Ethics and Professional Responsibility

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Client: Professor Cheng Wang
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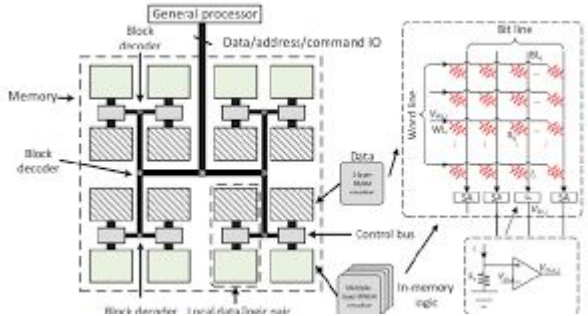
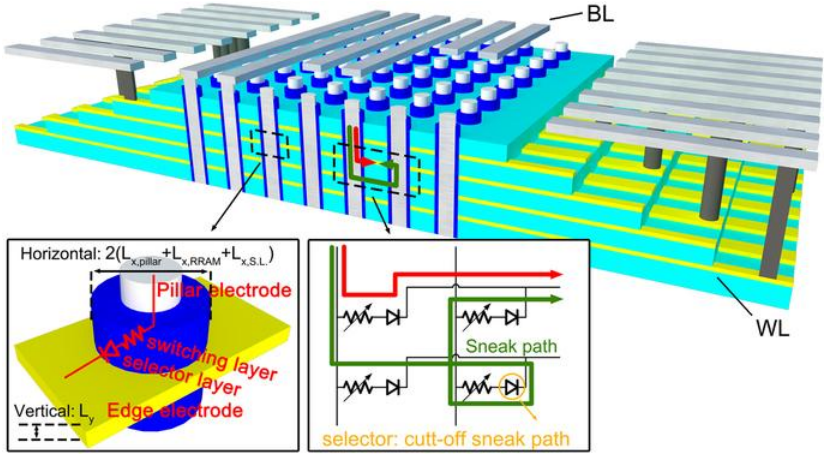
Project Overview

Our project focuses on creating a ReRAM-based compute-in-memory (CIM) test chip to improve matrix-vector multiplication efficiency in machine learning. Traditional CPUs struggle with the data bottleneck and energy cost of constant data movement, so our design incorporates multiple ReRAM architectures to enable parallel computation directly in memory. We'll fabricate the chip using the Skywater 130nm process, allowing ISU researchers and ChipForge club members to test and analyze different ReRAM designs. Alongside the chip, we'll provide documentation and C code for interfacing, helping research teams evaluate CIM's potential in low-power computing.





Communication Honesty

Relevance: In this multidisciplinary project like ours, it is important to maintain clear and honest communication with team members, advisor, and client. With this new emerging technology, it is important to maintain clarity of what we are doing and the ideas we have come across.

Approach: To help keep clarity throughout the project, the team meets twice a week; one hour on fridays, and two hours on sunday. We also have weekly client/advisor meetings on thursday for one hour.

- Any issues that are faced during the design and development process are openly discussed and collaborated on throughout the meetings.

Communication Honesty

Ethical and Professional Responsibility: Honesty in communication ensures that any delays, challenges, or limitations are acknowledged early, allowing for changes in direction if necessary. This aligns with our ethical responsibility to be accountable and transparent in all aspects of the project.

Financial Responsibility

Relevance: The end goal of this project is to print out the chip on the tapeout date of April 21st. Each chips costs one hundred dollars and we are ordering one hundred chips. This is a great deal of money.

Approach: Recently, our design process has become sloppy due to confusion around what the professor expects from us. There has been a lack of clarity, and as a result, our team has struggled with direction. This impacts our financial investment and our projects success.

Financial Responsibility

Ethical and Professional Responsibility Approach:

- Clarify expectations with professor
- Formalize Task allocation
- Focus on Quality and Precision

Broader Context Area-Four Principles chart

Economic: The broader impact that this design will have on the community is it will make processing data faster and use less power. It will also be used in AI which will basically give computers processing methods in their memory part.

Uncertainty: The more we innovate on new products like this where AI can potential become something more than it already is. This can take away even more jobs than it already has.

There will also be a skills gap. When science grows there will be a technical skills deficient which will make it hard to find employment.

Conclusion

- One ideal that we excel at: communication honesty
- One ideal that needs to be worked on: Financial Responsibility
- Broader Context Area-Four Principles chart: Economic
- Uncertainties: ReRAM will help make AI faster, but at what consequence