UMS-INDUSTRY DATA MANAGEMENT SYSTEM

(UMS - IDMS)

JOEL LEE MIN KANG

FACULTY OF COMPUTING AND INFORMATICS
UNIVERSITI MALAYSIA SABAH
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JOEL LEE MIN KANG

THESIS SUBMITTED IN PARTIAL FULFILLMENT FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE WITH HONOURS (NETWORK ENGINEERING)

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NAME	**:**	JOEL LEE MIN KANG
MATRIC NO.	**:**	BI18110228
TITLE	**:**	UMS-INDUSTRY DATA MANAGEMENT SYSTEM (UMS - IDMS)
DEGREE	**:**	BACHELOR OF COMPUTER WITH HONOURS (NETWORK ENGINEERING)
VIVA DATE	**:**	18 JANUARY 2022

CERTIFIED BY;

1. SUPERVISOR:

TS. DR. CHIN PEI YEE Pei Yee

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DECLARATION

I hereby declare that the material in this thesis is my own except for quotations, equations, summaries, and references, which have been duly acknowledged.

11 FEBRUARY 2022

JOEL LEE MIN KANG
BI18110228

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ABSTRACT

UMS-INDUSTRY DATA MANAGEMENT SYSTEM (UMS - IDMS)

Customer Relationship Management (CRM) Centre for Industrial Collaboration and Engagement (CICE) UMS will be developed into a system comprises of two sectors between Industry Network and Community network to serves as a referral by industries to connect with University Malaysia Sabah (UMS). Before using the system, the CICE staffs and other users must manually record the customer information using Microsoft Excel to check the relationship between both networks. A web portal system for CICE was proposed and described in this paper. The objectives for this project are to investigate the Collaborative filtering (CF) techniques for industry engagement recommendations in the web-based system, to develop the (UMS)Industry Data Management System (UMS-IDMS) and to evaluate the usability of the developed proposed (UMS) Industry Data Management System (UMS-IDMS) using the System Usability Scale (SUS) approach. The methodology used in this proposed system is Waterfall development. The system proposed was developed using several development tools such as Microsoft Visual Studio to create the system; Apache is the server. MySQL will use for the database and PHP as the scripting language. Some modelling tools such as flowchart, Data Flow Diagram (DFD) and the Use Case Diagram is designed. System testing and stabilise check will be performed. These tests include unit testing, integration testing, system testing and user acceptance testing. The Collaborative filtering (CF) techniques in the system uses user-based technique to developed and get better recommendations between all the users. The expected outcome for the system should be all the functions have to work successfully to help CICE manage their data easier.

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ABSTRAK

Pengurusan Perhubungan Pelanggan (CRM) untuk Pusat Kolaborasi Dan Libatsama Industri (PKLI) akan dicandangkan untuk menjadi sistem yang terdiri daripada dua sektor antara rangkaian Industri dan rangkaian Komuniti oleh industri untuk berhubung dengan Universiti Malaysia Sabah (UMS).). Sebelum sistem digunakan, kakitangan CICE dan pengguna lain mesti merekod maklumat pelanggan secara manual menggunakan Microsoft Excel untuk menyemak hubungan antara kedua-dua rangkaian. Sistem portal web untuk PKLI telah dicadangkan dan diterangkan dalam projek ini. Objektif projek ini adalah untuk menyiasat teknik penapisan Kolaboratif (CF) untuk cadangan penglibatan industri dalam sistem berasaskan web, untuk membangunkan Sistem Pengurusan Data Industri (UMS-IDMS) dan menilai kebolehgunaan cadangan yang dibangunkan dengan SUS.Model air terjun telah digunakan sebagai metodologi pilihan di mana ia menerangkan pendekatan sistematik kepada pembangunan perisian. Portal yang dicadangkan dibangunkan dengan menggunakan beberapa alat pembangunan seperti Microsoft Visual Studio di mana platform Windows sistem operasi di mana portal berjalan, Apache adalah server, sementara MySQL digunakan untuk pangkalan data dan PHP sebagai bahasa skrip. Model portal direka bentuk menggunakan alat pemodelan seperti carta aliran, Diagram Aliran Data (DFD) dan Garis Diagram Penggunaan. Beberapa ujian sistem telah dilakukan semasa dan selepas projek selesai. Ujian ini termasuk ujian unit, ujian integrasi, ujian sistem dan ujian penerimaan pengguna. Teknik Penapisan Kolaboratif di dalam sistem ini adalah teknik berasaskan pengguna teknik supaya boleh mendapat cadangan yang lebih baik untuk pengguna. Hasil yang diharapkan untuk sistem adalah semua fungsi perlu berfungsi dengan jayanya untuk membantu CICE mengurus data mereka dengan lebih mudah. Hasil yang diharapkan untuk sistem adalah semua fungsi perlu berfungsi dengan jayanya untuk membantu CICE mengurus data mereka dengan lebih mudah.

