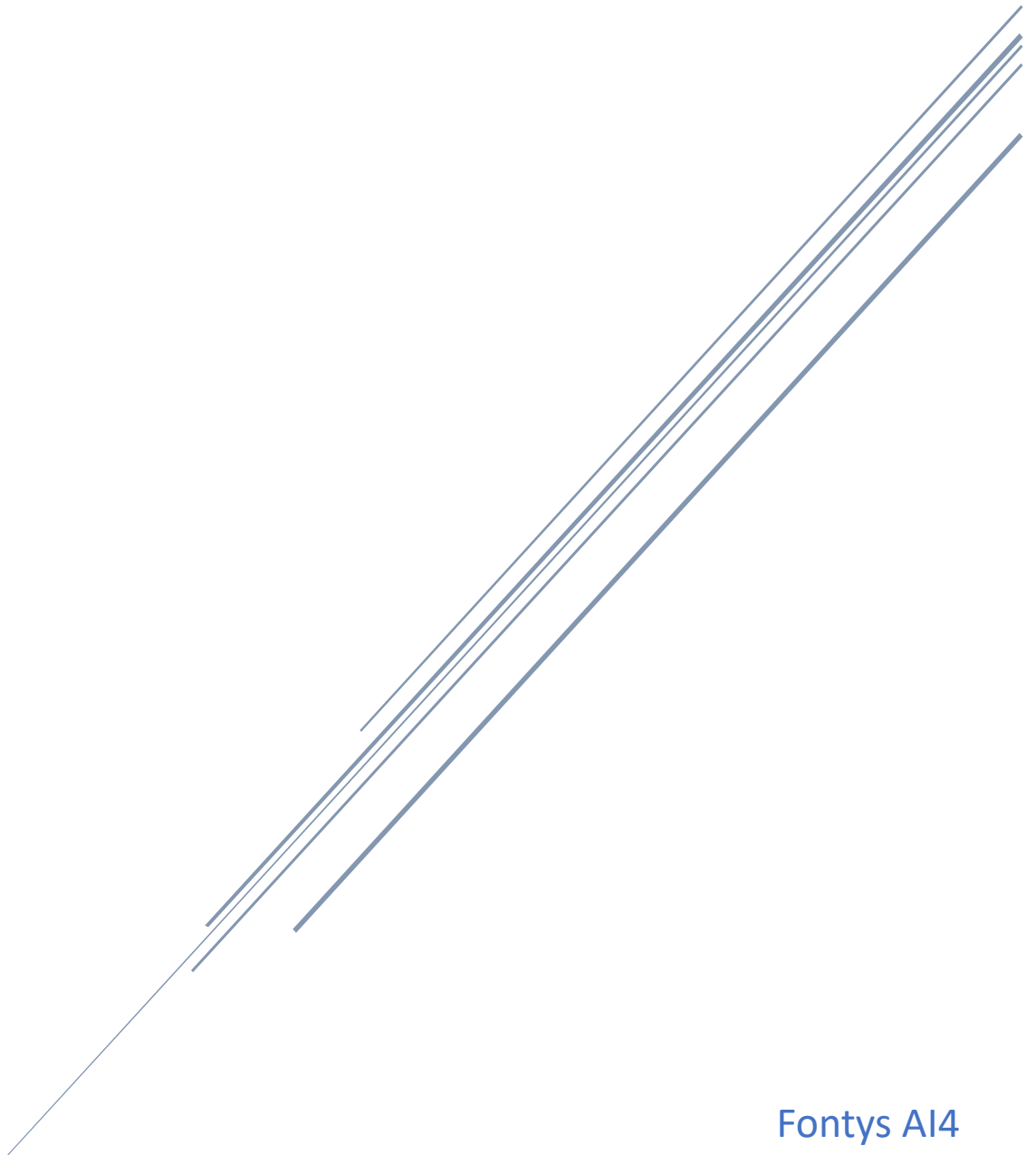# ANALYST CONSENSUS PREDICTION

Phase 1: Proposal

Fontys AI4
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Contents

Introduction

In the dynamic and ever-evolving world of finance, the ability to make informed investment decisions is crucial. This proposal outlines the development of a "Fundamental Analysis Rating" system, a project aimed at harnessing the power of AI to predict "Buy", "Sell," or "Hold" recommendations specifically for ASR Nederland, a leading entity in the insurance sector. The primary objective of this system is to aid investors in making well-informed decisions by automating the investment advice process, which traditionally requires extensive expert analysis.

