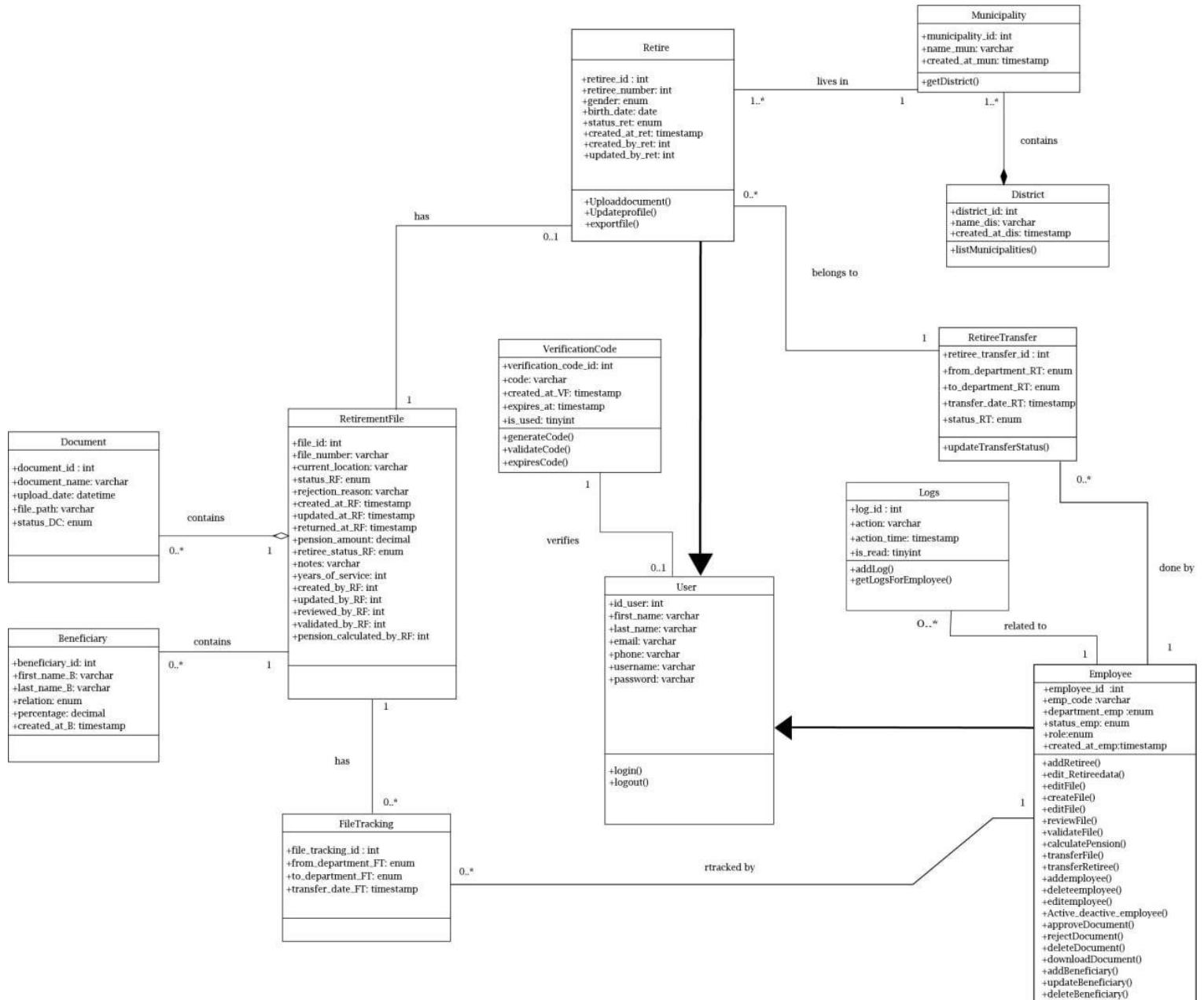


Figure 2. 10: Class Diagram of E retraite

Description:

The class diagram of the retirement_system represents the object-oriented structure of the platform, including key entities such as Employee, Retiree, RetirementFile, Document, and Tracking. It illustrates relationships, attributes, and methods that govern data interaction and workflow coordination across system components.

4.6.3 Relational Model: Retirement File Management System

User (id_user, first name, last name, email, phone, username, password)

Employee (employee_id, emp_code, department_emp, role, status_emp, user_id#, created_at_emp)

Retiree (retiree_id, retiree_number, gender, birth_date, municipality_id#, status_ret, user_id#, created_at_ret, created_by_ret#, updated_by_ret#)

RetirementFile (file_id, file_number, retiree_id#, current_location, status_RF, rejection_reason, created_at_RF, updated_at_RF, returned_at_RF, pension_amount, retiree_status_RF, notes, years_of_service, created_by_RF, updated_by_RF, reviewed_by_RF, validated_by_RF, pension_calculated_by_RF)

Document (document_id, file_id#, document_name, upload_date, file_path, status_DC)

Beneficiary (beneficiary_id, file_id#, first_name_B, last_name_B, relation, percentage, created_at_B)

FileTracking (file_tracking_id, file_id#, from_department_FT, to_department_FT, employee_id#, transfer_date_FT)

RetireeTransfer (retiree_transfer_id, retiree_id#, from_department_RT, to_department_RT, employee_id#, transfer_date_RT, status_RT)

District (district_id, name_dis, created_at_dis)

Municipality (municipality_id, district_id#, name_mun, created_at_mun)

Logs (log_id, employee_id#, action, action_time, is_read)

VerificationCode (verification_code_id, id_user#, code, created_at_VF, expires_at, is_used)

5 Dynamic Behavior Representation of the System through Sequence and Activity Diagrams

In this section, we will show Sequence Diagrams and Activity Diagrams to depict the behavior of the system from the two complimentary views:

1. Sequence Diagrams show the interactions between objects in time sequence for the implementation of different operations [7]

2. Activity Diagrams display the flow of operations and the steps that a process transvers through the system at a high-level [7]

For each of the main functional scenarios within the system, we will show the Sequence Diagram of the interaction between the objects, followed by the Activity Diagram representing the flow of action associated with that scenario.

5.1 Presentation of Sequence and Activity Diagrams

5.1.1 Retiree registration (sequence diagram)

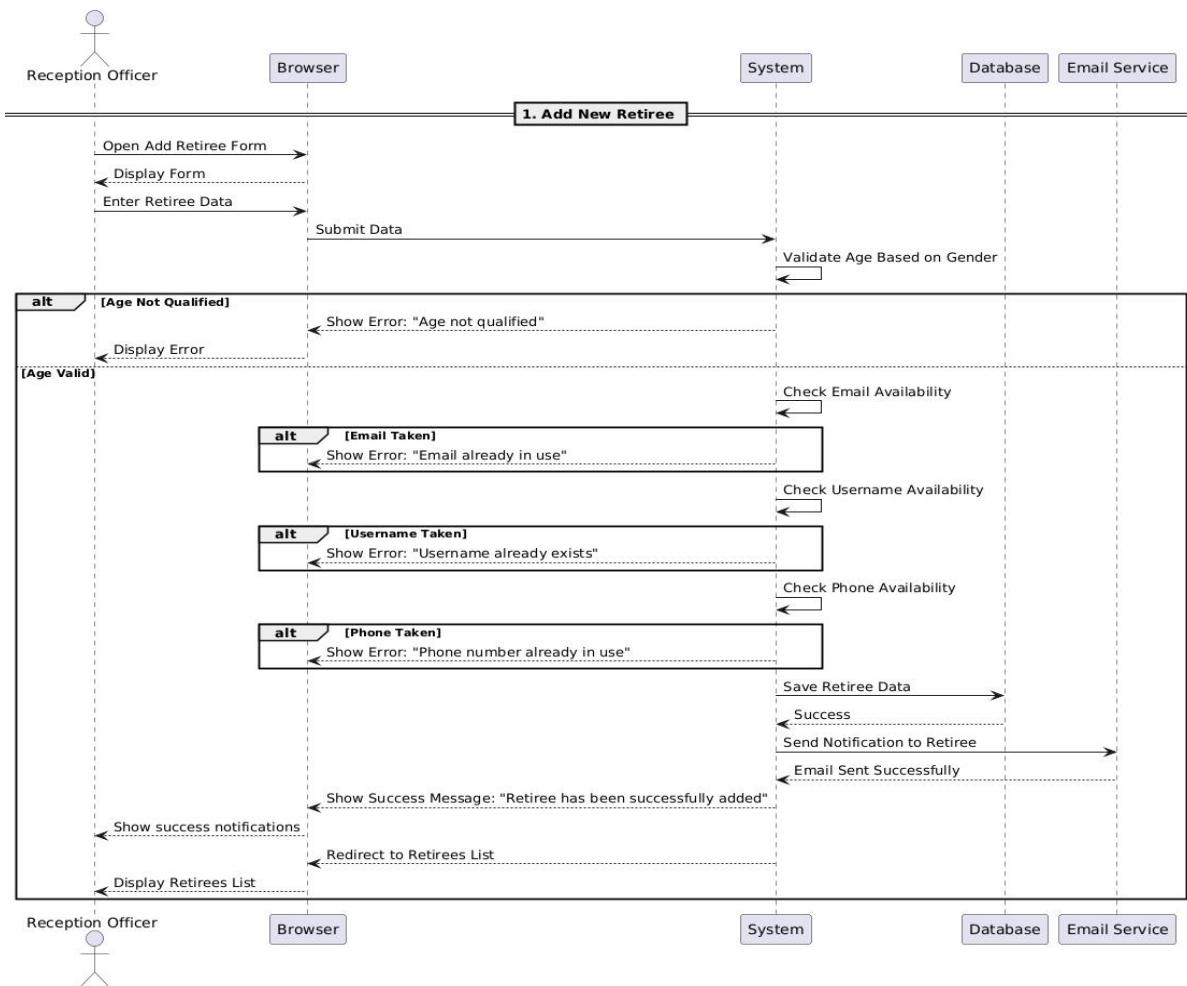


Figure 2. 11: sequence diagram for retiree registration

Description

The following diagram represents the sequence of interactions between the Reception Agent and the system components during the entry, validation, and storage of new retiree data.

5.1.2 Retiree registration (activity diagram)

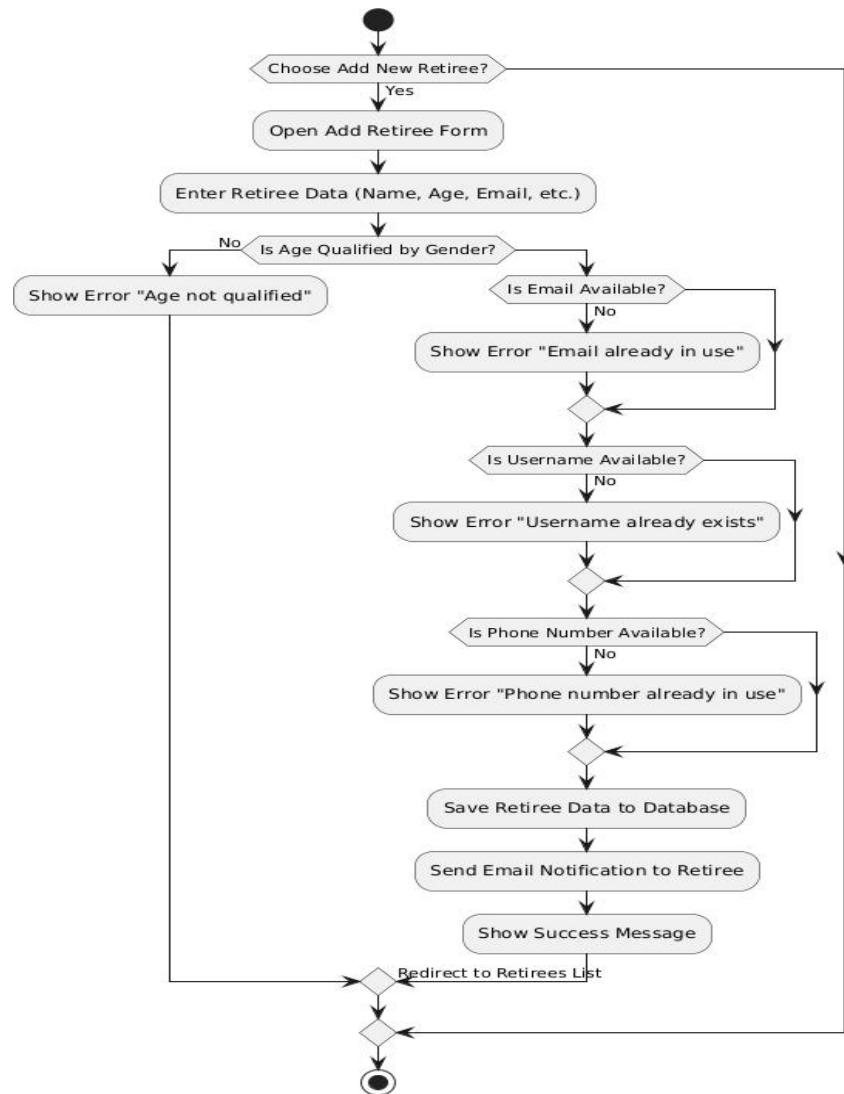


Figure 2. 12: activity diagram for retiree registration

Description

The following diagram represents the procedural flow of registering a new retiree, starting from data input, through validation, to final confirmation

5.1.3 Create retirement file (sequence diagram)

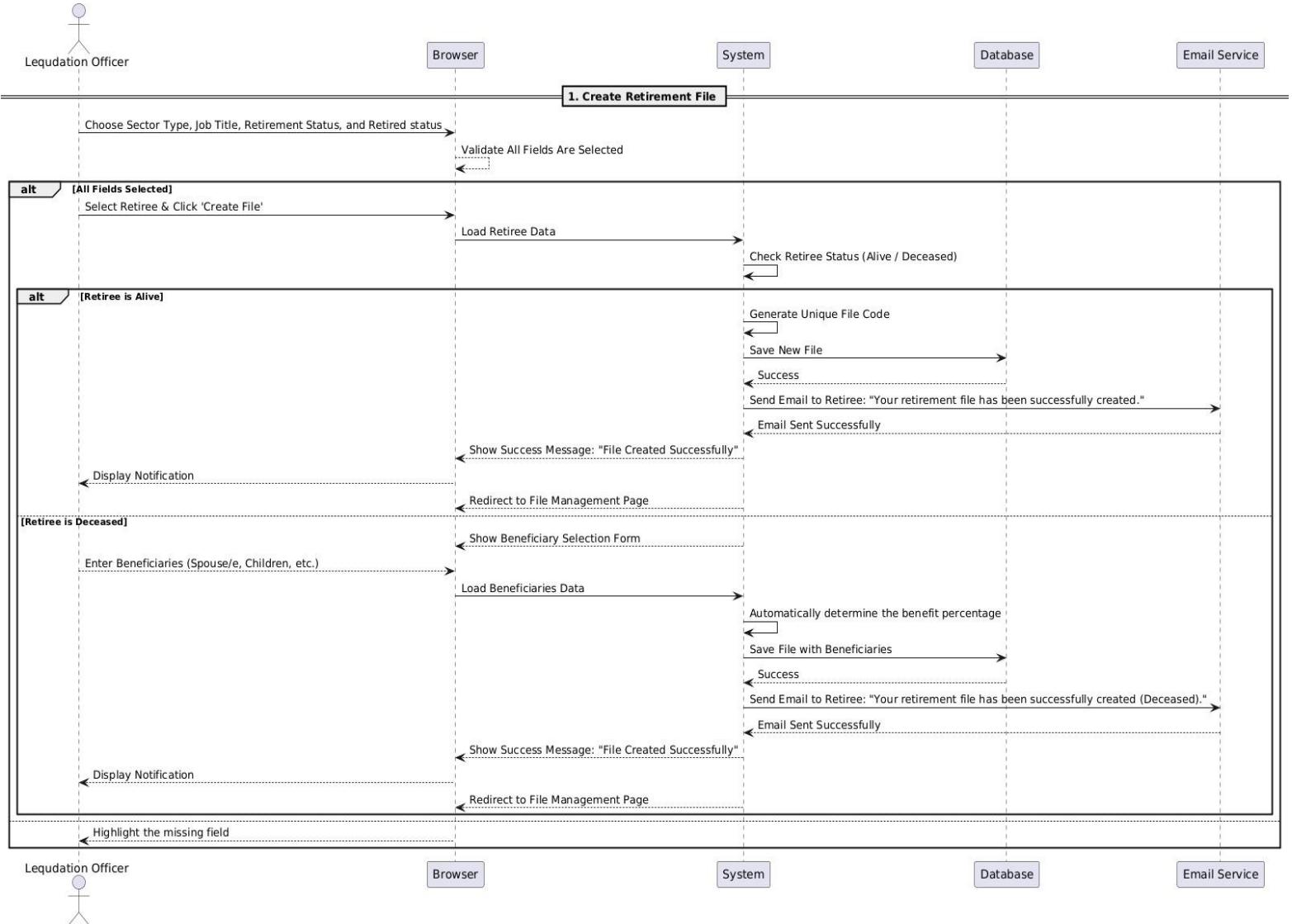


Figure 2. 13: sequence diagram for create retirement file

Description

The following diagram illustrates how the filtering service interacts with the system to create a structured retirement file based on existing retiree information.

