

بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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Faculty of Engineering
Department of Computer and Control Engineering

Advancing Computer Applications

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In

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By

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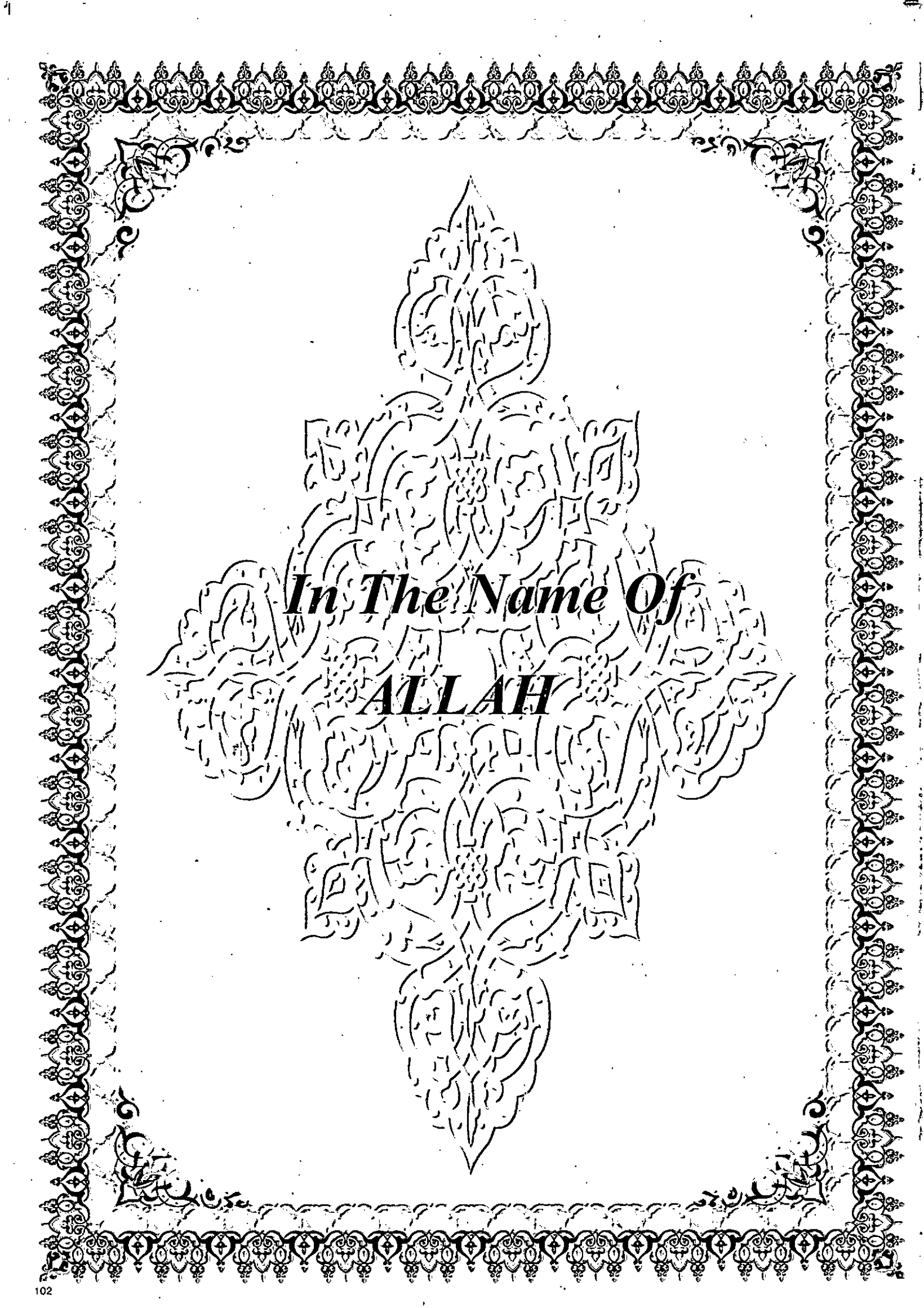
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The page is framed by a wide, ornate border featuring a repeating geometric and floral motif. The background is filled with a complex, symmetrical pattern of interlocking lines and shapes, creating a star-like or floral appearance. The text is centered within this pattern.

In The Name Of
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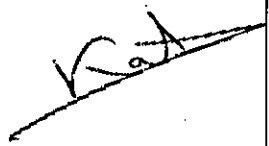
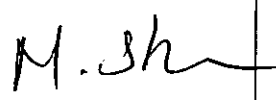
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Abstract

Voiceprint identification is an important biometrically based technology for personal identification and verification. The motivation for endeavor stems from the fact that each person has a unique voiceprint pattern, which is formally accepted as a valid personal identification method by law-enforcement agencies. The automation of each system has several facets.

In this thesis, the techniques of speech signal pre-processing, feature extraction, and neural networks are combined in order to analyze, identify and classify speech signal. Computer programs are developed to perform the analysis and classification of speech signal. The used speech database consists of 240 utterances; 10 repetitions of the same word, spoken by 4 different speakers (2 males, and 2 females). They spoke the Arabic numbers

(واحد, اثنين, ثلاثة, أربعة, خمسة, ستة).

The used sampling rate was 16,000 sample/sec.

The application of appropriate transforms in feature extraction stage (Fast Fourier Transform (FFT), Discrete Hartley Transform (DHT), Discrete Cosine Transform (DCT), Discrete Walsh-Hadamard Transform (DWHT), Haar Transform (HT), Discrete Wavelet Transform (DWT) enabled important information from the speech signal to be identified: it's asserted that the use of wavelet transform gives the best identification ratio (98.75%).

The results could possibly be improved further by increasing the database and the use of different classification methods (different neural topology).

The thesis is organized in six chapters as follows:

- Chapter 1** is an introduction.
- Chapter 2** gives background of the physiology of voiceprint.
- Chapter 3** presents speech preprocessing and neural networks.
- Chapter 4** illustrates the feature extraction techniques.
- Chapter 5** presents the classification of voiceprints using neural networks as classifiers.
- Chapter 6** is conclusion.

CHAPTER 1

Chapter 1

Introduction

1.1 Introduction

The problem of resolving the identity of a person can be categorized into two fundamentally distinct types of problems with different inherent complexities: (i) verification and (ii) identification. Verification (authentication) refers to the problem of confirming or denying a person's claimed identity (Am I who I claim I am?). Identification (Who am I?) refers to the problem of establishing a subject's identity. A reliable personal identification is critical in many daily transactions. For example, access control to physical facilities and computer privileges are becoming increasingly important to prevent their abuse. There is an increasing interest in inexpensive and reliable personal identification in many emerging civilian, commercial, and financial applications.

Typically, a person could be identified based on (i) a person's possession ("something that you possess"), e.g., permit physical access to a building to all persons whose identity could be authenticated by possession of a key; (ii) person's knowledge of a piece of information ("something that you know"), e.g., permit login access to a system to a person who knows the user-id and a password associated with it. Another approach to positive identification is based on identifying physical characteristics of a person. The characteristics could be either a person's behavioral characteristics, e.g., voice and signature or his physiological traits, e.g., fingerprints, hand geometry,