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TABLE OF CONTENTS

TITLE	Page
DECLARATION	ii
ACKNOWLEDGEMENT	iii
ABSTRACT	iv
ABSTRAK	vi
TABLE OF CONTENTS	vii
LIST OF FIGURES	ix
LIST OF TABLES	ixi
CHAPTER 1: INTRODUCTION	1
1.1 Introduction	1
1.2 Concept of University-Industry-Government Relationship	1
1.3 UMS Centre for Industrial Collaboration and Engagement (CICE)	2
1.4 Problem Statement	2
1.5 Objectives	3
1.6 Project Scope	3
1.7 Organisational report	6
1.8 Conclusion	7
CHAPTER 2: LITERATURE REVIEW	8
2.1 Introduction	8
2.2 An Overview of Data Management System	8
2.3 Industry Relationship Management Versus Customer Relationship Management	10
2.4 The Current and Future Status of Customer Relationship Management (CRM)	11
2.5 An Overview of Collaborative Filtering (CF) Technique	13
2.6 Challenges When Embedded Collaborative Filtering (CF) Technique	17
2.7 Comparison of Current CRM Software	19
2.7.1 Salesforce	19
2.7.2 HubSpot	20
2.7.3 Pipedrive	20
2.8 Conclusion	23
CHAPTER 3: METHODOLOGY	24

UMS
UNIVERSITI MALAYSIA SABAH

3.1 Introduction 24
3.2 Methodology for UMS-IDMS development 24
Phase 1: Literature Review 25
Phase 2: User and System Requirements Gathering and Analysis 26
Phase 3: System Design Of UMS-IDMS 27
Phase 4: Implementation of Collaborative Filtering (CF) In UMS-IDMS 27
Phase 5: Testing and Evaluation 27
Phase 6: Deployment 28
Phase 7: Report writing and documentation 28
3.3 Software and Hardware Requirement 28
3.4 Conclusion 29
CHAPTER 4: PRELIMINARY SYSTEM DESIGN 30
4.1 Introduction 30
4.2 Interview Finding 30
4.3 System Design 31
4.3.1 Data Flow Diagram (DFD) 31
4.3.2 Entity Relationship Diagram (ERD) 35
4.3.3 Data Dictionary 36
4.3.4 User Interface Design 41
CHAPTER 5: RESEARCH IMPLEMENTATION/EXPERIMENT 45
5.1 Introduction 45
5.2 Jupyter Notebook 45
5.3 Collaborative Filtering (CF) Technique Recommendation Procedure 45
5.4 Conclusion 55
CHAPTER 6: IMPLEMENTATION OF UMS-IDMS 56
6.1 Introduction 56
6.2 Screenshots of System Interface 56
6.2.1 Login Module of UMS-IDMS 57
6.2.2 Dashboard Module of UMS-IDMS 57
6.2.3 Company Module of UMS-IDMS 58
6.2.4 Company Person-in-Charge Module of UMS-IDMS 60
6.2.5 Engagement Module of UMS-IDMS 61
6.2.6 Engagement Report Module of UMS-IDMS 62

