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MACHINE LEARNING-BASED LINUX KERNEL HANDLER

This project seeks to offer a new solution to Operating System Page Handling, the subject of page handling has been around since the dawn of computing. This project attempts to bring the technology into the modern age using Machine Learning.

The Project outlines the problems facing current cache paging algorithms, and why the necessity for a modern approach is a must. There are several bottlenecks when it comes to computing, we have designated caching as a major bottleneck, which if solved may enhave computer performance by several magnitudes.

A major obstacle around our solution, was data extraction. The solution we used was cache flux tracing, based on uprobes and kprobes in the OS Linux. We did some basic data analysis to the information siphoned.

After gaining some insight through the analysis. We fed the data into two deep neural networks. A more shallow network and a deeper model. Each with its pros and cons, boiling down to power and computation consumption vs. accuracy.

The models received a page with multiple features about the system and the program running owning the page.

Where the output is a binary, TRUE/FALSE of whether the page will be accessed in the next timeframe. The timeframe is dictated by the training data. We trained our models for 20 second timeframes.

Results

- Shallow model Acc: **84.54%**

- Deeper model Acc: **87.91%**