

Financial Risk Assessment System

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1 Project Overview

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Project Overview

Project Name: Financial Risk Assessment System

Project Goal: Provide an integrated platform for financial risk management and analysis

Core Functions:

- User Management

- Model Management

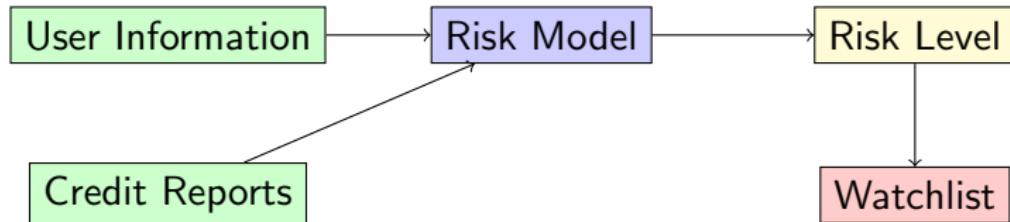
- Credit Report Management

- Risk Control Watchlist Management

- System Logs

Tech Stack: PostgreSQL, Python, PyQt5

System Workflow



Data Input: The system collects user information and recent credit reports from DB as primary inputs.

Risk Assessment: Multi risk models processes the input data to evaluate the financial risk profile of each user.

Watch-list Integration: Users are systematically added to a risk control watch-list based on their assigned risk level.

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User Interface Overview

Main Interfaces

- User Management
- Model Management
- Credit Report Management
- Risk Control Watchlist Management:
 - Watchlist Database
 - Rule Management
 - Rule Statistics
 - Loan Evaluation
- System Logs

User Experience Design

- Friendly navigation structure
- Role-based access control
- Advanced search and filtering capabilities
- Real-time notifications and alerts(Logs)

Key Features

Integrated Risk Assessment Flow

- Credit reports processed through risk models
- Rule-based filtering and validation
- Automated watchlist generation

Comprehensive Data Analysis

- Rule hit rate statistics
- Performance metrics for models

Security & Compliance

- Role-based access control
- Comprehensive audit logging

Key Features

Risk Control Watchlist Management

Watchlist Database:

- Derived from credit reports processed through models
- Stores entities with identified risk factors

Rule Management:

- Creation and modification of risk assessment rules
- Rule versioning and deployment control

Rule Statistics:

- Tracking rule hit rates and effectiveness
- False positive/negative analysis

Loan Evaluation:

- Input applicant basic information, loan information, and risk indicators to provide a risk rating.

1 Project Overview

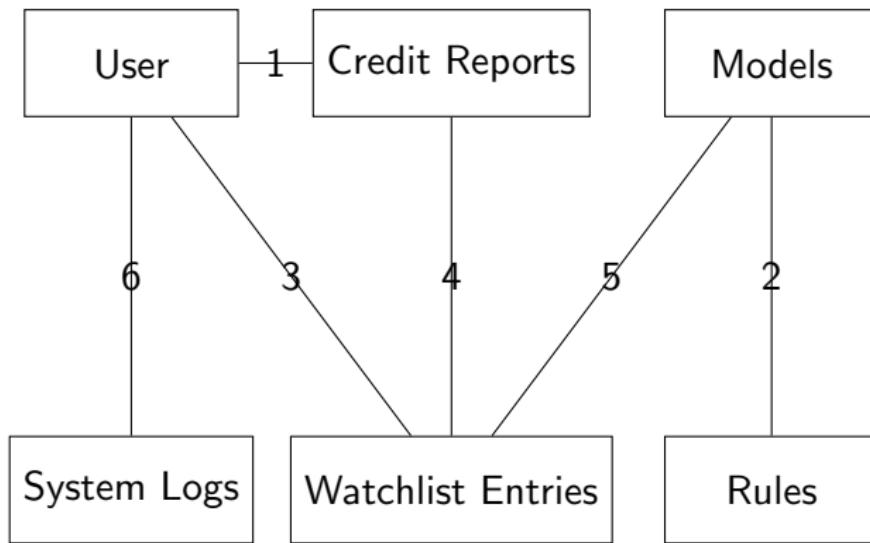
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Entity-Relationship Diagram



Explanation of Relationships

1. User and Credit Reports

1 (User) → N (Credit Reports)

2. Models and Rules

1 (Models) → N (Rules)

3. Watchlist Entries and User

1 (User) → N (Watchlist Entries)

4. Watchlist Entries and Credit Reports

1 (Credit Reports) → N (Watchlist Entries)

5. Watchlist Entries and Models

1 (Models) → N (Watchlist Entries)

6. User and System Logs

1 (User) → N (System Logs)

Detailed ER Model Attributes

Users

user_id (PK)

role

...

