CONVOLUTIONAL NEURAL NETWORK-BASED FOREX MARKET PREDICTION USING A DIVERSE SET OF VARIABLES

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INTRODUCTION

Deep learning is a powerful method for resolving picture recognition issues. People make intuitive judgments from trading charts; this work employs deep learning features to train computers to imitate this type of intuition in the context of trading charts. [1]

The foreign exchange market specifically is a global decentralized over the counter for the buying and selling of different currencies. This market decides foreign exchange rates for every currency. Financial markets are the beating heart of the global economy, with billions of dollars changing hands every day. A solid forecast of market behavior in the future would be incredibly useful in a variety of situations. [2]

To predict market moves and analyze patterns, traders utilize one of three methods of forex analysis. They are:

1. Fundamental Analysis
   The process of dissecting the impact of political, economic, and social factors on the relative value of a currency is known as fundamental analysis. Forex traders can make well-informed trading decisions by identifying the major drivers of a currency's inherent value. [3]

2. Technical Analysis

   Technical analysis is a set of strategies for predicting future price movements of financial items based on previous price patterns and movements. [4]

3. Sentimental Analysis

   Sentimental analysis is used to determine how other traders feel about a certain currency pair or the wider currency market. [5]

A Convolutional Neural Network also known as CNN is a type of artificial neural network used to interpret visual imagery in deep learning. [6]

The following are the two main arguments for using a CNN model to forecast currency movements:

1. CNN models excel at recognizing patterns such as lines in photos. This property should be able to detect the trend of trading charts as well.
2. CNN's can recognize links between images that people are unable to detect, and the structure of neural networks can aid in the detection of complex interactions between features. [1]

PROBLEM STATEMENT

Forex trading can be a time-consuming and tedious process. Keeping track of factors that influence the market is a daunting task and successful traders find that they don't have time for much else.

In today's financial markets, where the vast majority of deals are completed entirely by electronic methods and the greater part of them are completely automated, evaluating this massive amount of data has become an opportunity. Investors can evaluate all of the generated data and find repeating patterns of price movements because all transactions are meticulously recorded. They can take successful positions or avoid abnormal events in the financial markets if they can spot them ahead of time. [7]

AIM & OBJECTIVES

AIM

The goal is simple, to predict the next day's direction of the forex market (i.e, up or down compared to today), as a result, it's a binary classification issue. However, it will be fascinating to observe how this issue can be solved.

OBJECTIVES

My main objectives are:

1. Pre-process the incoming data to convert it from quantitative to visual form.
2. Our trading model is trained using a convolutional neural network (CNN), a sort of deep learning.
3. We assess the quality of the model in terms of accuracy.

PROJECT JUSTIFICATION

In today's financial markets, where the vast majority of deals are completed entirely by electronic methods and the greater part of them are completely automated, evaluating this massive amount of data has become an opportunity. Investors can evaluate all of the generated data and find repeating patterns of price movements because all transactions are meticulously recorded. They can take

successful positions or avoid abnormal events in the financial markets if they can spot them ahead of time [7], this is achievable with the use of artificial intelligence.

SCOPE AND LIMITATIONS

Scope

The goal of this research is to provide traders with a better understanding of market trends so they can make better judgments, not entirely replace human analysis.

Limitations

1. It is always impractical to assume high accuracy in financial market prediction projects, as it is in other prediction efforts.
2. This a project that traders may find very useful, however, no miracle can help you make money quickly.

LITERATURE REVIEW

Algorithmic Financial Trading with Deep Convolutional Neural Networks: Time Series to Image Conversion Approach

In this paper, they present CNN-TA, a novel algorithmic trading model based on image processing properties that use a 2-D Convolutional Neural Network. 15 different technical indicators with varied parameter settings are used to convert financial time series into 2-D visuals. Data is generated for 15 days by each indicator instance. As a result, 2-D images of the size 15x15 are created. Each Depending on the original's hills and valleys, the image is then labeled as Buy, Sell, or Hold. A sequence of events When compared to the Buy & Hold Strategy and the Buy & Sell Strategy, the results show that in other widely used trading platforms The trained model outperforms the untrained model over an extended out-of-sample time.

Financial Time-series Data Analysis using Deep Convolutional Neural Networks

This research proposes a new financial time-series analysis method based on deep learning techniques. They focus on time series data processing and prediction in financial markets in this research. The most important contribution this paper has is to improve algorithmic trading.

CNN-based stock market prediction using a diverse set of variables

They propose a CNN-based framework in this research that may be used to analyze data from a range of sources, including different markets. To identify traits that can be used to forecast the future of such markets, the proposed framework has been used to forecast the direction of the next day's weather, movement of the S&P 500, NASDAQ, DJI, NYSE, and RUSSELL indexes based on a variety of starting variables When compared to the state-of-the-art baseline, the evaluations demonstrate a considerable improvement in prediction performance.

## Predicting Financial Prices of Stock Market using Recurrent Convolutional Neural Networks

In this research, they suggest combining architectures for the trading signal prediction that take advantage of the advantages of both CNN and RNN at the same time. Their model is fundamentally fed into a gated recurrent unit (GRU) layer to capture long-term signal dependencies and presented

to financial time series forecasting signals via a CNN layer. The GRU model outperforms ordinary RNNs in sequential learning tasks and solves the vanishing gradients and exploding problem. They test their model on three datasets for stock indexes from the Hang Seng Indexes (HSI), the Deutscher Aktienindex (DAX), and the S&P 500 Index from 2008 to 2016, and compare it to existing deep learning methods. According to the results of the experiments, the suggested GRU-CNN model had the best prediction accuracy of 56.2 percent on the HIS dataset, 56.1 percent on the DAX dataset, and 56.3 percent on the S&P500 dataset.

RESEARCH METHODOLOGY

The waterfall model was employed in the System's development. The waterfall model has been discussed and its steps have been demonstrated above. This methodology is appropriate for the project at hand because the project's goal is to predict future prices of currency pairs, and each phase of the project focuses on a different goal and must be completed completely before moving on to the next.

DELIVERABLE AND EXPECTED OUTCOME
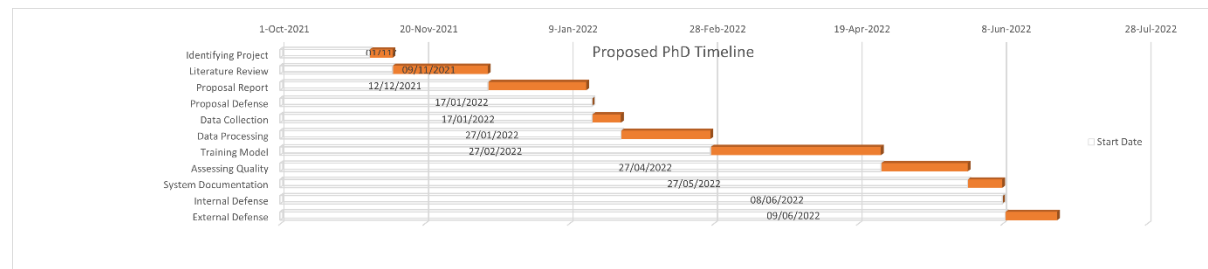
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