A Project Report

on

"Human Machine Interaction

Submitted in partial fulfillment of the
Requirement for the award of the degree of

Bachelor of Technology in Computer Science and Engineering

(Established under Galgotias University Uttar Pradesh Act No. 14 of 2011)

Under The Supervision of
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CANDIDATE'S DECLARATION

I/We hereby certify that the work which is being presented in the project, entitled "**Human Machine Interaction**" in partial fulfilment of the requirements for the award of the **BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING**
Submitted in the School of Computing Science and Engineering of **Galgotias University**, Greater Noida is an original work carried out during the period of **JULY-2021 to DECEMBER-2021**, under the supervision of **Mr.Arjun KP**, Assistant Professor, Department of Computer Science and Engineering of School of Computing Science and Engineering , Galgotias University, Greater Noida

The matter presented in the project has not been submitted by me/us for the award of any other degree of this or any other places.

18SCSE1010056–SHIVANI MISHRA
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This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

Supervisor

(Mr.Arjun KP, Assistant Professor)

CERTIFICATE

The Final Project Viva-Voce examination of **18SCSE1010056 –SHIVANI MISHRA, 18SCSE1010263 –SONY SAINI** has been held on _____ and his/her work is recommended for the award of **BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING**.

Signature of Examiner(s)   Signature of Supervisor(s)

Signature of Project Coordinator   Signature of Dean

Date: Place:

ABSTRACT

Human machine interaction (HMI) is a multidisciplinary field of research that focuses on the design of computer technology, especially the interaction between humans (users) and computers. HCI began with computers and has since evolved to practically every aspect of information technology design. It includes both desktop and embedded systems found in a variety of devices. The efficiency with which a user can interact with a technology is the main decider of its success. The user will just ignore the product or technology if the interface is bad or difficult to use. Functionality and usability are the most essential parts in HCI. Functions refer to the services supplied by a system. Usability refers to how simply, correctly, and clearly a user can use a system's features.

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CHAPTER-1

Introduction

1.1 <u>PURPOSE:</u>

Human–machine interaction (HMI) refers to the communication and interaction between a human and a machine via a user interface. Nowadays, natural user interfaces such as gestures have gained increasing attention as they allow humans to control machines through natural and intuitive behaviours.

1.2 <u>OBJECTIVE:</u>

* Achieve efficient, effective, and safe interaction.

*Put people first.

*Understand the factors that determine how people use technology.

*Develop tools and techniques to enable building suitable systems.

CHAPTER 2
LITERATURE REVIEW/SURVEY

2.1 PROJECT PERSPECTIVE: When pursuing a cognitive **perspective**, researcher of **HMI** may

seek to align computer interfaces with the mental model that humans have of their activities.

2.2 PROJECT FUNCTION: HMI **focuses on increasing user effectiveness and improving user**

computer experiences with organizational systems. It does so by enhancing the user interface through an

understanding of the tasks and organizational contexts in which HMI occurs. HMI is more than just the user

interface.

INDUSTRY SURVEY

A number of surveys covering specific facets of HMI or human factors has been

identified in the course of collecting relevant literature for this paper. The vast

majority of these studies is specifically oriented towards either VR or AR

applications, or both, within operations and, thus, covers only a subset of this paper's

scope. Butters et al. conduct a survey on AR and VR applications in manufacturing

activities, more precisely on the available platform technologies and application

areas, creating a small-scale design space for such Mixed Reality applications in

manufacturing [6]. This design space differentiates among four general application

