**TITLE IN CAPITAL LETTERS, FONT SIZE 12,**

**TIMES NEWS ROMAN, CENTRED, BOLD**

**STUDENT’S NAME 1**

**STUDENT’S NAME 2**

**A project report submitted in partial fulfilment of the**

**requirements for the award of the degree of**

**Bachelor of Computer Science (Honours)**

**Department of Computer Science**

**Bahria University, Karachi Campus**

**January 2018**

DECLARATION

I/We hereby declare that this project report is based on my/our original work except for citations and quotations which have been duly acknowledged. I/We also declare that it has not been previously and concurrently submitted for any other degree or award at Bahria University or other institutions.

Signature : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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APPROVAL FOR SUBMISSION

I/We certify that this project report entitled **“TITLE TO BE THE SAME AS FRONT COVER, CAPITAL LETTER, BOLD”** was prepared by **STUDENT’S NAME/S** has met the required standard for submission in partial fulfilment of the requirements for the award of Bachelor of Computer Science (Honours) at Bahria University.

Approved by,

Signature : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Supervisor : Dr/Mr/Miss/Madam XXXXXXXXX

Date : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Specially dedicated to

my beloved grandmother, mother and father

(Student Name 1)

my beloved grandmother, mother and father

(Student Name 2)

(this dedication page is optional)

ACKNOWLEDGEMENTS

I/We would like to thank everyone who had contributed to the successful completion of this project. I/We would like to express my gratitude to my research supervisor, Dr/Mr/Miss/Madam XXXXX for his/her invaluable advice, guidance and his/her enormous patience throughout the development of the research.

In addition, I/We would also like to express my gratitude to my/our loving parent and friends who had helped and given me encouragement.

(This acknowledgements page is optional)

**PROJECT TITLE IN CAPITAL LETTER**

**TITLE TO BE THE SAME AS FRONT COVER**

ABSTRACT

The objective of this project is to develop image recognition algorithms to recognize handwriting on postal letters and parcels. This report explores different techniques used for the recognition of handwriting. Different stages involving image processing like the preprocessing stage, segmentation and feature extraction will be studied and discussed. Finally the end product of the algorithms will be written in the software called Matlab.

This project uses the Artificial Neural Network technique to develop the software. The main advantage of using this technique is that it provides features extraction and detection that is suitable for character recognition. Different models of neural network are discuss and Error-back propagation algorithm was used due to its’ capability of forming internal representations of features in classification. After trials and errors, a suitable set of training parameters are define and network structure that consist of 1 input layer, 2 hidden layers and 1 output layer with 69 input neurons, 324 neurons for both hidden layers and 38 neurons for output layer is created.

The system first proceeds with the pre-process of the captured image with threshold, inverting and smoothing. Filtering, segmentation, resizing and features extraction are also performed in the process. Next, the feed forward process through the network is invoked to yield an output matrix. Based on the output matrix, the recognized character can be determined. This system is designed to customize the network for an individual user. Recommendations for future development and conclusions are also included in the report.

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LIST OF SYMBOLS / ABBREVIATIONS

*cp* specific heat capacity, J/(kg⋅K)

*h* height, m

*Kd* discharge coefficient

*M* mass flow rate, kg/s

*P* pressure, kPa

*Pb* back pressure, kPa

*R* mass flow rate ratio

*T* temperature, K

*v* specific volume, m3

*α* homogeneous void fraction

*η* pressure ratio

*ρ* density, kg/m3

*ω* compressible flow parameter

ID inner diameter, m

MAP maximum allowable pressure, kPa

MAWP maximum allowable working pressure, kPa

OD outer diameter, m

PCB printed circuit board

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## INTRODUCTION

### Background

Spacing between title of subsection and first line of text is 1.5 lines. The first paragraph in a subsection should align with left margin. General alignment for texts in paragraph should be “justified”.

Spacing between paragraphs is 1.5 lines. Subsequence paragraphs should be indented 1.27 cm (0.5 inch) from the left margin. General alignment for texts in paragraph should be “justified”. Spacing between last line of text and the next subsection title is 4.5 lines [1].

### Problem Statements

Spacing between title of subsection and first line of text is 1.5 lines [2]. General alignment for texts in paragraph should be “justified” [3].

A new paragraph should NOT begin on the last line of a page. A subsection title should NOT begin on the last line of a page. A new chapter must start on a new page. Spacing between the last line of text and equation is 1.5 lines.

