Recreating AI Models From Scratch

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Abstract

Transformer model [1]

1 Introduction

2 Machine Learning

2.1 Linear regression

2.2 Logistic regression

2.3 Decision Trees

2.4 Random Forest

2.5 XGBoost

3 Deep Learning

3.1 Convolutional Neural Network

3.2 Recurrent Neural Network

3.3 Generative Adversarial Network

3.4 Transformers

4 Experiments and Results

4.1 Linguistic Probing Tasks

4.2 Image Classification on CIFAR-10

4.3 Text Classification on IMDB

5 Conclusion

6 Future work

Since the main focus of this report was to start with recreating machine learning models like Random Forests, XGBoost and to then gradually continue to Deep Learning models, I made the

decision to leave Reinforcement Learning models for another time. In the future, I would like to explore Reinforcement Learning models such as Deep Q-Networks (DQN) [2] and Proximal Policy Optimization (PPO) [3].

7 Discussion

Acknowledgments

References

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[2] Volodymyr Mnih, Koray Kavukcuoglu, David Silver, Andrei A. Rusu, Joel Veness, Marc G. Bellemare, Alex Graves, Martin Riedmiller, Andreas K. Fidjeland, Georg Ostrovski, Stig Petersen, Charles Beattie, Amir Sadik, Ioannis Antonoglou, Helen King, Dharshan Kumaran, Daan Wierstra, Shane Legg, and Demis Hassabis. Human-level control through deep reinforcement learning. *Nature*, 518(7540):529–533, February 2015. doi: 10.1038/nature14236. URL https://doi.org/10.1038/nature14236.

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