**WEST UNIVERSITY OF TIMIŞOARA**
**FACULTY OF MATHEMATICS AND COMPUTER SCIENCE**
**BACHELOR STUDY PROGRAM: Computer Science in English**

# BACHELOR THESIS

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**TIMIŞOARA**
**2024**

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# FOREX COMPASS: WEB APPLICATION FOR FOREX STRATEGY MANAGEMENT

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# Chapter 1

# Introduction

## 1.1 Domain Description

This bachelor thesis focuses on the development of a comprehensive web application made to assist users in managing their forex trading strategies. Forex, or foreign exchange, is a vast, decentralized global market where currencies are traded. The primary objective of this web application is to enhance the trading experience by offering a suite of tools that provide real-time data, analytics, and efficient strategy management. By integrating these features, the application aims to empower traders with the necessary resources to make informed decisions and optimize their trading strategies in the dynamic forex market.

## 1.2 Motivation

The forex market, being one of the largest and most liquid financial markets in the world, offers vast opportunities for traders to profit from currency fluctuations. However, the complexity and volatility of the forex market require traders to have access to reliable tools and data to make informed decisions. Many traders struggle with managing their strategies effectively due to the lack of integrated tools that provide real-time data, analytics, and streamlined execution capabilities.

The motivation behind this project stems from the need to bridge this gap by developing a comprehensive web application that not only provides live forex rates and market news but also facilitates strategy creation and management. By integrating real-time data feeds, advanced analytics, and seamless integration with MetaTrader, this application aims to empower traders with the tools they need to succeed in the highly competitive forex market.

## 1.3 Objectives

The primary objectives of this project are:

1. **Provide Real-Time Forex Data:** Integrate live forex pair rates into the web application to ensure users have up-to-the-minute information crucial for trading decisions.

2. **Enable Strategy Creation:** Develop a feature that allows users to create trading strategies through a user-friendly form. This feature will generate scripts compatible with MetaTrader, incorporating all necessary indicators and parameters.

3. **Aggregate Market News:** Implement a news section that gathers relevant forex market news from multiple sources, helping traders stay informed about market-moving events.

4. **Facilitate User Management:** Design a user profile section that offers secure authentication, allowing users to log in, register, and manage their profiles and settings.

5. **Ensure Security and Accessibility:** Implement robust security measures to protect user data and ensure that the application is accessible and responsive across various devices, including desktops, tablets, and smartphones.

# Chapter 2

# State of Art

## 2.1 Scope and Limitations

The scope of this project encompasses the development of a web application that provides live forex pair rates, a trading interface, advanced analytics tools, and an aggregated news section to keep users informed about market developments. The application will also feature a profile management section, allowing users to register, log in, and manage their personal information and trading preferences. A key functionality will be the strategy creation feature, which enables users to create trading strategies through a form-based interface and generate scripts compatible with MetaTrader, incorporating all specified indicators and parameters. Additionally, the application will prioritize security and accessibility, ensuring a responsive design that works across different devices.

However, there are several limitations to consider. The application will depend on third-party APIs for real-time forex rates and news updates, which may occasionally experience outages or data discrepancies. The strategy creation feature is specifically tailored for MetaTrader, limiting its usefulness to users of other trading platforms. Despite implementing robust security measures, the system cannot be entirely immune to security breaches, and users must follow best practices to protect their login credentials and personal information. The application also assumes that users have a basic understanding of forex trading and technical analysis, as it does not provide extensive educational resources for beginners. Finally, a stable internet connection is required for real-time data and trading functionalities, and users with intermittent connectivity may experience service disruptions.

## 2.2 Related Work

The development of web applications for forex strategy management is a growing field within the financial technology (FinTech) sector. This section explores existing research on web-based tools for forex trading and identifies areas where your proposed application offers unique contributions.

