Options Pricing using Machine Learning and Deep Learning

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Options pricing has always been an important mathematical problem in Quantitative Finance. Among the traditional models, the Black-Scholes-Metron (BSM) model was considered as one of the biggest breakthroughs. While the BSM model is widely popular, and has an appreciable accuracy, it makes certain assumptions [1].

With time, as the computational capabilities increased, and researchers set out to address the limitations of the BSM model and other traditional models, Machine Learning (ML), and now Deep Learning (DL), have been increasingly used to develop better options pricing models [2]. This is a relatively young domain, and there is a lot of scope in the field.

In this study, we explore the different existing ML/DL models used for options pricing. We attempt to create similar models using Python and associated libraries like TensorFlow, Keras, PyTorch, scikit-learn, other libraries, whichever applicable. We then proceed to analyze our results.

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References

[1] R. Culkin and S. R. Das, "Machine learning in finance : The case of deep learning for option pricing," 2017.

[2] A. Ke and A. Yang, "Option pricing with deep learning," 2019.