

# FOREX Trend Classification using Machine Learning Techniques

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**Abstract :-** Foreign Currency Exchange market (Forex) is a highly volatile complex time series for which predicting the daily trend is a challenging problem. In this paper, we investigate the prediction of the High exchange rate daily trend as a binary classification problem, with uptrend and downtrend outcomes. A large number of basic features driven from the time series data, including technical analysis features are generated using multiple history time windows. Various feature selection and feature extraction techniques are used to find best subsets for the classification problem. Machine learning systems are tested for each feature subset and results are analyzed. Four important Forex currency pairs are investigated and the results show consistent success in the daily prediction and in the expected profit.

**Keywords:** - Technical analysis, Feature selection, Feature extraction, Machine-learning techniques, Bagging Trees, SVM, Forex prediction.

## 1 Introduction

This paper is about predicting the Foreign Exchange (Forex) market trend using classification and machine learning techniques for the sake of gaining long-term profits. Our trading strategy is to take one action per day, where this action is either buy or sell based on the prediction we have. We view the prediction problem as a binary classification task, thus we are not trying to predict the actual exchange rate value between two currencies, but rather, if that exchange rate is going to rise or fall. Each day there are four observed rates, namely, the "Open", "Close", "Low" and "High". In this work, we focus on predicting the direction of the "High".

Forex daily exchange rate values can be seen as a time series data and all time series data forecasting and data mining techniques can be used to do the required classification task.

In time series analysis, it is always a challenge to determine the required history window used by the classification or forecasting system to do its prediction. In this paper, we have taken an approach of providing features from multiple time windows ranging from one day up to 30 days. This of course results in a number of features larger than using a single time window. Processing of the raw time domain daily values is done to produce the basic features used in the feature selection and extraction steps. This processing involves calculation of technical analysis and other time and frequency domain features over multiple time windows with a total of 81 basic features. Our approach is to let feature selection and feature extraction techniques find the best set of features for the classification task. Feature selection techniques choose a subset of the basic features while feature extraction techniques find features in new projected spaces. In this paper, two feature selection and six feature extraction techniques are used which all aim at finding feature subsets to enhance the classification performance.

For each feature subset, three supervised machine learning classifiers are used, namely, radial basis function neural network (RBF), multilayer perceptron neural network (MLP) and support vector machine (SVM). This gives a large array of different feature subsets and different classifiers. Comparison between these different systems is done based on two factors. The first is the percentage classification performance on the test data. The second is a novel function we call the percentage normalized profit (PNP), which represents the ratio between the accumulated profits using the predicted trends versus the accumulated profit using perfect predictions along the duration of the test period. We have selected four Forex pairs which are namely the USD/YEN, USD/EGP, EURO/EGP and EURO/SAR (where EGP is the Egyptian pound and SAR is the Saudi Riyal). The remaining of this paper is organized as follows. Section 2 discusses the nature of the Forex data, and the most prominent approaches used in the literature

# Forex Trend Classification Using Machine Learning Techniques

**Joacim Rocklöv**



## **Forex Trend Classification Using Machine Learning Techniques:**

**Second International Conference on Sustainable Technologies for Computational Intelligence** Ashish Kumar Luhach, Ramesh Chandra Poonia, Xiao-Zhi Gao, Dharm Singh Jat, 2021-10-18 This book gathers high quality papers presented at the Second International Conference on Sustainable Technologies for Computational Intelligence ICTSCI 2021 held at Graphic Era University Dehradun India during May 22-23 2021 It covers emerging topics in computational intelligence and effective strategies for its implementation in engineering applications

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*Artificial Intelligence Based Smart and Secured Applications* Sridaran Rajagopal, Kalpesh Popat, Divyakant Meva, Sunil Bajeja, Pankaj Mudholkar, 2025-04-22 The six volume set CCIS 2424-2429 constitutes the refereed proceedings of the Third International Conference on Advances in Smart Computing and Information Security ASCIS 2024 held in Rajkot Gujarat India in October 16-18 2024 The 138 full papers and 43 short papers presented in these six volumes were carefully reviewed and selected from 667 submissions The papers presented in these six volumes are organized in the following topical sections Part I II III IV Artificial Intelligence Network and Cloud Computing Part VI Cyber Security Computer Application for Sustainability

