به کارگیری موثر پردازنده گرافیکی در تست نرم افزار

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INTRODUCTION

CONTRASTING APPROACH WITH EXISTING LITERATURE ON GPGPU

- This approach leaves the program and its logic untouched, focusing on parallelizing test case execution.

- No program transformation from CPU to GPU program is required.

- Original program logic is maintained, ensuring the same results as CPU testing.

- 1 testcase per 1 gpu thread

THE SUGGESTED APPROACH

Figure 1: Our Approach for Test Execution on a GPU
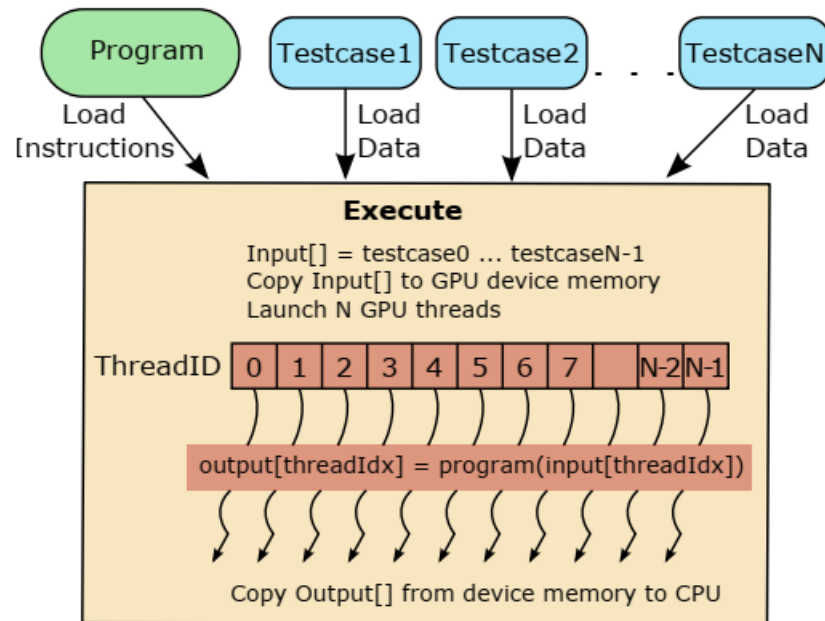
1. We vectorise the test inputs so that their dimension is the number of test cases in the test suite.
2. We copy the vectorised inputs from the host memory to the GPU device memory.
3. We then launch the kernel with the program functionality on the requisite number of GPU threads (ideally as many as there are test cases). Each GPU thread will operate on the same program but with different test data, using the unique thread id to identify the test case inputs to execute over.
4. We copy the program output from the GPU back to the CPU.

- speed-ups up to a factor of 27

SIMULTANEOUS EXECUTION OF TEST CASES USING GPUS

- Each test case runs on a separate GPU thread, independent of other test cases.

- GPU device management code acts as a wrapper for the original program.

- No thread synchronization is needed due to the independence of test case executions.

GPU ADVANTAGES

- Massively parallel processors with unmatched multi-threaded performance

- State-of-the-art GPU architectures offer over 1500 GFLOPS, compared to around 100 GFLOPS for traditional CPUs

- Energy-efficient and cost-effective compared to multi-core CPUs or PC clusters

TECH REQUIREMENTS

GPU ADVANTAGES

- Significant reduction in test suite execution time, leading to cost savings.

- Ability to execute more test cases within the same allotted time, increasing fault detection likelihood.

GENERAL-PURPOSE COMPUTING ON GPUS (GPGPU)

- Utilizes GPUs for non-graphical tasks, exploiting data-level parallelism

- Software testing can benefit from GPUs due to the data parallelism inherent in test case execution

CONCLUSION

- In conclusion, we have demonstrated the potential of GPU acceleration in reducing test suite execution time.

- Our approach provides significant benefits, including cost savings, increased fault detection likelihood, and energy efficiency.

- Further research can address the limitations and explore broader application domains.

REFERENCES:

Accelerated test execution using GPUs

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با تشکر از توجه شما