The focus of this project is twofold: Firstly, to provide a deep, data-driven analysis of ASR Nederland, thereby offering specific insights into a key player in the insurance industry. Secondly, to explore and demonstrate the potential of AI and machine learning in the realm of investment analysis, a domain where these technologies have begun to play an increasingly significant role.

Domain understanding

Scope and Objectives

Scope

- The project will exclusively look at ASR Nederland, a major player in the insurance sector.
- The analysis will be contextualized within the insurance sector, considering sector-specific challenges, opportunities, and trends that could impact ASR Nederland's performance.
- The project is designed for academic or research purposes, and its outcomes are intended to demonstrate the potential of AI in investment analysis rather than serve as actual investment advice.
- The project will have a defined time frame of 2 weeks, which could influence the extent of data analysis and the depth of the AI model development.

Objectives

To develop a "Fundamental Analysis Rating" that predicts "Buy", "Sell," or "Hold" for ASR Nederland, aiding investors in making informed decisions. By analysing existing data, the project seeks to automate investment advice traditionally requiring expert analysis, increasing accessibility and efficiency in investment decision-making.

Primary Stakeholder

Our stakeholder is a 23 year old male who works fulltime. He finished his study in woodworking.

Due to working fulltime he has money available to invest in the market.

Domain Context and Problem Statement

Domain Context

The domain of this project lies at the intersection of finance, specifically investment analysis in the insurance sector, and artificial intelligence. The insurance industry, characterized by its complex financial structures and susceptibility to various market and economic factors, presents a unique challenge for investment analysis. ASR Nederland, as a prominent player in this sector, serves as an ideal subject for a nuanced study of these challenges.

Traditionally, investment analysis in the insurance sector requires a deep understanding of specific financial metrics, regulatory impacts, risk assessment, and market trends. This industry's complexity necessitates expert knowledge and experience, often making investment advice inaccessible or overwhelming for average investors.

With the advent of AI and machine learning, there is a growing potential to transform this traditionally expertise-driven process into an automated, data-driven system. These technologies offer new ways to analyse vast amounts of financial data, identify patterns, and predict market trends with a level of efficiency and precision that is difficult to achieve through manual analysis.

Problem Statement

The primary challenge addressed in this project is the development of an AI-driven "Fundamental Analysis Rating" system capable of providing accurate investment recommendations (Buy, Sell, Hold) for ASR Nederland. The system aims to automate the complex process of investment analysis in the insurance sector, making it more accessible and efficient for investors.

Currently, investment decision-making, especially in the insurance sector, relies heavily on the expertise of financial analysts, which can be a barrier for investors without such resources. Now they would have to wait until the analyst consensus is formed. Additionally, the volume and complexity of financial data pertaining to insurance companies like ASR Nederland require sophisticated analysis methods to extract meaningful insights.

There is a significant opportunity to employ AI and machine learning techniques to meet these challenges. However, the application of these technologies in the context of insurance investment analysis is not without its difficulties. The system must accurately interpret and analyse industry-specific financial indicators and market trends while also being adaptive to the dynamic nature of the financial markets.

This project, therefore, seeks to address these challenges by developing an AI model that not only simplifies investment analysis for ASR Nederland but also provides a blueprint for applying AI in the broader field of insurance investment decision-making.

Main Research Question

How can we effectively provide investment recommendations (Buy, Sell, Hold) for ASR Netherlands?

Sub-Questions

What are the standard methodologies and criteria used by analysts for making investment recommendations?

Introduction to Literature study: This question aims to explore the methodologies and criteria investment analysts use for making stock recommendations. The focus is on understanding these practices as they apply to real-world investment analysis, with an emphasis on sources that provide clear, industry-standard insights.

