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.

Possible Applications
Enhancement to License Plate Recognition System
Military Operations, Hostile Environment, Facial Recognition ...

Challenges & Lessons learned 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

Architectural View

Backend Server Program
Mobile App
Super Resolution Server

Components
- Image Processor
- TCP Client
- Image Decode
- User Interface
- Android Camera API

Connections
- Use Cell Port
- Provide (Return) Port
- Image data
- TCP connection
- Process Streams
- File Data store access (Read/Write)

Physical View

Software Dynamic View

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

http://tiny.cc/superres