scenarios and four types of Mixed Reality technology platforms available for

application, respectively. The application scenarios are manufacturing, logistics,
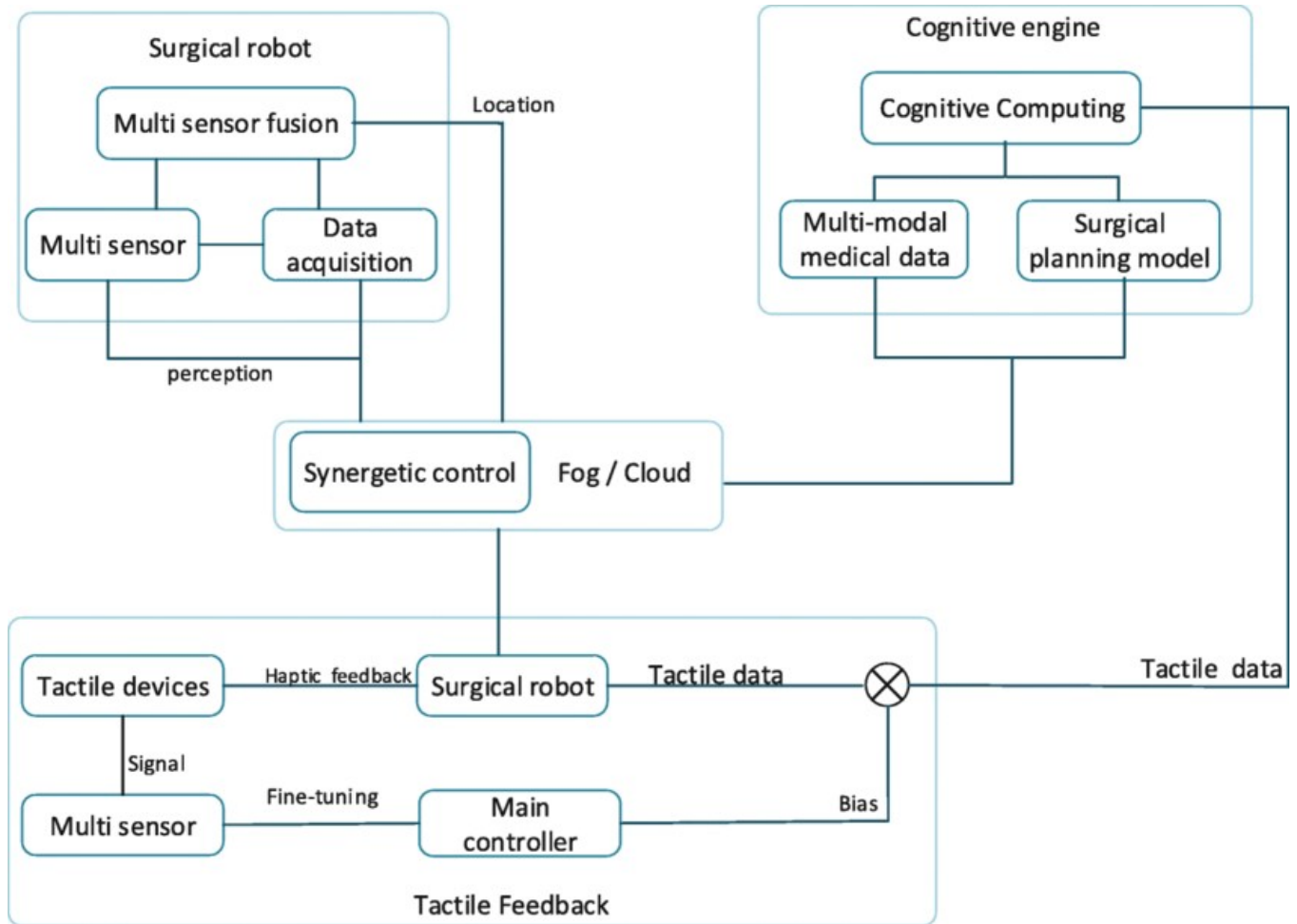
maintenance, or training while the available platforms comprise mobile devices (AR), projection (AR), and head-mounted displays (HMDs) (AR or VR).

A Survey on Human Machine Interaction in Industry they consider applicability of various VR technologies for the phases of concept development, system-level design, and design of details, testing and refinement, and launch of production. Besides those surveys on AR and VR applications, a literature review by Heckle exists on the major challenges as well as skills and competencies needed for future employees under a scenario. The authors utilize the insights from the literature analysis to structure the required skills according to different categories, based on which a competence model is created analyzing employees' levels of skills and competencies which will be particularly important in a working environment. Those main categories for the competence model are technical, methodological, social, and personal competencies.