### MetaTrader WebTrader

A widely used platform offering basic charting and strategy building functionalities [Reference: MetaQuotes Software Corp. (2023). MetaTrader 5 trading platform.

https://www.metaquotes.net/en/download]

### TradingView

An online charting platform with advanced technical analysis tools and a growing community of strategy developers [Reference: TradingView (2023). TradingView - Stock charts, Forex charts, Technical analysis tool. https://www.tradingview.com/]

# Chapter 3

# Architecture

## 3.1 Requirements

1. **Live Forex Pair Rates:**
    - Integrate an API to fetch and display real-time forex pair rates on the home section.
2. **User Authentication:**
    - Implement secure login, registration, and password recovery mechanisms.
3. **Strategy Creation:**
    - Develop a form-based interface for users to input trading parameters and indicators, and generate MetaTrader-compatible scripts.
4. **Responsive Design:**
    - Ensure the application is accessible and functional across different devices, including desktops, tablets, and smartphones.
5. **Profile Management:**
    - Allow users to view and edit their profile information, track trading performance, and manage their settings.
6. **Analytics Tools:**
    - Provide tools for analyzing historical data, tracking performance metrics, and applying technical indicators in the analytics section.
7. **Trading Interface:**
    - Develop a user interface for executing trades, including options to buy and sell currency pairs, set stop-loss and take-profit levels, and monitor open positions.

## 3.2 Technologies proposed to be used

1. **Frontend Development:**
   - **React.js:** For building a dynamic and responsive user interface.
   - **HTML5:** For structuring the content of the web application.
   - **CSS3:** For styling the web application and ensuring a visually appealing design.
   - **JavaScript:** For implementing client-side logic and interactivity.
2. **Backend Development:**
   - **Node.js:** For creating a scalable and efficient server-side application.
   - **Firebase:** A set of backend cloud computing services and application development platforms provided by Google.
3. **Database Management:**
   - **Firebase:** For a reliable, open-source database to manage user data and trading information.
4. **Database Management:**
   - **SQL (Structured Query Language):** For managing and querying databases, storing historical market data.
5. **APIs:**
   - **Firebase Realtime Database:** Enables programmatic setup and management of Firebase projects, including a project's Firebase resources and Firebase apps.
   - **OANDA API:** To fetch real-time forex pair rates.
   - **Financial Times API:** To aggregate and display relevant forex market news.
6. **Authentication and Security:**
   - **Firebase Auth:** For secure user authentication.
7. **Version Control Systems:**
   - **Git:** To manage and maintain versions of the codebase.
   - **GitHub:** For repository hosting, collaboration, and project management.
8. **Development Environments:**
   - **WebStorm:** an integrated development environment (IDE) by JetBrains. It includes everything needed for JavaScript, HTML and CSS development.

9. **MetaTrader Integration:**
    - **MQL4/MQL5:** For generating trading scripts compatible with MetaTrader 4 and MetaTrader 5 based on user-defined strategies.