UNIVERSITI MALAYSIA SABAH
UMS
UNIVERSITI MALAYSIA SABAH

6.2.7 Rating Module of UMS-IDMS 63
6.2.8 Faculty Module of UMS-IDMS 64
6.2.9 Faculty Person-in-Charge Module of UMS-IDMS 66
6.2.10 Account Module of UMS-IDMS 67
6.2.11 Announcement Module of UMS-IDMS 68
6.2.12 Quick Stat Module of UMS-IDMS 70
6.2.13 Settings Module of UMS-IDMS 71
6.3 IDE Platform 71
6.4 Backend implementation 72
6.5 Conclusion 72
CHAPTER 7: TESTING AND EVALUATION 73
7.1 Introduction 73
7.2 Preliminary Testing 73
7.3 System Usability Scale (SUS) 86
7.3.1 Questionnaire for System Usability Scale (SUS) 86
7.3.2 Calculation for System Usability Scale (SUS) 93
7.4 Conclusion 95
CHAPTER 8: CONCLUSION 96
8.1 Conclusion 96
8.2 Limitation of Project 97
8.3 Future Work 97
References 98
Appendix A 100
Appendix B 102
Appendix C 102
Appendix D 102

UMS
UNIVERSITI MALAYSIA SABAH

LIST OF TABLES

		Page
Table 1.6.1 :	Functionalities of Each Module	6
Table 2.5.1 :	Characteristics of Collaborative Filtering Techniques	16
Table 2.7.1 :	Comparison of Existing CRM Software	23
Table 3.3.1 :	Hardware specification	29
Table 3.3.2 :	Software specification	30
Table 4.3.1 :	Table in Database	38
Table 4.3.2 :	Data Dictionary for Accounts Table	38
Table 4.3.3 :	Data Dictionary for Announcements Table	38
Table 4.3.4 :	Data Dictionary for Company's Images Table	39
Table 4.3.5 :	Data Dictionary for Company Table	40
Table 4.3.6 :	Data Dictionary for Company's Person-In-Charge Table	40
Table 4.3.7 :	Data Dictionary for Engagement Table	40
Table 4.3.8 :	Data Dictionary for Engagement's Images Table	41
Table 4.3.9 :	Data Dictionary for Faculty's Images Table	41
Table 4.3.10 :	Data Dictionary for Faculty Table	42
Table 4.3.11 :	Data Dictionary for Faculty's Person-In-Charge Table	42
Table 4.3.12 :	Data Dictionary for Rating Details Table	42
Table 4.3.13 :	Data Dictionary for Rating Table	42
Table 7.2.1 :	Integration Testing for UMS-IDMS Login Module	77
Table 7.3.1 :	Unit Testing for Login In UMS-IDMS	78
Table 7.3.2 :	Unit Testing for Dashboard In UMS-IDMS	79
Table 7.3.3 :	Unit Testing for Company In UMS-IDMS	80
Table 7.3.4 :	Unit Testing for Engagement In UMS-IDMS	82
Table 7.3.5 :	Unit Testing for Faculty In UMS-IDMS	84