**Forex Trend Classification by Machine Learning** Areej A. Baasher, Mohamed W. Fakhr, 2016-11-17

**Digital Transformation and Sustainability of Business** Sai Kiran Oruganti, Dimitrios Karras, Srinesh Thakur, Janapati Krishna Chaithanya, Sukanya Metta, Amit Lathigara, 2025-05-20 It explores the integration of digital technologies into business models offering innovative approaches

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**Machine Learning Algorithms** Meenu Khurana,Abhishek Thakur,Praveen Kantha,Chin-Shiuh Shieh,Rajesh K. Shukla,2024-11-11 This book constitutes the refereed proceedings of the First International Conference on Machine Learning Algorithms ICMLA 2024 held in Himachal Pradesh India during February 23 24 2024 The 23 full papers and 17 short papers included in this book were carefully reviewed and selected from 400 submissions They were organized in the following topical sections machine learning image processing deep learning

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*Current Index to Journals in Education* ,1972 *Estimating Directional Changes Trend Reversal in Forex Using Machine Learning* Adesola Tolulope Noah Adegboye,2022 [Forex Trend Trading](#) Abraham Robert C,2023-11-09 Forex Trend Trading A Practical Guide to Master the Art of Trend Trading for Long Term Consistent Profit renowned trader and expert strategist Abrahama Robert C shares invaluable insights and proven techniques to help you navigate the ever changing world of forex trading Whether you re a novice trader seeking to enhance your skills or an experienced investor looking for a reliable method to generate consistent profit this comprehensive guide is your ultimate resource Packed with real life examples step by step instructions and practical tips it equips you with the tools necessary to identify and capitalize on lucrative trends in the forex market From understanding market dynamics to recognizing patterns Abrahama Robert C unveils the secrets of successful trend trading With a clear focus on long term profitability this book provides you with a strategic framework designed to minimize risk while maximizing your potential gains By mastering the art of trend trading you ll be able to spot profitable opportunities time your entries and exits effectively and build a solid foundation for sustainable success Unleash your trading potential by acquiring the knowledge and skills needed to thrive in the fast paced world of forex trading With [Forex Trend Trading](#) you ll gain an edge over other traders ensuring your journey towards consistent profit becomes a reality So whether you re new to the forex market or a seasoned trader searching for innovative strategies dive into this practical guide and revolutionize your trading approach today [Trend Following Strategies in Forex - Maximizing Profit Potential](#)

Robert Carey,2023-11-21 In the dynamic world of Forex trading where market conditions are ever changing and opportunities arise amidst volatility adopting effective strategies becomes paramount for traders seeking to maximize profit potential One such approach that has gained prominence for its adaptability and potential for substantial gains is trend following In this comprehensive guide we will delve into the principles techniques and nuances of Trend Following Strategies in Forex with a singular focus on unlocking and maximizing profit potential Overview of Trend Following in Forex Trend following is not merely a trading strategy it is a mindset a systematic approach that seeks to capitalize on sustained market trends Rather than attempting to predict market directions trend followers aim to identify existing trends and align their positions accordingly By riding the momentum of trends traders employing this strategy seek to extract the maximum profit potential offered by extended market movements Importance of Maximizing Profit Potential In the vast and liquid Forex market the ability to maximize profit potential is a key factor that separates successful traders from the rest Trend following strategies when executed with precision provide traders with the tools to not only identify profitable trends but also to stay invested in those trends as they develop over time This guide will explore the fundamental principles technical tools and strategic considerations that empower traders to not only follow trends but to extract the full profit potential from these trends As we embark on this exploration of Trend Following Strategies in Forex we will delve into the intricacies of technical analysis the art of building a robust trend following plan and the tactical use of advanced tools and technology Real life case studies will illuminate successful trades providing tangible examples of how trend following can be a lucrative endeavor Additionally we will scrutinize mistakes and pitfalls to fortify traders against potential setbacks By the end of this guide traders will gain a comprehensive understanding of trend following as a dynamic and profitable strategy in Forex The insights shared herein will equip traders with the knowledge and tools needed to navigate the markets identify trends and most importantly maximize profit potential in their pursuit of success in the ever evolving Forex landscape

