Educating the Architects of the Mobile Economy

A Program for "Mobile Computing & Applications Software Development" (MCASD)

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Abstract

In this paper a program for mobile computing and applications software development, in a developing region perspective is described. The aim of the program is the promotion and harnessing of the explosive mobile technology and service growth for a sustainable economic development. The paper describes the program as a framework and vehicle towards a usable, locally relevant development and provision of innovative mobile content and services. This in turn is expected to promote the continued growth of the mobile market in developing regions and the creation of local mobile content and service provider sector.

Introduction:

The mobile phone has become a powerful portable multimedia computer, and is an important link in the convergence of information and communication technologies and services for many people in the developing world. The recent terminal technologies are adding affordability, reach, and ever-increasing capabilities, in a world where everything is going mobile, digital and adaptive.

It is estimated that there are over 3.5 billion mobile phone subscribers globally (Q4 2007) and these figures are growing fast thanks to emerging markets in Asia, Latin America and Africa. Africa has contributed to the fastest growth rates of 36% of Emerging Market subscribers. Such a development is partly due the large demand and the inadequate or non-existent access for fixed line telecommunications services in Africa. Therefore access to communication technology and services in Africa is mainly expected to progress through mobile communications technology and terminals. Growth in mobile telephony in Africa has been rapid in the last 10 years, since telecommunications sector reforms in most countries opened markets to competition as a result of the 'Basic Telecommunication Services Agreement'. Africa mobile subscribers outnumber the fix lines 10:1 in a number of countries. The GSM connections reached 210 million, over 120 operators exist in the 53 African countries in Q1 2007 (GSMA 2007).

To maintain the mobile technology and services growth in Africa and migrate towards more relevant data services: such as mobile-health, mobile-learning, mobile payment,…, we need to look beyond the voice & SMS services that are now prevalent. The challenges to be addressed can be classified into infrastructure and human resource to develop the necessary localized services and content. This paper tries to address the later challenge, by developing an MSc program titled: "Mobile Computing & Application Software development" (short MCASD) to be delivered at the University of Makerere. The program will address the issue of the development of a localized mobile content and service provider sector in a formal and competitive way. Such a sector will ensure that African countries can benefit in the form of employment creation and economic development as a spinoff of the explosive growth of mobile technology and services in the continent. The program is also designed to work as a University-Industry collaborative initiative. To make the program successful three areas are identified that will be addressed in the paper: 1) The MCASD curriculum, 2) The Mobile Laboratory for Research, usability testing & prototyping, and 3) A research group in usability & localization for Mobile Computing, Technology & services.

1.0 The MCASD Program Curriculum

The masters in mobile computing and applications software development, MCASD program at Makerere University is designed to give a service oriented understanding of the wireless technology, standards and architecture of the mobile network. It will also address the mobile services echo system from different stake holder's perspective. The program will also equip students with mobile programming skills to design innovative, and locally relevant mobile content and services. In general the program will focus in producing graduate students with competence to address the following issues:

1- To Bridge the mobile services and local content development knowledge gap between African subscribers and the mobile communications & service industry.

2- To Perform relevant research in the areas of mobile technology and services. To cater for this a research group focused in the areas of Mobile Computing & Networking, in collaboration with international partners and industry is being formed at CIT, Makerere university.

3- To support the mobile telecom industry and regulatory authorities with research to extend connectivity and mobile services to rural areas by performing locally relevant research in mobile communication services with community based usability lab studies.

4- To play an important role in harnessing the explosive mobile communications services growth in emerging markets of Africa to the benefit of the society and economic development.

5- To maintain the mobile market growth with active collaboration of the telecom network and service provider industry and improving the user experience by usability studies.

6- To establish a Mobile software and applications programming Lab. to support the MCASD program, perform research in mobile software development and service sability studies.

7- Support graduating students' entrepreneurship, and promote the creation of a mobile web content & service provider sector in Uganda and the Eastern Africa region.

The Three Pillars of MCASD

Educating the Architects of the Mobile Economy !

