

Paper Critique: Odessa: Enabling Interactive Perception Applications on Mobile Devices

Name: Wenqi Xu ID: 400156647

1) What problem does the paper try to address

The article come up with three questions:

- a. What factors impact offloading and parallelism?
- b. How do we improve throughput and makespan simultaneously?
- c. How much benefits can we get?

2) Why is the problem important

Interactive perception applications have some unique characteristics: crisp response time, high data rate and compute intensive. It need to leverage computation on nearby servers. The two key questions that impact performance are what computation to offload, and how to structure the parallelism across the mobile device and server.

3) How is the problem addressed?

a. Measurement:

The paper present experimental results that highlight how the performance of interactive perception applications is impacted by multiple factors include input data variability, varying capabilities of mobile platform, network performance and effects of parallelism. From the results we can get some conclusion: Offloading decisions must be made in an adaptive way; The level of data parallelism cannot be determined a priori; A static choice of pipeline parallelism can cause sub-optimal performance.

b. Odessa Design:

The key insight of design of Odessa is that the dynamics and parallelism requirements of interactive perception applications preclude prior approaches that use offline profiling and optimization based partitioning; instead, a simpler greedy and incremental approach delivers good performance.

4) How is the solution evaluated?

The article use C++ on Linux to implement Odessa. The experiments were carried on 1-core Netbook, 2-core Laptop and 8-core Server using canned input data. Odessa was evaluated in three ways: Adaption, Resulting Partitions and Performance Comparison. Odessa finds a desirable configuration automatically. Resulting Partitions in Different Devices. Odessa performs 4x better than the partition suggested by domain expert, close to the offline optimal strategy.

5) Any aspect that can be improved/extended?

Much work remains, including exploring the performance of Odessa under a broader range of applications, extending it to take advantage of the public cloud, and exploring easy deploy ability on mobile devices by leveraging modern browser architectures.