### SIR M VISVESVARAYA INSTITUTE OF TECHNOLOGY BANGALORE -562157

#### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING



### **CERTIFICATE**

It is certified that the project work entitled "Bio-Me: A Fingerprint Authentication and Identity Information System" is a bona fide work carried out by Ankita K Karnad (1MV13CS017) and Arpita R (1MV13CS020) in partial fulfillment for the award of the Degree of Bachelor of Engineering in Computer Science and Engineering of the Visvesvaraya Technological University, Belgaum during the year 2016-2017. It is certified that all corrections and suggestions indicated for Internal Assessment have been incorporated in the report. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the course of Bachelor of Engineering.

Name & Signature
of Guide

Name & Signature of HOD

Name & Signature of Principal

Mrs. Sushila Shidnal Asst. Prof & Internal Guide Dept. Of CSE, Sir MVIT Bangalore - 562157

**Prof. Dilip K. Sen** HOD, Dept of CSE Sir MVIT Bangalore - 562157

Prof. K. R. Kini
Prinicpal
Sir MVIT
Bangalore – 562157

External Examination:

Name of the examiners

Signature with date

1)

2)

#### ACKNOWLEDGMENT

It gives us immense pleasure to express our sincere gratitude to the management of **Sir M. Visvesvaraya Institute of Technology,** Bangalore for providing the opportunity and the resources to accomplish our project work in their premises.

On the path of learning, the presence of an experienced guide is indispensable and we would like to thank our guide **Mrs. Sushila Shidnal**, Assistant Professor, Dept. of CSE, for her invaluable help and guidance.

We would like to express our thanks to our mentors at Herman Miller, Mr Jan Mohammed and Mrs. Pushpa Linganna. Our sincere thanks to Mrs. Pooja Verma, Mr Sudeep Niambar, Mr Naveen, Mr. Sriram and Mr Sudhindhra for their valuable help.

We would also like to convey our regards and sincere thanks to **Prof. Dilip K. Sen,** HOD, Dept. of CSE for his suggestions, constant support and encouragement.

Heartfelt and sincere thanks to **Prof. K R Kini,** Principal, Sir. MVIT for providing us with the infrastructure and facilities needed to develop our project.

We would also like to thank the staff of Department of Computer Science and Engineering and lab-in-charges for their co-operation and suggestions.

Finally, we would like to thank all our friends for their help and suggestions without which completing this project would not have been possible.

-Arpita R (1MV13CS020)

-Ankita K Karnad (1MV013CS017)

## **DECLARATION**

We hereby declare that the entire project vecarried out by us and no part has been submitted previously.	work embodied in this dissertation has been for any degree or diploma of any institution
Place: Bangalore	
Date:	Signature of Students:
	Ankita K Karnad (1MV013CS017)
	Arpita R (1MV13CS020)

#### **ABSTRACT**

India suffers from a growing epidemic of missing children with an average of 180 children going missing per day. Elderly suffering from memory loss have the tendency to wander around and forget their way back to their homes. To identify these individuals, newspapers and social media are used to spread the word. With Bio-Me, we intend to change that.

Bio-Me is a biometric solution for the identification of *lost children and senior citizens*, *runaways and incapacitated or delirious individuals*. It uses Fingerprint Authentication technology to do this. It is a desktop application supported by a Bio-Me database to store the biometric and demographic data of the individuals. The enBioScan-C1 HFDU08 Fingerprint Scanner is used to capture the fingerprints and using the Nitgen's enBSP SDK for matching the fingerprints, authentication is performed. The fingerprints are safe from misuse as they are stored as a secure template from which the fingerprints cannot be reproduced.

Bio-Me can be integrated with India's national ID program, *Aadhar*. Hence, the usernames of all users are their Aadhar Numbers (UIDs).

The Bio-Me app has an easy to use UI and hence can be comfortably operated by both IT savvy as well as the technologically naïve. It can be deployed at Police stations, Hospitals etc. thus eliminating an unstructured and haphazard search process.

Bio-Me: Your identity at a touch!