UNIVERSITI MALAYSIA SABAH

Table 7.3.6 : Unit Testing for Rating In UMS-IDMS 85

Table 7.3.7 : Unit Testing for Manage User In UMS-IDMS 86

Table 7.3.8 : Unit Testing for Announcement In UMS-IDMS 86

Table 7.3.9 : Unit Testing for Setting In UMS-IDMS 87

Table 7.4.1 : Questionnaire for System Usability Scale (SUS) 88

Table 7.4.2 : System Usability Scale (SUS) Scale Table 95

UMS
UNIVERSITI MALAYSIA SABAH

LIST OF FIGURES

			Page
Figure 2.4.1	:	Evolution Of The Technological And Management Approaches	12
Figure 2.5.1	:	Categories in Recommendation System	14
Figure 2.7.1.1	:	Salesforce Software	19
Figure 2.7.2.1	:	HubSpot software	20
Figure 2.7.3.1	:	Pipedrive software	21
Figure 3.2.1	:	Waterfall Model	26
Figure 3.2.2 5	:	Steps to Conduct User Interview	27
Figure 4.3.1	:	Level 0 DFD - UMS-IDMS	32
Figure 4.3.2	:	DFD Level 1 - Register Process	33
Figure 4.3.3	:	DFD Level 1 - Login Process	33
Figure 4.3.4	:	DFD Level 1 - Dashboard Process	34
Figure 4.3.5	:	DFD Level 1 - Profile Details Process	34
Figure 4.3.6	:	DFD Level 1 - CF Technique Recommendation Process	35
Figure 4.3.7	:	DFD Level 1 - Manage Data Process	35
Figure 4.3.8	:	DFD Level 1 - Rating Process	36
Figure 4.3.9	:	DFD Level 1 - Generate Report Process	36
Figure 4.3.10	:	Entity Relationship Diagram for UMS-IDMS	37
Figure 4.3.11	:	Dashboard Interface Design	43
Figure 4.3.12	:	Activity Interface Design	43
Figure 4.3.13	:	Login Interface Design	44
Figure 4.3.14	:	Company List Interface Design	45
Figure 4.3.15	:	Create New Engagement Interface Design	45
Figure 5.3.1	:	Experiment for Flow Chart	47

UMS
UNIVERSITI MALAYSIA SABAH

Figure 5.3.2	:	Import Library for Jupyter Notebook	48
Figure 5.3.3	:	Creating Table From Files	48
Figure 5.3.4	:	Merged Table	48
Figure 5.3.5	:	Code of Pivot Table	49
Figure 5.3.6	:	Formula of Pearson's Correlation Coefficient	49
Figure 5.3.7	:	Steps for Drop Ratings and Pearson's Correlation Coefficient Method	49
Figure 5.3.8	:	Data Frame After Pearson's Correlation Method	50
Figure 5.3.9	:	Recommendation Method	50
Figure 5.3.10	:	Creating Data Frame for Recommended List	51
Figure 5.3.11	:	Data Frame for Similar Company	52
Figure 5.3.12	:	Sum Up the Values in Data Frame	52
Figure 5.3.13	:	Data Fame of Recommendation List	53
Figure 5.3.14	:	Data for Dummy User 2	53
Figure 5.3.15	:	Data Frame of Recommendation List for Dummy User 2	54
Figure 5.3.16	:	Data for Dummy User 3	54
Figure 5.3.17	:	Data Frame of Recommendation List for Dummy User 3	55
Figure 5.3.18	:	Formula of Euclidean Distance	55
Figure 5.3.19	:	Formula for User Based Collaborative Filtering	56
Figure 6.2.1	:	Login Module of UMS-IDMS	58
Figure 6.2.2	:	Dashboard Module of UMS-IDMS	58
Figure 6.2.3	:	Company Main Page of UMS-IDMS	59
Figure 6.2.4	:	Create Company of UMS-IDMS	59
Figure 6.2.5	:	Company Detail of UMS-IDMS	60
Figure 6.2.6	:	Company Files of UMS-IDMS	60
Figure 6.2.7	:	Company PIC Module of UMS-IDMS	61

