

# HomeEase

## Simplifying Home Purchases for Chinese Residents in the Netherlands

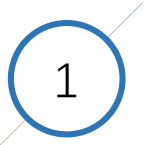
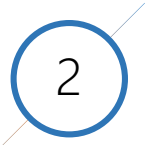
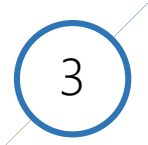
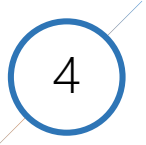

A Fin-Tech MVP for Better Financial Planning and Decision Making

Dan Li (674117)      Email: [674117dl@student.eur.nl](mailto:674117dl@student.eur.nl)



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# Product overview

## Introduction

- Platform designed to streamline property purchasing for Chinese residents in Europe

## Key Features

- Real-Time Currency Exchange Rate and Mortgage Rate Display
- Prediction of Future Currency Exchange Rates and Mortgage Rates
- Mortgage Calculator Based on Dutch Rules





# Function & Technology 1



## Functionality

- Aggregates real-time currency exchange rates from various banks and platforms
- Displays current mortgage rates from different financial institutions

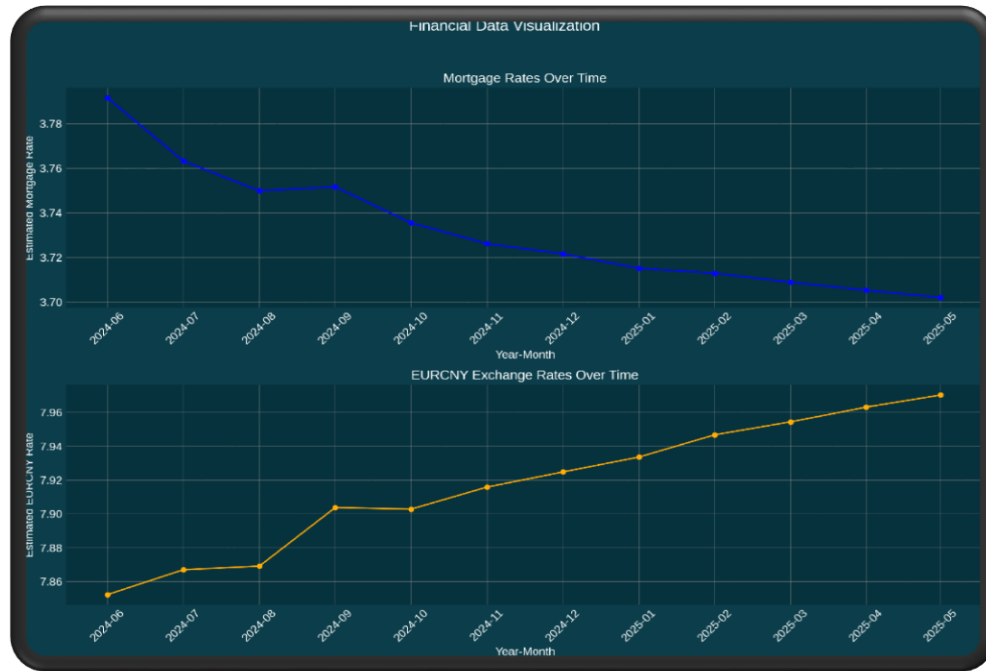
## Technology

- Programming Languages: Python
- Frameworks and Libraries: Requests for API calls

Pandas for data manipulation

# Function & Technology 2

## Mortgage & Currency exchange rate prediction



## Functionality

- Predict future mortgage rates and currency exchange rates

## Technology:

- Programming Languages: Python
- Frameworks and Libraries: Machine Learning and Time Series
- Methods statsmodels for ARIMA modeling
- pandas for data manipulation
- Scikit-learn for Linear Regression, scaling, and data imputation

## Data Sources

- Historical data from the Dutch Central Bank
- Trading Economics for economic indicators



# Function & Technology 3

## Functionality

- Calculates the maximum mortgage amount based on annual income, interest rate, purchase price, energy label, and mortgage type
- Provides detailed breakdowns of gross monthly expenses and total own funds required

## Technology

- Programming Languages: Python
- Frameworks and Libraries
- Ipywidgets for creating interactive input fields
- IPython.display for displaying results in HTML format

## Mortgage calculator

The screenshot displays a mortgage calculator interface. On the left, there are input fields for 'Your gross income\*' (60000), 'Your partner's gross income' (optioneel), 'Interest rate\*' (4), 'Purchase price' (300000), 'Student loan' (0), 'Total credit' (0), 'Type of mortgage' (Annuity selected, Linear unselected), and 'Energy label' (B). On the right, a light blue box titled 'Mortgage calculation' displays the results: 'Maximum mortgage € 272.117,00', 'Gross monthly expenses € 1.299,13', and 'Contributions of own funds € 42.528,00'. Below these, a table lists various fees: Minimum own funds (€ 27.883,00), Taxes (€ 6.000,00), Broker fee (€ 4.500,00), Appraisal fee (€ 650,00), Mortgage advice fee (€ 1.995,00), and Notary fee (€ 1.500,00). An orange button labeled 'Get your quote' is positioned below the table. At the bottom of the blue box, a note states: 'Calculate your exact maximum mortgage with a mortgage advisor today free of charge.'

