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Department of Electrical
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Master Thesis

Finetuning Diffusion Model on Bitcoin Dataset

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CYPRUS UNIVERSITY OF TECHNOLOGY

Faculty of Engineering and Technology

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ABSTRACT

Diffusion models like Stable Diffusion are currently State of the Art for generating images from text prompts. One of its most impressive capabilities is to synthesize highly realistic, high-quality, and detailed images that closely align with the given prompt. On a different front, there exist chart-based images that visually represent the price flow of financial assets over specific time frames. In this work, we focus on fine-tuning the Stable Diffusion XL (SDXL) model, which is the largest variant in the Stable Diffusion family that uses the diffuser framework on a custom dataset consisting of Bitcoin price charts and a description of the price flow. These charts represent various time frames and are labeled with descriptive prompts. Our goal is to evaluate how effectively SDXL can be adapted to this specialized task, which differs from the original training objective of the model. Specifically, synthesize a forecast chart based on the user's prompt that represents the future trajectory of the asset.

Keywords: Diffusion Models, Stable Diffusion XL (SDXL), Text-to-Image Generation, Transformers, Attention