UNIVERSITI MALAYSIA SABAH

Figure 6.2.8 : Create Company PIC of UMS-IDMS 61
Figure 6.2.9 : Engagement Main Page of UMS-IDMS 62
Figure 6.2.10 : Create New Engagement of UMS-IDM 62
Figure 6.2.11 : Engagement Detail of UMS-IDMS 63
Figure 6.2.12 : Generate Engagement Report of UMS-IDMS 63
Figure 6.2.13 : Engagement Report of UMS-IDMS 64
Figure 6.2.14 : Rating Main Page of UMS-IDMS 64
Figure 6.2.15 : Rating Detail of UMS-IDMS 65
Figure 6.2.16 : Faculty Module of UMS-IDMS 65
Figure 6.2.17 : Create New Faculty of UMS-IDMS 66
Figure 6.2.18 : Faculty Detail of UMS-IDMS 66
Figure 6.2.19 : Faculty PIC Module of UMS-IDMS 67
Figure 6.2.20 : Create Faculty PIC of UMS-IDMS 67
Figure 6.2.21 : Edit Faculty PIC of UMS-IDMS 67
Figure 6.2.22 : Account Module of UMS-IDMS 68
Figure 6.2.23 : Create New Account of UMS-IDMS 68
Figure 6.2.24 : Account Detail of UMS-IDMS 69
Figure 6.2.25 : Announcement Module of UMS-IDMS 69
Figure 6.2.26 : Create Announcement of UMS-IDMS 70
Figure 6.2.27 : Edit Announcement of UMS-IDMS 70
Figure 6.2.28 : Quick Stat of UMS-IDMS 71
Figure 6.2.29 : Engagement Quick Stat of UMS-IDMS 71
Figure 6.2.30 : Setting Module of UMS-IDMS 72
Figure 6.3.1 : Visual Studio Code Platform 72
Figure 6.4.1 : phpMyAdmin Backend Implementation 73
Figure 7.3.1 : Number of User Answered Form Based on Gender 88

UMS
UNIVERSITI MALAYSIA SABAH

Figure 7.3.2	:	System Usability Scale (SUS) Questionnaire Question 1	89
Figure 7.3.3	:	System Usability Scale (SUS) Questionnaire Question 2	89
Figure 7.3.4	:	System Usability Scale (SUS) Questionnaire Question 3	90
Figure 7.3.5	:	System Usability Scale (SUS) Questionnaire Question 4	90
Figure 7.3.6	:	System Usability Scale (SUS) Questionnaire Question 5	91
Figure 7.3.7	:	System Usability Scale (SUS) Questionnaire Question 6	91
Figure 7.3.8	:	System Usability Scale (SUS) Questionnaire Question 7	92
Figure 7.3.9	:	System Usability Scale (SUS) Questionnaire Question 8	92
Figure 7.3.10	:	System Usability Scale (SUS) Questionnaire Question 9	93
Figure 7.3.11	:	System Usability Scale (SUS) Questionnaire Question 10	93
Figure 7.3.12	:	Equation for System Usability Scale (SUS)	94
Figure 7.3.13	:	Result of the Questionnaire for System Usability Scale (SUS)	94

UMS
UNIVERSITI MALAYSIA SABAH

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter presents an overview of the proposed final year project. First, a brief concept about University-Industry-Government Relationship is being explained, followed by the background study. Next, the problem statement, objectives, and scope are discussed. Lastly, the organisation of the report is presented.

1.2 Concept of University-Industry-Government Relationship

For over some decades, every university has continuously developed a cooperative and long-lasting relationship directly or indirectly with the industry partners and government agencies to raise the economy and entrepreneurship. The collaborative effort between these three separate entities: academia, industry, and the government, is critical as these entities can share their resources and knowledge efficiently to get to their innovation goals and perform as the central processor for the growth of the economic (Saad, 2017). The University-industry-government collaborations and relationships are also known as the triple helix model. These UIG relationships are critical for improved overall student employability (Salleh & Omar ,2013), unique opportunities for the campus students and staff. Villanueva-Felez et al. (2010) effective and higher productions Malairaja & Zawdie (2016), With the cooperation between the university and the company, they will do well in terms of product and service efficiency, cost competitiveness, and market share. When the era of more advanced innovations is coming, universities, industry, and government focus on achieving the best and brightest of the future (Alayoubi et al., 2020).

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1.3 UMS Centre for Industrial Collaboration and Engagement (CICE)

UMS Centre for Industrial Collaboration and Engagement (CICE) is an established ONE-STOP CENTRE to effectively initiate and manage strategic partnerships with the industries and government agencies. CICE's role includes initiating the everyday needs of UMS stakeholders and the industry to share knowledge or technology to support the sustainable development of both the university and industry capability and capacity. The expected impact shall enhance the university's visibility and reputation regarding staff expertise, benefitting its progressive aspirations for excellence (CICE, 2020).

