UNIVERSITI TEKNOLOGI MARA

SERIOUS GAMES WITH RECOMMENDATION TECHNIQUES FOR OBESITY AWARENESS

MUHAMMAD SYAFIQ BIN MOHD OMAR

Thesis submitted in fulfillment
of the requirements for the degree of
Master of Computer Sciences

Faculty of Mathematical and Computer Sciences

Jan 2019

ABSTRACT

Serious games is a games that have ability to motivate behavior in serious context, in which can change the attitudes, behaviors and habits of players. To create obesity awareness, the existing serious games are available but they are lacking of information, in which not taking an account of importance in giving the feedback or knowledge during gameplay, that can change behavior or habit of obese people. The authors investigate situation awareness model and behavioral change model in understanding the process in achieving awareness. Besides, the authors also exploring an important serious game elements in term of storyline, gameplay, interface and visualization that can help players in achieving their awareness. The authors also investigate recommendation technique which includes content-based filtering techniques, collaborative filtering technique and hybrid filtering technique to be implemented in serious games in order to raise obesity awareness. In addition, the development and testing of the games are also been explained. Both results from control group testing and experimental group testing are discussed and compared.

ACKNOWLEDGEMENT

Firstly, I wish to thank Allah for giving me the opportunity to embark on my Master degree and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor Dr. Marina Ismail who provided guidance in completing this project.

My appreciation goes to Dr. Noraini Seman who provided assistance in completing this project report. Special thanks to my colleagues and friends for helping me with this project.

Finally, this thesis is dedicated to my father and mother for the vision and determination to educate me. This piece of victory is dedicated to both of you. Alhamdulillah.

TABLE OF CONTENTS

		Page
CONFIRMATION BY PANEL OF EXAMINERS		**ii**
AUTHOR'S DECLARATION		**iii**
ABSTRACT		**iv**
ACKNOWLEDGEMENT		**v**
TABLE OF CONTENTS		**vi**
LIST OF TABLES		**ix**
LIST OF FIGURES		**x**
LIST OF SYMBOLS		**xi**
CHAPTER ONE INTRODUCTION		**1**
1.1	BACKGROUND OF STUDY	1
1.2	PROBLEM STATEMENT	2
1.3	OBJECTIVES	3
1.4	RESEARCH QUESTION	3
1.5	SCOPE	3
1.6	SIGNIFANCE OF STUDY	4
1.7	ROADMAP	4
CHAPTER TWO LITERATURE REVIEW		**5**
2.1	INTRODUCTION	5
2.2	SITUATION AWARENESS MODEL	5
	2.2.1 Endsley`s model	6
2.3	BEHAVIORAL CHANGE MODEL	7
	2.3.1 Transtheoretical Model of Change	7
	2.3.2 Social Cognitive Theory	8
2.4	SUMMARY OF SITUATION AND BEHAVIORAL MODEL	8
2.5	SERIOUS GAMES	9
	2.5.1 Serious Games Elements (Storyline)	9
	2.5.2 Serious Games Elements (Game Play)	10

2.5.3 Serious Games Elements (Interface) 11
2.5.4 Serious Games Elements (Visualization) 13
2.6 RECOMMENDATION TECHNIQUES 13
2.6.1 Content-Based Filtering Technique 14
2.6.2 Collaborative Filtering Technique 15
2.6.3 Hybrid Filtering Technique 15
2.7 SUMMARY 16

CHAPTER THREE RESEARCH METHODOLOGY 17
3.1 RESEARCH DESIGN 17
3.2 INITIAL WORK 18
3.3 SERIOUS GAMES DESIGN 19
3.3.1 Gameplay Design 19
3.3.2 Interface Design & Visualization 20
3.4 SERIOUS GAMES DEVELOPMENT 21
3.4.1 Recommendation Techniques Implementation 24
3.5 SERIOUS GAMES TESTING 25
3.5.1 Testing Environment 25
3.5.2 Control Group and Experimental Group Testing 25
3.6 DATA COLLECTION 28
3.7 DATA ANALYSIS 28

CHAPTER FOUR RESULT AND DISCUSSION 30
4.1 INTRODUCTION 30
4.2 RESULT 30
4.2.1 Features of Application 30
Impacts of Recommendation Module and gameAudio elements in Eat Module 30
4.2.2 Control Group Testing 31
4.2.3 Experimental Group Testing 35
4.2.4 Control Group and Experimental Group Testing Comparison 39