



Bahria University
Discovering Knowledge

FINAL YEAR PROJECT REPORT

INTELLIGENT COMMUNICATION SYSTEM (ICS)

**In fulfillment of the requirement for degree of
Bachelors in Computer Engineering (BCE)**

By

**SHAHEER AHMED KHAN
SYED FOUZAN HASAN
SYED BASSAM ALI**

**64997
64983
65019**

**SUPERVISED BY
ENGR. USRA SAMI**

BAHRIA UNIVERSITY (KARACHI CAMPUS)

SPRING-2023

Bahria University (Karachi Campus)**Submission Performa**

Name (1) Shaheer Ahmed Khan
 (2) Syed Muhammad Fouzan Hasan
 (3) Syed Bassam Ali

Address (1) BUKC
 (2) BUKC
 (3) BUKC


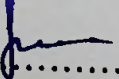
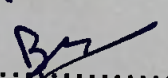
Title of Report: Intelligent Communication System (ICS).

Project Supervisor's Name: Engr. Usra Sami.

This report is submitted as required for the Project in accordance with the rules laid down by the Bahria University as part of the requirements for the award of the degree of Bachelor of Engineering. I/We declare that the work presented in this report is my/our own except where due reference or acknowledgement is given to the work of others.

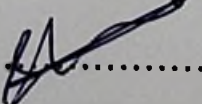
Signatures of students

Date

(1).....  18/7/2023
 (2).....  18-7-2023
 (3).....  18/7/2023

Signature of Supervisor

Date

.....  18/7/2023



Intellectual Property Right Declaration

This is to declare that the work done under the supervision of **Engr. Usra Sami** having title “**Intelligent Communication System (ICS)**” carried out in partial fulfillment of the requirements of Bachelors of Engineering in Computer Engineering, is the sole property of Bahria University and is protected under the Intellectual Property right laws and conventions. Bahria University asserts legal and beneficial ownership rights over all Intellectual Property developed as a result of support either directly from or channeled through Bahria University, or created at the request or direction of Bahria University, or developed as a result of utilization of Bahria University Resources including copyright in any material. It can only be considered/ used for purposes like extension for further enhancement, product development, adoption for commercial/organizational usage, etc., with the permission of the university and in adherence to its policies.

The above statements apply to all students and faculty members.

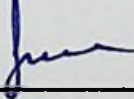
Date: June, 1st 2023

Author(s):

Name: Shaheer Ahmed Khan

Signature: 

Name: Syed Muhammad Fouzan Hasan

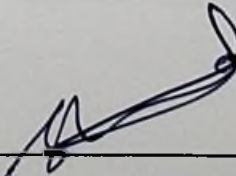
Signature: 

Name: Syed Bassam Ali

Signature: 

Supervisor(s):

Name: Engr. Usra Sami

Signature: 

Acknowledgments

Final Year Project is a demonstration for undergraduate students which is combination of teamwork and implementation of theoretical and practical knowledge. It enhances abilities of students to step up in their field. With this willingness, we affiliated with this project.

In the successful accomplishment of our project, we would like to express our sincere gratitude and appreciate those people who are actively involved in our project.

Foremost, all thanks to **Allah (S. W. T)** for being able to compete with a great feat in these endeavors and helped out to make our project successful.

Next, we are highly obliged in taking the opportunity to sincerely thank our project Coordinator **Dr. Rizwan Iqbal** for helping us in managing and other project tasks. We also want our deepest thanks to the Head of CE department **Dr. Shoaib Mughal** for his support and kind cooperation in our difficult phases. Lastly, all of our team express great appreciation and special thanks to our project supervisor **Engr. Usra Sami** for guiding, monitoring, and support us throughout the project lifecycle with his great experience and knowledge.

Abstract

Deaf and dumb individuals in the modern world face a significant communication gap due to limited sign language proficiency among the general population, reliance on interpreters, and challenges with written and digital communication. This communication gap hampers their ability to express themselves, understand others, and fully participate in various aspects of life, including education, employment, and social interactions.

“**Intelligent Communication System (ICS)**” represents a significant advancement in assistive technology, empowering deaf and dumb individuals to express themselves and engage more fully with the world around them. By bridging the gap between sign language and spoken or written language, this project brings forth a new era of communication accessibility, promoting inclusivity and breaking down barriers for individuals with hearing and speech impairments.