Credit Reports

report_id (PK)

user_id (FK)

...

Credit Reports

report_id (PK)

user_id (FK)

...

Watchlist Entries

entry_id (PK)

risk_level

user_id (FK)

report_id (FK)

model_id (FK)

rule_id (FK)

...

Logs

log_id (PK)

user_id (FK)

...

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Implementation: Update

Update & Edit the User's Information

Add/Edit User

ID:	Leave blank when adding new user
Username:	user169
Password:	***
Is Admin:	<input type="radio"/> Yes <input checked="" type="radio"/> No
Full Name:	user 169
Email:	test@gmail.com
Phone:	169169169

Add **Update** **Delete** **Clear Form**

Implementation: Update

Update & Edit the User's Information

The screenshot shows a user management application interface. At the top, there is a search bar with placeholder text "Search username" and a "Search" button. Below the search bar, a message states "User management system started. Currently there are 101 users". The main area is a table with columns: ID, Username, Is Admin, Full Name, Email, Phone, and Actions. The table contains 17 rows of user data. A modal window titled "Success" is displayed in the center, stating "User information updated successfully!". An arrow points from the "Update" button in the bottom navigation bar to this success message. At the bottom of the page, there is a footer with navigation icons.

ID	Username	Is Admin	Full Name	Email	Phone	Action
1	admin	Yes	Admin	admin@example.com	22345678901	
2	user2	No	User 2	user2@example.com	22345678902	
3	user3	No	User 3	user3@example.com	42345678903	
4	user4	No	User 4	user4@example.com	52345678904	
5	user5	No	User 5	user5@example.com	62345678905	
6	user6	No	User 6	user6@example.com	72345678906	
7	user7	No	User 7	user7@example.com	82345678907	
8	user8	No	User 8	user8@example.com	92345678908	
9	user9	No	User 9	user9@example.com	102345678909	
10	user10	No	User 10	user10@example.com	112345678910	
11	user11	No	User 11	user11@example.com	122345678911	
12	user12	No	User 12	user12@example.com	132345678912	
13	user13	No	User 13	user13@example.com	142345678913	
14	user14	No	User 14	user14@example.com	152345678914	
15	user15	No	User 15	user15@example.com	162345678915	
16	user16	No	User 16	user16@example.com	172345678916	
17	user17	No	User 17	user17@example.com	182345678917	

Add new user

ID:
Username:
Password:
Is Admin: Yes No
Full Name:
Email:
Phone:

Actions

Implementation: Add

Add Model with Model files

The screenshot shows the "Add Model with Model files" interface in a software application. The main window has tabs for "Model Management" and "Model Errors". The "Model Management" tab is active, showing a table of models with columns: ID, Model Name, Version, and Status. A message at the top says "Model management system started. There are 3 models." Below the table is a "Select Model File" dialog box, which is highlighted with a red border. The dialog shows a file tree and a list of files in the current directory. An arrow points from the "Select Model File" dialog to the "Select Model File" button in the main window.

Model Management

ID	Model Name	Version	Status
1	Model A	1	Normal
2	Model B	2	Normal
3	Model C	1	Normal
4	Model D	2	Normal
5	Model E	3	Normal
6	Model F	4	Normal
7	Model G	5	Normal

Select Model File

文件名(N): All Files

打开(O) 取消

Add Model

Model Name: test A

Version: 1.0

Environment: testing

Approver: admin

Model File: No file selected

Select Model File

+ New

Implementation: Add

Add Model with Model files

Admin Control Panel - admin

User Management | Model Management | Credit Report Management | Risk Control List Management | System Logs

Model Management **Model Errors**

Search model name: Environment: All Status: All Search Reset

Model management system started. There are 3 models.