5.1.4 Edit retirement file (sequence diagram)

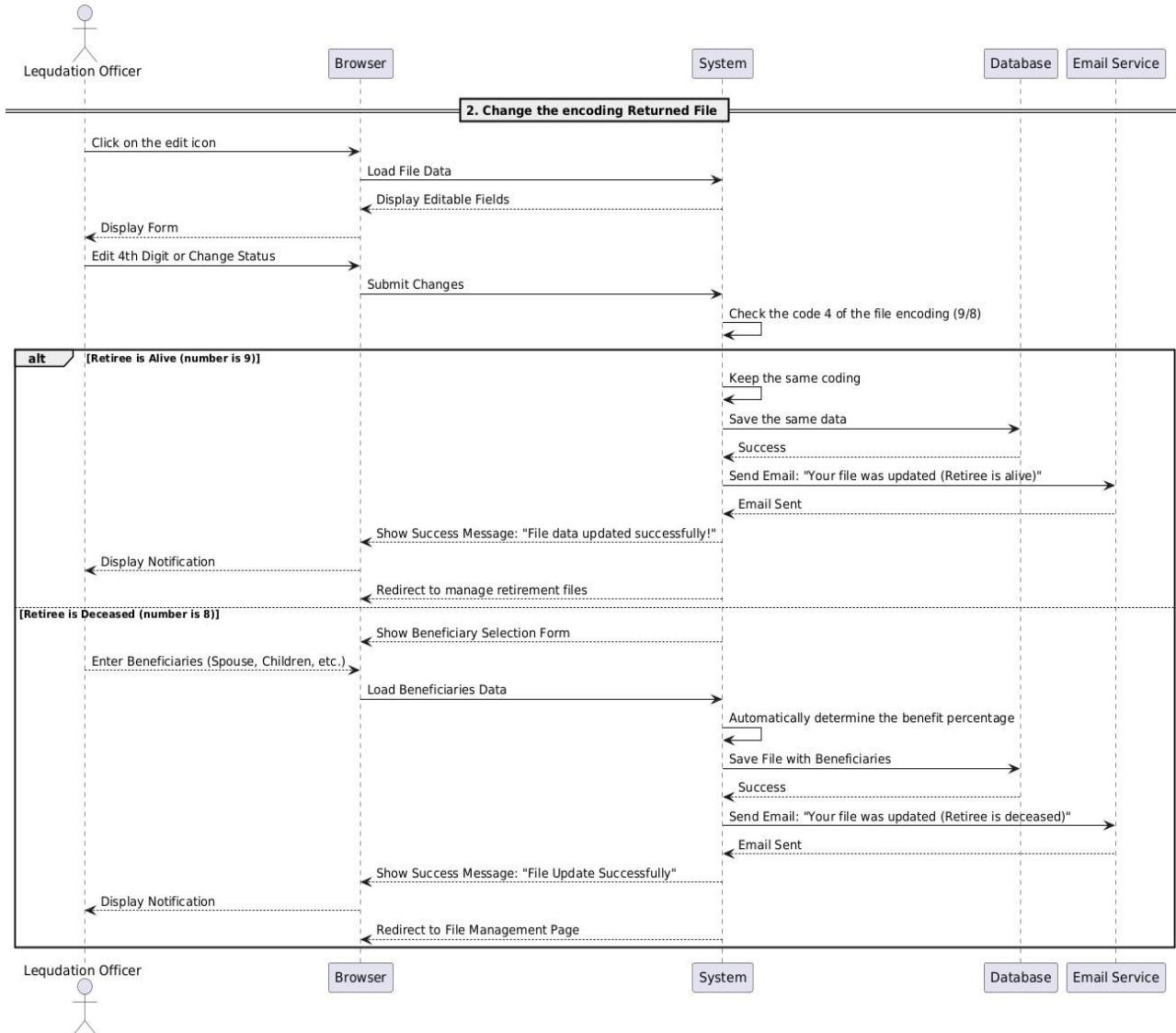


Figure 2. 14: sequence diagram for edit retirement file

Description

The following diagram illustrates the timelines that an employee takes to update their retirement file.

5.1.5 Retirement File Creation and Modification

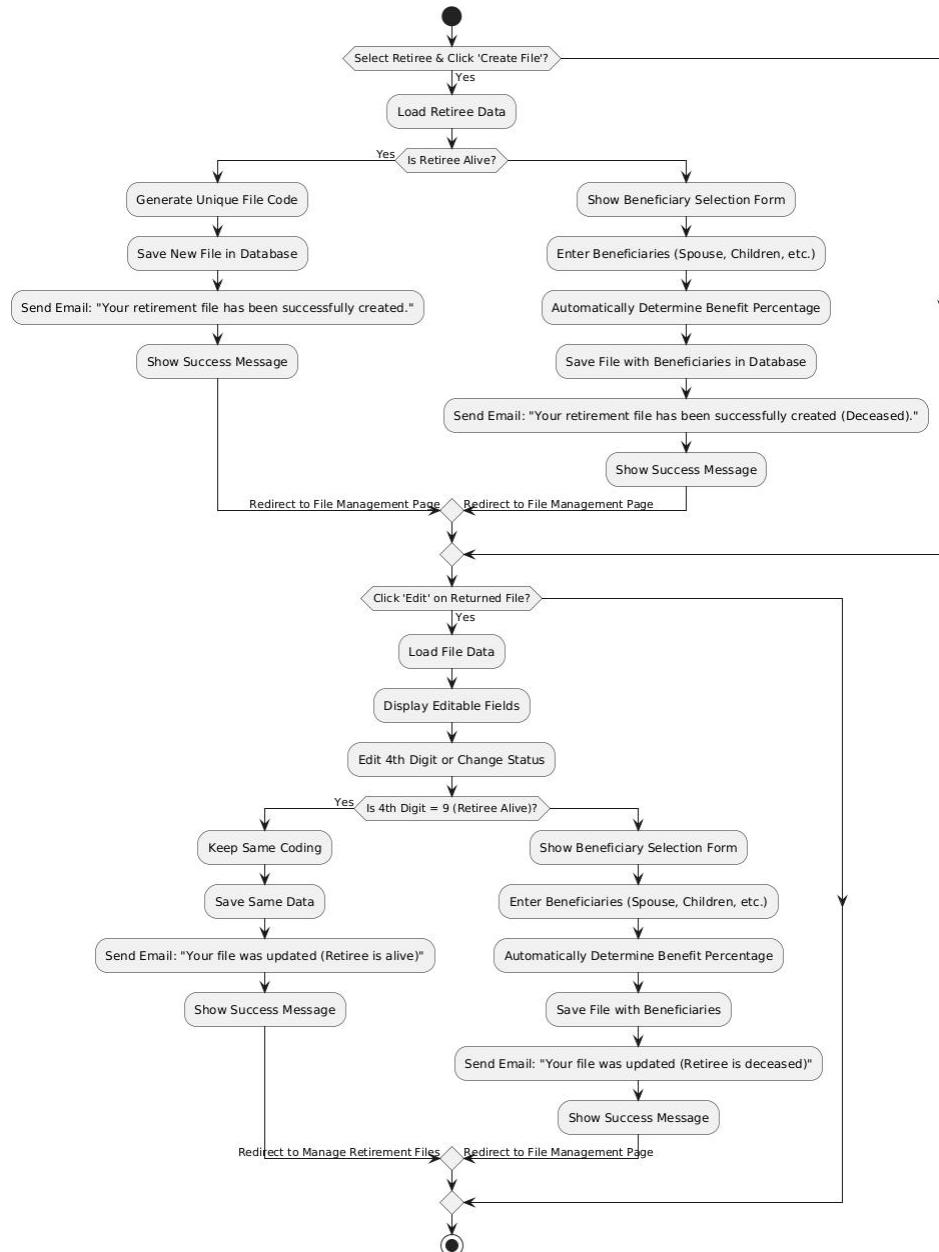


Figure 2. 15: activity diagram retirement file creation and modification

Description

The following diagram represents the steps involved in creating or modifying a retirement file, including conditional flows and validations.

5.1.6 Retirement file review (sequence diagram)

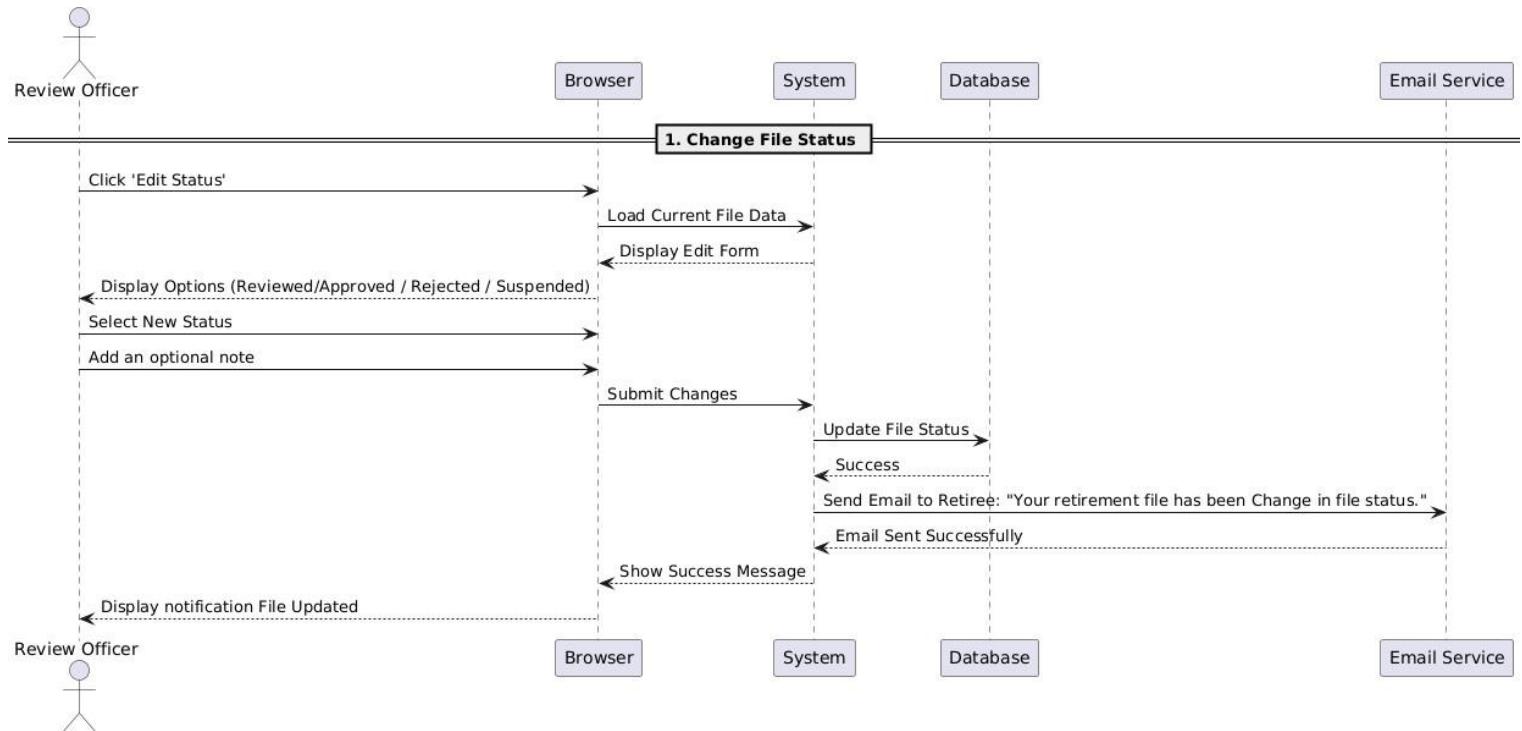


Figure 2. 16: sequence diagram for retirement file review

Description

The following diagram demonstrates how the Verifier interacts with the system to inspect documents and update the status of the retirement file.

5.1.7 Retirement file review (activity diagram)

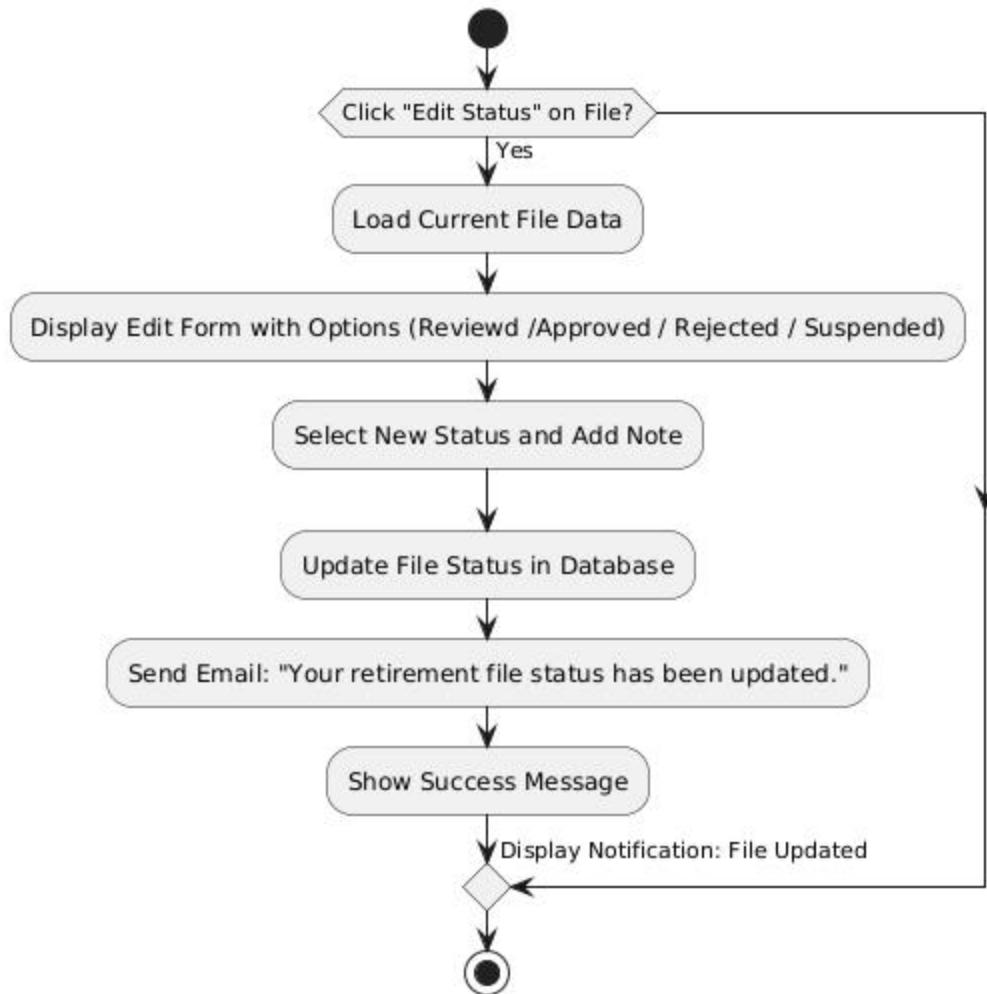


Figure 2. 17: activity diagram for retirement file review

Description

The following diagram outlines the internal review process, from analyzing the file to making a decision to forward or reject it.

5.1.8 File Approval or Rejection (diagram sequence)

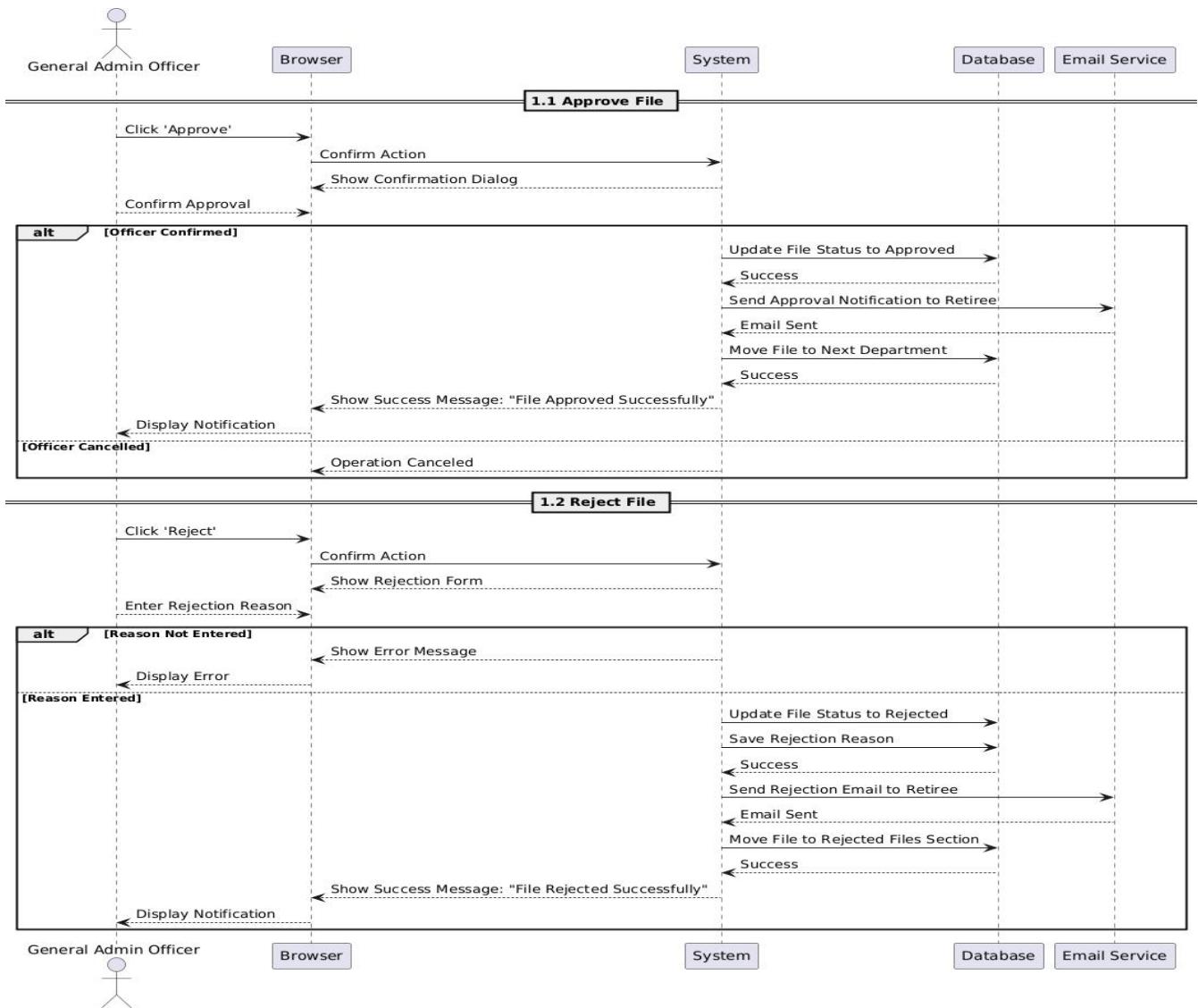


Figure 2. 18: sequence diagram for approve and reject file

Description

The following diagram illustrates how the Manager makes a final decision regarding a file and how the system updates the file's status accordingly

