

A Visual Search Platform with Heterogeneous Edge Nodes

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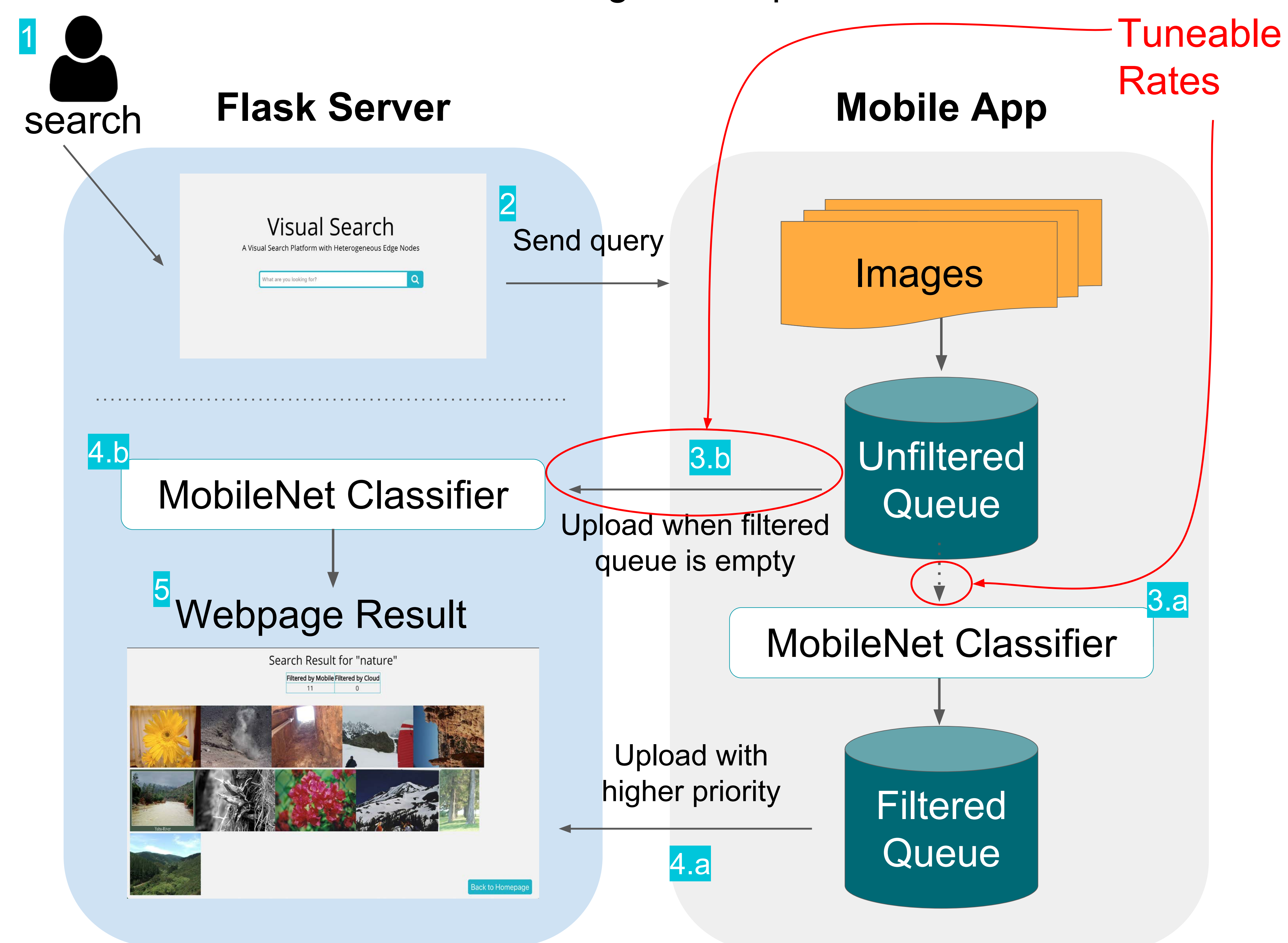
Problem Description

Mobile devices can capture images faster than they can upload them to the cloud. We consider a low-bandwidth environment where a user wants to query for images stored on a mobile device. We developed a strategy that worked well on devices with different levels of computational power.

Our Demo

Users search for images that match an ImageNet label. The dataset contains 2515 images. Filtering is done using MobileNet. Images can be filtered either on the web server or on the mobile device. We offer the following tuning knobs:

1. The rate at which images are run through MobileNet on the mobile device.
2. The rate at which unfiltered images are uploaded to the server.



Experiment

We ran tests with different settings of our tuning knobs. We used a Nexus 6, with the following specifications:

CPU	Qualcomm APQ8084 Snapdragon 805
Memory	2.90 GB
GPU	Adreno 420

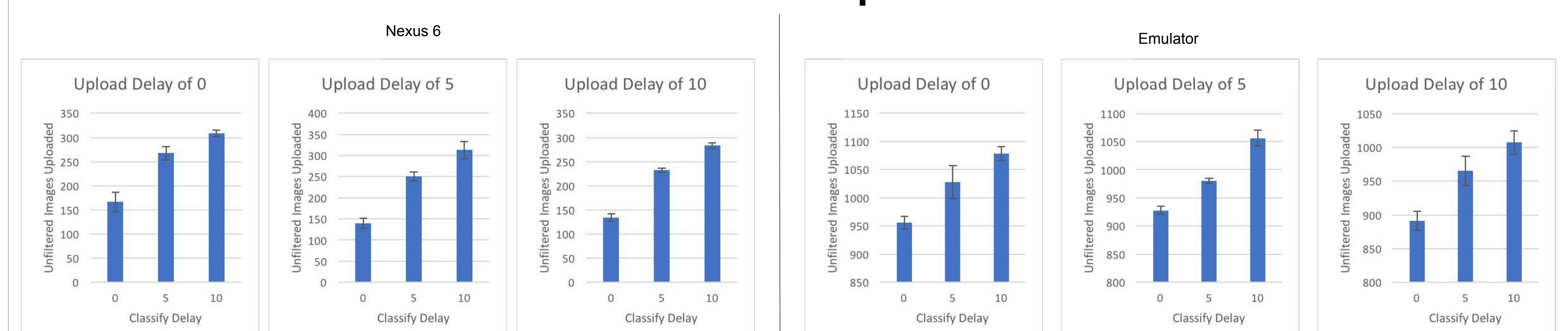
The Geekbench 4 benchmark results for this device were as follows:

Single-Core CPU	1043
Multi-Core CPU	2915
RenderScript Compute	2468

We also ran tests using an Android emulator running on a MacBook Pro. Unfortunately the emulator could not run Geekbench 4.

Results

We ran each combination of parameters 4 or 5 times.



Future Work

- Run the system on multiple devices at the same time
- Tune the image classifier for better performance
- Incorporate additional filters (RGB, SVM)