ID	Model Name	Version	Environment	Caller	Approver	Verified	Rolled Back	Created At	Actions
1	Model A	1	production	admin	manager	Yes	No	2025/4/12	Unverify Rollback
2	Model B	2	development	user1	manager	No	Yes	2025/4/12	Verify Cancel Rollback
3	Model C	1	production	user2	manager	Yes	No	2025/4/12	Unverify Rollback
4	Model D	2	testing	admin	manager	No	Yes	2025/4/12	Verify Cancel Rollback
5	Model E	3	production	user3	manager	Yes	No	2025/4/12	Unverify Rollback
6	Model F	4	development	admin	manager	No	Yes	2025/4/12	Verify Cancel Rollback
7	Model G	5	production	user4	manager	Yes	No	2025/4/12	Unverify Rollback
8	test A	1.0	testing	admin	admin	No	No	2025-04-15	Verify Rollback

Mark as Verified | Rollback Model | Refresh

Add Model

Model Name:

Version: e.g.: 1.0.0

Environment: testing

Approver:

Model File: No file selected

Select Model File

+ New

Implementation: Add

Add Credit Report to the Report Management

Admin Control Panel - admin

User Management Model Management Credit Report Management Risk Control List Management System Logs

ID: Please enter ID ReportID: Please enter ... Name: Please enter ... Status: All Source: Please enter ... Search Reset

+ New Batch Import More Actions ▾

Credit report historical variables have been cached.

	ID	ReportID	Name	ComAddress	HomeAddress	Hit-count	Format	Status	CreateTime	Source
<input type="checkbox"/>	16	CR0011	User16	Beijing Haidian	Beijing Haidian	13	XML	Valid	2022-04-23 23:12:00	People's Bank of ...
<input type="checkbox"/>	17	CR0012	User17	Beijing Haidian	Beijing Haidian	72	JSON	Invalid	2022-05-12 13:22:30	People's Bank of ...
<input type="checkbox"/>	18	CR0013	User18	Beijing Haidian	Beijing Haidian	67	JSON	Valid	2022-10-31 08:22:44	People's Bank of ...
<input type="checkbox"/>	19	CR0014	User19	Beijing Haidian	Beijing Haidian	67	XML	Invalid	2022-07-23 22:12:28	People's Bank of ...
<input type="checkbox"/>	20					12	JSON	Invalid	2022-10-31 23:12:00	Agricultural Bank of ...
<input type="checkbox"/>	21					100	JSON	Valid	2022-02-11 22:12:10	China Construct...
<input type="checkbox"/>	22					163	XML	Valid	2022-10-21 13:23:10	Bank of China
<input type="checkbox"/>	23					12	JSON	Valid	2022-05-21 09:12:02	Industrial and Commercial ...
<input type="checkbox"/>	24					21	JSON	Valid	2022-04-11 10:12:01	China Merchants ...

Add Credit Report ? X

ID: 11

ReportID: test11

Name: t

Company Address: Beijing Haidian

Home Address: Beijing Haidian

Hit Count: 10

Format: XML

Status: Valid

Creation Time: 2022-04-13 12:00:00

Source: Industrial and Commercial ...

OK Cancel

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Implementation: Add

Add Name List Entry to Risk Control List Management

Admin Control Panel - admin

User Management Model Management Credit Report Management Risk Control List Management System Logs

Risk Control List Management Rules Management Rule Statistics Loan evaluation

RCID: Ple... ID: Ple... Status: All Type: All Risk Domain: All Business Line: All Search Reset

+ New Batch Import More Actions ▾

Name list cache filter is online

	RCID	ID	Type	Rule Hit-count	Business Line	Risk Domain	Risk Tag	Status	Creation Time	Actions
	RC0001	16	Phone	1	Loan	Anti-cheat	Blacklist	Valid	2022-04-23 23:12:00	Add to Whitelist A...
	RC0002	17	Email	1	Personal	Anti-cheat	Blacklist	Invalid	2022-05-12 13:22:30	Add to Whitelist A...
	RC0003	18	Phone	1	Personal	Anti-cheat	Blacklist	Invalid	2022-10-31 08:22:24	Add to Whitelist A...
	RC0004	19	Email	1	Personal	Anti-cheat	Blacklist	Valid	2022-07-23 22:12:28	Add to Whitelist A...
	RC0005	20	Email	1	Loan	Anti-cheat	Blacklist	Valid	2022-10-31 23:12:00	Add to Whitelist A...
	RC0006	21	Phone	1	Personal	Anti-cheat	Blacklist	Valid	2022-02-11 22:12:10	Add to Whitelist A...
	RC0007	22	Email	1	Personal	Anti-cheat	Blacklist	Invalid	2022-10-21 13:23:10	Add to Whitelist A...
	RC0008	23	Email	1	Personal	Anti-cheat	Blacklist	Valid	2022-05-21 09:12:02	Add to Whitelist A...
	RC0009	23	Phone	1	Personal	Anti-cheat	Blacklist	Valid	2022-04-11 10:12:01	Add to Whitelist A...