5.1.9 File approval or rejection (activity diagram)

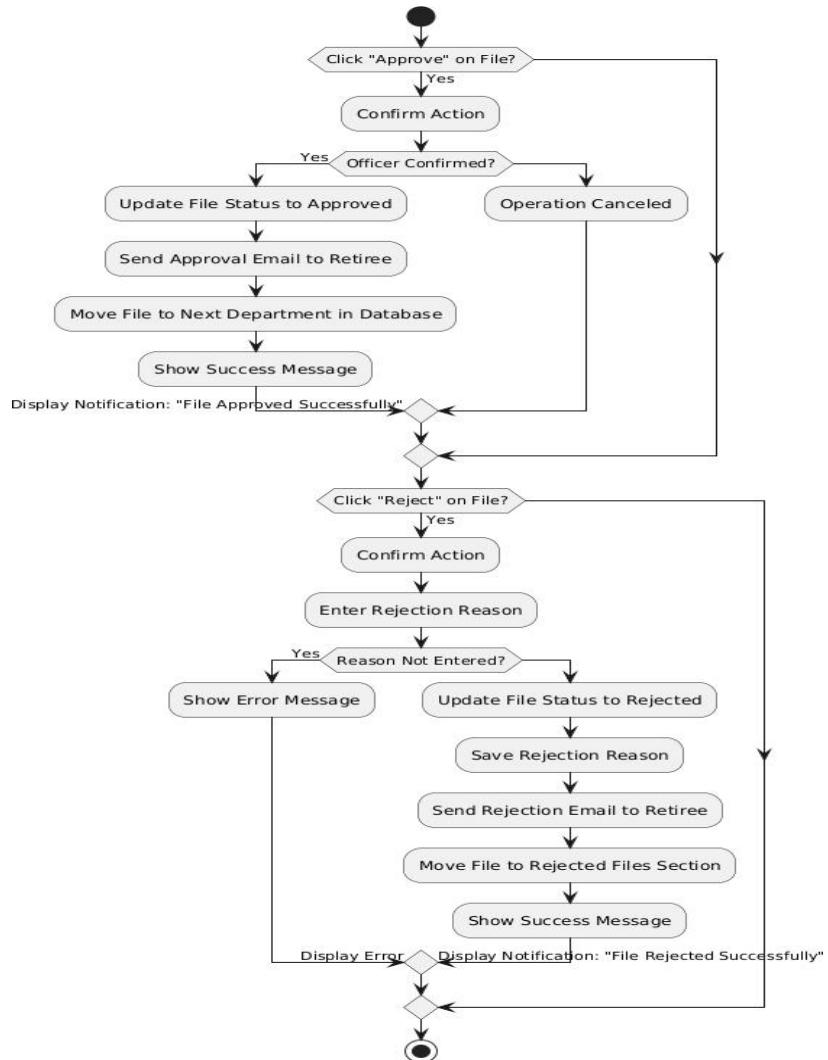


Figure 2. 19: activity diagram for approve and reject file

Description

The following diagram describes the approval or rejection process, including alternate flows such as suspension or return.

5.1.10 Pension Calculation (sequence diagram)

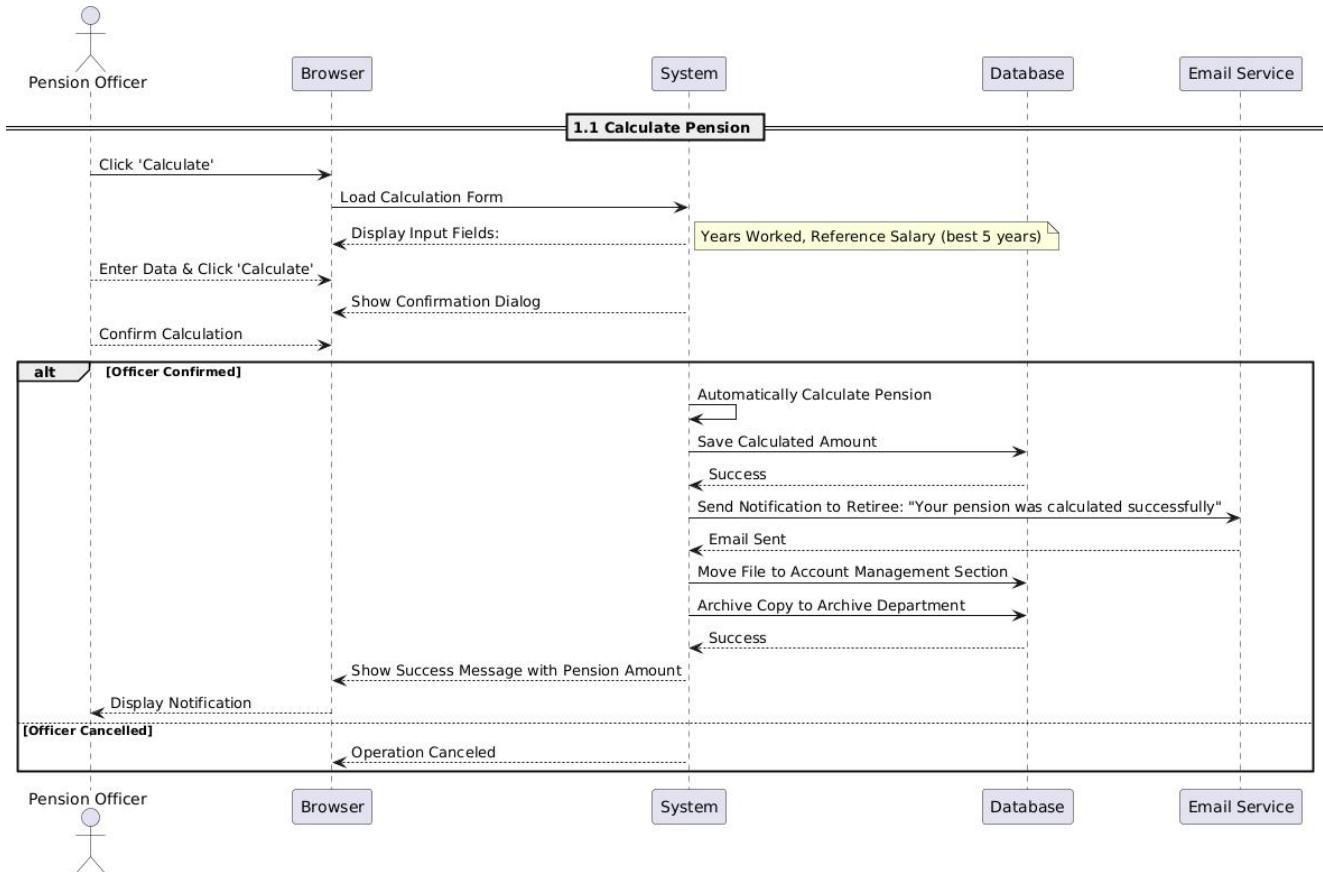


Figure 2. 20: sequence diagram for pension calculation

Description

The following diagram shows the interaction between the pension officer and the system during the pension calculation procedure.

5.1.11 Pension calculation (activity diagram)

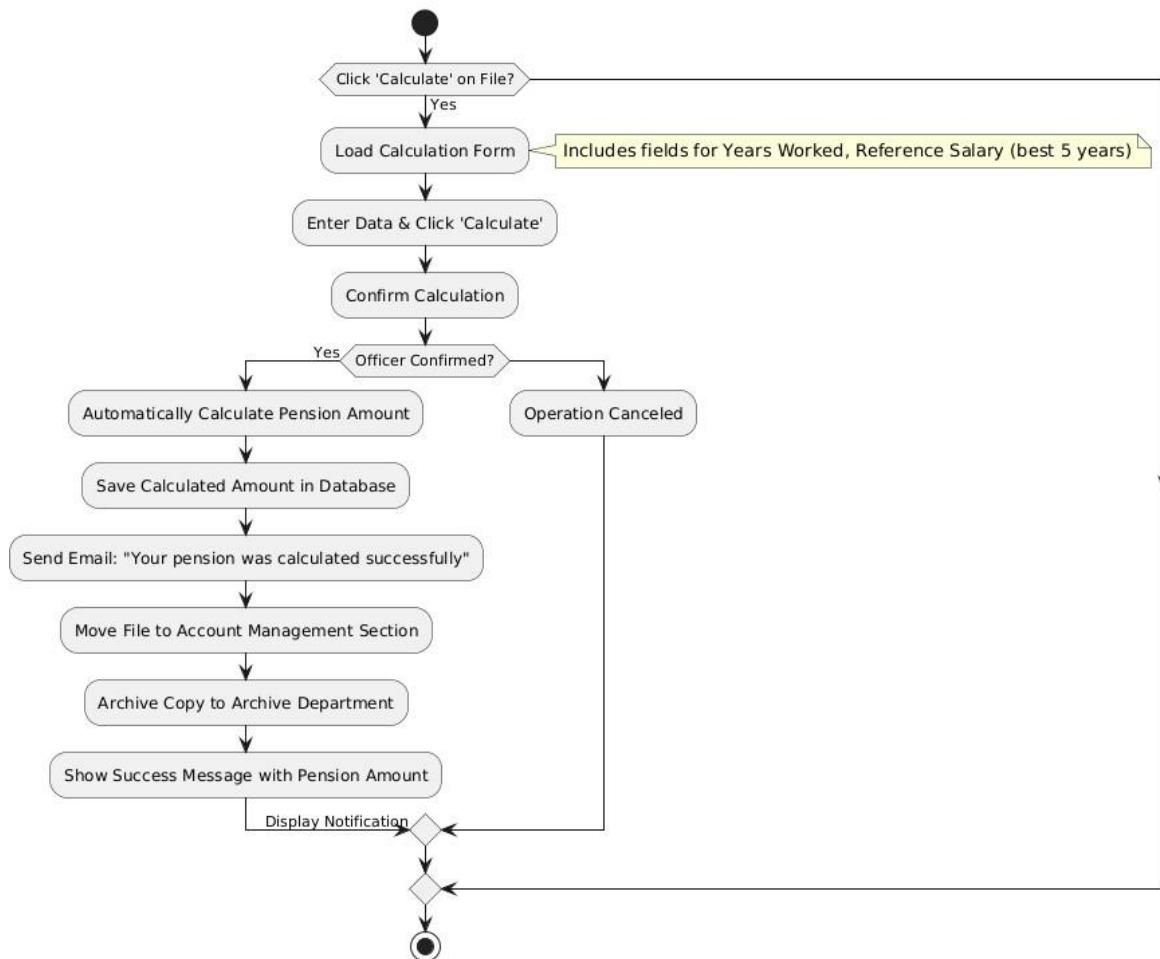


Figure 2. 21: activity diagram for pension calculation

Description

The following diagram presents the procedural logic used to compute pension values based on legal formulas and employee data.

5.1.12 System administration (sequence diagram)

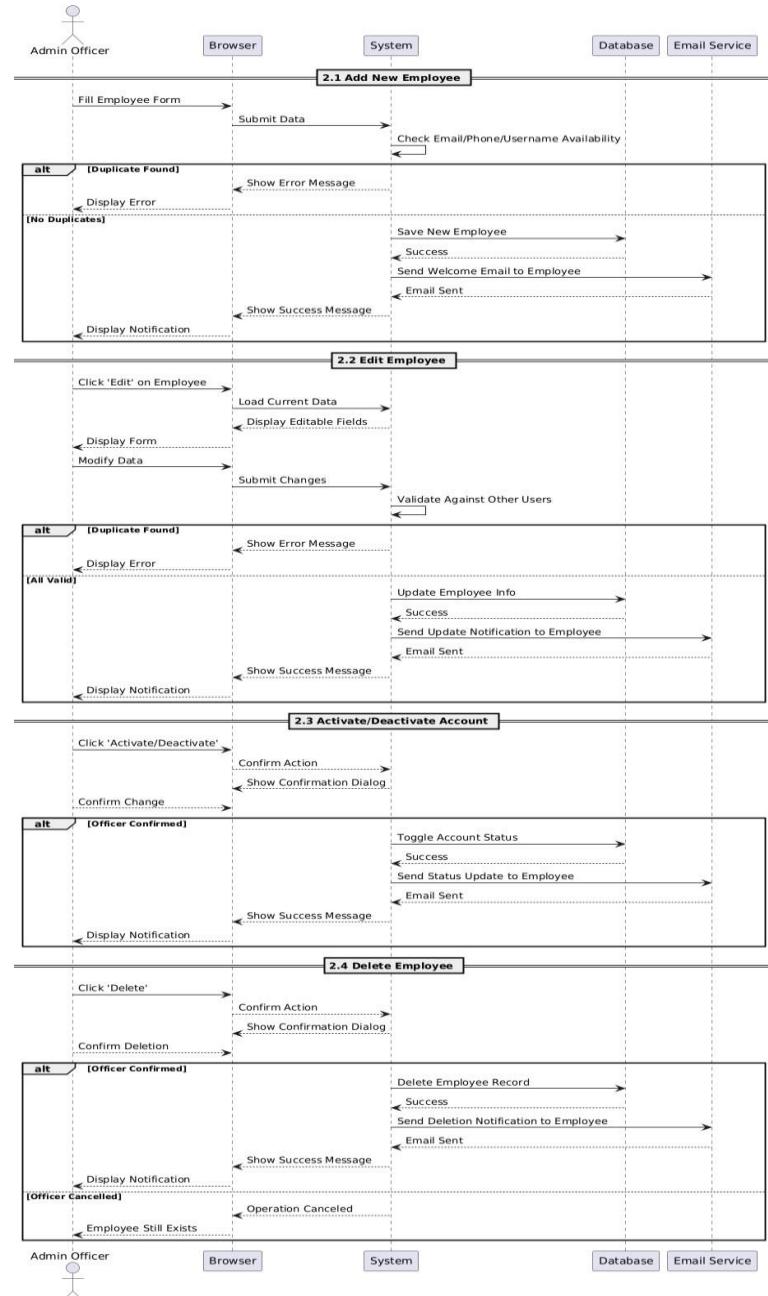


Figure 2. 22: sequence diagram for system administration

Description

The following diagram illustrates how the System Administrator interacts with administrative interfaces to manage users and monitor activities.

5.1.13 System administration (activity diagram)

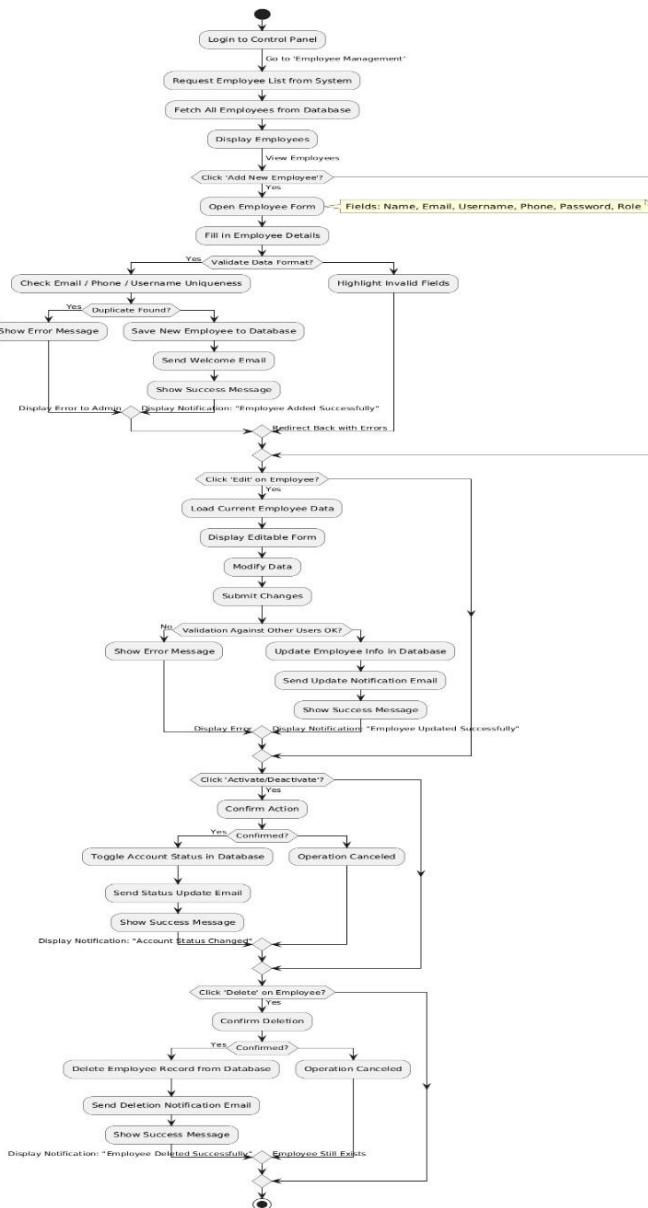


Figure 2. 23: activity diagram for system administration

Description

The following diagram outlines the administrative workflow for creating accounts, modifying permissions, and managing access rights.