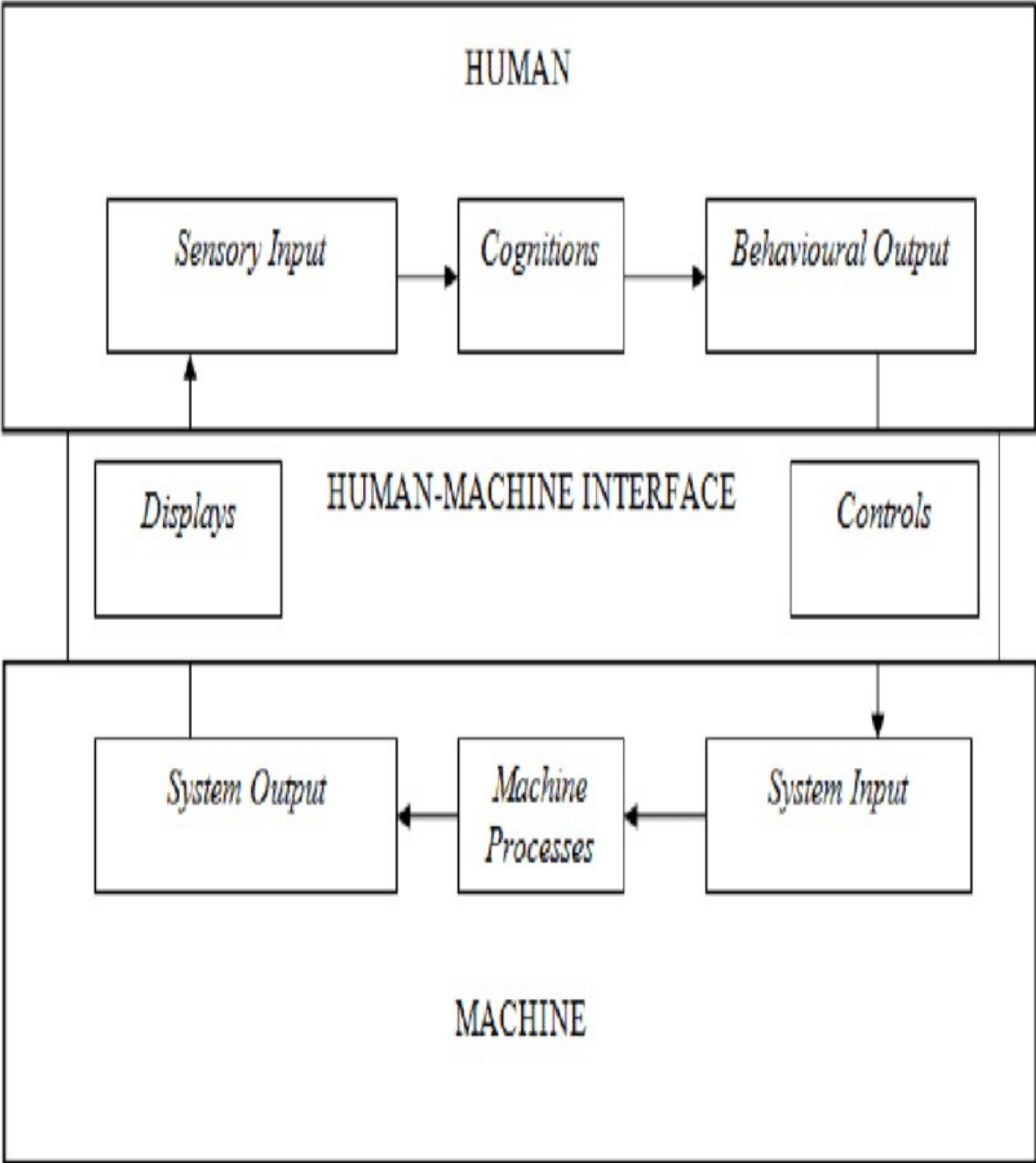## 3.1 UML DIAGRAM:

3.2 PROCESS DIAGRAM:

HUMAN

| Sensory Input | → | Cognitions | → | Behavioural Output |

HUMAN-MACHINE INTERFACE

| Displays | | Controls |

MACHINE

| System Output | ← | Machine Processes | ← | System Input |

CHAPTER 4

IMPLEMENTATION

4.1 Fingerprint Based Voting System:

In this chapter, we will deal with the actual process which we have done to make the design working. The design which was designed earlier will be implemented using the code and structures, with the help of different software so that it works as planned. So let's look over the implementation methods one by one.

Installation of the Drivers All the hardware requires their drivers to run in the system. We are using Secure Hamster Pro 20 as hardware to scan the fingerprint and storing and matching. There are many ways to read the fingerprint, but we are using hybrid technology which is more accurate and will give the efficient way to recognize the fingerprint. And also this process is very fast when compared to other technologies. The hybrid technology will also work if a person's finger is sweating and it will help in clearing that sweat and then identifying the finger. Once the finger Image is scanned and only the useful information we will store in the database. Not the entire fingerprint. So basically, what we are going to do is we take the finger, Scan it with SHP20 and extract the patter in the form of data. Store this data in the database and the remaining will not be stored. At the time of validation, The fingerprint will again be scanned and the useful information will be extracted. This

extracted information will be matched with the database. If it matches, Then the user is a registered voter and then again checks whether the voter has cast the votes or not. If cast the send a pop message saying that you can't cast the vote again as you have cast the vote already. If the user has not cast the vote, The give him the menu to cast the vote. The user can check the profile of the candidate and the photo including the past works and all other information about the user. Drivers play an important role in the working of the hardware. We are using the SHP20 Web API driver of Windows 10 (Version 1.0.0.54). As it includes all the file which we require for Scanning fingerprint, Extracting useful information, And Comparing it with other information. And that's all we need. Our project code will take care of the rest of things.

4.2 Front End

The front end is the major part of any software as the user can only view this part of the software. The front-end would be designed in such a way that it is user-friendly and it can help in smoothly access to the software. If a user can't access the software, it is of no use. So designing the front end is one of the tasks, which needs a lot of Attention, Creativity and Hard work.