Table of Contents

Contents

1. INTRODUCTION	1
1.1 PURPOSE OF THIS PROJECT	1
1.2 COMPLEX ENGINEERING PROBLEM STATEMENT	2
1.3 OBJECTIVE OF THIS PROJECT	2
1.4 SCOPE OF THE PROJECT.....	2
1.5 PURPOSE OF THE DOCUMENT.....	3
1.6 MODULES IN THE PROJECT	3
1.7 GENERAL OVERVIEW AND DESIGN GUIDELINES/APPROACH	4
2. BACKGROUND AND LITERATURE REVIEW	6
2.1 EXISTING SYSTEMS.....	6
2.1.1 <i>Existing Systems Description</i>	7
2.1.2 <i>Problems in the Existing Systems</i>	7
2.2 RELATED WORK.....	7
3. SYSTEM ANALYSIS.....	8
3.1 WORK ANALYSIS	8
3.1.1 <i>Work Flow Diagram</i>	10
3.1.2 <i>Work Breakdown Structure</i>	13
3.2 DATA ANALYSIS.....	13
3.2.1 <i>Data Flow Diagram</i>	14
3.3 SYSTEM REQUIREMENTS	15
3.3.1 <i>Clients, Customer and Users</i>	15
3.3.2 <i>Resource Requirements</i>	16
3.3.3 <i>Data Requirements</i>	17
3.3.4 <i>Non-Functional Requirements</i>	17
3.4 PROPOSED SOLUTION.....	18
4. SYSTEM DESIGN.....	20
4.1 PROJECT MODULES.....	20
4.2 DESIGN CONSTRAINTS.....	20
4.3 HARDWARE AND SOFTWARE ENVIRONMENT	20
4.3.1 <i>Hardware</i>	20
4.3.2 <i>Software</i>	21
4.4 ARCHITECTURAL STRATEGIES.....	21
4.4.1 <i>Algorithm to be used</i>	22
4.4.2 <i>Development Method</i>	23
4.5 PROJECT MANAGEMENT STRATEGIES.....	23
4.5.1 <i>PROJECT SCHEDULE</i>	24
4.5.2 <i>GANTT CHART</i>	24

4.5.3	<i>QUALITY MANAGEMENT</i>	25
4.5.4	<i>HUMAN RESOURCE MANAGEMENT</i>	25
4.5.5	<i>RISK MANAGEMENT</i>	25
4.6	DATA CONVERSIONS.....	25
4.7	APPLICATION PROGRAM INTERFACES	26
4.8	USER INTERFACE.....	27
4.9	DATABASE DESIGN.....	45
4.10	PERFORMANCE	46
4.11	ARCHITECTURE DESIGN	46
4.11.1	<i>Logical View</i>	47
4.11.2	<i>HARDWARE ARCHITECTURE</i>	49
4.11.3	<i>SOFTWARE ARCHITECTURE</i>	50
4.11.4	<i>SECURITY ARCHITECTURE</i>	51
4.12	USE-CASE	52
5.	IMPLEMENTATION	55
5.1	IMPLEMETING CODE.....	55
5.2	ARDUINO NANO	57
5.3	FLEX SENSORS	57
5.4	BLUETOOTH MODULE	57
5.5	ACCELEROMETER SENSOR	58
5.6	ADAPTER.....	58
5.7	ANDROID.....	58
5.8	SMART GLOVE INTERFACE.....	59
6.	TESTING	60
6.1	PURPOSE OF THE TEST PLAN	60
6.2	FUNCTIONAL TESTING	60
6.2.1	<i>Test Risks / Issues</i>	60
6.2.2	<i>Items to be Tested / Not Tested</i>	60
6.2.3	<i>Test Approach(s)</i>	61
6.2.4	<i>Test Regulatory / Mandate Criteria</i>	61
6.2.5	<i>Test Pass / Fail Criteria</i>	62
6.2.6	<i>Test Entry / Exit Criteria</i>	63
6.2.7	<i>Test Deliverables</i>	64
6.2.8	<i>Test Suspension / Resumption Criteria</i>	66
6.2.9	<i>Test Environmental / Staffing / Training Needs</i>	66
6.3	PERFORMANCE TESTING.....	66
6.3.1	<i>Load Testing</i>	66
6.3.2	<i>Test Risks / Issues</i>	66
6.4	SYSTEM TESTING	67
6.4.1	<i>Test Risks / Issues</i>	67
7.	IMPACT OF PROJECT ON SOCIETY AND ENVIRONMENT	68
8.	RESULTS AND DISCUSSION	69

9. CONCLUSIONS AND FUTURE WORK..... 75
 9.1 CONCLUSION.....75
 9.2 FUTURE WORK.....75

10. REFERENCES..... 76

APPENDICES..... 77
 APPENDIX A..... 77