5.1.14 Retiree details on the platform (sequence diagram)

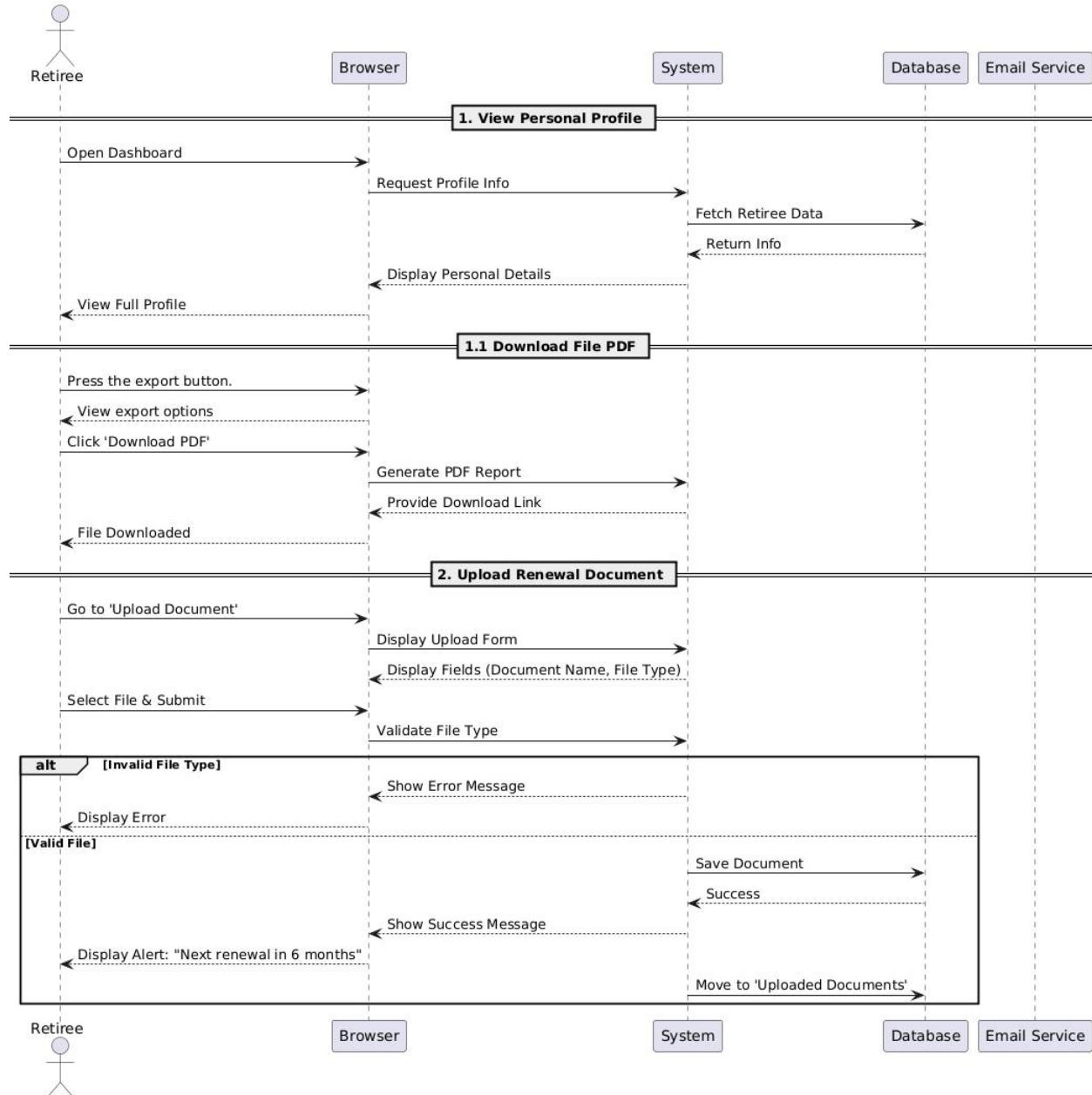


Figure 2. 24: sequence diagram for retiree details on the platform

Description

The following diagram shows how the retiree interacts with the system to track file status, upload documents,

5.1.15 Retiree details on the platform (activity diagram)

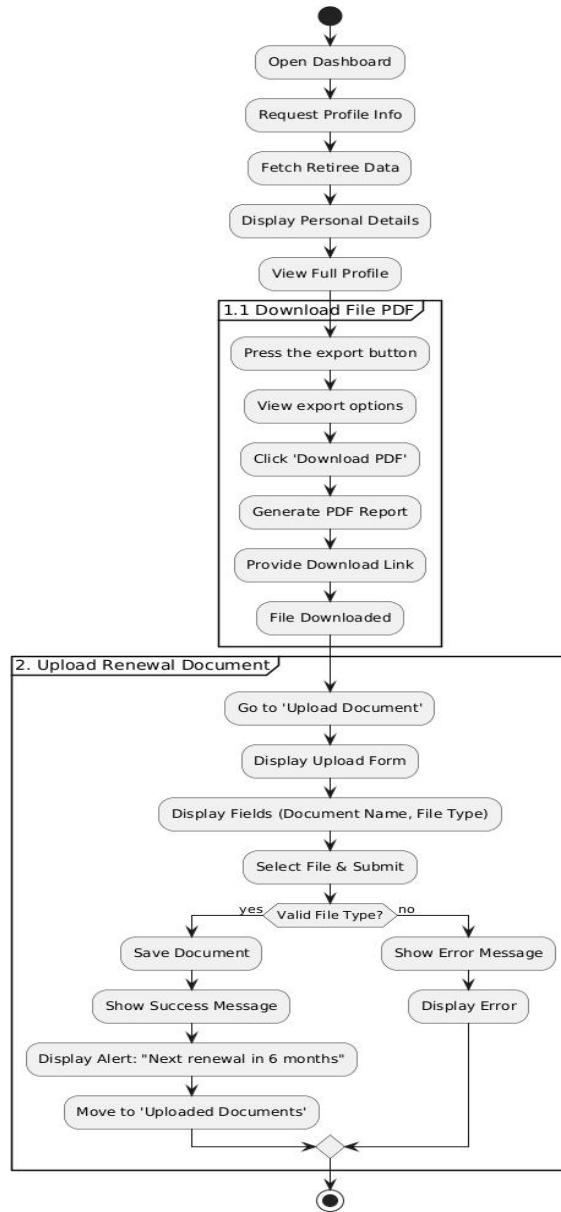


Figure 2. 25: activity diagram for retiree details on the platform

Description

The following diagram represents the functional flow experienced by the retiree within the system—from login to document retrieval.

Conclusion:

Once we made the system's actors, the allocated tasks assigned to each acting, and looked at the specific demands of our project, we established the meaning of different concepts of the system by creating Unified Modeling Language (UML) diagrams.

In this way, we have thoroughly undertaken the designs phase- we now have a clear and unified vision of the system's structure and behavior.

This vision marks a significant step as we look toward the implementation phase of the project and begins to give us the foundation for fulfilling its intended purpose.

Chapter 03: Platform development

Introduction

This chapter provides a detailed presentation of the software development work carried out within the project of developing a digital platform for managing retirement files. It covers the programming tools used, the adopted development methodology, and presents the system interfaces along with an explanation of the function of each. Furthermore, it highlights the platform's workflow and functional testing to assess its effectiveness in achieving the set objectives.

1. Project Presentation

This project aims to develop a comprehensive digital platform for managing retirement files, replacing traditional paper-based procedures with a secure and efficient electronic system. The platform enhances workflow for employees, administrators, and retirees by offering a structured environment for processing and tracking cases.

Designed with an intuitive and user-friendly interface, the system supports key functionalities such as new file registration, status tracking, data updates, pension calculation, and periodic reporting to support decision-making. Its role-based access control ensures users interact only with data relevant to their responsibilities, maintaining data security and confidentiality.

The platform also incorporates internal and external notification systems, including email alerts, to improve communication across all stakeholders. Ultimately, this solution aligns with the broader vision of digital transformation in public administration by improving service quality, reducing errors, and accelerating retirement file processing.

2. Technical Choices Adopted in Development

2.1 System Components

- **User Interface (Frontend)**

Modern and user-friendly technologies were used to create an interactive and smooth interface: **(HTML / CSS / Bootstrap/ JavaScript)**: Used to design responsive and consistent interfaces across various devices.

1. **HTML**: It is the primary language used to create web pages and define their content and structure. [8]

2. **CSS:** It is a language used to format and design the appearance of web pages created using HTML. [9]
3. **Bootstrap:** It is a free and open-source framework used to design fast, responsive web pages using HTML, CSS, and JavaScript. [10]
4. **JavaScript (Vanilla JS):** JavaScript is a programming language used to add interactivity and liveliness to web pages, such as manipulating forms, creating animations, or updating content without reloading the page. [11]

2.2 Business Logic and Backend

1. **PHP:** A lightweight and widely-used language for web application development, supported by a large community. It allows for efficient implementation of business logic. [12]

2.3 Database

1. **MySQL:** A powerful, open-source relational database suitable for storing and managing system data efficiently. It is based on the SQL language and is widely used with web applications. [13]

2.4 Security & Access Control

1. **Secure Login System:** Implemented using Two-Factor Authentication (2FA) for enhanced security.
2. **Role-Based Access Control (RBAC):** Access is restricted based on user roles

2.5 Notifications & Communication

1. **Email:** Notifications are sent using the PHPMailer library.
2. **Internal Notification System:** Displays real-time updates to users when actions related to their department occur.

2.6 Reports

1. **Report Generation:** Supports exporting data in PDF and Excel formats using the TCPDF library, enabling easy data analysis and display.

2.7 Design & Documentation Tools

1. **StarUML**: Used to create UML diagrams, including:
 2. Class Diagrams
 3. Use Case Diagrams
 4. Sequence Diagrams
 5. Activity Diagrams
6. **Visual Studio Code (VS Code)**: The main code editor, offering powerful extensions that enhance project development efficiency. [14]

2.8 Development Environment

The platform was developed using a standard laptop running Windows 10 with 8GB RAM and an Intel Core i5 processor. However, since it is a lightweight web-based application, it is not hardware-dependent and can run on any modern computer with a web browser and basic server environment (e.g., XAMPP or WAMP).

3. Display platform interfaces

This section presents the various interfaces of the digital platform for managing retirement files, along with a functional explanation of each page, highlighting the system's practical and technical aspects. The interfaces were carefully designed to be simple and user-friendly, in line with the needs and nature of the agency's users.

3.1 Authentication and login

3.1.1 Login Page



Figure 3. 1: Login page

Description

- This interface is the primary gateway to the system
- The name is an abbreviation for Retirement File Management System.
- It includes input fields for username and password, with validation mechanisms to ensure correct credentials before access is granted.
- If the entered data is correct, the user will be directed to the two-factor authentication page
- If the data is entered incorrectly, a notification will appear with the incorrect field.

3.1.2 Two-Factor Authentication - 2FA

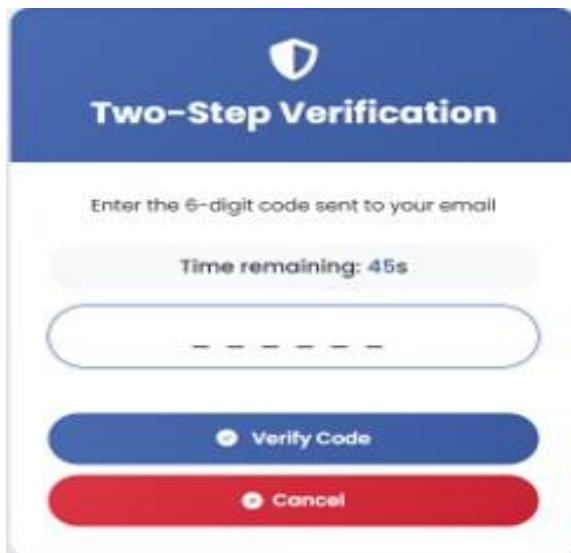


Figure 3. 2: Two-Factor Authentication

Description

- This page aims to enhance system security by verifying that the user accessing the platform is the legitimate account owner.
- This page aims to enhance system security by verifying that the user accessing the platform is the legitimate account owner.
- The verification code is valid for only one minute and includes a visible countdown timer.
- If the code expires, an error message will appear and the user will be returned to the login page.
- Entering an incorrect or expired code will result in an error message.

3.1.3 Forgot Password

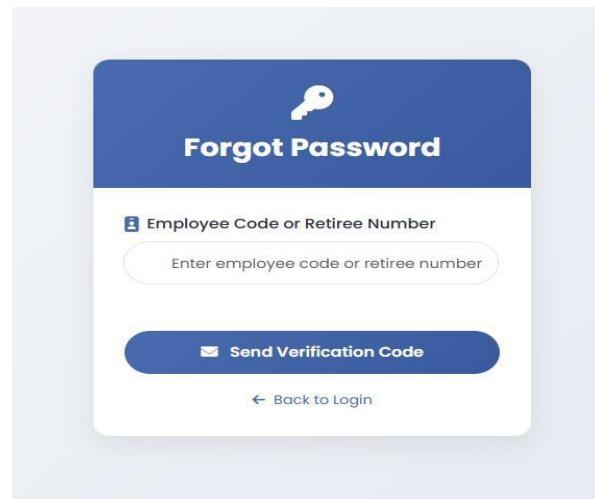


Figure 3. 3: Forgot Password

Description

- This interface allows users to recover their accounts in case they forget their passwords.
- The user is required to enter either their Employee ID (for staff) or Preliminary Number (for retirees).
- If the entered identifier is valid, a verification code is sent to the associated email address.
- If the identifier is incorrect or not found in the system, an error notification is displayed, informing the user of the issue.

3.1.4 virefy reset code

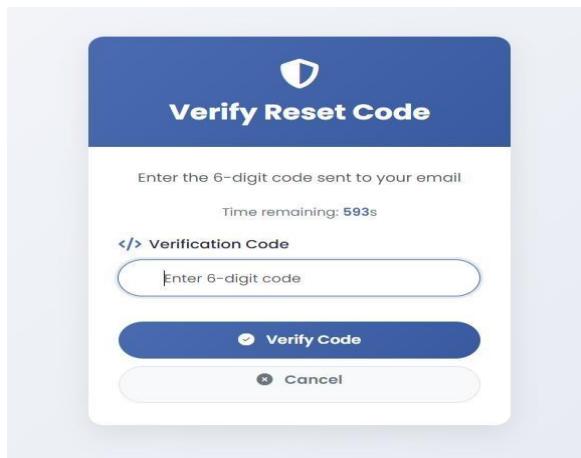


Figure 3. 4: virefy reset code

Description

- This interface is used to validate the verification code sent to the user during the password recovery process.
- The code is valid for 10 minutes only, with a countdown timer to indicate the remaining time.
- If the code is correct and still valid, the user is redirected to the Reset Password page.
- If the code is incorrect or expired, an error message is displayed to the user.

3.1.5 Reset Password

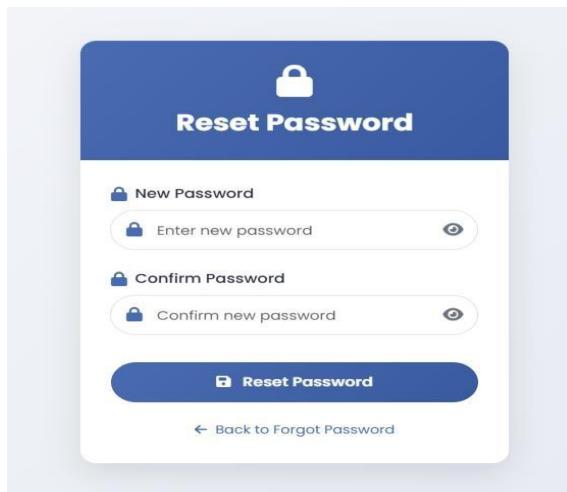


Figure 3. 5: Reset Password

Description

- This interface allows users to securely set a new password after successful verification.
- The user is required to enter the new password and confirm it by typing it again.
- If both entries match, a success notification is displayed, and the user is automatically redirected to the login page.
- If the two passwords do not match, an error message is shown, prompting the user to correct the input.

3.2 System administration

3.2.1 Admin control panel

The Admin Dashboard is a central interface for managing the Retirement System. It features a sidebar on the left with icons for Dashboard, Manage Employees, Manage Files, System Logs, Statistics, Reports, and Logout. The main area displays four key metrics: Total Employees (7), Total Retirees (13), Total Files (9), and Active Files (4). Each metric includes a 'View All' link. The top right corner shows a notification icon with '89' and 'AD Admin'. The bottom right shows the date 'Wednesday - May 28 - 2025' and time '8:53:46 PM'.

Figure 3. 6: Admin Dashboard

Description

- The main administration interface is designed with an interactive approach that simplifies data comprehension and enables real-time system monitoring.
- This interface provides quick access to basic features such as user management, file management, etc.

3.2.2 Employee Management

This interface allows the administrator to manage the accounts of employees registered in the system.

The Employee Management System interface includes a header with a user icon, 'Employee Management System', and a 'Back to Dashboard' button. Below the header is a search bar with placeholder 'Search by employee name, ID, email...' and buttons for 'All Departments', 'All Statuses', 'Search', and 'Add New'. The main area displays a table of employee data with columns: Employee ID, Full Name, Email, Department, Status, and Actions. The first employee listed is 'IT-0001' (Moumen Boussag, devmayne8@gmail.com, IT Department, Active, with edit, view, and delete icons).

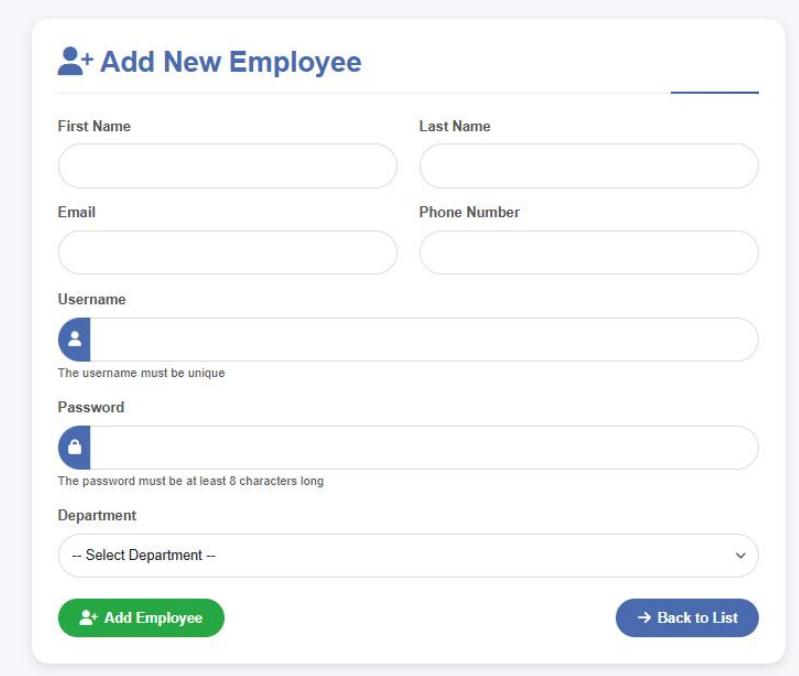
Figure 3. 7: employee management

Description

Through this panel, the administrator can carry out key operations such as:

- Adding new employees and assigning them to specific departments and roles.
- Updating employee details when necessary.
- Activating or deactivating user access based on employment status.
- Removing accounts of users no longer associated with the system.
- Searching for employee records using usernames or unique identifiers.