Databases and Search Engines Used: For this question, the following resources were explored:
- Google: Utilized for initial broad searches to identify relevant sources on financial analysis and investment recommendation methodologies.
- Fontys Library: Searched for academic and professional literature related to investment analysis techniques. While this resource was explored, it did not yield relevant information for the specific focus of this study.
- Investopedia: Identified as the primary and most relevant source due to its comprehensive coverage and reliability on financial topics, and it became the main reference point for this study.

Search Process: Initially, a broad search was conducted using Google and the Fontys Library database. Search terms included "how investment analysis", "how analyst consensus" and similar phrases. Investopedia emerged as the most relevant and trustworthy source, leading to a focused exploration of its content. This approach ensures a transparent and replicable research methodology, focusing on the most relevant and reliable source identified

– Investopedia. The emphasis on this single, comprehensive resource is based on its recognized industry authority and the depth of information it provides on financial analysis methodologies.

Based on the comprehensive analysis in Investopedia articles by Julia Kagan and Kristina Zucchi, the standard methodologies and criteria used by analysts for making investment recommendations are multifaceted and involve several layers of financial analysis.

From Julia Kagan's Article on Analyst Expectations:

- Analyst Expectations: Analysts issue expectations about a company's stock performance, often in the form of buy, sell, or hold recommendations. These are based on a thorough analysis of the company's financial situation and comparisons with industry peers and competitors.
- Methodology of Creating Expectations: Analysts gather information from diverse sources, including direct interactions with the company's management and industry-specific research. They then create models that incorporate this data, reflecting their judgment or expectation of the company's financial performance for the upcoming quarter.
- Consensus Expectation: Rather than relying on a single analyst's expectation, investment decisions are often based on the average of all expectations from multiple analysts covering the stock, known as the consensus expectation. This consensus is considered more reliable due to the variance in methods, assumptions, and inputs used by different analysts.

From Kristina Zucchi's Article on Forecasting Revenue and Growth:

- Forecasting Techniques: Analysts forecast revenue and growth by collecting quantitative data from the company, industry, and consumer sources, alongside more subjective determinations.
- Modeling Revenue: Financial statements and industry data inform analysts about current market conditions and potential market size. Forecasts are made by considering variables like inventory levels, average price-per-unit, and expected unit sales.
- Determining Growth Projections: Analysts apply growth rates to projected revenue, considering factors like market penetration, competition, and product demand.
- Valuation Implications: These forecasts are crucial for valuing stocks. Analysts assess how well a company can convert revenue growth into earnings, influencing the valuation multiples the market is willing to pay for the stock.

What are the key financial and operational indicators critical to evaluating an insurance company like ASR Netherlands?

<u>Introduction to Literature study:</u> This segment of the study focuses on identifying the key financial and operational indicators crucial for evaluating an insurance company, specifically ASR Netherlands. The goal is to comprehend the metrics and indicators that are most telling of an insurance company's performance and potential for investment.

<u>Databases and Search Engines Used:</u> For this question, the following resources were explored:
- Google: Utilized for conducting broad searches to find information on financial and operational indicators specific to the insurance sector.
- Fontys Library: Searched for academic literature, including journals and industry reports, pertinent to insurance company evaluation. Although this source was explored, it did not provide specific information directly applicable to ASR Netherlands.
- Investopedia: Employed as a primary source for its accessible and detailed content

<u>Search Process:</u> Initially, a broad search was conducted using Google and the Fontys Library database. Search terms included "evaluating insurance company", "evaluating insurance " and similar phrases. Investopedia emerged as the most useful and trustworthy source, leading to a focused exploration of its content. This approach ensures a transparent and replicable research methodology, focusing on the most relevant and reliable source identified

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Summary from Ryan Fuhrmann's article (Fuhrmann, 2021):

<u>Insurance Business Basics:</u> The core of an insurance company's operation involves pooling together premiums to offset the risk of loss in various domains like health, life, property, casualty, and specialty lines. Key to an insurer's success is estimating future insurance claims and setting premiums to cover these claims and ensure profitability.

<u>Investment Portfolios:</u> Insurers manage investment portfolios funded by profits (such as earned premiums) and premiums before they are paid out as claims. The concept of 'float' is crucial, where premiums are received before losses are paid, and during this time, the insurer invests the money.

