



## International Journal of Innovative Research in Computer and Communication Engineering

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# Design of A DIP System for Circumstantial Examination and Determination for Visually Disabled Persons

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**ABSTRACT:** DIP or Digital Image processing processes the 2 Dimensional Images by using algorithms. Circumstantial examination refers to a system's ability to examine the surroundings around it, considering the organizational and spatial relationship with the environment. A blind does not know the actual circumstance. So, circumstantial examination is a very crucial factor in restoration of sight for the blind using modern technology. In this paper, a digital image is given as an input and process it using image processing algorithms and find out the data regarding the objects in the image. This data is compared with the pre-defined set of data and generates the output in audio format. The objects found are then compared with the pre-defined circumstantial pattern and if found correct, the circumstance is expressed in audio format. Digital Image processing thus helps the blind to analyse the surrounding environment in a better way.

**KEYWORDS:** Image processing algorithms , Circumstantial examination, Circumstantial patterns

### I. INTRODUCTION

Development of Information Technologies (IT) at the end of 20th century brings two main changes for the blind. The first, positive one is extensive electronic communication, which gave blind people the ability to work and communicate with other people at nearly the same level as non-blind. The second, negative change for the blind is more intensive use of graphical user interface (GUI) with pictures and visual effects. The problem of graphical information is its very difficult presentation for the blind and the problem of GUI is a difficult orientation in it for the blind. In many cases the use of GUI is entirely dependent on the perception of graphical information in a form of pictures of various kinds. This means that blind users should get access to graphical information in order to process the graphical information presented. The solution to this problem is the existence of tools that would allow blind users to browse a picture in a specific way. Picture understanding is derived from combination of both relation types. Another problem that we had to solve is the handling of picture hierarchy. In general it is possible to group objects and also establish relations among these groups. The hierarchy can help us to perceive pictures on different levels of detail. Besides the browser, by means of which blind users can perceive the picture, it is necessary to create a tool that would allow us to create the picture description that could be processed by the browser with properties described. In the following text the strategy for creation of such a tool for picture description creation is described.

### II. RELATED WORK

#### INTRODUCTION TO DIGITAL IMAGE PROCESSING

An image as defined as a digital representation of a real world scene. It is composed of discrete elements generally called picture element or pixels for short. A digital image has two parameters x or horizontal position, y or vertical position. It has three intensity parameters red, green and blue which are three basic colors of any image. The field of digital image processing refers to processing digital image by means of a digital computer. Image processing typically attempts to accomplish one of three things. They are,

- Restoring images.
- Enhancing images.
- Understanding images.

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## A. Circumstantial examination

Circumstance awareness and assessment are fundamental components of rational virtual humans. They are central parts of models of virtual humans and critical elements of efficient reasoning and planning systems.

Circumstance awareness is one such phenomenon that visually capable persons can and a visually impaired cannot. So this must be achieved. The partial restoration of sight for the blind is currently being pursued by a number of international research teams. Partial restoration can be achieved by the use of a camera to capture images, an intelligent image processing system and then delivery of an audio signal to the blind person.

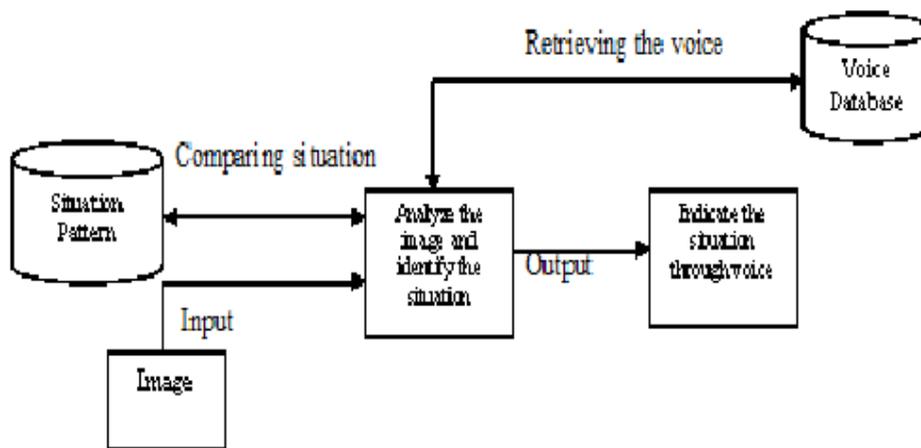


Figure 1: Working Model

In this model first we acquire an image and it is compared with images present in the standard database. This process takes place in image processor and classifier. The images are analyzed and the result is produced in the audio format. The Circumstance patterns contain certain number of well-defined situations. An input image is taken which is compared with situations in the database. Voice database contains the explanation of the situations present in situation database. A prerecorded Voice is extracted from the voice database, which is corresponding to situation analyzed. As we are trying to design a system for situation recognition, we need some predefined sets of data regarding the situations. So, we have considered two databases, one for storing object attributes and other the situation pattern along with the audio file.