Mortgage calculation	
Maximum mortgage	€ 272.117,00
Gross monthly expenses	€ 1.299,13
Contributions of own funds	€ 42.528,00
€ 27.883,00	Minimum own funds
€ 6.000,00	Taxes
€ 4.500,00	Broker fee
€ 650,00	Appraisal fee
€ 1.995,00	Mortgage advice fee
€ 1.500,00	Notary fee

# Software Architecture

## Overview

- The software architecture of HomeEase is designed to integrate various modules to support the core functionalities

01	02	03	04	05
<b>User Interface (UI)</b> <ul style="list-style-type: none"><li>➤ Technologies: HTML, CSS, JavaScript (to be developed)</li><li>➤ Provides a responsive and intuitive interface for users to interact with the platform</li><li>➤ Status: Needs further development</li></ul>	<b>Backend Services</b> <ul style="list-style-type: none"><li>➤ Technologies: Python</li><li>➤ Frameworks: Flask</li><li>➤ Handles business logic, API integrations, and data processing</li><li>➤ Status: Basic functionalities developed for real-time data aggregation, prediction algorithms, and mortgage calculations. Further development required for comprehensive features.</li></ul>	<b>Data Storage</b> <ul style="list-style-type: none"><li>➤ Technologies: SQLite</li><li>➤ Stores user data and prediction results</li><li>➤ Status: Needs further work for scaling and security</li></ul>	<b>API Integrations</b> <ul style="list-style-type: none"><li>➤ Technologies: RESTful APIs</li><li>➤ Integrates with external services for real-time currency exchange rates and mortgage rate</li><li>➤ Status: Implemented for currency exchange rates. Needs further development for additional financial data sources.</li></ul>	<b>Machine Learning Models</b> <ul style="list-style-type: none"><li>➤ Technologies: Python, scikit-learn, statsmodels</li><li>➤ Implements ARIMA for time series forecasting and linear regression for prediction models</li><li>➤ Status: Developed and functional. Further refinement and additional models may be needed</li></ul>

01

## Functionality

- Aggregates real-time currency exchange rates and mortgage rate from various banks and platforms
- Predicts future mortgage rates and currency exchange rates.
- Calculates the maximum mortgage amount based on annual income, interest rate, purchase price, energy label, and mortgage type
- Provides detailed breakdowns of gross monthly expenses and total own funds required

02

## Business Plan Integration

- Real-Time Data Aggregation: Supports users in making informed decisions with up-to-date financial information
- Predictive Analytics: Enhances financial planning by forecasting future rates
- Mortgage Calculator: Simplifies the home buying process with clear financial insights tailored to Dutch regulations.

03

## Status

- Developed: Real-time data aggregation, prediction algorithms, and mortgage calculator functionalities.
- Needs Further Work: developing the user interface, enhancing data storage capabilities, integrating more financial data sources, and potentially adopting blockchain technology for secure currency exchange services





# Software Deployment & Usage Workflow

## Development

- Technologies: Docker (to be implemented)
- Platforms: AWS, Azure, Google Cloud (planned)
- Ensures scalable and reliable deployment of the application
- Uses containerization for consistent environments across development, testing, and production

## Usage Workflow

- **User Registration:** Users sign up and create an account on HomeEase.
- **Data Input:** Users input their financial data, including annual income, interest rate, and purchase price
- **Real-Time Data Aggregation:** The system aggregates real-time currency exchange rates and mortgage rates from various sources
- **Predictive Analytics:** The system predicts future mortgage rates and currency exchange rates using machine learning models
- **Mortgage Calculation:** The system calculates the maximum mortgage amount and provides a detailed financial breakdown
- **User Decision Support:** Users receive comprehensive financial insights to aid in their property purchasing decisions

## Status

- Developed: Basic functionalities for data input, real-time data aggregation, predictive analytics, and mortgage calculation.
- Needs Further Work: Full deployment setup and additional features for user decision support.



**Thank you**