# TABLE OF CONTENTS

Certificate	I
Acknowledgement	II
Declaration	III
Abstract	IV
Table of Contents	V
List of Figures.	VIII
List of Tables	IX
Chapter 1 INTRODUCTION	1
1.1 Our Name and Logo	2
1.2 Motivation	3
1.3 Purpose	3
1.4 Applicability	3
Chapter 2 LITERATURE SURVEY	4
2.1 Overview of Biometrics	5
2.1.1 Requirements of Biometrics	5
2.1.2 Comparison of Biometrics	6
2.2 Fingerprints	6
2.2.1 Types of Fingerprints	7
2.3 Identification and Authentication Systems	7
2.4 Fingerprint Identification Approach	8
2.4.1 Fingerprint Sensors	9
2.4.2 Fingerprint Matching Algorithms	10
Chapter 3 SYSTEM REQUIREMENTS	11
3.1 Hardware Requirements	13
3.2 Software Requirements	13
Chapter 4 SYSTEM DESIGN AND ANALYSIS	14
4.1 Overview of Biome	15
4.2 Roles in Bio-Me	16
4.3 Modules of Bio-Me	17
4.4 Use Case Diagram	18
4.5 Flowchart of Bio-Me	19

4.6 B10-Me L	vatabase Schema	20
4.8 Bio-Me D	Oatabase	21
<b>Chapter 5 IMPLEM</b>	MENTATION	22
5.1 Gantt Cha	nrt	23
5.2 Language	Used	25
5.2.1	C#	25
5.2.2 1	Features of C#	25
5.3 Framewor	rk	29
5.3.1	Microsoft .NET	29
5.3.2	Versions of .NET	30
5.3.3	Design Principles	30
5.4 User Inter	face	33
5.4.1	Forms	33
5.4.2	WinForms	33
5.4.3	Bio-Me Forms	34
5.5 Microsoft	Visual Studio.	35
5.5.1	Designer	36
5.5.6	Debugger	37
5.6 SQL		39
5.6.1	Language elements	39
5.6.2	Advantages of SQL	40
5.7 Bio-Me C	perating Instructions	41
<b>Chapter 6 SOURCE</b>	E CODE	43
6.1 User Regi	istration	43
6.2 Front End	L	67
6.3 Login		72
6.4 Print the p	page	74
6.5 Automate	d E-mail sending	77
6.6 Stored Pro	ocedures	78
6.6.1	Sp_welcome_login	78
6.6.2	Sp_Reg_On_submit	79
6.6.3	Sp_pending_form_update	80
6.6.4	Sp_Resetpassword	81

Chapter 7 TESTING	82
7.1 Introduction	83
7.2 Unit Testing	84
7.3 System Testing	84
7.4 Bio-Me Test Cases	85
Chapter 8 SNAPSHOTS	87
CONCLUSION	101
FUTURE ENHANCEMENTS	102
RIRI IOCRAPHV	103

## LIST OF FIGURES

Sl. No.	Title Page	No.
1	Bio-Me Logo	2
2	Types of Fingerprints	7
3	Minutiae	8
4	Concept of SEIR	9
5	Minutiae Feature Extraction-based algorithm Flowchart	10
6	Overview of Biome	15
7	Roles in Bio-Me	16
8	Modules of Bio-Me	17
9	Use Case Diagram	18
10	Flowchart of Bio-Me	19
11	Bio-Me Database Schema	20
12	Gantt Chart of Bio-Me	24
13	The .NET Framework	29
14	NET Versions and their services	30
15	Database Settings Form	88
16	E-mail Settings Form	89
17	Welcome Page	90
18	Home Page	91
19	Control Panel-User Settings	92
20	Control Panel-Roles Settings	92
21	Control Panel-Permission Settings	93
22	Control Panel-User Role Mapping Settings	93
23	Control Panel-Agency Settings	94
24	Control Panel-Audit Log Settings	94

25	Pending Cases Form	95
26	Resolved Cases Form	95
27	Report Incident Form	96
28	Reset Password Form	96
29	User Registration Form	97
30	On clicking Scan	98
31	On Successful Search	99
32	On Unsuccessful Search	100
	LIST OF TABLES	
Sl. No.	Title	Page No.
1	Comparison of Biometrics	6
2	Bio-Me Test Cases	85