3.2.3 Add a new employee



The screenshot shows a user interface for adding a new employee. The title is 'Add New Employee'. The form includes fields for First Name, Last Name, Email, Phone Number, Username (with a note 'The username must be unique'), Password (with a note 'The password must be at least 8 characters long'), and Department (a dropdown menu with the placeholder '-- Select Department --'). At the bottom are two buttons: a green 'Add Employee' button and a blue 'Back to List' button.

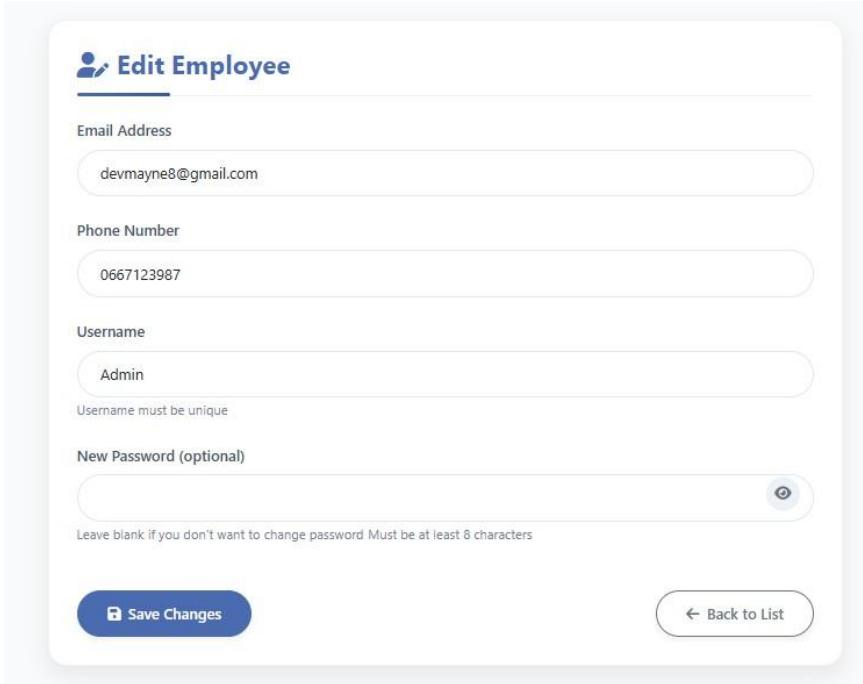
Figure 3. 8: add employee

Description

- This interface allows the administrator to register a new employee in the system. The process requires filling in all mandatory fields, including personal information, contact details, and job assignment.
- The system displays an error notification if any required field is left blank, with empty fields visually highlighted.

- It also performs validation to prevent duplicate entries by checking the uniqueness of key data such as email address, phone number, and username.
- Upon successful verification and submission, the system displays a success notification and automatically generates a unique employee identifier, which follows a predefined structure (e.g., department code + random digits).

3.2.4 Modify employee data



The screenshot shows a web-based 'Edit Employee' form. At the top, there is a header with a user icon and the text 'Edit Employee'. Below the header, there are four input fields: 'Email Address' (containing 'devmayne8@gmail.com'), 'Phone Number' (containing '0667123987'), 'Username' (containing 'Admin'), and 'New Password (optional)'. A note below the 'Username' field states 'Username must be unique'. A note below the 'New Password' field states 'Leave blank if you don't want to change password. Must be at least 8 characters'. At the bottom left is a blue 'Save Changes' button with a save icon, and at the bottom right is a 'Back to List' button with a back arrow icon.

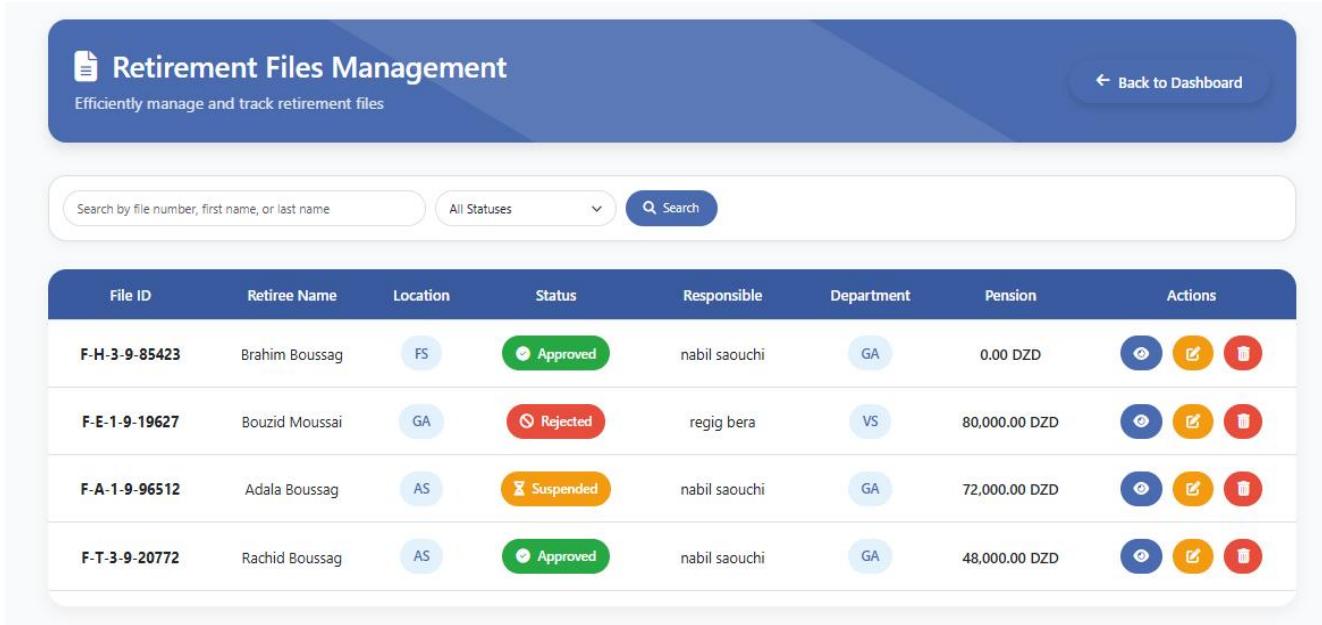
Figure 3. 9: Edit employee

Description

- This interface allows the administrator to update existing employee information.
- The form is pre-filled with the recorded data, enabling quick and accurate modifications when necessary.
- All changes are validated before being saved to ensure data consistency.

3.2.5 Retirement File Management

This administrative interface enables tracking the status of all files. It includes functionalities such as search, filtering by status, viewing details, and changing the file status. The interface allows comprehensive tracking of file workflows across different departments.



The screenshot shows a web-based administrative interface for managing retirement files. The header is titled 'Retirement Files Management' with a subtitle 'Efficiently manage and track retirement files'. A 'Back to Dashboard' button is in the top right. Below the header is a search bar with a placeholder 'Search by file number, first name, or last name', a dropdown for 'All Statuses', and a 'Search' button. The main content is a table with the following data:

File ID	Retiree Name	Location	Status	Responsible	Department	Pension	Actions
F-H-3-9-85423	Brahim Boussag	FS	Approved	nabil saouchi	GA	0.00 DZD	  
F-E-1-9-19627	Bouzid Moussai	GA	Rejected	regig bera	VS	80,000.00 DZD	  
F-A-1-9-96512	Adala Boussag	AS	Suspended	nabil saouchi	GA	72,000.00 DZD	  
F-T-3-9-20772	Rachid Boussag	AS	Approved	nabil saouchi	GA	48,000.00 DZD	  

Figure 3. 10: Retirement files Management

This image displays the retirement file management interface for the system administrator. Through it, the admin can:

- View all retirement files and access their detailed information.
- View personal details related to each file.
- Edit a retirement file.
- Delete a retirement file.
- Search for a specific file using the username or file ID.

3.2.6 System Log

System Activity Log					
Track all system activities and user actions					
ID	Employee	Department	Action	Timestamp	Status
77	imam boussag	IT	Logged in	May 20, 2025 21:52	Completed
78	System	N/A	Retiree logged in: Rachid_Boussag	May 20, 2025 18:02	Completed
79	Moumen Boussag	IT	Logged out	May 20, 2025 18:01	Completed
80	Moumen Boussag	IT	Deleted file number: F-H-1-8-28207 for retiree number: 28207 by Admin	May 20, 2025 17:52	Completed
81	Moumen Boussag	IT	Logged in	May 20, 2025 17:50	Completed
82	regig bera	IT	Logged out	May 20, 2025 17:50	Completed

Figure 3. 11: System Logs

Description

This interface provides a comprehensive list of all operations performed within the system, such as logins, file or account additions/modifications/deletions, along with the associated user, timestamp, and relevant details. This feature facilitates activity tracking and ensures transparency.

3.2.7 Statistics

3.2.7.1 Retirement statistics

This image shows a small portion of the retiree statistics by age and gender.

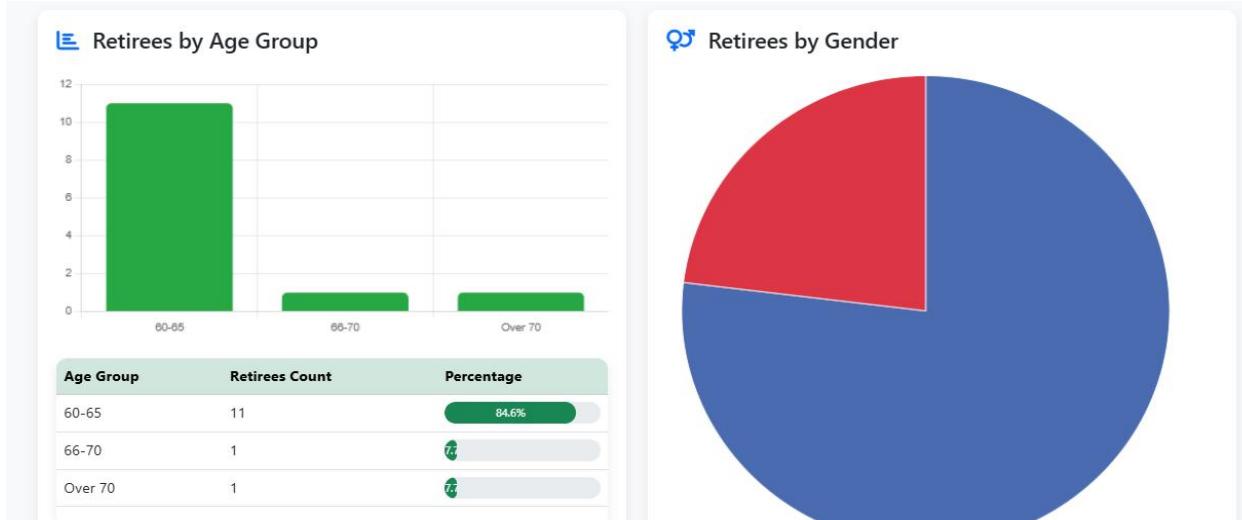


Figure 3. 12: Retirement statistics

2.2.7.2 Retirement file statistics

This image shows a brief overview of retirement file statistics categorized by sector and job title

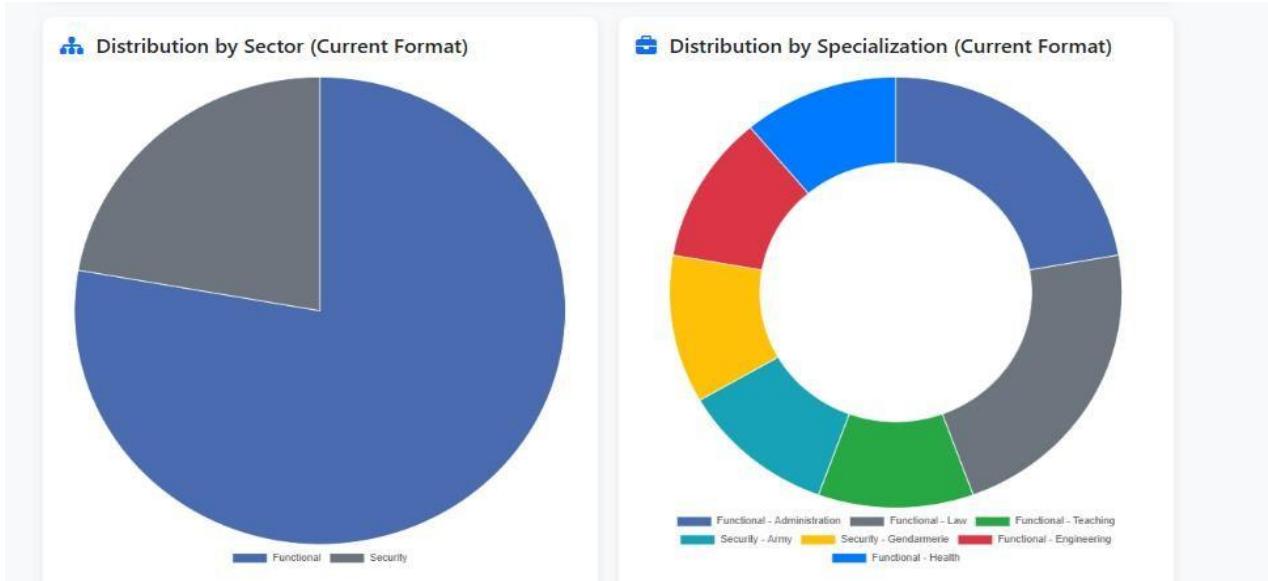


Figure 3. 13: Retirement file statistics

2.2.7.3 Employee statistics

This image provides a brief overview of the agency's staff statistics, broken down into top performers, inactive staff, general statistics cards, and reception staff performance.



Figure 3. 14: General statistics.

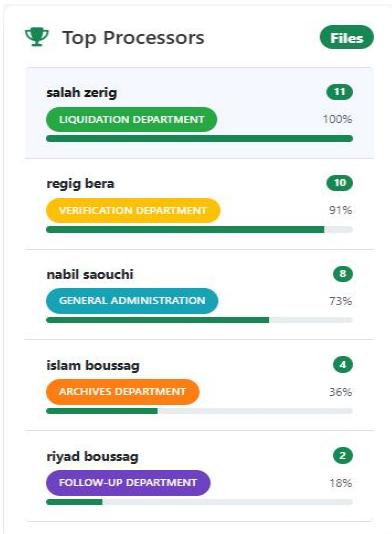


Figure 3. 15: Best employee performance

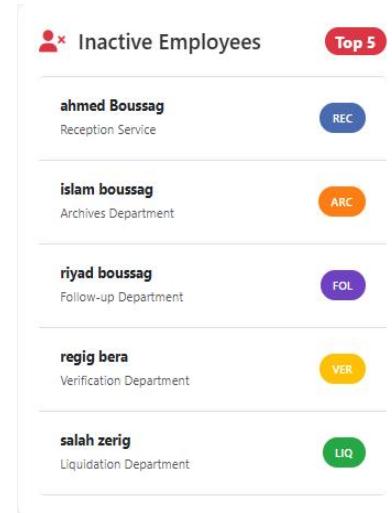


Figure 3. 16: inactive employees

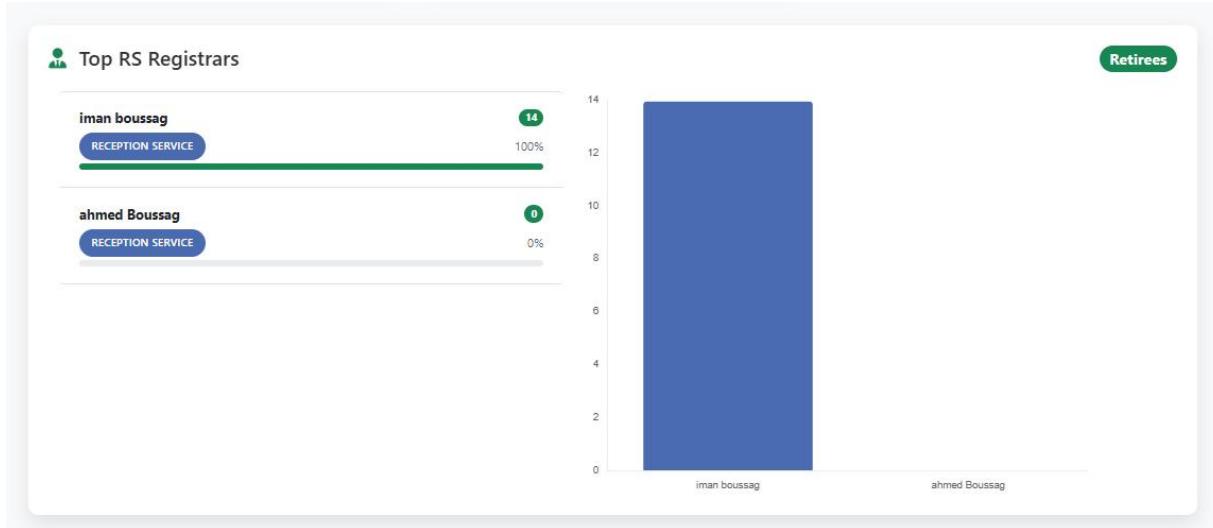


Figure 3. 17: Reception staff performance.

Description

These interfaces display key employee statistics, including monthly activity, active to inactive users.

