INTRODUCTION

Finding a missing child in the crowd is a crucial and non-trivial task. This project aims to reduce the burden on anxious parents and alleviate their unpleasant experience.

- **How do we help?**
  
  The Parent uses the Lost Child app on her/his phone, to upload 10 recent pictures of the missing child and request for help. An user of the app in the crowd will stream video via a Google Glass/phone, from which the child is located and the parent is notified with the image and location.

- **What do we aim to learn?**
  
  - Validate if cloudlets as backend cognition engine can help in reducing latency, while performing computationally intensive tasks
  
  - Evaluate performance for cloudlets vs public cloud
  
  - Limitations of wearable computing in continuous usage (video streaming, battery life)

- **Tasks**
  
  - Build a face recognition model (from the child’s images)
  
  - Stream video from Google Glass to the cloudlet server
  
  - Find child in video frames from Glass/phone
  
  - Send notification (with location of missing child) to parent’s phone

- **Devices**
  
  - Google Glass
  
  - Android Phone
  
  - Cloudlet Server

USE CASE

- Parent launches the Lost Child app on her/his Android phone and uploads 10 recent pictures of the missing child to the cloudlet

- The server builds a **face recognition model** of the child, and notifies the users of the app in the area to help find the missing child

- Users volunteer to **stream video** of the crowd using their Google Glass or Android phone to the cloudlet

- The cloudlet server finds the child in the video frame and sends the location with the frame to the parent

- Parent confirms the found child, and the server notifies the user to stop streaming

SYSTEM ARCHITECTURE

SOFTWARE STACK

- **Cloudlet Server**
  
  - Resource Management – OpenStack
  
  - Video streaming backend – Gabriel
  
  - Cognitive engine – OpenFace
  
  - HTTP server – Flask

- **Push Notifications**
  
  - Google Cloud Messaging

- **Phone and Glass**
  
  - OS – Android
  
  - Streaming front end – Modified Gabriel client (on Android API 19/GDK preview)

PERFORMANCE EVALUATION

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<th>Min</th>
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<th>Mean</th>
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CONCLUSION

- Mobile and wearable devices are resource poor, and cannot perform computationally intensive tasks (face recognition) locally. Although hyper scale public clouds overcome computation constraints, they aren’t a suitable choice for latency sensitive applications.

- Cloudlets are a viable alternative to perform computationally intensive tasks with a lower latency than hyper scale public clouds, due to their presence at the edge of the networks.

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REFERENCES