4.3 Code:

Admin login page:-

```csharp
using System;
 using System.Collections.Generic;
 using System.ComponentModel;
using System.Data;
using System.Drawing;
 using System.Linq;
using System.Text;
using System.Windows.Forms;
using System.Data.SqlClient;
namespace Finger_ATM
{
 public partial class AdminLogin: Form
{
SqlConnection con = new SqlConnection(@"DatSource=DESKTOP68SHPBA\SQLEXPRESS;Initial
Catalog=FingerVote;Integrated Security=True");
 public AdminLogin() { InitializeComponent();
 }
 private void groupBox1_Enter(object sender, EventArgs e) { } private void button1_Click(object sender,
EventArgs e)
{
SqlCommand cmd = new SqlCommand("Select Pass from Admin where Id = '"+textBox1.Text+"'",con);
```

```
con.Open();

SqlDataReader dr = cmd.ExecuteReader();

 if (dr.HasRows)

{

 dr.Read();

 if (dr[0].ToString() == textBox2.Text)

{ con.Close(); this.Hide();

AdminMenu am = new AdminMenu(); am.Show();

 }

 Else

 {

 con.Close();

MessageBox.Show("Invalid Password", "Error !!!",

 MessageBoxButtons.OK, MessageBoxIcon.Error);

}

 }

 Else

 {

 MessageBox.Show("Invalid ID","Error !!!",

MessageBoxButtons.OK,MessageBoxIcon.Error);

}

 }
```

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```csharp
private void AdminLogin_Load(object sender, EventArgs e)

{

}

private void button2_Click(object sender, EventArgs e)

{

TakeElection te = new TakeElection(); te.Show(); this.Hide();

} } }
```

Admin Dashboard:-

```csharp
using System;

 using System.Collections.Generic;

 using System.ComponentModel;

using System.Data;

 using System.Drawing;

 using System.Linq;

using System.Text;

using System.Windows.Forms;

 namespace Finger_ATM { public partial class AdminMenu : Form

{

public AdminMenu()

{

InitializeComponent();
```

```csharp
        }
        private void addCandidateToolStripMenuItem_Click(object sender, EventArgs e)
        {
        AddCandidate a = new AddCandidate(); a.MdiParent = this; a.Show();
        }
        private void logoutToolStripMenuItem_Click(object sender, EventArgs e)
        {
        Application.Exit();
        }
        private void addElectionToolStripMenuItem_Click(object sender, EventArgs e)
        {
        AddElection a = new AddElection(); a.MdiParent = this; a.Show();
        }
        private void addVotersToolStripMenuItem_Click(object sender, EventArgs e)
        {
        AddVoter a = new AddVoter(); a.MdiParent = this; a.Show();
        }
        private void viewCandidateToolStripMenuItem_Click(object sender, EventArgs e)
        {
        ViewCandidate a = new ViewCandidate(); a.MdiParent = this; a.Show();
        }
        private void caculateResultToolStripMenuItem_Click(object sender, EventArgs e)
        {
        Result a = new Result(); a.MdiParent = this; a.Show();
        } } }
```

4.4 Back End:

We have used My SQL to manage the databases. This tool will help in accessing the database to store and retrieve the information from it. We are using Microsoft SQL Server 2008 R2 as a server to host the system and all the backend thing will be available in it. One can access the backend only he knows the location of the server. The IP of the server is encrypted using Viginier Cipher. The one who knows the physical location of the server, as well as the key of encryption, can only access the database which will be known to the higher authority of ECI. Even though, the ECI people can't make any alterations to the vote cast by the voter. We are using the access control algorithm to secure the system. Even the admin can't see which candidate the user has cast the vote, As only the count of the vote will increase. And the voter will be marked as voted and hence he or she can't cast the vote in this election any further. The admin will have the access only to add candidates, Add voters add Election, etc which will be saved in the DB. We have used My SQL as backend Language.

CHAPTER 5

CONCLUSION:

In total, this system overcomes most of the problems that are faced in the traditional approach of the voting system.The efficiency of this system depends upon the web interface, its usability. This will surely ensure a safer voting method which is very much what is required for the healthy growth of a developing nation. The proposed fingerprint based voting system which is better and faster than the previous system. The new system prevents access to illegal voters, provides ease of use, transparency and maintains the integrity of the voting process. The system also solves the problem of RIGGING, means it does not allows a user to vote multiple times since his fingerprint is recorded once in an election. The system does not allow the voter to vote for more than once in the same election. The fingerprint-based voting system has provided a chance to avoid invalid votes, it reduces the polling time, easy carrying to polling centres from the polling box, Reduce the staff of the voting centre, It provides easy and accurate cutting without any trouble.

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