**Emerging Trends in Forex Trading Professional Level** CPA John Kimani ,Dr. James Scott ,2023-06-26 Algorithmic Trading Social Trading Machine Learning in Forex Trading Cryptocurrency Trading High Frequency Trading Artificial Intelligence in Forex Tradi Trading Psychology Risk Management in Forex Trading [Forex Trend Following Strategies: How to Make Big Gains with Low Risk Currency Trading](#) Thomas Carter,2014-11-26 Forex trend following offers you the opportunity to lock into the trends that can make triple digit profits but while it looks easy it is not and you wouldn t expect it to be with the rewards on offer but if you can master it then you can enjoy spectacular success Trend following is an investment strategy that tries to take advantage of long term moves that seem to play out in various markets The strategy aims to work on the market trend mechanism and take benefit from both sides of the market enjoying the profits from the ups and downs of the financial markets Traders who use this approach can use current market price calculation moving averages and channel breakouts to determine the general direction of the market and to generate trade signals Traders who employ a trend following strategy

do not aim to forecast or predict specific price levels they simply jump on the trend and ride it This book will show you 20 Forex Trend Following Strategies that will help you in catching small and big trend in the market     **Mastering the Supertrend by Lalit Mohanty** Lalit Prasad Mohanty,2023-12-05 Mastering the Supertrend by Lalit Mohanty Chapter 1 Understanding the Basics Introduction to Technical Analysis Role of Indicators in Trading Introduction to the Supertrend Indicator Calculation and Components Chapter 2 Types of Supertrend Indicators ATR Based Supertrend Heiken Ashi Supertrend MACD Supertrend Multi Timeframe Supertrend Chapter 3 Setting Up Your Trading Platform Installing and Configuring the Supertrend Indicator Customizing Parameters for Different Securities Choosing the Right Timeframe Chapter 4 Interpreting Supertrend Signals Identifying Buy and Sell Signals Signal Confirmation Techniques Filtering False Signals Chapter 5 Backtesting Strategies Importance of Backtesting Building a Backtesting Framework Analyzing Results and Refining Strategies Chapter 6 Developing a Trading Plan Defining Risk Tolerance Setting Profit Targets Incorporating Supertrend into Your Trading Plan Chapter 7 Advanced Supertrend Strategies Combining Supertrend with Other Indicators Adaptive Supertrend Strategies Trend Reversal Strategies Chapter 8 Real Life Case Studies Walkthroughs of Successful Trades Learning from Mistakes and Losses Adapting Strategies to Market Conditions Chapter 9 Risk Management and Position Sizing Importance of Risk Management Position Sizing Techniques Adjusting Position Sizes Based on Volatility Chapter 10 Psychological Aspects of Trading Dealing with Greed and Fear Maintaining Discipline in Trading Building Confidence in Your Trading System Chapter 11 Building a Trading Routine Daily Weekly and Monthly Routines Reviewing and Adapting Your Trading Plan Continuous Learning and Improvement

## Decoding **Forex Trend Classification Using Machine Learning Techniques**: Revealing the Captivating Potential of Verbal Expression

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web the control circuit is based on a cmos inverter ic1 type 40106 the motor is switched by a darlington with discrete components t1 t2 ic1a inverter operates as an oscillator whose duty cycle the t2 leads so the motor receives energy is determined by r2 c2 d3 gave the inactive signal oscillator when t2 is blocked is determined by r3 p1

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web three phase brushless dc 3 motor 2 brush dc motor 4 bipolar stepper motor basic principle an electric motor is a device converting electrical energy into mechanical energy generally a torque this conversion is usually obtained through the generation of a magnetic field by means of a current flowing into one or more coils electrical energy

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web the diagram below has two components the normally open temperature switch and the magnetic contactor the three normally closed contacts that represent the olr protection are connected in series with the motor coil and so can be treated as a single device in practice a motor starter often only has two external connection points and all internal

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web ically when voltage returns the control circuit is completed through the stop button and also a holding contact 2 3 on the starter when starter drops out this contact opens breaking the control circuit until the start button is pressed once again l3 t3 t

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web jun 2 2002 hobby circuit designed by david johnson p e february 2010 12v pwm motor light controller the diagrams are for 12v operation only and there are high side common ground and low side common 12v versions the low side version of the circuit uses an n channel fet the high side version of the circuit uses a p channel fet

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