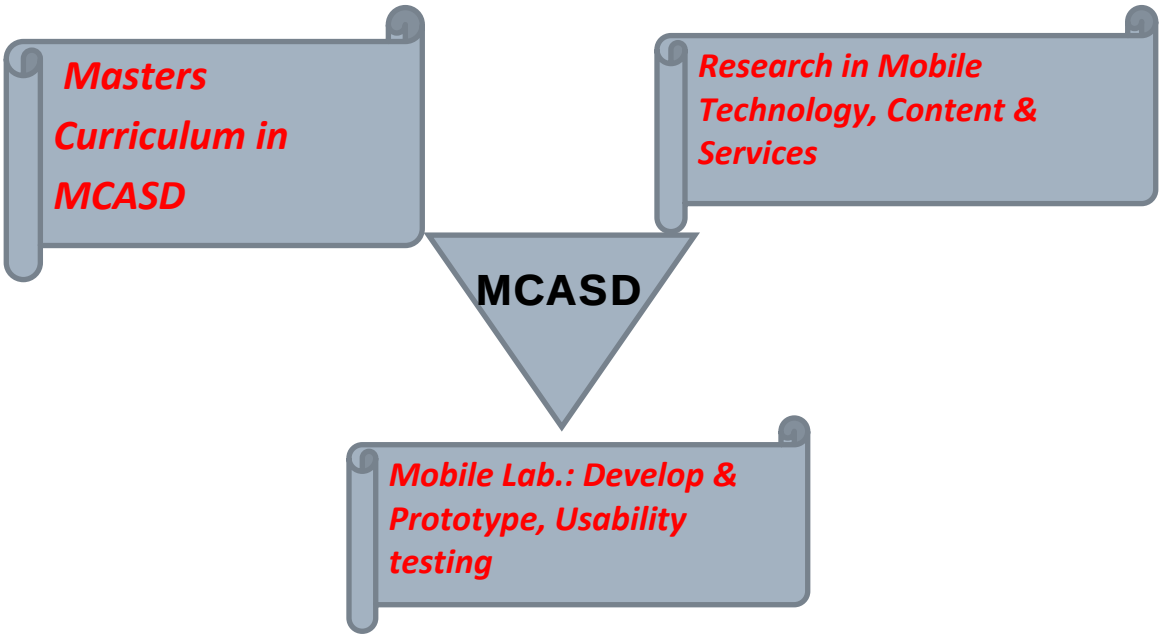

Figure 1, A conceptual block diagram of the MCASD program functional Units.

2.0 **Research in Mobile Technology, Content & Services**

The second pillar of the MCASD program is the research that Makerere University, faculty of Computing and IT, as an academic & research institute has initiated to support the long term sustainability of the MCASD program. It is built in collaboration with international research faculty, the local mobile network service and network industry, and finally the involvement of the public policy and regulatory authorities. Students final year thesis work will be guided with high quality research and prototyping lab support, to produce relevant and localized mobile service and content.

To make the research in component in MCASD feasible and to support new mobile services such as mobile search, mobile web services, mobile blogging and mobile social networking, a research group is formed which will spearhead the MCASD research areas. The research group will be composed of academics, industry representatives and public sector policy makers. Such a research group will spearhead the development of new innovative mobile services, which will guarantee successful launch,

which is based on real need of local mobile users, and will enrich the lifestyle of the community where it is deployed. Using the mobile Lab which is discussed in the next section, the research group will also be involved in mobile service usability and localization research to support the successful diffusion of mobile services to underserved rural communities in Africa.

3.0 Mobile Lab for Developing, Prototyping & Usability testing of Innovative Mobile Services

The MCASD program embodies the important component of mobile Lab to teach graduate students the tools for mobile applications programming, perform research in mobile service usability and performing practical field research on mobile technology and service usability. The mobile laboratory can transported to the community where the service is to be deployed once the lab trials are completed and a prototype mobile service is developed. Such a field usability testing will give crucial feedback to the developed mobile service, and will help promote sustainable diffusion of technology and services specifically for rural and urban underserved communities.

The MCASD mobile Lab will also be used to promote graduate students entrepreneurial activities in mobile software development, innovative mobile service based startups and the emergence of a mobile content and services provider sector. The Lab also will be a resource tool for operators and service providers to test new mobile services before launch, for testing of usability and localization. Another wish expressed from the public sector policy and regulatory authorities and consumer groups is the need to generate consumer information material on capabilities of mobile terminals and which services are possible with affordable terminals of customers. This is especially important in developing regions where the literacy level and exposure to technical gadgets is minimal.

4.0 The Challenges of Innovative Mobile Data Services in Developing Regions

As next generation mobile technologies are being deployed in developing regions, one important challenge that the MCASD program aims to perform research is the provision of innovative mobile data services in an environment where the customer base is composed of greater than 95 % prepaid customers and belong to the low ARPU segment of the market. Issues such as affordability and total cost of mobile innovative services will be studied together with usability, language & cultural context localization.

If the mobile industry and service provider sector is to develop towards the provision of relevant innovative mobile data services in developing regions, it has to look above the present complacent position and look towards solving the issues associated with affordability, usability and localization.

5.0 MCASD Program Objective

The objective of the MCASD masters program is to produce approximately 100 graduates in the first year and successively ramping up to 200 over consecutive years. Graduates completing the MCASD program shall:

- Have a full understanding of the principles of mobile /wireless communications.
- Understand the mobile terminal hardware and software set-up, the user interface, the API and the radio interface to the base station.

- Acquire working knowledge and skills of mobile operating systems and user interface design. Be able to manipulate and modify installed mobile applications and trouble shoot.
- Be able to use the tools for designing mobile optimized web-sites, mobile content development, and mobile web services.
- Be able to use mobile programming tools, design Innovative mobile applications and test on a mobile platform. Modify existing applications to achieve localization of mobile services with desired usability characteristic.
- Have state of the art competence in the areas of mobile communications & services and be readily available for employment and consulting assignments by the mobile communications industry.
- Have state of the art competence in the areas of mobile content, application software, and web services development, and be able to pursue entrepreneurial path and start a mobile service provider company.

Conclusion

This paper described a proposed program and a local center of excellence for generating locally relevant innovative mobile services in a developing region context. The success of such a program will in the authors opinion can guarantee successful diffusion, and continued growth of the mobile technology and services in the African context.

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