3.3 Reception Department

3.3.1 Reception Dashboard

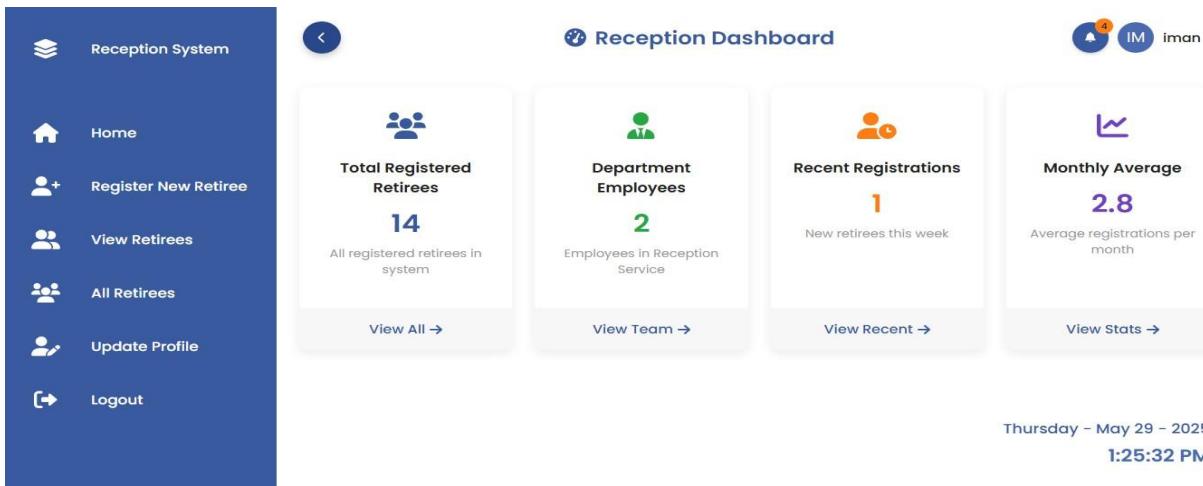
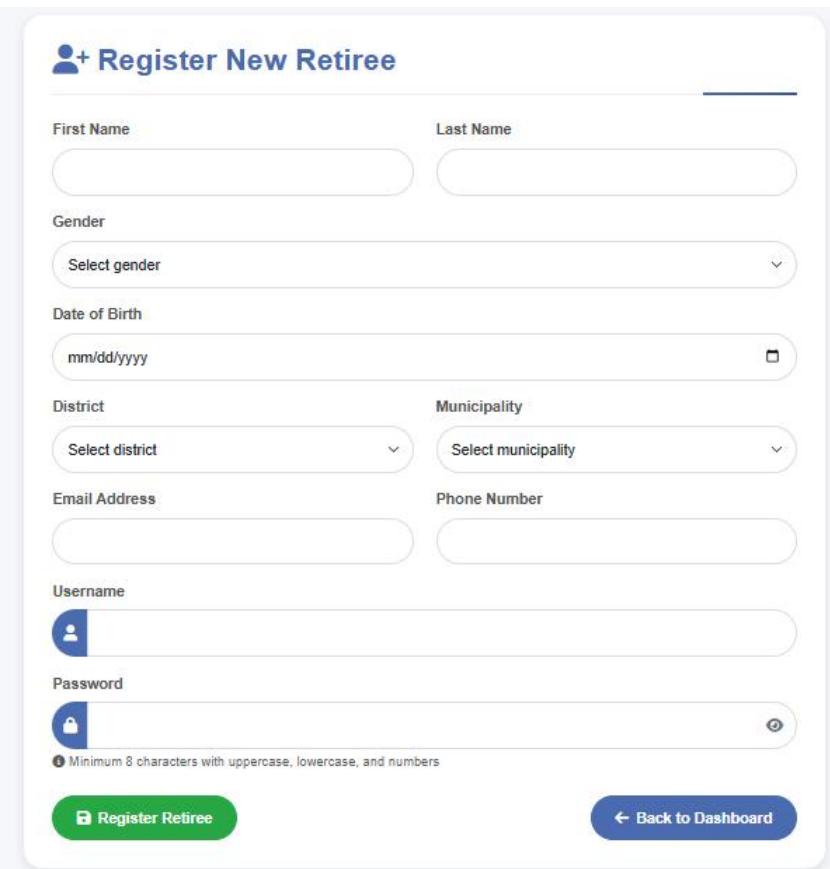


Figure 3. 18: Reception Dashboard

Description

- The reception department interface is designed with an interactive approach that simplifies the user experience and streamlines task execution.
- Internal notification panel: Displays real-time alerts related to any department-wide activity.
- Retirement management: Allows employees to register new retirees and modify their data.
- View a list of all registered retirees.

3.3.2 Add New Retiree



The screenshot shows a registration form titled 'Register New Retiree'. The form fields are as follows:

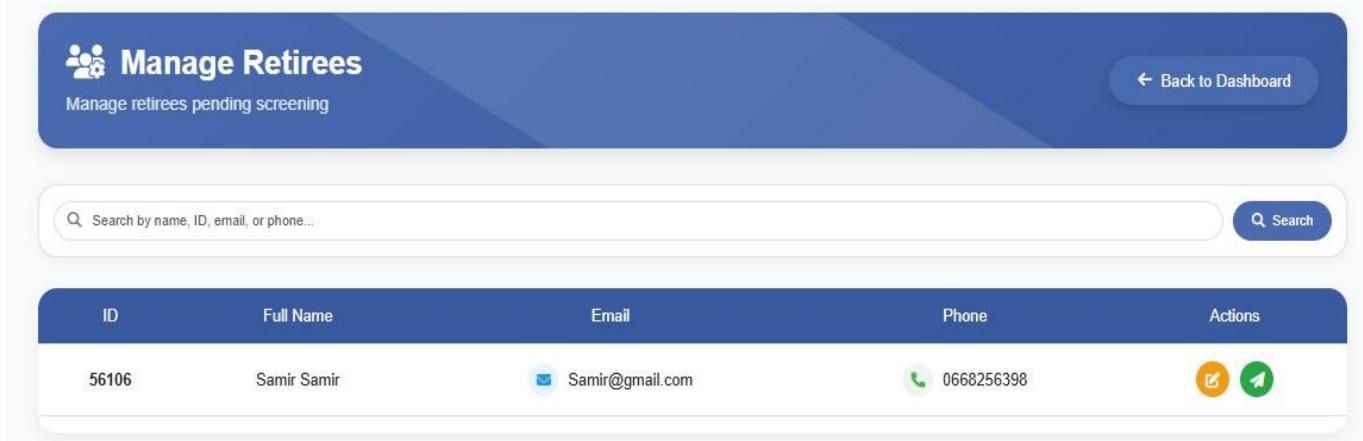
- First Name and Last Name (text input fields)
- Gender (dropdown menu with placeholder 'Select gender')
- Date of Birth (text input field with placeholder 'mm/dd/yyyy')
- District and Municipality (dropdown menus with placeholder 'Select district' and 'Select municipality')
- Email Address and Phone Number (text input fields)
- Username (text input field with placeholder 'User icon')
- Password (text input field with placeholder 'Lock icon') and a note below: 'Minimum 8 characters with uppercase, lowercase, and numbers'
- Buttons: 'Register Retiree' (green button) and 'Back to Dashboard' (blue button)

Figure 3. 19: Add New retiree

Description

- This interface allows reception employees to register a new retiree by completing a detailed form. Key functionalities include:
- Automatic Validation: The system first verifies the retiree's age and gender to ensure eligibility.
- Duplicate Check: Email, phone number, and username are cross-checked to avoid duplicates.
- Mandatory Fields Highlighting: Any empty required field is highlighted to guide the user.
- Primary Number Generation: Upon successful registration, the system automatically generates a unique primary number for the retiree.
- Success Notification: A confirmation message is displayed once the process is completed.

3.3.3 List of Registered Retirees



The screenshot shows a web-based application titled 'Manage Retirees' with a blue header. The header includes a 'Back to Dashboard' button. Below the header is a search bar with a placeholder 'Search by name, ID, email, or phone...' and a 'Search' button. The main content area displays a table with the following columns: ID, Full Name, Email, Phone, and Actions. A single row is shown for a retiree with ID 56106, name Samir Samir, email Samir@gmail.com, and phone 0668256398. The 'Actions' column contains two icons: a yellow one and a green one. The table has a dark blue header and white rows.

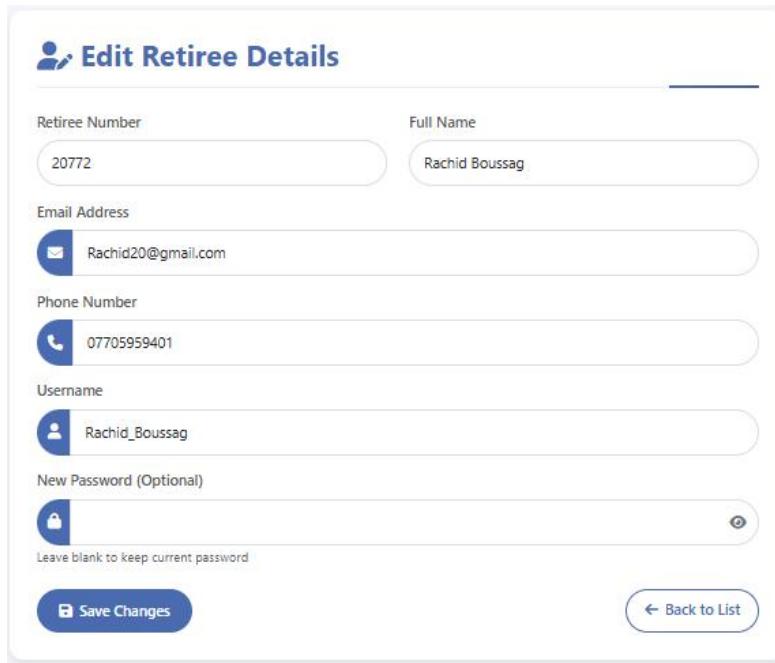
ID	Full Name	Email	Phone	Actions
56106	Samir Samir	Samir@gmail.com	0668256398	 

Figure 3. 20: List of Registered Retirees

Description

This image represents a list of retirees who have been created and are awaiting transfer to the next department. The interface also allows for editing the retiree's information before submission.

3.3.4 Edit Retiree Information



The screenshot shows a form titled 'Edit Retiree Details' with a blue header. The form fields are as follows: Retiree Number (20772), Full Name (Rachid Boussag), Email Address (Rachid20@gmail.com), Phone Number (07705959401), Username (Rachid_Boussag), and New Password (Optional). A note below the password field says 'Leave blank to keep current password'. At the bottom are 'Save Changes' and 'Back to List' buttons.

Retiree Number	20772	Full Name	Rachid Boussag
Email Address	Rachid20@gmail.com		
Phone Number	07705959401		
Username	Rachid_Boussag		
New Password (Optional)	Leave blank to keep current password		

Figure 3. 21: edit retiree information

Description

- In the edit data page, the retiree's first name, last name, and primary number cannot be modified, while the other fields can be edited.
- Duplicate Check: Email, phone number, and username are cross-checked to avoid duplicates.
- Success Notification: A confirmation message is displayed once the process is completed.

3.4 Liquidation Department Interfaces

3.4.1 Liquidation Dashboard

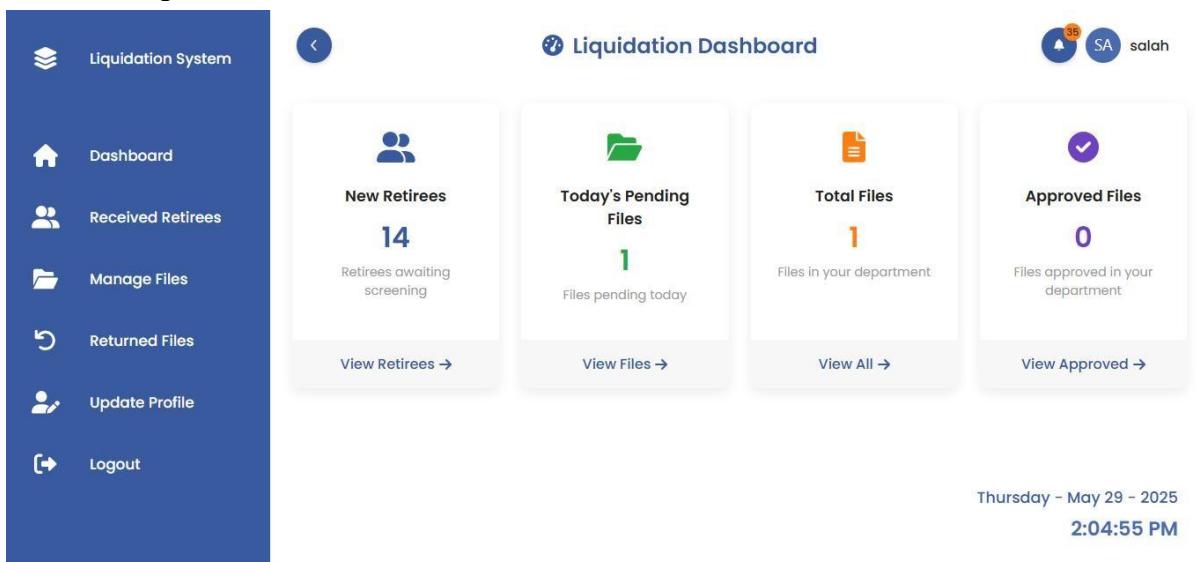


Figure 3. 22: Liquidation Dashboard

Description

- The Liquidation section interface is designed with an interactive approach that simplifies the process of performing the required functions fully.
- It includes the following key features:
- Integrated Notifications: Displays real-time alerts within the platform regarding file updates or actions specific to this section.
- Received Files Display: Shows retirement files transferred from the previous department for processing.

3.4.2 View the list of retirees sent by the Reception Department

Manage Retirees - LS Department

View and manage retirees without retirement files

Back to Dashboard

Retirees List

9 Retirees

ID	Full Name	Email	Phone	Status	Actions
68068	Nabil Boussag	Moussab@gmail.com	0664125874	Pending	

Figure 3. 23: the list of retirees sent by the Reception Department

Description

This image represents a list of retirees from the Reception Service waiting to create a retirement file.

3.4.3 Create Retirement File

1. (Retire alive)

Create Retirement File

Complete all required information to create a new retirement file

Back to List

Retiree Information

Full Name: Nabil Boussag
Gender: Male
R Number: 68068

File Classification

Sector: Functional
Job: Select Job
Retirement Type: Normal Retirement
Retiree Status: Alive

Cancel Save File

Figure 3. 24: Create retirement file (retired living)

Description

When creating a new retirement file in the processing section, the employee selects the retiree's occupational sector and then selects the desired job based on the pre-defined options in the system. The abbreviated classification is as follows:

1. **Occupational Sector (F)** (T - Teaching, H - Health, A - Management, E - Engineering, F - Finance, L - Law, O - Other)
2. **Mujahideen Sector (V)** (T - Teaching, H - Health, A - Management, S - Security, P - Politics, O - Other)
3. **Hard/Stressful Work Sector (H)** (M - Mining, P - Petroleum, N - Maritime, C - Chemical Plants, O - Other)
4. **Security and Defense Sector (S)** (P - Police, G - Gendarmerie, A - Army, C - Civil Protection, O - Other)

After selecting the sector and job type, employees enter additional relevant information such as the type of retirement and the applicant's status. The file is then linked to the retiree's previously created primary number and is attached with the required documents before being submitted electronically for further processing.

2. (Deceased retiree)

The screenshot shows the 'Create Retirement File' interface for a deceased retiree. The 'Retiree Information' section displays the full name (Nabil Boussag), gender (Male), and R number (68068). The 'File Classification' section includes fields for Sector (Functional), Job (Other), Retirement Type (Normal Retirement), and Retiree Status (Deceased). The 'Beneficiaries' section lists three beneficiaries: Wife (80.00%), Father (10.00%), and Mother (10.00%). A green button labeled 'Add Beneficiary' is visible. At the bottom, a message states 'Total Percentage: 100.00%' and features 'Cancel' and 'Save File' buttons.

Figure 3. 25: Create retirement file (deceased retiree)

Description

In cases where the retiree is deceased, the system adapts the file creation process accordingly. Upon selecting the "Deceased Retiree" option, an additional section is displayed, allowing the entry of one or more beneficiaries. This ensures that the entitlements are properly assigned to eligible individuals and that their information is accurately linked to the retirement file.

The system supports predefined inheritance rules to calculate benefit distribution fairly among family members, as follows:

- Spouse: entitled to 50% of the distributable pension amount. If there are multiple spouses (e.g., in polygamous cases), the share is divided equally among them.
- Parents: entitled to 20%, equally split between the mother and father.
- Children: entitled to 30%, divided equally among all children. The more children there are, the smaller each individual share becomes proportionally.
- These predefined percentages ensure that all beneficiaries are appropriately accounted for in accordance with internal guidelines, promoting fairness and consistency in pension allocation.

3.4.4 View Created Files

File Number	Retiree Name	Status	Created At	Renewal Date	Actions
F-T-3-9-44944	Rachid Boussag	Pending	29 May 2025 13:54	29 Nov 2025	

Figure 3. 26: View Created file

Description

This interface displays all retirement files that have been successfully created, with the ability to edit a file or send it to the next department for further processing.

2.4.5 Edit Retirement File

Retiree Information

Full Name: Rachid Boussag
Gender: Male
R Number: 44944

File Details

File Status: Pending Retiree Status: Alive

Figure 3. 27: Edit Retirement file

Description

The retirement file code can be modified in the event of the retiree's death by changing the digit representing the applicant's status from 9 to 8, and beneficiaries can be added on their behalf.