Add Name List Entry

Rule ID: 1

Risk Level: 1

List Type: Blacklist

Business Line: Loan

Risk Label: Fraud

Risk Domain: Personal

Value: Phone number/ID/IP, etc.

Value Type: Phone Number

OK Cancel

Implementation: Add

Add New Rules

Admin Control Panel - admin

User Management Model Management Credit Report Management Risk Control List Management System Logs

Risk Control List Management Rules Management Rule Statistics Loan evaluation

RuleID: Please enter Rule... Status: Please select Search Reset

+ New Batch Import More Actions ▾

Risk control rules filter status notification Clear

Rule ID

Add Risk Control Rule

* Rule Scope: External Internal

* Select Service: Loan

Rule Description:

* Rule Content:
score<500

Success

Rule added successfully!

OK

Updated Time Actions

Cancel Add

The screenshot shows the 'Add New Rules' interface in the Admin Control Panel. At the top, there's a navigation bar with tabs like User Management, Model Management, etc. Below it is a search bar with fields for RuleID and Status, and buttons for Search and Reset. There are also buttons for '+ New', 'Batch Import', and 'More Actions'. A red arrow points from the '+ New' button to a modal window titled 'Add Risk Control Rule'. This modal has fields for Rule Scope (set to Internal), Select Service (set to Loan), Rule Description, and Rule Content (set to 'score<500'). A success message box is overlaid on the modal, stating 'Rule added successfully!' with an OK button. The background shows a table with columns for Updated Time and Actions.

Implementation: Filter

Filter the Admin from all the users

Admin Control Panel - admin

User Management Model Management Credit Report Management Risk Control List Management System Logs

Search username Role: All **Search** **Reset**

User management system started, currently there are 100 users.

ID	Username	Is Admin	Full Name	Email	Phone	Actions
1	admin	Yes	Admin	admin@example....	22345678901	Edit Delete
2	user2	No	User 2	user2@example.c...	32345678902	Edit Delete
3	user3	No	User 3	user3@example.c...	42345678903	Edit Delete
4	user4	No	User 4	user4@example.c...	52345678904	Edit Delete
5	user5	No	User 5	user5@example.c...	62345678905	Edit Delete
6	user6	No	User 6	user6@example.c...	72345678906	Edit Delete
7	user7	No	User 7	user7@example.c...	82345678907	Edit Delete
8	user8	No	User 8	user8@example.c...	92345678908	Edit Delete

Add/Edit User

ID: Leave blank when adding new user

Username:

Password:

Is Admin: Yes No

Full Name:

Email:

Phone:

Add **Update** **Delete** **Clear Form**

Implementation: Filter

Filter the Admin from all the users

Admin Control Panel - admin

User Management Model Management Credit Report Management Risk Control List Management System Logs

Search username: Role:

• Search results: Found 2 matching users.

ID	Username	Is Admin	Full Name	Email	Phone	Actions
1	admin	Yes	Admin	admin@example.com	22345678901	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
2	vincent	Yes	vincent111	111vincent@gmail....	1118520	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

Add/Edit User

ID: Leave blank when adding new user

Username:

Password:

Is Admin: Yes No

Full Name:

Email:

Phone:

Implementation: Loan Evaluation

Applying the model to evaluate the risk

Click to play

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Project Conclusion

We developed a preliminary financial risk analysis system that integrates a multi-tiered risk assessment workflow, a structured database design, and a admin-centric interface, providing a foundation for risk management in the financial sector.

Technical Achievements

The implementation of this high-reliability financial risk system demonstrates the successful integration of a multi-stage risk assessment workflow, including data input, risk classification, and watchlist generation, all supported by a designed entity-relationship model.

Application Results

The system provides a user-friendly interface for intuitive risk control operations, supports real-time rule statistics, and implements core functions such as risk evaluation and database management.

Future Outlook

Feature Extensions

Machine Learning Integration Use algorithms to predict risks from historical data, enabling proactive mitigation.

Advanced Visualizations Develop interactive tools like dashboards and 3D models for better data insights.

Technical Upgrades

Transaction Management Implement distributed transaction management to ensure atomicity and consistency across multiple servers, supporting commit and rollback operations for reliable data processing.

While advanced automation features are still under development, the current version already enables analysts to manage and monitor risk more efficiently through a structured digital workflow.

Thank You!

Q&A