DEFECT PREDICTION MODEL FOR TESTING PHASE

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ABSTRACT

The need for predicting defects in testing phase is important nowadays as part of the improvement initiatives for software production process. Being the group that ensuring successful implementation of verification and validation process area, all test engineers in Test Centre of Excellence (Test COE) department are required to play their part to discover software defects as many as possible and contain them within testing phase. This research is aimed to achieve zero-known post release defects of the software delivered to end-user. To achieve the target, the research effort focuses on establishing a defect prediction model for testing phase using Six Sigma methodology. It identifies the customer needs on the requirement for the prediction model as well as how the model can benefits them. It also outlines the possible factors that associated to defect discovery in testing phase. Analysis of the repeatability and capability of test engineers in finding defects are elaborated. This research also describes the process of identifying type of data to be collected and techniques of obtaining them. Relationship of customer needs with the technical requirements is then explained clearly. Finally, the proposed defect prediction model for testing phase is demonstrated via regression analysis. This is achieved by considering faults found in phases prior to testing phase and also the code size of the software. The achievement of the whole research effort is described at the end of this project together with challenges faced and recommendation for next research work.

ABSTRAK

Keperluan terhadap meramalkan kecacatan dalam fasa pengujian adalah penting pada masa kini sebagai sebahagian daripada inisiatif pembaikan untuk proses penghasilan perisian. Menjadi kumpulan yang memastikan kejayaan perlaksanaan bidang proses verifikasi dan validasi, semua jurutera pengujian di jabatan Pusat Kecemerlangan Pengujian adalah diperlukan dalam memainkan peranan mereka untuk menjumpai kecacatan perisian sebanyak yang mungkin dan membendung kecacatan tersebut dalam lingkungan fasa pengujian. Penyelidikan ini menyasarkan untuk mencapai kecacatan sifar diketahui bagi pasca pelepasan untuk perisian yang diserahkan kepada pengguna akhir. Untuk mencapai sasaran tersebut, usaha penyelidikan bertumpu kepada mewujudkan model ramalan kecacatan untuk fasa pengujian dengan menggunakan kaedah Six Sigma. Ia mengenal pasti keperluan pengguna ke atas keperluan model ramalan dan juga bagaimana model tersebut member manfaat kepada mereka. Ia juga menggariskan faktor-faktor yang berpotensi dikaitkan dengan penemuan kecacatan dalam fasa pengujian. Analisa mengenai kebolehulangan dan kemampuan para jurutera pengujian dalam menjumpai kecacatan turut dihuraikan. Penyelidikan ini juga menerangkan proses mengenal pasti jenis data yang perlu dikumpul and teknik untuk memperolehnya. Kaitan keperluan pengguna dengan keperluan teknikal kemudiannya diterangkan dengan jelas. Akhirnya, cadangan model ramalan kecacatan untuk fasa pengujian ditunjukkan melalui analisa regresi. Ini dicapai dengan menimbang kesilapan-kesilapan yang dijumpai dalam fasa-fasa sebelum fasa pengujian dan juga saiz kod untuk perisian tersebut. Kejayaan untuk keseluruhan usaha penyelidikan dijelaskan di akhir tesis bersama-sama dengan cabaran yang dihadapi dan cadangan untuk kerja penyelidikan seterusnya.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	DECLARATION	iii
	DEDICATION	iv
	ACKNOWLEDGEMENT	v
	ABSTRACT	vi
	ABSTRAK	vii
	TABLE OF CONTENTS	viii
	LIST OF TABLES	x
	LIST OF FIGURES	xi
	LIST OF ABBREVIATIONS	xii
1	**INTRODUCTION**	1
	1.1 Introduction	1
	1.2 Introduction to Defect Prediction Model for Software Testing	1
	1.3 Background of Company	2
	1.4 Background of Problem	3
	1.5 Statement of Problem	5
	1.6 Objectives of Study	6
	1.7 Importance of Study	7
	1.8 Scope of Work	7
	1.9 Project Schedule	7

	1.10Project Outline	8
2	**LITERATURE REVIEW ON DEFECT PREDICTION MODEL FOR TESTING PHASE**	10
	2.1 Introduction	10
	2.2 Defect Prediction across Software Development Life Cycle (SDLC)	10
	2.3 Reviews on the Defect Prediction across SDLC and Testing Phase	19
	2.4 Applications and Issues of Defect Prediction	20
	2.5 Summary of the Proposed Solution	30
3	**METHODOLOGY**	31
	3.1 Introduction	31
	3.2 Six Sigma - DMADV Methodology	31
	3.3 Supporting Tools	36
4	**PROJECT DISCUSSION**	37
	4.1 Introduction	37
	4.2 Findings of Define Phase	37
	4.3 Findings of Measure Phase	44
	4.4 Findings of Analyze Phase	50
5	**CONCLUSION**	53
	5.1 Achievements	53
	5.2 Constraints and Challenges	55
	5.3 Recommendation	56
REFERENCES		58

LIST OF TABLES

TABLE NO.	TITLE	PAGE
1.1	Project schedule	8
2.1	Short-term defect inflow prediction example	17
2.2	Strength and weakness of defect prediction techniques	27
3.1	Project team	32
3.2	Customer identification	33

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter describes the introduction of the research effort presented throughout this project. It illustrates the overview of the research that encourages the establishment of defect prediction model for software testing phase. The discussion continues with background of the research, problem statements, research objectives and the importance of the research. The scope of work and project outline is then explained in the last sections of this chapter.

1.2 Introduction to Defect Prediction Model for Software Testing

As an organization that aims to become a premier applied research centre in frontier technologies, MIMOS has always committed to develop, produce and release high quality software to the market. One of the key aspects to ensure it can be achieved is by having effective and efficient software development process throughout entire SDLC. Thus, prediction or estimation of defects for particular software during testing phase is very crucial to enhance the testing process as part of process improvement in SDLC.

Being the last gate before acknowledging that the particular software is ready to go to the market requires strong and accurate data and metrics. The initiative on having defect prediction model for testing phase helps in determining defects that are likely to occur during test execution and contributes in providing relevant software quality metrics. Defect prediction model for testing contributes to zero-known post release defects of a software product. This is determined by defect containment in testing phase. Predicting total number of defects at the start of testing allows for wider test coverage to be put in place. As more defects contained within testing phase, it helps in improving quality of software product being delivered to end user. By using testing metrics for predicting total defects, it demonstrates the stability of development effort of releasing a software product.

1.3 Background of Company

MIMOS or Malaysian Institute for Microelectronics System was established on 1st January 1985 as a unit of Prime Minister's department following the initiative by group of academicians led by Tengku Dr. Mohd Azzman Shariffadeen. The initial objective is to conduct microelectronics research to support the industries as well as to develop indigenous products. After going through corporatization exercise as a company under Ministry of Finance (MOF), MIMOS has been focusing on three (3) core functions: Research and Development (R&D), National IT Policy Development and Business Development. Since then, MIMOS has embarking on various initiatives and projects including manufacture affordable personal computer (PC), commission industrial-class water fabrications plant, launch first Malaysia's first Internet Service Provider (ISP) called JARING, initiate Computer Forensic Services and also launch AgriBazaar. On 1 July 2006, Dato' AbdulWahab Abdullah was appointed as new President and Chief Executive Officer of MIMOS replacing Tengku Dr. Mohd Azzman Sharifadden. The appointment of Dato' Abdul Wahab has turned MIMOS from the R&D organization in ICT and microelectronics to world class R&D Centre of Excellence.