**Report Summary**

This report compares several optimization algorithms used in neural network models, focusing on their loss and accuracy performance. The algorithms were tested in different neural network setups, and their implementations are available in Colab notebooks.

**Key Findings**

* Lion Optimizer: Demonstrated the highest accuracy (0.9888) and the lowest loss (0.0648) among the tested optimizers.
* Ftrl Optimizer: Showed the highest loss (2.0186) and the lowest accuracy (0.2109) compared to the other optimizers.
* Other Optimizers: The performance of RMSprop, Adam, Nadam, and AdamW optimizers fell between the Lion and Ftrl optimizers in terms of both loss and accuracy.

**Specific Model Performances**

| **Model Type** | **Loss** | **Accuracy** |
| --- | --- | --- |
| **RMSprop** | **1.3863** | **0.3695** |
| **ANN with Adam** | **1.631** | **0.3441** |
| **Nadam Optimizer** | **1.6265** | **0.3155** |
| **AdamW optimizer** | **1.5785** | **0.3305** |
| **Ftrl optimizer** | **2.0186** | **0.2109** |
| **Lion Optimizer** | **0.0648** | **0.9888** |

**Colab Notebooks**

The following Colab notebooks provide detailed implementations and experiments for each model:

* **Lion Optimizer: https://github.com/chelimallatejasai/Lion-Optimizer-/tree/main**

**Conclusion**

The Lion Optimizer appears to be the most effective among the tested algorithms for this specific neural network setup, achieving significantly higher accuracy and lower loss compared to the others. The Ftrl optimizer, on the other hand, showed the poorest performance. These results highlight the importance of selecting an appropriate optimization algorithm for neural network training.