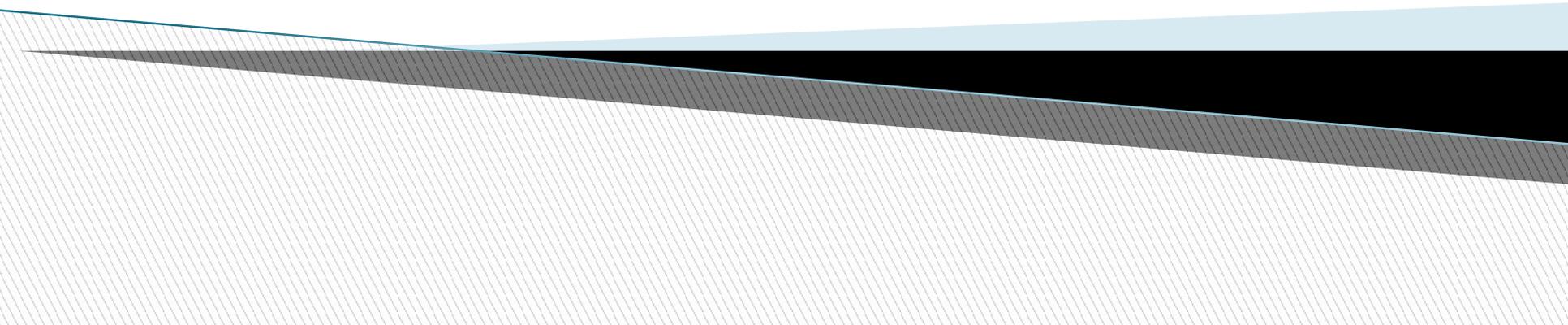# Energy and Latency Impact of Outsourcing Decisions in Mobile Image Processing

# INTRODUCTION

- Only mobile batteries are not developing at the same rate as all the above mentioned features. Comparing a two weeks standby to a daily charged mobile phone can reveal the problem that is facing mobile phone manufacturers these days. The problem of these restrictions can be solved by moving some work from the phone to somewhere else.

- So one solution of this capacity restriction that is investigated in this paper is to outsource the working load of power hungry algorithms from the power limited mobile phones to a power efficient server where the execution takes place much faster, and the result is sent back to the mobile phone to be presented. The novelty lies in revealing the dependence between the type of the connection and the performance expected which lead to the introduction of an outsourcing decision making algorithm.

# ABSTRACT

This research paper illustrates an adaptive outsourcing algorithm that runs on mobile phones. The algorithm outsources the computational load that needs to be done on a sensor data (in this case an image) to a server, based on many criteria, where the execution takes place. The end result is sent back to the mobile phone and presented to the user. The results from these measurements have shown up to 85% decrease in power consumption and up to 60% decrease in latency compared to locally executing on the mobile phone in many situations. Moreover, outsourcing using a WiFi connection has proved to be favourable in most scenarios where complex algorithms are applied on the image, while a 3G connection has showed a lot of discrepancy from one situation to another.

# EXISTING SYSTEM

- Moving from a device that has a well defined task of voice communication in the early days of GSM, to a device mainly designed for data communication with voice communication as a minor goal1. A mobile phone is equipped with many extra hardware sensors which collect different kinds of data, and at the same time a more complex hardware to be able to handle this flow of data.

- Only mobile batteries are not developing at the same rate as all the above mentioned features. Comparing a two weeks standby to a daily charged mobile phone, can reveal the problem that is facing mobile phone manufacturers these days.

# PROPOSED SYSTEM

- The algorithm outsources the computational load that needs to be done on a sensor data (in this case an image) to a server, based on many criteria, where the execution takes place. The end result is sent back to the mobile phone and presented to the user.

- The results from these measurements have shown up to 85% decrease in power consumption and up to 60% decrease in latency compared to locally executing on the mobile phone in many situations.

- Moreover, outsourcing using a WiFi connection has proved to be favourable in most scenarios where complex algorithms are applied on the image, while a 3G connection has showed a lot of discrepancy from one situation to another.

# HARDWARE REQUIREMENTS :

- Processor :Intel Pentium IV 1GHz

- RAM :256MB (Min)

- Hard Drive :5GB free space

- Monitor :1024 * 768, High Color inch

- Mouse :Scroll Mouse(Logitech)

- Keyboard :104 keys

# Contd..

**Software Requirements :**

- OS : Windows XP/7/8

- Front End : Visual Studio 2010/netbeans 7.1

- Back End : SQL Server 2005/heidisql

- Browser : Any Web Browser

# CONCLUSION

This paper has presented a novel approach to outsource energy-hungry algorithms from a mobile phone to a server. The application supports image processing algorithms and it is scalable to different data contents (videos, voice, other sensor data,...) as well as adding extra algorithms. The application also includes an adaptive self-learning outsourcing decision making algorithm that is used to compensate for the discrepancies that appear once connected to a 3G network mainly. The measurements have shown energy savings up to 85% in outsourcing complex algorithms running on big images using a WiFi connection while reducing the latency by more than a factor of 2 in the same case. The measurements also showed that the factors affecting the decision can be summed in the complexity of the algorithm, the size of the image and the type of the network connection. Moreover, adding an extra stage locally on the phone, like compression, before outsourcing can lead to significant improvements in both power saving and latency experience on the expense of image quality.

# REFERENCES

[1] B.-G. Chun et al., "Clonecloud: elastic execution between mobile device and cloud," in Proceedings of the sixth conference on Computer systems, ser. EuroSys '11. New York, NY, USA: ACM, 2011, pp. 301–314.[Online]. Available: http://doi.acm.org/10.1145/1966445.1966473

[2] R. K. Rana et al., "Earphone: an end-to-end participatory urban noise mapping system," in Information Processing in Sensor Networks, 2010, pp. 105–116.

[3] A. Abukmail and A. Helal, "Energy management for mobile devices through computation outsourcing within pervasive smart spaces," Mobile and pervasive computing research, University of Florida, Tech. Rep., 2007.

[4] C. Mei et al., "Dynamic outsourcing mobile computation to the cloud," Department of Computer Science and Engineering, University of Minnesota, Tech. Rep., 2011.

[5] T. K. Roelof Kemp, Nicholas Palmer and H. Bal, "Cuckoo: a computation offloading framework for smartphones," in Proceedings of The Second International Conference on Mobile Computing, Applications, and Services, 2010.