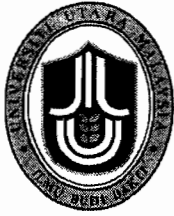


**MULTI-TAP MOBILE PHONE TEXT ENTRY: KEY-PRESS  
OPERATORS FOR KEYSTROKE LEVEL MODEL**

**AYMAN I.H. SROUR**

**UNIVERSITI UTARA MALAYSIA  
2008**

A thesis submitted to the College of Arts and Sciences in partial  
fulfilment of the requirements for the degree of Master of Science  
(Information Technology) Universiti Utara Malaysia



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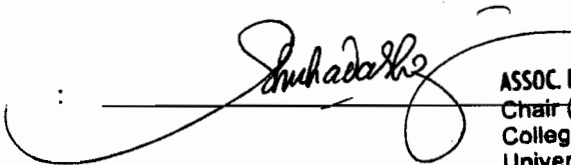
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## ABSTRACT

The Keystroke Level Model (KLM) has been utilized to predict the user behaviors and activities with desktop system. Recently, the mobile device application designers could use updated KLM model to predict the consumed time while users use mobile devices, but when designers use this method to evaluate the text entry they still face some difficulties with the calculation of long equations, due to multi-tap technology. This study proposes new KLM operators to facilitate the time calculation process for text entry using traditional mobile keypad. Updated KLM operators are used to predict the user behavior in interacting with mobile devices in general and text entry in specific. The expected results contribute in estimating the consumed time accurately.

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## LIST OF ABBREVIATIONS

<b>CCT</b>	Cognitive Complexity Theory
<b>CLDC</b>	Connected Limited Device Configuration
<b>CMN-GOMS</b>	Card, Moran and Newell GOMS
<b>CPM-GOMS</b>	Cognitive Perceptual Model - GOMS
<b>F</b>	Finger Movement Operator
<b>GOMS</b>	Goals Operators Methods Selection
<b>HCI</b>	Human Computer Interaction
<b>J2ME</b>	Java Two Micro Edition
<b>K</b>	Keystroke Operator
<b>K<sub>i</sub></b>	Multi-tap Keystroke Operators
<b>KLM</b>	Keystroke Level Model
<b>M</b>	Mental Act Operator
<b>MIDP</b>	Mobile Information Device Profile
<b>NGOMSL</b>	Natural GOMS Language
<b>OP</b>	Operator
<b>PC</b>	Personal Computer
<b>PDA</b>	Personal Digital Assistants
<b>UML</b>	Unified Modelling Language
<b>USB</b>	Universal Serial Bus
<b>UUM</b>	University Utara Malaysia
<b>V<sub>i</sub></b>	Values of K <sub>i</sub>
<b>X</b>	Distraction Operator

# CHAPTER 1

## INTRODUCTION

### 1.1. INTRODUCTION

The revolution of mobile technology recently has become out of our expectation, with great new designs and new model, but actually these new generations pose some difficulties. Users have to learn how to use the new version of mobile services. In fact, it is important to take in mind user learn ability and the usability of the new mobile product.

Human-computer interaction (HCI) is a discipline that is concerned with the design, evaluation and implementation of interactive computing systems for human use and the phenomena surrounding them according to (Cooper *et al.*, 2007). The Keystroke-Level Model (KLM) one of HCI topics is a simplified version of Goals Operators Methods Selection (GOMS) used as a method for predicting user performance (Hochstein, 2002).

Interaction with mobile phone device is totally different from interacting with traditional desktop computer. The evaluation method that depends on the original KLM-GOMS (which is used with desktop computer) is not efficient to measure the time needed for completing any task with mobile phone device. So, this model needs suitable customization, this helps the designers in estimating the

The contents of  
the thesis is for  
internal user  
only

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