Valuation Metrics:

- <u>Price to Book (P/B) Ratio:</u> This is a primary valuation measure that relates the insurance firm's stock price to its book value. Book value, or shareholders' equity, is indicative of a firm's value if it were liquidated. A P/B ratio of 1 or lower is generally considered favorable for buying, while a ratio of 2 or higher is deemed pricey.

- <u>Return on Equity (ROE):</u> This measures the income level an insurance firm is generating as a percentage of shareholder's equity. An ROE around 10% is indicative of a firm covering its cost of capital and generating a satisfactory return for shareholders.

- <u>Other Comprehensive Income (OCI):</u> OCI on the balance sheet shows the impact of the investment portfolio on profits and gives a clearer indication of unrealized investment gains and changes in equity.

- <u>Combined Ratio:</u> This measures incurred losses and expenses as a percentage of earned premiums. A ratio below 100% suggests an operating profit, while above 100% indicates a loss on insurance operations.

Specific Industry Valuation Metrics:

The article also suggests considering metrics like premium growth potential, potential for new product introduction, projected combined ratios, and expected payout of future reserves alongside associated investment income.

Discounted Cash Flow (DCF): While DCF can be used to value an insurance firm, it is noted to be less valuable due to the difficulty in gauging cash flow, influenced by the investment portfolio and insurance operations.

The article provides an example using **MetLife** (NYSE:MET) and **China Life Insurance Co.** (NYSE:LFC), showcasing how these metrics are applied in practical valuation scenarios.

> *'MetLife's ROE has only averaged 6.84% over the last ten years and 2017 was a difficult year that they have recovered from. This was below the industry average of 9.43% during this period, but MetLife's ratio is projected to reach 12% to 14% over the near-term. China Life's ten year average ROE is currently 10.78%, and Prudential's is 0.57%. MetLife is currently trading at a P/B of 0.5, which is below the industry average of 0.91. China Life's P/B is 1.32, and Prudential's is 1.68.'*

Based on this they (Fuhrmann, 2021) state that MetLife is a reasonable bet. Here is their explanation on this.

> *'Its ROE is returning to double digits and is above the industry average. Its P/B is also below 1, which is generally a good entry point for investors based on historical P/B trends. MetLife has higher ROE than Prudential but less than China Life, and both P/B are much higher. This is where it becomes important to dig deeper into each firm' financial statements. OCI is important in investigating the investment portfolios, and analyzing growth trends will be needed to decide if paying a higher P/B multiple is warranted. If these firms outgrow the industry, they could be worth paying a premium.'*

What are the typical market and economic factors that significantly impact the insurance sector

Conclusion

Data sourcing

1. **Define Objectives:**
   - The primary objective of this project is to gather data to predict the upcoming analyst consensus as 'buy', 'sell' or 'hold' for the insurance company ASR Netherlands.

2. **Data Characteristics:** Determine the type and volume of data needed for evaluating ASR Netherlands:
   - **Financial Report Data:** Detailed structured data from annual and quarterly reports covering at least the past 3 years, to understand long-term financial health.
   - **Market Performance Data:** Structured numerical data on ASR Netherlands' stock performance, including historical stock prices and trading volumes, synchronized with financial report data.
   - **Industry-Specific Metrics Data:** Structured data covering key insurance metrics like premium growth, combined ratios, and return on equity (ROE), ideally for the same period as financial reports.
   - **Investment Portfolio Data:** Structured data detailing 'float', other comprehensive income (OCI), and investment strategies, synchronized with financial report periods.
   - **Valuation Metrics Data:** Structured data on price to book (P/B) ratio and ROE, compared with industry benchmarks and peers, to assess market valuation.
   - **Regulatory and Compliance Data:** Textual and tabular data from regulatory filings, detailing compliance, risk factors, and other legal considerations impacting ASR Netherlands.
   - **Analyst Consensus Data:** Structured data reflecting the consensus of financial analysts on ASR Netherlands' stock, including buy, sell, or hold recommendations. This data should be collected periodically to capture the market sentiment and analyst opinions.

