



# Cloudlet Powered Super Resolution Magnifier App

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## Project Overview

Applying Super Resolution technique to produce higher resolution images than the native camera on a mobile device. Since the processing is compute intensive and the end-to-end latency is important for the user, cloudlet is used.



\* Images from Simon Baker and Takeo Kanade, "Super-Resolution Optical Flow", 1999, CMU-RI-TR-99-36

## Possible Applications



Enhancement to License Plate Recognition System

Military Operations, Hostile Environment, Facial Recognition ...

\* Images from Mitzel et al, Video Super Resolution using Duality Based TV-L1 Optical Flow, 2009  
\* Images from Sina Farsiu, M. Dirk Robinson, Fast and Robust Multiframe Super Resolution, IEEE TRANSACTIONS ON IMAGE PROCESSING, VOL. 13, NO. 10, OCTOBER 2004

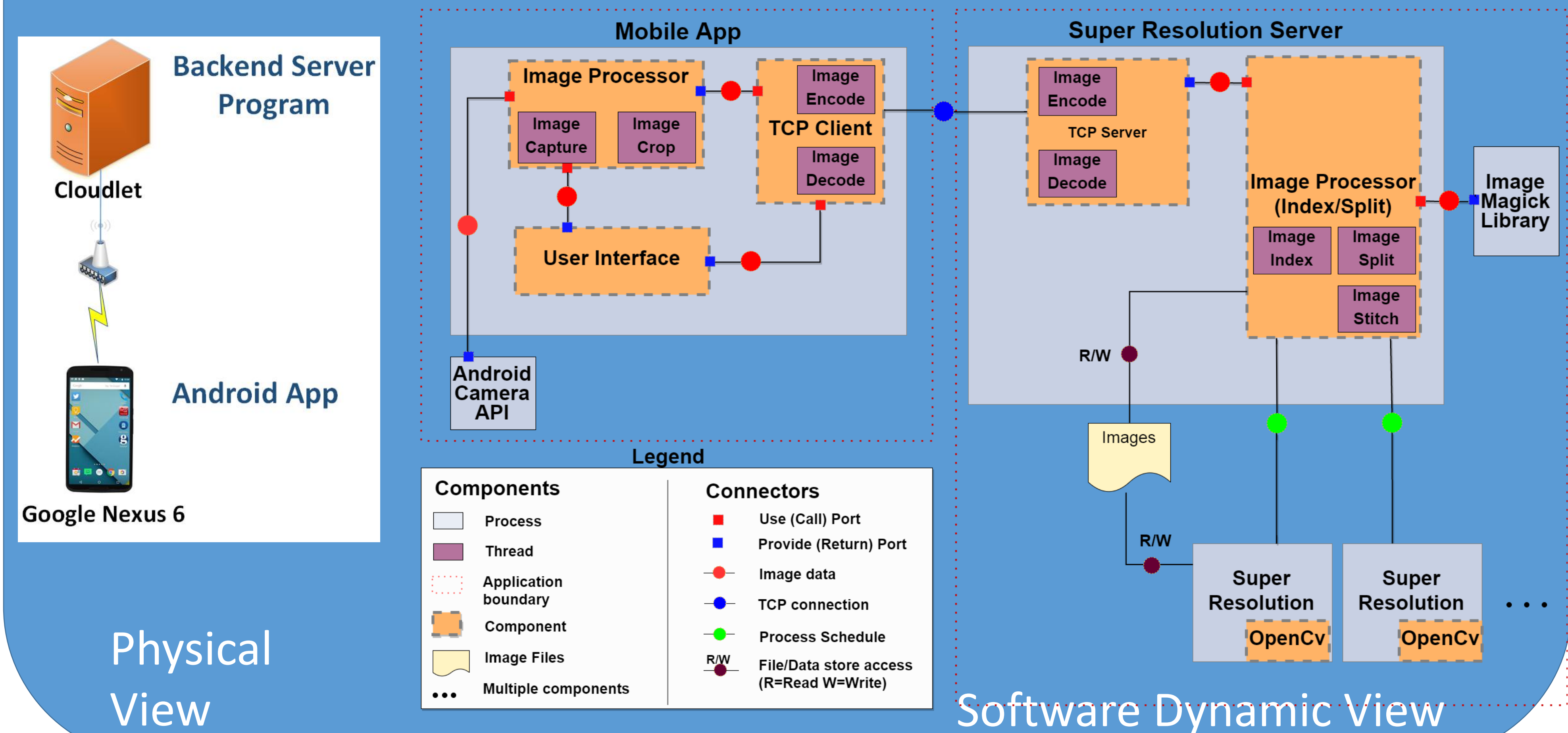
## Challenges & Lessons learned

- Tradeoffs between real-time performance and image quality, i.e. Finding the sweet spot between responsiveness and quality
- Splitting the images into smaller pieces and using parallelization on Cloudlet to improve performance