This will create impactful UMS-industry collaboration & engagement outcomes based on relevance to the current national development plan. In addition, the expected impact shall enhance the university's visibility & reputation in terms of staff expertise, benefiting its progressive aspirations for excellence. The UMS-Industry-Government relationship aims to aid in realising UMS as an innovative and recognised institution globally, relevant, referred to, and respected. By forming strategic and intelligent partnerships with government agencies, industry, and the community in achieving holistic and balanced human capital development that is financially sustainable and managed efficiently.

Consequently, CICE was established to help UMS improve their collaborative relationship with industry and government. With the help of CICE, UMS will create more and maintain a supportive partnership with their industry partners and government agencies for further collaborative engagement. However, as the current business systems are limited, CICE needs to keep their partners' details and what they have done and even suggest a future collaboration.

1.4 Problem Statement

Currently, CICE does not have any data management system to keep track of its industry partners and what has been done between industries and faculties. All recorded details are done manually in Microsoft Excel. CICE will email the faculty every three months a year to get the engagement data in excel format. There is no

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data visualisation on the industry engagement conducted by each faculty every year with respective industries, agencies and society. A collaborative filtering technique will be used in the system.

1.5 Objectives

Three objectives need to be achieved in this study which are:

i. To investigate the Collaborative filtering (CF) techniques for industry engagement recommendations in the web-based system.

ii. To develop the (UMS)Industry Data Management System (UMS-IDMS).

iii. To evaluate the usability of the developed proposed (UMS) Industry Data Management System (UMS-IDMS) using the System Usability Scale (SUS) approach.

1.6 Project Scope

This proposed system target users are the CICE staff and focal faculty coordinators. The team of the CICE can manage the system to input the industry and society activities information and update the data. All the records will update and store in the database. The projection will mainly focus on web-based for the user to use the system anytime and anywhere. In UMS-IDMS, there is three users type which are Administrator, CICE Staff and Faculty Coordinator. All the faculties can also add or update the information inside the UMS-IDMS. For admin, it is responsible for coordinating the other modules. The CICE staff to enter industrial companies and organisation community details and modify them when necessary. For faculty coordinator, it refers to a faculty representative who is going to use this system.

Type of User:

- Admin
    - This module is responsible for coordinating the other modules. It allows the administrator to set up CICE staff and faculty coordinator

UNIVERSITI MALAYSIA SABAH

with their respective details. It will enable the administrator to enter all information about faculty, department, etc. It allows the admin to have a global view of the centre record, view registered users, and generate reports. It also allows the administrator to create a new industry or social engagement activity, assign it to industrial companies or organisation communities, and manage them.

- CICE Staff
  - This module allows the staff to enter industrial companies and organisation community details and modify them when necessary. It also can create and view industry/community engagement activity.

- Faculty Coordinator
  - This user refers to a faculty representative who will use this system and with who they will collaborate.

Table 1.6.1: Functionalities of Each Module

Module	**Sub-module**	**Description**
Login & Logout	Login & Logout	User can log in to the system and log out from the system.
Dashboard	Activity Analysis	This module provided for the admin to be able to monitor the activities inside the system. The system will auto-generate a chart for current data for other users and show the user of the upcoming event between the university and industry.
Account Management	User Registration	Create new user details.
	Manage User	Display the inquiry.
	Update Password	Update user's password.
	Create company	Create New Company profile

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Company Management	Update company	Update Company profile
	Delete company	Delete the whole company profile
	Company Files	Upload all the files and photos related to the company
Company Person in Charge Management	Create Company PIC	Create PIC details
	Update Company PIC	Update the person in charge.
	Delete Company PIC	Delete the person in charge.
Faculty Management	Create Faculty	Create New faculty profile
	Update Faculty	Update faculty profile
	Delete Faculty	Delete the whole faculty profile
	Faculty Files	Upload all the files and photos related to the faculty
Faculty Person in Charge Management	Create Faculty PIC	Create PIC details
	Update Faculty PIC	Update the person in charge.
	Delete Faculty PIC	Delete the person in charge.
Engagement Management	Add new engagement	Insert new engagement.
	Update engagement	Update engagement details
	Delete engagement	Delete the engagement
	Generate report	It can generate reports of details and analyse the information. They can also print the report and save it in pdf form.
Rating	Company and Engagement Details	User can view the engagements of the company done and the details of the profile and then rate the company
Quick Stat	Total Company According to Past 12 Months	User can view the total company according to past 12 months