 (1.1)

where

*G1* = specific mass flow rate, kg/s

*ρ* = density, kg/m3

*T* = temperature, K

*ho* = xxx, m

Spacing between the equation and first line of text is 1.5 lines. Equation should be centred, but its numbering should align with right margin.

**** (1.2)

where

*G2* = specific mass flow rate, kg/s

*ρ* = density, kg/m3

Spacing between the equation and first line of text is 1.5 lines. Equation should be centred, but its numbering should align with right margin.

### Aims and Objectives

The objectives of the thesis are shown as following:

1. To define the principles of a plasma actuator.
2. To characterize the electrical performances of plasma actuator
3. To study the material degradation on the plasma actuator surfaces.

### Scope of Project

This paragraph define the scope of project.

## LITERATURE REVIEW

### Subsection Title 1

Spacing between title of subsection and first line of text is 1.5 lines. The first paragraph in a subsection should align with left margin. General alignment for texts in paragraph should be “justified”.

Spacing between paragraphs is 1.5 lines. Subsequence paragraphs should be indented 1.27 cm (0.5 inch) from the left margin. General alignment for texts in paragraph should be “justified”. Spacing between last line of text and the next subsection title is 4.5 lines.

### Subsection Title 2

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Spacing between title of subsection and first line of text is 1.5 lines. The first paragraph in a subsection should align with left margin. Spacing between the last line of text and table is 1.5 lines.

**Table 2.1: Processing Time (in hours) of Board for Different Machines**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Board** | **Machine** | | | | |
| **1** | **2** | **3** | **4** | **5** |
| **A** | 30 | 18 | 26 | 17 | 15 |
| **B** | 23 | 22 | 32 | 25 | 30 |
| **C** | 17 | 31 | 24 | 22 | 29 |

Spacing between the table and first line of text is 3.0 lines. Subsequence paragraphs should be indented 1.27 cm (0.5 inch) from the left margin. General alignment for texts in paragraph should be “justified”.

### Subsection Title 3

#### Sub-subsection Title 1

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#### Sub-subsection Title 2

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### Subsection Title 4

Spacing between title of subsection and first line of text is 1.5 lines. The first paragraph in a subsection should align with left margin.

**Table 2.2: Processing Time (in hours) of Board for Different Machines**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Board** | **Machine** | | | | |
| **1** | **2** | **3** | **4** | **5** |
| **A** | 30 | 18 | 26 | 17 | 15 |
| **B** | 23 | 22 | 32 | 25 | 30 |
| **C** | 17 | 31 | 24 | 22 | 29 |

Spacing between the table and first line of text is 3.0 lines. Subsequence paragraphs should be indented 1.27 cm (0.5 inch) from the left margin. Spacing between the last line of text and figure is 1.5 lines.



Figure 2.1: Computer User

Spacing between the figure and first line of text is 3.0 lines. Subsequence paragraphs should be indented 1.27 cm (0.5 inch) from the left margin.

## DESIGN AND METHODOLOGY

### Subsection Title 1

Spacing between title of subsection and first line of text is 1.5 lines. The first paragraph in a subsection should align with left margin. General alignment for texts in paragraph should be “justified” [4].

Spacing between paragraphs is 1.5 lines. Subsequence paragraphs should be indented 1.27 cm (0.5 inch) from the left margin. General alignment for texts in paragraph should be “justified”. Spacing between last line of text and the next subsection title is 4.5 lines.

### Subsection Title 2

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### Sub-subsection Title 1

#### Sub-sub-subsection Title 1

Spacing between title of subsection and first line of text is 1.5 lines. Spacing between the last line of text and table is 1.5 lines.

**Table 3.1: Processing Time (in hours) of Board for Different Machines**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Board** | **Machine** | | | | |
| **1** | **2** | **3** | **4** | **5** |
| **A** | 30 | 18 | 26 | 17 | 15 |
| **B** | 23 | 22 | 32 | 25 | 30 |
| **C** | 17 | 31 | 24 | 22 | 29 |

Spacing between the table and first line of text is 3.0 lines. Spacing between the last line of text and figure is 1.5 lines.



Figure 3.1: OCR Block Diagram

Spacing between the figure and first line of text is 3.0 lines. Subsequence paragraphs should be indented 1.27 cm (0.5 inch) from the left margin.

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[9] Name of author(s) as above, “Title of content”, page, if any, and year. On Line, Available at: Address of link.

## APPENDICES

APPENDIX A: Graphs

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APPENDIX B: Computer Programme Listing

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