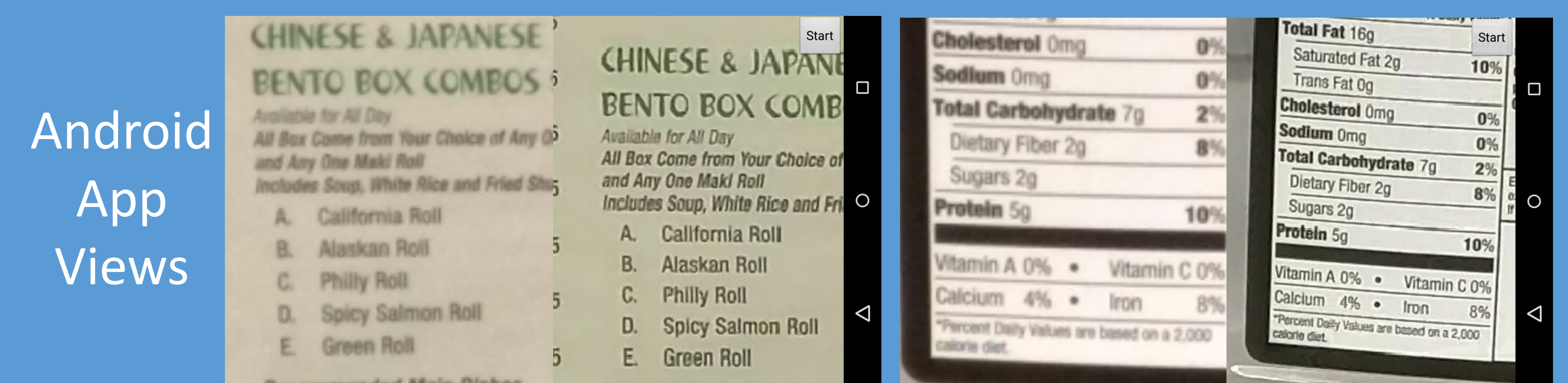
## Future work

- Use raw images to improve image quality
- Use in memory processing to reduce file I/O operations, hence improve performance
- Further benchmarks to find the optimum parameters for super resolution algorithm

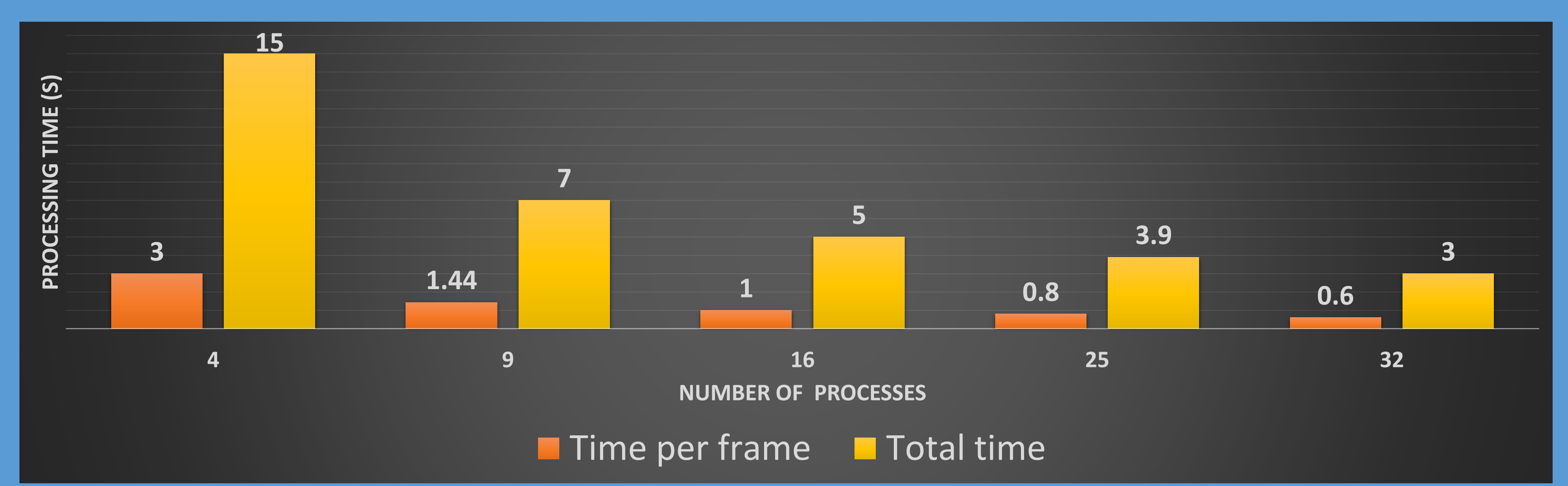
## Architecture



## Final Result



Android App Views



## Benchmarks

### Processing Steps:

- Split images into N (configurable) parts
- Perform super resolution on each part in different process
- Stitch images together

Scan for Demo



<http://tiny.cc/superres>