UNIVERSITY of GUELPH

COLLEGE of ENGINEERING AND PHYSICAL SCIENCES

SCHOOL OF COMPUTER SCIENCE

MSc Seminar

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Transformer based networks for
combinational fundamental-technical analysis of equity shares

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Abstract:

Transformer networks have largely captured the attention of many in recent years with impressive results in the field of natural language processing and more recently computer vision. The fundamental abstraction of the original transformer network is the self-attention mechanism, doing away with convolutions and recurrence, while being able to achieve superior performance. Additionally, the residual connections present in transformer blocks combat the exploding/vanishing gradient problem, enabling very deep networks with billions of parameters. Within the field of finance there exist two accepted approaches of analysis: fundamental and technical. Fundamental analysis focuses on economic conditions of the market and the finances of the company itself. Here, an analyst may judge the future price of a company's equity shares based on the Buffett Indicator or the company's specific P/E ratio. With technical analysis, historical patterns in price, volume, and open interest (open interest only with options) are used to project future prices. Rigorous research exists that demonstrates the data used in fundamental and technical analysis has predictive value that a neural network can utilize. Despite this, it is rare to see a combination of these analysis, which is an aim of this work.

Our previous work has enabled the development of a filtering algorithm and investing strategy that demonstrated an annual non-compounding alpha of 1.33% over a 17-year period from February 2005 to January 2022. This strategy involves rebalancing our portfolio on an annual basis. We aim to investigate the use of transformer networks considering time series fundamental and technical data to create one-year alpha predictions for US based equity shares. This work will enable ranking of equities to further refine our one-year portfolios, with the aim of outperforming our prior work. Given the limitations of the scale of our data, we expect to also perform rigorous hyperparameter search to achieve an optimal architecture for this task. Finally, through ablation studies we aim to study the importance of components in our system.