3. **Data Sources:** The data for this project is sourced from:
   - **Company Publications:** Direct from ASR Netherlands (annual and quarterly reports).
   - **Financial Databases:** Bloomberg, Reuters, Yahoo Finance.
   - **Industry Reports:** For insurance sector-specific insights.

4. **Data Legality and Ethics:** To adhere to legal and ethical standards:
    a. **Legal compliance**
        - **Financial Data Regulations:** Adhere to regulations governing financial data, such as the EU's Markets in Financial Instruments Directive (MiFID II), ensuring that all financial data used, especially sensitive information, complies with legal standards.
        - **Public Disclosure Requirements:** Utilize only the data that ASR Netherlands has disclosed publicly in compliance with stock exchange regulations and financial reporting standards.
        - **Data Access Permissions:** In cases where data access requires permissions (e.g., subscription databases, internal data), ensure that all licensing agreements and terms of use are adhered to, avoiding any unauthorized use of proprietary data.

    b. **Ethical considerations**
        - **Data Integrity:** Maintain the integrity of financial data by avoiding manipulation or misrepresentation of data in analysis. This includes accurate representation of financial statements and analyst consensus without bias.
        - **Transparency in Data Use:** Be transparent about the source of data, especially when using analyst consensus, and clarify that the data is used for research and educational purposes, not for influencing market decisions or offering financial advice.
        - **Respecting Intellectual Property:** Acknowledge the intellectual property rights of the data sources, giving proper credit to agencies, databases, and authors of reports, especially when using specific methodologies or proprietary models.
        - **Confidentiality and Anonymity:** If engaging with insiders or experts for qualitative insights, ensure confidentiality and anonymity where requested, respecting the privacy of individuals involved.
        - **Conflict of Interest Disclosure:** Disclose any potential conflicts of interest, such as personal investments in ASR Netherlands, to maintain transparency and objectivity in research.

5. **Data Diversity:** The project aims for a diverse set of data:
   - A mix of quantitative and qualitative data, including both financial metrics and subjective analyst insights.
   - Comparison with industry peers for a broad market perspective.

6. **Version Control:** A systematic version control approach:
   - **File Naming Convention**: Reflecting the date of data collection as year, month and day. Whilst also stating the content of the file.
   - **Data Tracking**: Data will be stored locally with a planned use of tools like Git for change history, enhancing data preparation transparency and reproducibility.

7. **Iterative Process:** The data sourcing strategy is iterative:
   - **Performance Monitoring**: Regular evaluation using current data to assess model performance.
   - **Data Updates**: Monthly updates with new financial information and analyst reports to maintain model accuracy and relevance.

Analytical Approach

- **Target Variable Identification:**

The primary focus of this project is to predict the 'Analyst Consensus' for ASR Netherlands. This consensus, usually categorized as "Buy", "Sell," or "Hold" recommendations, will be predicted based on various financial and operational indicators. The inclusion of industry-specific metrics like P/B ratio, ROE, and Combined Ratio is expected to enhance the model's accuracy in reflecting the analysts' consensus.

- **Nature of the Problem:**

This project is essentially a classification problem, where the goal is to categorize the target variable, 'Analyst Consensus,' into one of the 5 categories: Buy, Outperform, Hold, Underperform or Sell. The use of financial indicators and market performance data underscores the classification nature of the problem, as these factors are indicative of the stock's potential performance.

- **Selection of Indicators:**

Our approach includes conducting research to identify key predictors for the 'Analyst Consensus'. This will involve assessing how various financial metrics and market trends correlate with analyst recommendations. Indicators such as financial performance, market trends, and investment portfolio health will be crucial in this analysis.

- **Algorithm Selection and Refinement:**

Given the nature of the problem as a classification task, we will explore algorithms suited for categorical prediction. Potential algorithms include Logistic Regression for its simplicity and interpretability, Decision Trees for handling nonlinear relationships, and Random Forests for improved accuracy and handling of overfitting. We will also consider Ensemble Methods to enhance prediction robustness.

- **Iterative Refinement:**

The project will adopt an iterative model refinement approach. With each iteration, we will incorporate feedback and new insights, particularly focusing on the integration and impact of different financial indicators on the prediction of the analyst consensus. Continuous evaluation and refinement of the model will be key to improving its predictive accuracy.

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