

Enabling New Interaction Forms and Applications through Next Generation Mobile Platforms for Urban and Rural Africa

Kasper Løvborg Jensen¹ and Gary Marsden²

¹ Polytechnic of Namibia
Windhoek, Namibia

leafcastle@acm.org

² University of Cape Town
Cape Town, South Africa

gaz@acm.org

Abstract. Mobile phones constitute the most ubiquitous computing platform across Africa and in many rural areas it is the only computer available. Through rapid technological development a new wave of “low-end smartphones” are becoming available and affordable, and in this work we investigate how to use the new features of these devices to enable more natural interaction forms that lower the technical and knowledge threshold for people to access and use mobile ICT solutions in urban and rural African contexts. Specifically we investigate how new sensor-based interactions can be designed for mobile applications and how to implement a software platform for facilitating the development of such applications.

Keywords: HCI4D, ICT4D, mobile, context-aware, sensor-based interaction, NUI.

1 Introduction

While it is well established that people in both urban and rural areas can benefit from information and services provided through ICTs, it is still unclear how to design and deploy such systems in an effective, efficient and sustainable way in the developing world context [1]. Mobile phones constitute the most ubiquitous computing platform across Africa and in many rural areas it is the only computer available. This makes it the optimal platform for ICT solutions, even though it comes with a range of limitations and challenges; not least from the perspective of human-computer interaction [2][3].

Through rapid technological advances a new wave of “low-end smartphones” are becoming available and affordable. In this work we focus on this emerging wave of devices and acknowledge the fact that such technology will eventually reach even the remote areas of Africa. The questions are then: how can this next generation of mobile devices be utilized to enable new interaction forms to lower the technical and knowledge threshold for users to access the benefits of deployed mobile ICT solutions, and how can this pave the way for new information and services for people in both urban and rural areas in Africa?

1.1 Towards New Interaction Forms and Applications

Besides the increasing processing power, memory, storage, and data networks, the most interesting features of these new devices come from their range of built-in sensors. These allow application developers to access information about the current environment and situation of device and users such as orientation, acceleration, light intensity, location and proximity to objects and people. It is possible to leverage such information to create more advanced computer systems, and by combining these sensors it is possible to create systems with more natural user interfaces that are e.g. location-based, proximity-based or gesture-based.

Solutions for implementing such interaction forms are already available from the body of research and development within mobile technology and novel interaction paradigms such as ubiquitous, pervasive and context-aware computing. Another branch of research, often referred to as HCI4D (Human Computer Interaction for Development) [3], is concerned with HCI and interaction design methods focused on ICT for developing countries. With the emerging mobile platforms the combined results from both of these endeavors can now find their way into the African context.

The goal of our research is to design, implement and study new interaction forms and investigate how they lower the technical and knowledge thresholds for users to access the benefits of deployed mobile ICT solutions. This can be used to empower semi-literate handset owners to use their technology more effectively. By lowering the barriers to technology usage it will be possible to create and deploy new applications and services for a large target group that were not previously possible or feasible and thus help bringing sustainable ICT solutions to people and communities in developing regions.

As part of this work we also focus on the development and study of a software platform for facilitating easier development and deployment of applications using these new interaction forms. Based on experiences from the development of a previous sensor-enabled context capture tool [4], we aim to provide a generic platform that allows for rapid prototyping and large-scale field testing of mobile applications in both urban and rural Africa.

References

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