3.5 Verification Department Interfaces

3.5.1 Verification Dashboard

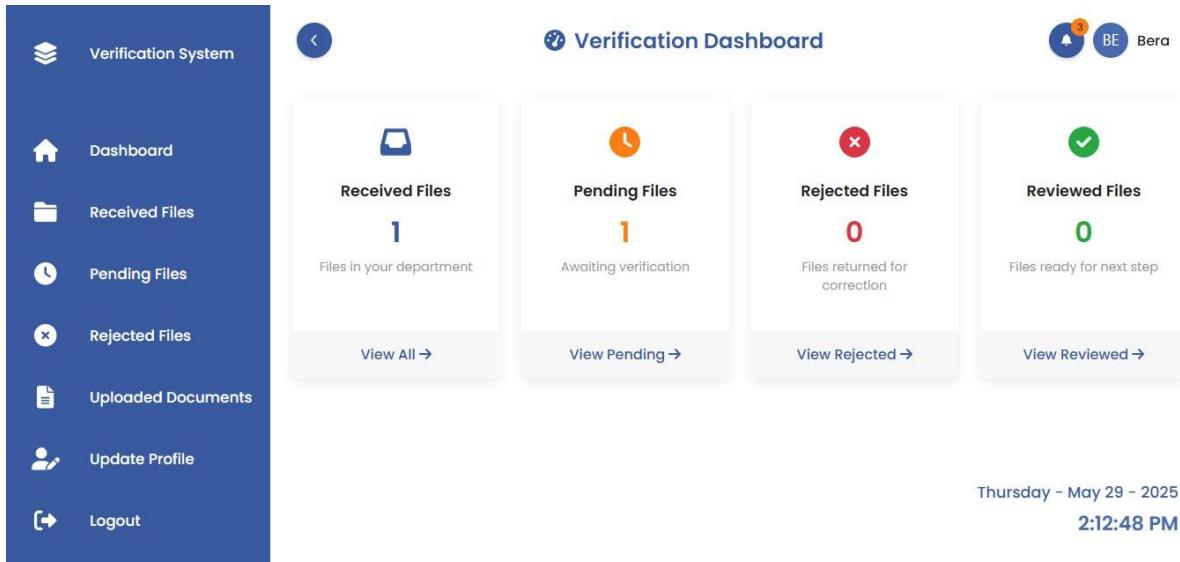
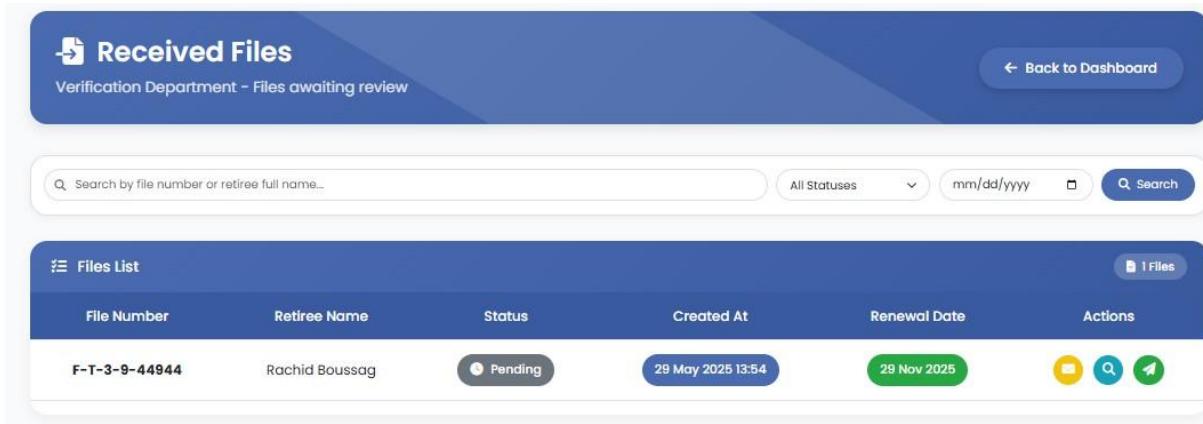


Figure 3. 28: Verification Dashboard

Description

The review section interface is designed with an interactive approach that simplifies the process of performing the required functions fully. It provides access to received retirement files from previous departments, allows verification of attached documents, displays file status and notes, and includes a notification system for real-time updates within the department.

2.5.2 List of Files Sent from Liquidation



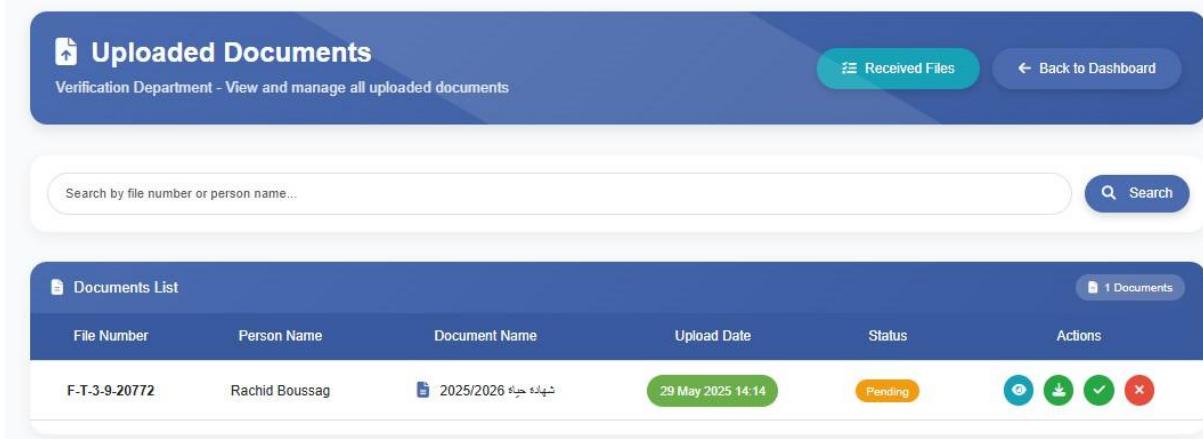
The screenshot shows a web application interface titled 'Received Files' under the 'Verification Department' section. At the top right is a 'Back to Dashboard' button. Below the title is a search bar with placeholder text 'Search by file number or retiree full name...' and a 'Search' button. To the right of the search bar are dropdowns for 'All Statuses' and 'mm/dd/yyyy', and a date input field showing '29 May 2025 13:54'. The main content area is titled 'Files List' and shows a single entry for a file numbered 'F-T-3-9-44944' belonging to 'Rachid Boussag'. The status is 'Pending' (indicated by a yellow circle with a clock icon). The creation date is '29 May 2025 13:54' and the renewal date is '29 Nov 2025'. On the right, there are three action buttons: a yellow envelope, a blue magnifying glass, and a green triangle.

Figure 3. 29: List of Files Sent from Liquidation

Description

The system provides the ability to change the file status and send alert notifications to the retiree, informing them of the need for renewal.

3.5.2 Viewing renewal documents



The screenshot shows a web application interface titled 'Uploaded Documents' under the 'Verification Department' section. At the top right is a 'Received Files' button and a 'Back to Dashboard' button. Below the title is a search bar with placeholder text 'Search by file number or person name...' and a 'Search' button. The main content area is titled 'Documents List' and shows a single entry for a document numbered 'F-T-3-9-20772' uploaded by 'Rachid Boussag'. The document name is '2025/2026' and the upload date is '29 May 2025 14:14'. The status is 'Pending' (indicated by a yellow circle with a clock icon). On the right, there are four action buttons: a blue envelope, a blue download icon, a green checkmark, and a red X.

Figure 3. 30: Document Viewer and Renewals

Description

- This image represents a list of renewal documents submitted by retirees.
- One of the Review Employee's permissions is to accept or reject a document after reviewing it.
- The approval or rejection process is accompanied by sending an email to the retiree informing them of the document's status

3.6 Agency Director Interfaces

3.6.1 General Administration Dashboard

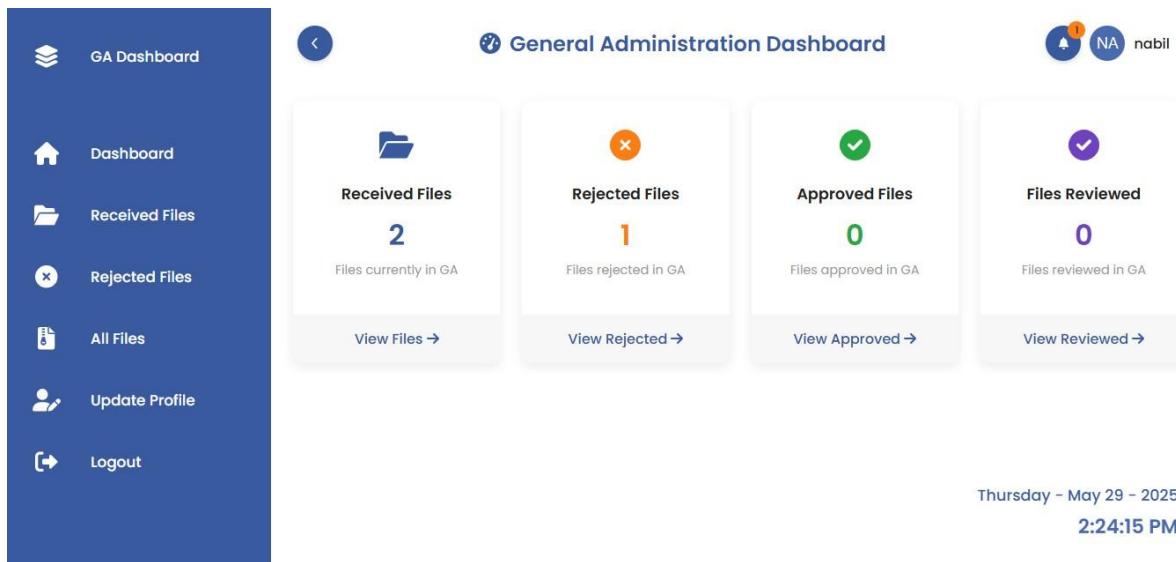


Figure 3. 31: General Administration Dashboard

Description

The General Administration interface is designed in an interactive manner that completely simplifies the process of performing the required functions

3.6.2 View Verified Files

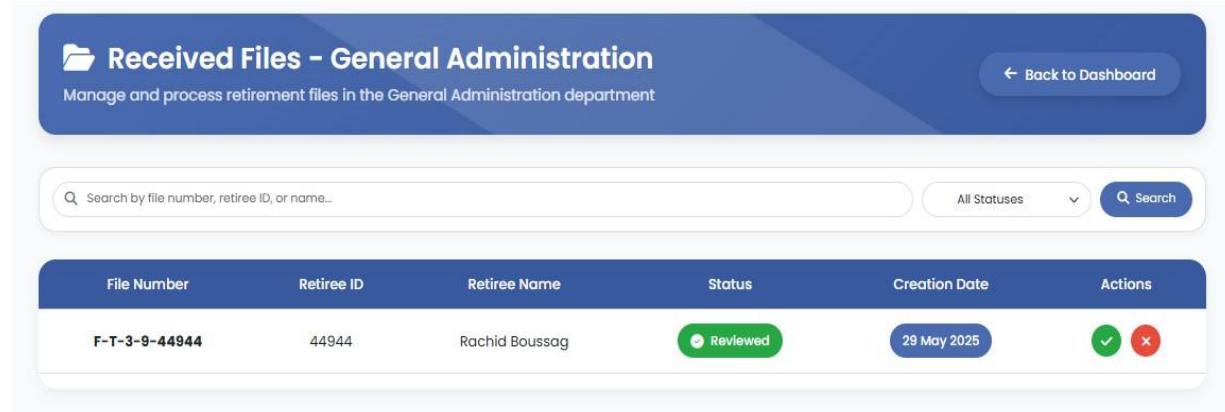


Figure 3. 32: View Verified Files

Description

Files reviewed by the review department and awaiting a final decision are displayed here.

3.6.3 Approve File

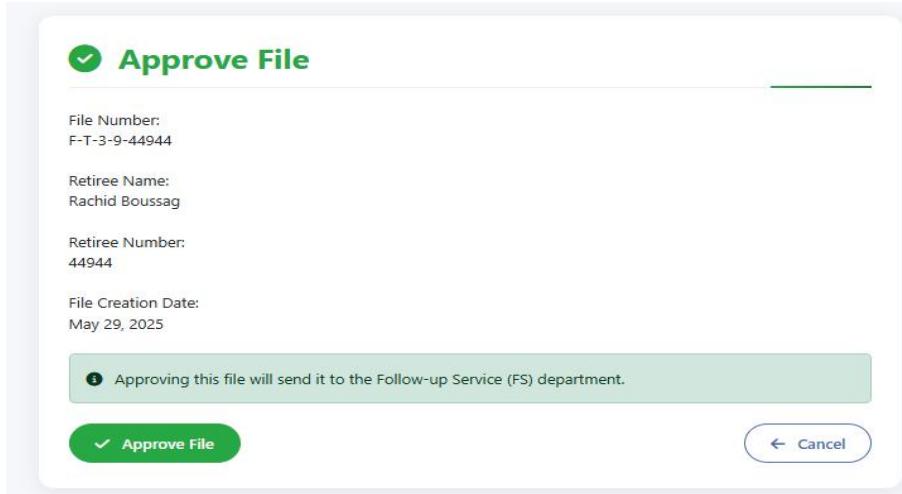


Figure 3. 33: Approve File

Description

Here, final approval of the retirement file is confirmed. After successful confirmation and approval, a notification appears indicating the successful completion of the process, automatically moving the file to the next section in the processing process.

3.6.4 Reject File

File Number:
F-T-3-9-44944

Retiree Name:
Rachid Boussag

Retiree Number:
44944

File Creation Date:
May 29, 2025

Rejection Reason

Provide a detailed reason for rejection...

This reason will be logged and visible to other departments.

X Reject File **Cancel**

Figure 3. 34: Reject File

Description

- Here, the retirement application rejection is confirmed, with the reason stated (mandatory).
- When the process is confirmed, a notification appears stating the rejection of the application.

3.6.5 Rejected Files Viewer

Rejected Files

Files rejected by General Administration department

Back to Dashboard

Search by file number, retiree ID, or retiree name...

Search

Rejected Files List

1 Files

File Number	Retiree ID	Retiree Name	Status	Rejection Date	Rejection Reason	Actions
F-T-3-9-44944	44944	Rachid Boussag	Rejected	29 May 2025	أُلقيت مذكرة في انتظار اعتماده وثائق على منسقى وكالة	

Figure 3. 35: Rejected Files Viewer

Description

Here you will see the rejected files with the possibility of returning them to the previous section

3.7 Pension or Follow-up Department

3.7.1 Follow-up Dashboard

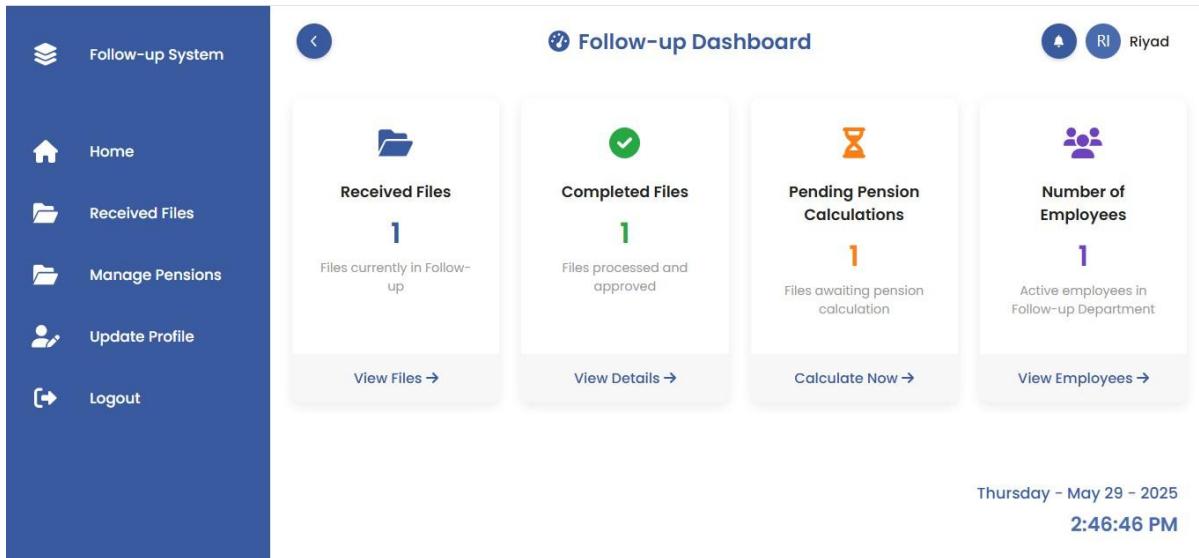


Figure 3. 36: Follow-up Dashboard

Description

The Pensions Department interface is designed in an interactive manner that completely simplifies the process of performing the required functions.

3.7.2 View Approved Files

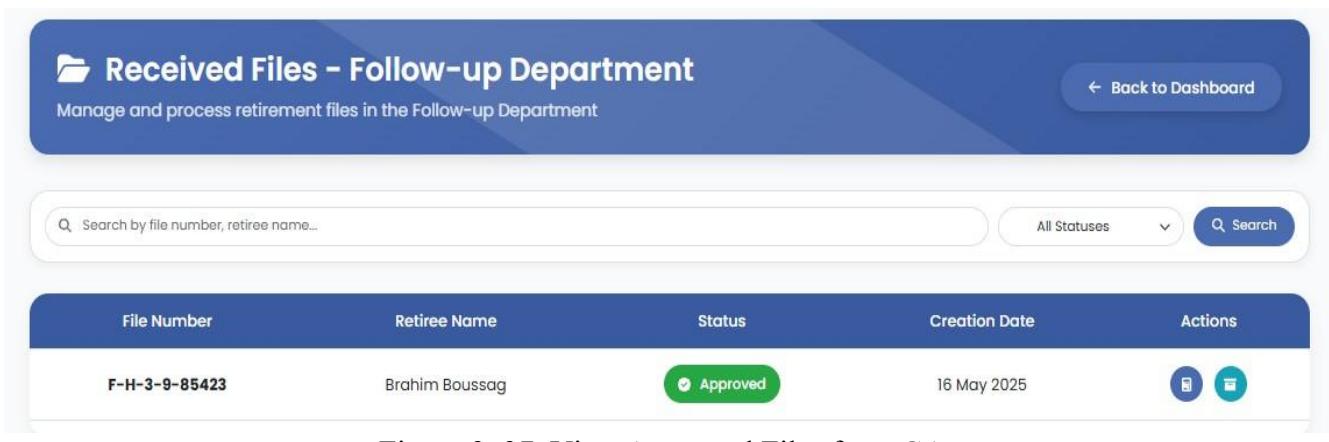


Figure 3. 37: View Approved Files from GA

Description

Here are displayed files approved by the General Administration awaiting pension calculation.

3.7.3 Pension Calculation Page

Calculate Pension Entitlements

File Number: F-E-1-9-19627 Status: Alive

Retiree Name: Bouzid Moussai

Monthly Salary (DZD)

Years of Service

Enter average salary for best 5 years

Total years of contribution (2.5% per year, max 80%)

Calculation Information

- Pension rate: 2.5% per year of service, maximum 80%
- For living retirees: Pension based on years of service
- For deceased retirees: 75% of base pension distributed among beneficiaries
- Minimum pension: 75% of SNMG (15,000 DZD)

✓ Calculate Pension ✘ Cancel

Figure 3. 38: Pension Calculation

Description

The image represents the method of calculating the pension according to the mechanism approved by the National Retirement Fund. (The calculation method was mentioned in the theoretical chapter.)