## 3.3 Architecture Diagram

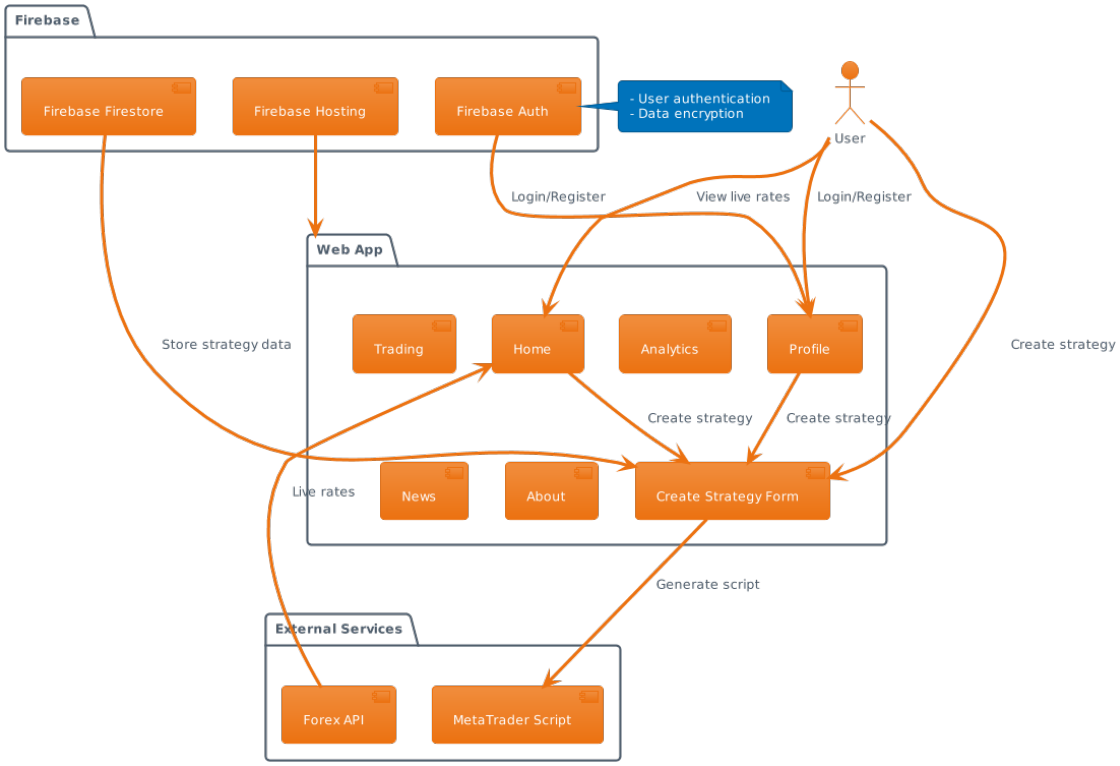


Figure 3.1: Architecture Diagram

## 3.4 UML Diagrams

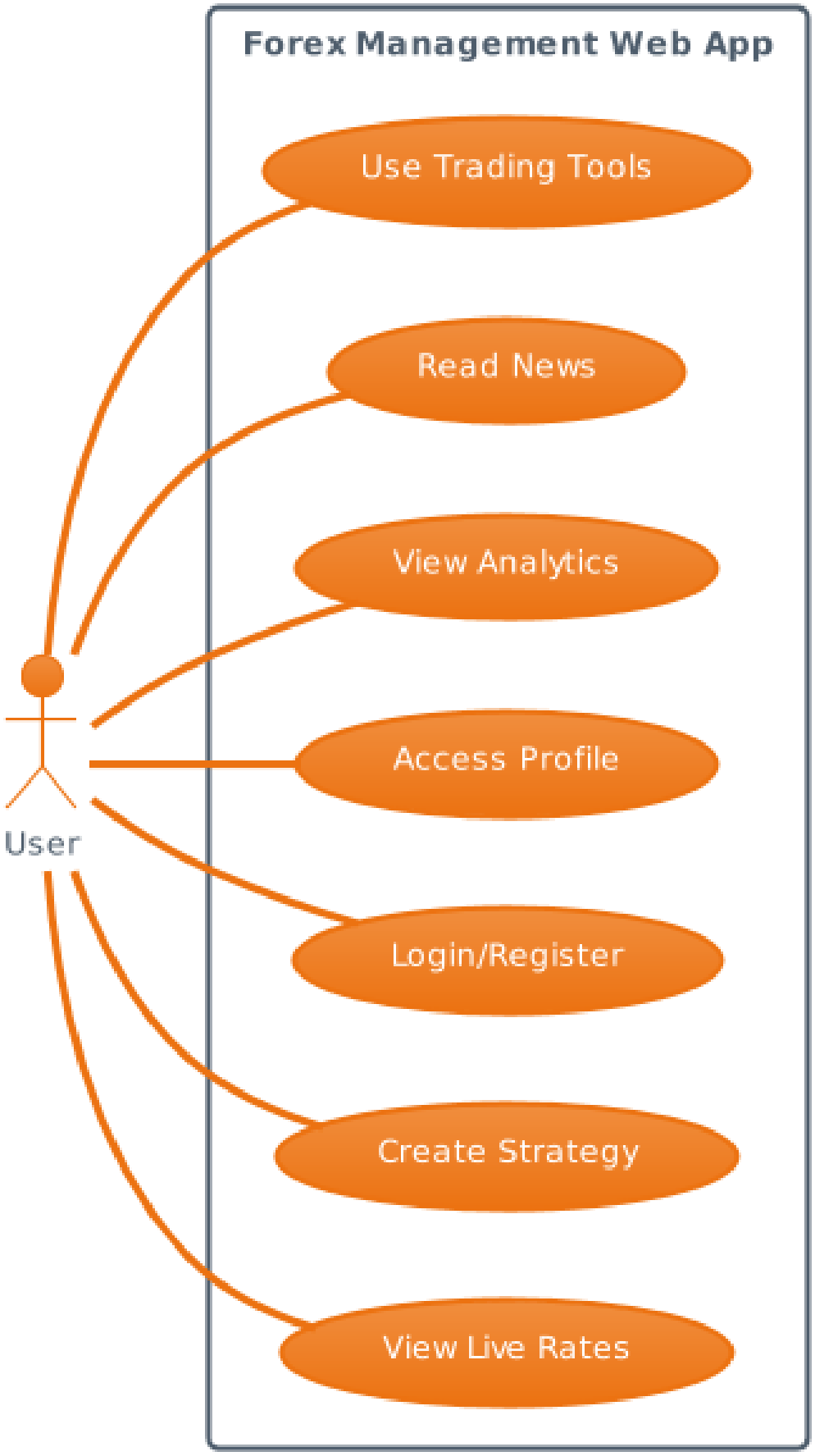


Figure 3.2: Use Case Diagram

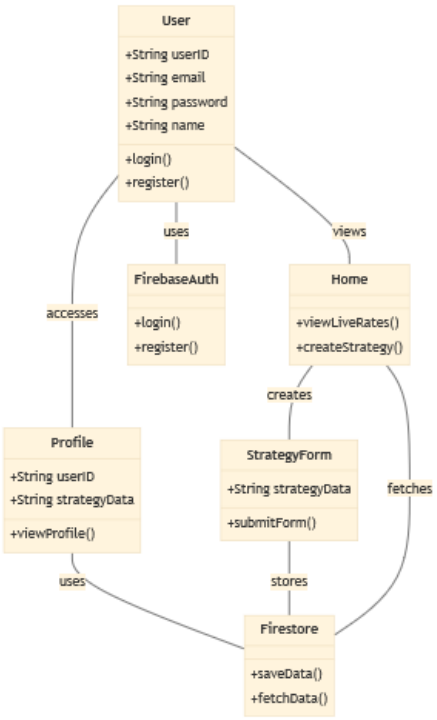


Figure 3.3: Class Diagram

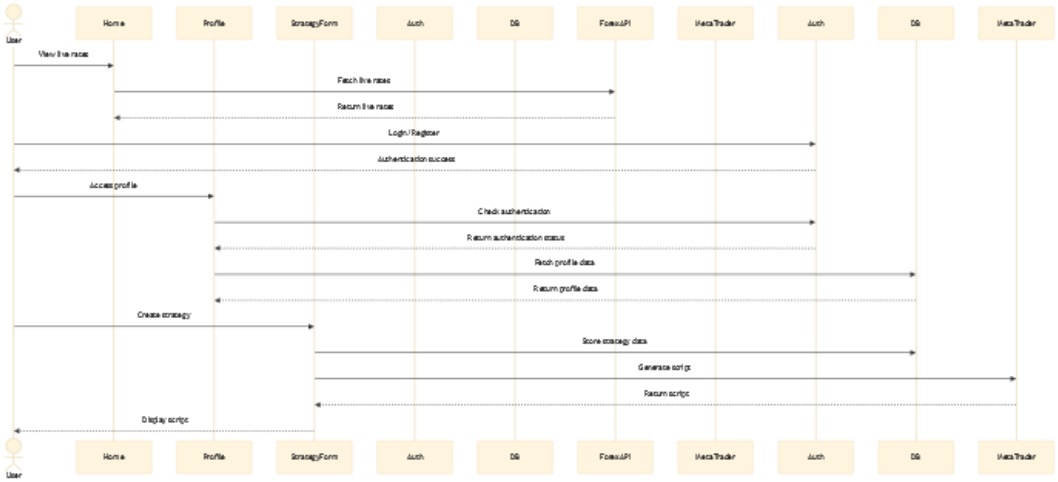


Figure 3.4: Sequence Diagram

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[1] MetaQuotes Software Corp. (2023). MetaTrader 5 trading platform. Retrieved from `https://www.metaquotes.net/en/download`

[2] TradingView. (2023). TradingView - Stock charts, Forex charts, Technical analysis tool. Retrieved from `https://www.tradingview.com/`