\mainmatter%

# \chapter{Introduction}\label{chap:introduction}

## \section{Motivation } 3 pages

-> Context or domain of your focus: Introduction to financial markets, importance of financial markets

-> Problem or challenge or open issue of the context you are going to address many want to get rich quick, unprecedented chasing of success, growingly impatient humanity, high frequency trading

* How to find appropriate qualitative measures for calculating intrinsic value?
* Build a machine learning model to find patterns of undervalued stocks
* Evaluate the success of the model within a certain fixed time frame

-> Research questions and goals:

Research questions:

* Can a machine learning model based on qualitative and quantitative fundamental company data reliably and accurately predict the intrinsic value of a company?
* Can the identified undervalued stocks be used to consistently beat the market and thus disprove the efficient market theorem?

Goals:

* Examine appropriate ML approaches for creating the basis for value investing
* Determine features to calculate intrinsic value of a company
* Evaluate the calculation within a fixed number of years focusing on returns
* Find undervalued companies whose stock prices are going to rise higher than the benchmark index

The goal of this thesis is it to discover the possibilities of automating the value investing approach. Fundamental company data will be used to calculate the intrinsic value and will hold as a basis for determining if a stock is worth buying now. The aim is to beat the Vanguard FTSE All-World High Dividend Yield Index, which would be the author's alternative choice of investing money. The second approach is considered as passive investing, only putting money on a regular basis into a low-cost index fund. Backpropagation will be used to train and evaluate the model on past and current data.

It is of utmost importance for the model to perform well over long period of time, i.e. constantly over several years. Short-term success is mostly luck and cannot often not be reproduced. The thesis will not cover any technical analysis for speculative short-term predictions of stock movements. The results of the model will be evaluated on a yearly basis.

\section{State of the art} 3 pages

Most relevant state of the art/state of practice

Mention what is done by *Firstauthorlastname et al.* and what is needed to be done

If needed you can refer to multiple related works

* High frequency trading focused on short-term price movements
* Only few approaches to long-term value investing
* Qualitative company evaluation parameters difficult to determine and translate for machines

\section{Background} 2 pages

Background knowledge needed to understand your mode: What the model is going to do (find undervalued stocks, predict intrinsic value, evaluate feature importance)

Briefly describe the methods that will be used in your model: Random Forest for feature importance (data mining), possible neural network for backtesting/adjusting the weights of the input features

\section{Model} 2 pages

Describe how your model or approach will work: Random Forests, neural networks

Add a diagram about the model so that it helps audience to understand how it will work

\section{Experimental Setup/Implementation} 2 pages

This slide can be one of the two types: experimental setup for data science or implementation details for tool development

Experimental Setup:

Plan -> how you will setup your experiment: where do I get my data from? Pipeline of implementation

Optional -> if needed describe how you will define threshold

Implementation details:

Plan -> how you will develop the tool

\section{Evaluation Plan} 2 pages

Plan -> how you will evaluate the developed tool or the model: backtesting, buy stocks and compare prize after certain time, check performance, compare to benchmark

\section{Conclusion/Summary} 1 page

Mention what will be the potential contribution of your thesis: stable, secure investment opportunities, stay safe from inflation, beat the market

Repeat how the research questions will be answered and/or how your research goals will be achieved: Neural Network fed with fundamental and qualitative data of a company to predict intrinsic value and thus find undervalued stocks

Beat the market in the long run by finding good investment opportunities and buy the most promising stocks (stock picking, market timing).