3.7.4 Calculated Pension Files

Retirement Benefits Management

View and manage all retirement files with calculated pensions

Back to Dashboard

Search by file number or retiree name... All Statuses Search

File Number	Retiree Name	Retiree Status	Pension Amount	File Status
F-E-1-9-19627	Bouzid Moussai	Alive	80,000.00 DZD	Rejected
F-A-1-9-96512	Adala Boussag	Alive	72,000.00 DZD	Suspended
F-T-3-9-20772	Rachid Boussag	Alive	48,000.00 DZD	Approved

Figure 3. 39: Calculated Pension Files

Description

This image displays the retirement files for which the pension has been calculated,

3.8 Archive Department Interfaces

3.8.1 Archive Dashboard

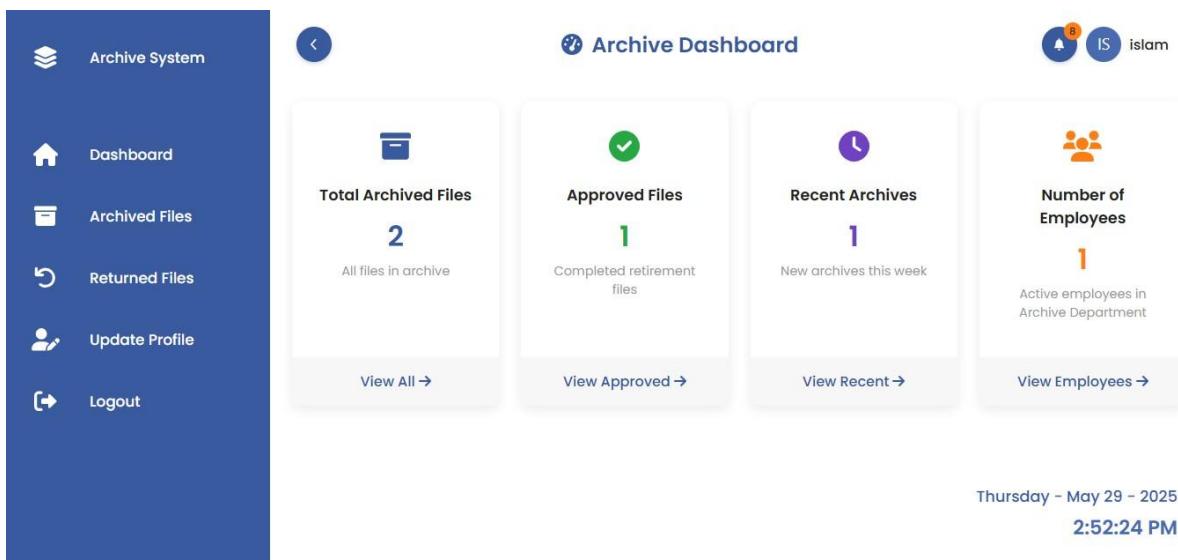


Figure 3. 40: Archive Dashboard

Description

The Archive interface is designed in an interactive manner that completely simplifies the process of performing the required functions.

3.8.2 Archived Files Viewer

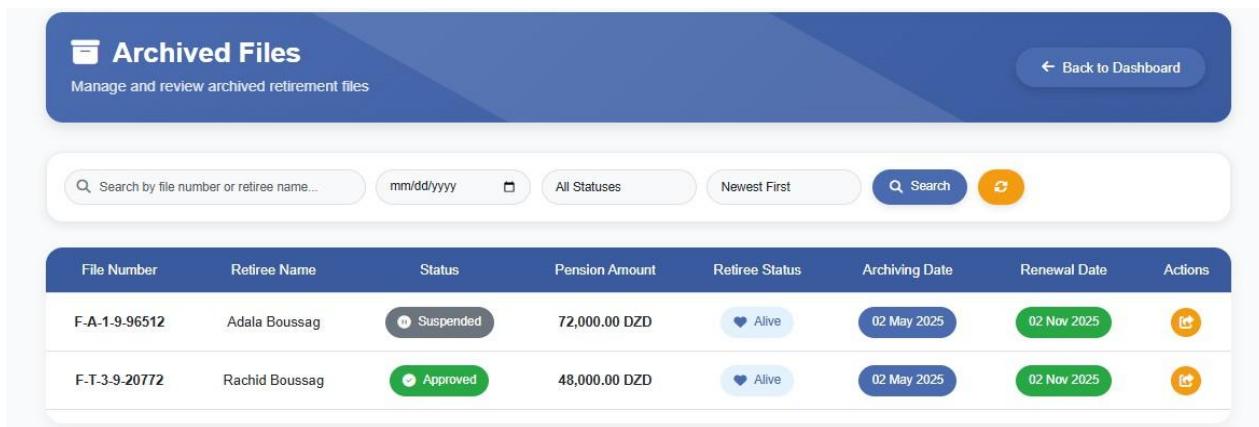


Figure 3. 41: Archived Files Viewer

Description

The image shows a page for displaying archived files with the ability to return files to previous departments for re-examination.

3.9 Retiree Interfaces

3.9.1 Retiree Dashboard

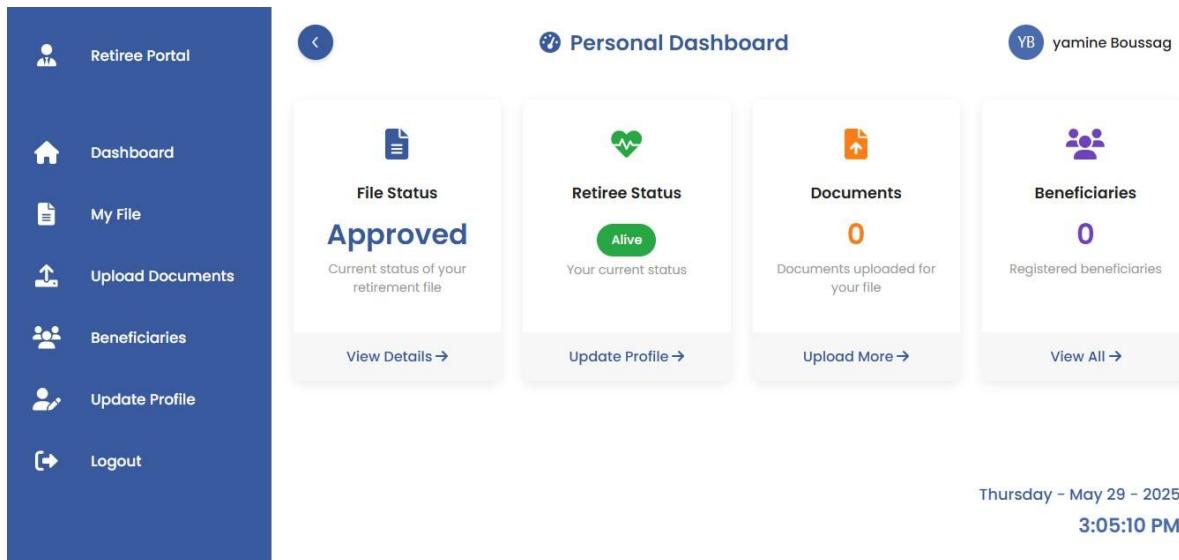


Figure 3. 42: Retiree Dashboard

Description

The retiree interface is designed in an interactive manner that facilitates full access to all retirement file details and enables the retiree to perform related tasks efficiently. Through this interface, the retiree can view their file information, upload renewal documents, and generate official documents related to their retirement status.

3.9.2 View Personal File

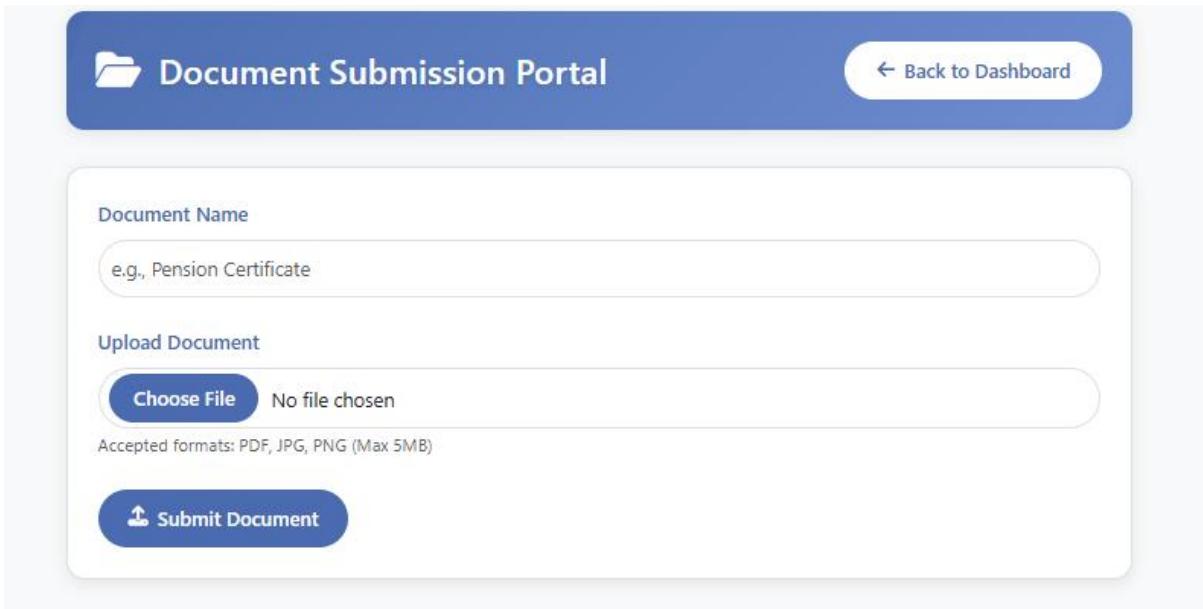
The screenshot displays the 'Retiree File Details' page. At the top, it shows the CNR logo and the name 'yasmine Boussag'. Below this, the file number is listed as 3-0-3-0-3-0-3-0, and the creation date is 2020/05/29. The file status is 'Approved'. The pension details section shows a monthly pension amount of 48,000.00 DZD, disbursed on the 5th of each month. The basic details section includes fields for full name (yasmine Boussag), email (yasmine10@gmail.com), phone (0644521450), creation date (2020/05/29), renewal date (2025-05-29), and current location (Archives Department). The workflow timeline shows three steps: 'File Creation' (2020/05/29), 'Transferred to Follow-up Department' (2020/05/29), and 'Annual Renewal' (2020-05-29). At the bottom, there are buttons for 'Logout Summary', 'Help', and 'Back to dashboard'.

Figure 3. 43: Personal File

Description

The image represents the details of a living person's retirement file.

3.9.3 Upload Document



The screenshot shows a 'Document Submission Portal' interface. At the top, there is a blue header bar with a folder icon and the text 'Document Submission Portal' on the left, and a 'Back to Dashboard' button with a left arrow icon on the right. Below the header, there are two input fields: 'Document Name' with a placeholder 'e.g., Pension Certificate' and 'Upload Document' with a 'Choose File' button and a message 'No file chosen'. Below these fields, a note states 'Accepted formats: PDF, JPG, PNG (Max 5MB)'. At the bottom of the form is a blue 'Submit Document' button with a paper icon.

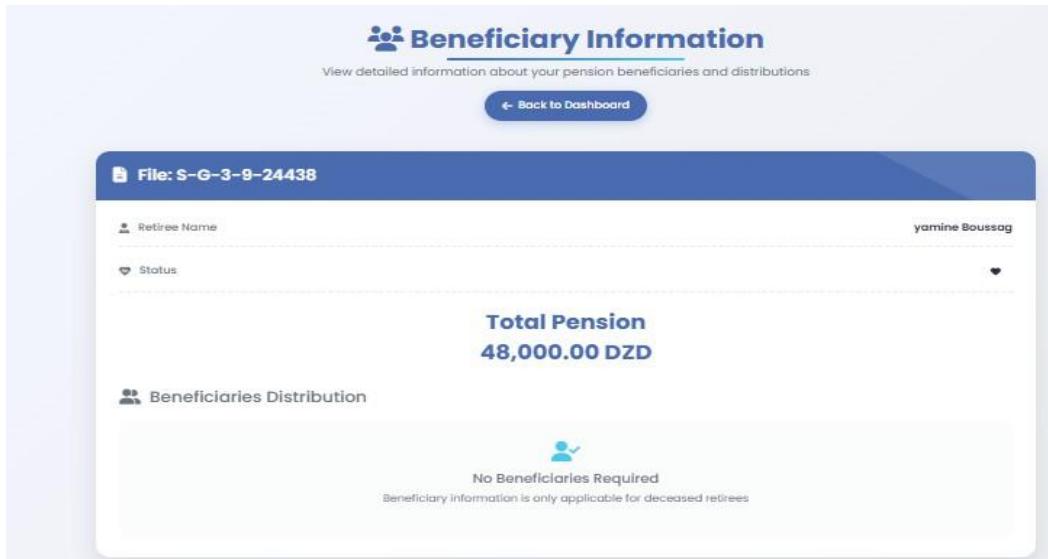
Figure 3. 44: Upload Documents

Description

The current image represents a page for uploading renewal documents. This process involves entering a document name and specifying its type.

3.9.4 View Beneficiaries

1. retired living (See pension only)



The screenshot shows a 'Beneficiary Information' page. At the top, there is a blue header bar with a people icon and the text 'Beneficiary Information' on the left, and a 'Back to Dashboard' button with a left arrow icon on the right. Below the header, there is a summary section with the file number 'File: S-G-3-9-24438' and a table showing 'Retiree Name' (yamine Boussag) and 'Status'. In the center, there is a large bold text 'Total Pension' followed by '48,000.00 DZD'. Below this, there is a section titled 'Beneficiaries Distribution' with a note 'No Beneficiaries Required' and a small icon of a person.

Figure 3. 45: retirement pension (retired living)

Description

The image shows only a pension without a beneficiary because the pensioner is alive.

2. **deceased retiree**(An account administrator can view the beneficiaries' pensions.)



Figure 3. 46: retirement pension deceased retiree

Description

The image displays the beneficiaries and their respective shares of the retirement pension.

4. Retirement File Management System Workflow

The system for managing retirement files is built on a controlled and systematic mechanism through a holistic process that passes through several distinct steps, which are outlined below:

- **Retiree Data Entry:** Once the retiree arrives at the reception employee, the retiree records their data and accounts are created.

All applicable information is recorded accurately, as this information can be modified later.

- **File Creation:** Once the data is entered, the retiree information is sent to the processing employee to create the retirement file.

During this step there will be all of the necessary documents collected and tied-glued to the retiree account.

- **File Review:** The file is electronically sent to the review employee.

The employee will check the documents and request invalid or missing items to renew or replace in the file.

- **File Approval:** The files will then be sent to the general administration for approval, after the review.

Final approval can come from the general manager or reject the files based on review findings.

- **Pension Calculation:** Once approved, the file will be sent to the pension employee to calculate the retirement pension.

The calculation outcomes are entered, making the file one of the finalized pension files.

- **File Archiving:** When all the processes are finished, it will be sent to the archives employee for digital storage.

The file can be digitalized and retrieved at any time, if necessary.

- **Retiree Interface:** Retirees can log into their own accounts and see the file information.

They can download or replace documents, and see the list of beneficiaries related to the file as well.

- **Activity Tracking and Edit Log:** All actions taken on the file are logged in a log specifically designated for that purpose.

To ensure traceability, transparency, and administrative accountability.

Conclusion:

In this chapter, the retirement file management platform's technical dimensions were demonstrated by providing the interfaces of each department along with a detailed description of the internal working of the system. The presentation of this work showed how an uncomplicated and focused digital tool can promote better administrative efficiency, improve file processing times, and cultivate a more organized and transparent environment.

This model was a first step to digital transformation for local administrations, particularly in regard to establishing tailored information solutions that are designed to meet unique departmental requirements. The system is ultimately intended to form the basis of future expansions.

Perspective

As part of the continuous effort to improve the efficiency of the retirement file management system and expand its range of services, a set of additional functionalities was identified for potential future integration. Although some of these were not implemented in the current version, they represent a clear direction for future system development and modernization according to user needs. The key proposed features are as follows:

1. Automatic Verification of Renewal Documents

While the current platform allows users to upload renewal documents manually, it is proposed to develop a mechanism based on artificial intelligence that automatically verifies the retiree's identity. This would involve comparing an uploaded photo with existing images stored in the database and issuing an immediate decision of approval or rejection. This feature would significantly reduce the time required for manual file review.

2. Automated Notification System for Retirees

This functionality aims to enhance the user experience by sending automatic alerts to retirees when it is time to renew their documents. Such reminders would help reduce delays and ensure better compliance with renewal deadlines.

3. Integration of an Intelligent Chatbot

It is proposed to embed a smart chatbot within the platform capable of answering user inquiries, guiding them through the system, and explaining the benefits of retirement registration or renewal. This would be especially helpful for users with limited experience in digital platforms.

4. Enhanced Administrative Privilege Management

A new feature is suggested to allow the administrator to assign or modify additional privileges for other employees based on operational needs. This flexibility would improve role distribution and support more dynamic workflows within the platform.

General conclusion

General conclusion:

During the global digital revolution, an urgent need is to instate efficient information systems which assist in reinforcing the administrative performance, facilitating transparency, and accelerating the processing of files within public organizations. This thesis aims to fulfill the need by developing and designing an integrated digital platform to deal with retirement files on the level of M'Sila Province's local agency.

Our work was built on a correct analysis and design process that started with a realistic exploration of the agency's needs, followed by the creation of an explicit functional model by using UML tools, and then ending up with a pragmatic implementation by using existing technologies that ensure flexibility, security, and usability. We also took into account the actual administrative structure of the agency by assigning duties on the basis of every department and linking them to a clear workflow from the receipt of the file to its being archived.

Although this platform is not attempting to be flawless, initial results indicate its potential to make a real contribution to administrative digitization and public service improvement. It also provides an opportunity for future development to include more features and integration with other systems on the national scale.

We hope that this thesis will contribute to opening new avenues towards accepting realistic digital solutions that cater to the nature of administrative work and place the citizen in the center of the system.

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