

REACH: Enabling Single-Handed Operation on Large Screen Mobile Devices

Varun Perumal
Dept. of Computer Science
University of Toronto
varun@cs.toronto.edu

Ahmadul Hassan
Dept. of Computer Science
University of Toronto
ahmadul.hassan@gmail.com

Zahid Abul-Basher
Mech. & Industrial Eng.
University of Toronto
zahid@cs.toronto.edu

ABSTRACT

Categories and Subject Descriptors

H.5.2 [Information interfaces and presentation]: User Interfaces—graphical user interfaces

General Terms

Design, Experimentation, Human Factors

Keywords

Data analytics

1. INTRODUCTION

There is an unprecedented rise in popularity of large screen mobile phones with screen sizes greater than 5 inches. The benefits of larger screens and a larger battery life being the primary drivers of user adoption, however, these larger devices are difficult if not impossible to use with one hand and pose usability issues for demographics with smaller hands (especially women). The existing solutions to this include on screen functions that the user can activate to bring the screen content closer to the user's thumb. These methods however, introduce extra steps in the user's interaction with the device and can be cumbersome. We propose "Project Reach".

By placing force sensors all around the rim of the phone, we can sense how the user is holding the phone and when they are straining their thumb to reach a corner. Using this information we can shift the UI closer to the operating finger. The force sensors can also be used to interact with the phone in other scenarios, for example swiping on the sides of the phone could scroll pages, or increase/decrease volume etc. With this project we intend to build the hardware, formulate UI design changes, and do basic user testing to validate our ideas.

2. RELATED WORK

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Many researchers have suggested that the devices should be intelligent enough to detect user's situation for better support as in [2] and [3]. For instance, *ability based design* aims to find the best match between the ability of the users and the interfaces [6]. There are also researches to recognize the activity of users on devices (also known as *activity recognition*). Choudhuri *et al.* [1] built a wearable device with sensors to detect the activity of the users. In [5], Laerhoven used an accelerometer in a phone to recognize different motions of walking, climbing stairs, *etc.* Schmidt *et al.* [4] also used accelerometer but to detect both the user movement and the place of the device itself whether it is in the hand or on a table or in a suitcase. REACH falls in this research area by detecting the activity of the user from the pressure that they apply on mobile devices.

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