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	Low Rating Company	User can view Low Rating Company
	High Rating Company	User can view High Rating Company
	No Rating Company	User can view No Rating Company
	Total Engagement According to Past 12 Months	User can view Total Engagement According to Past 12 Months
	Low Rating of Engagement	User can view Low Rating of Engagement
	High Rating of Engagement	User can view High Rating of Engagement
	Upcoming Engagement	User can view Upcoming Engagement
	Completed Engagement	User can view total Completed Engagement
Announcements	Create, Read, Update and Delete the announcements.	The announcement can be shown in the dashboard of the user to know what announcement has announced.

1.7 Organisational report

This report will cover six chapters: Chapter 1, Chapter 2, Chapter 3, Chapter 4, Chapter 5, and Chapter 6.

Chapter 1 discusses the concept of the University-Industry-Government Relationship, the background of the study, problem statements, project objective, and scope of a project.

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Next, Chapter 2 discussed the literature review of a study for supporting this title project. First, a literature review will define Customer Relationship Management (CRM) and the database used in the proposed system. Next, the Collaborative filtering (CF) technique will be described, and how is machine learning used together with CF.

Furthermore, Chapter 3 discussed the methodology of this project's technique and the software and hardware requirements for the system to run smoothly.

Chapter 4 consisted of the system analysis and designed the use case diagram, Data flow diagrams (DFD) and Entity Relationship Diagram (ERD). Use care description will be included as how is the system works when the user is going to operate the system.

Chapter 5 is the research implementation/experiment where all five modules are implemented to ensure the system will run without errors.

Finally, Chapter 6 consisted of a conclusion that summarises this report. This includes Chapter 1 until Chapter 6, such as problem statement, system comparison, project objective, system development, and conclusion in what will be added or improved in Final Year Project II for next sem.

1.8 Conclusion

In conclusion, UMS-IDMS in CICE can perform the valuable function of maintaining records of contact details between CICE and the partners with whom it is engaging. UMS-IDMS allows the CICE staff to monitor the industry and community engagement activity quickly and efficiently with the help of a faculty representative to enter the data. This project aims to develop a system with similar purposes to CRM specifically for CICE and powered by machine learning with Collaborative filtering (CF) technique to enhance the user experience and save time for the upcoming future. This system is mainly used to centralise a database where all details are kept in one place and easy to access anytime.

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter presents the prior literature related to the development of UMS-IDMS. The review begins with an overview of a database management system. The proposed system UMS-IDMS is a system that manages all the data about the industry and society, such as the historical event done, what project has been collaborated and so on. The system can visualise the data of industry and society and also their relationship with them. UMS-IDMS is a data management system that uses the concept of Customer Relationship Management (CRM). CRM will be used as the concept of UMS-IDMS because CRM is a well-known system in managing the relationship between customer and company, which is similar to the relationship between university, industry, and government proposed in this project. The difference between UMS-IDMS and CRM is UMS-IDMS can manage both industry and society and the relationship between them. After that, why is the approach needed and the system's current status will also be explained in this chapter. Next, according to the objectives in chapter one, the Collaborative Filtering (CF) technique will be defined and explained, and the advantages will be shown. What are the challenges when developing the system using the Collaborative Filtering (CF) technique? Finally, a comparison between the existing designs in the marketplace will be included in the chapter.

2.2 An Overview of Data Management System

A data management system is an interface that connects with the database using the database management system (DBMS). This system can control the database, applications, and users can access the system interface. There are different data management systems: a hierarchical database, a network database, a relational

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