## III. SOFTWARE REQUIREMENTS SPECIFICATION

One of the most important activities in software development is preparation of Software Requirements Specification (SRS).

### A. Purpose

The aim of the software requirement specification document is to list out the user requirements in an organized manner. It defines all the constraint and software requirements needed to understand this application and documentation. The main aim of this project is to design the system that help the visually disabled to recognize the objects as well as scene.

### B. Scope of the Project

The Scope of this project is to design

- A model for recognizing a scene.
- Extra input and output apparatus for object specification and scene analysis.
- A real time system for a blind to identify the objects as well as scene.
- Output in the audio format for the disabled.



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## C. Design Constraints

This section indicates any design constraints on system being built. Design constraints represent design decision that have been mandated and must be adhered.

## D. Developed Tools

- MATLAB 7.9.0.

## E. Hardware Requirements

- Processor Type: Pentium P4 Processor or higher.
- Speed: 2.66 GHZ.
- RAM: 1GB RAM.
- Hard Disk: 40 GB.
- Personal computer's 1.

## F. Software Requirements

- MATLAB 7.9.
- Operating System - Windows XP.

## G. Operating System

The operating system used is windows operating system. Windows is the most popular and user friendly operating system. It sufficiently caters to the needs of the application on the client side. It's good enough to support all sorts of activities required by the user as she/he may not be a technical graduate; it's easier for them to use the application in the windows operating system.

## H. About MATLAB

MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. MATLAB is an interactive system whose basic data element is an array that does not require dimensioning. This allows you to solve many technical computing problems, especially those with matrix and vector formulations, in a fraction of the time it would take to write a program in a scalar non-interactive language such as C or Fortran.

I. Image Processing Toolbox: Image Processing Toolbox software provides a comprehensive set of reference-standard algorithms and graphical tools for image processing, analysis, visualization, and algorithm development. Most toolbox functions are written in the open MATLAB language, giving you the ability to inspect the algorithms, modify the source code, and create your own custom functions.

## IV METHODOLOGY

### A. MODULES DESIGNED:

#### a) Module for Object Identification:

It is one of the important modules. In this module the major function of identifying objects has been dealt. Here image is taken as input and processed to identify the objects. The steps done in this module is as follows.

Step 1: Read the image

Step 2: Filter the image, to identify the edges.

Step 3: Make a uniform background.

Step 4: Convert the image to binary image, so that computation is easy.

Step 5: Eliminate the noise that is generated while converting.

Step 6: Identify the object by tracing their boundaries.

Step 7: Calculate the attributes of the objects which will be helpful for further processing.

Step 8: These attributes are compared with values stored in database previously, to generate the respective audio.

#### b) Module for Object Recognition:

This is the module designed to identify the particular objects present in the scene. It also takes image as input and processes it as in object identification. Here it labels each object with some value so that it is easy to identify. The steps to recognize objects are as follows:

Step 1: Read the image.

Step 2: Convert it to binary and process it has done in object identification.

Step 3: Label the objects.

Step 4: Click on any of the objects in the image.

Step 5: Find out the x and y co-ordinates and extract its pixel value.

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Step 6: Extract the boundary corresponding to that value.

Step 7: Compare the value with the boundary value in database and if match is found announce the corresponding audio.

c) Module for Registering an Object:

This module has been designed to register the audio file of unidentified objects. It takes the audio file of the object to be added to database as input. It adds that audio file so that whenever that object is present in image it will be identified. The steps are as follows:

Step 1: Perform the steps as in object identification.

Step 2: Compare the object attributes with the values in database.

Step 3: If present generate corresponding audio.

Step 4: Else store it in a database as a new object, along with its audio file.

d) Module for Circumstantial examination:

This is the most important module. Here is where the situation is recognized and announced to blind people. It makes use of the object identification module and then proceeds to identify the situation.

Step 1: Perform the steps as in object identification.

Step 2: Compare these object with datasets of situation patterns.

Step 3: If majority of objects are found in situation patterns then announce the corresponding situation.

## IV. FLOW CHART

### A. Circumstantial examination

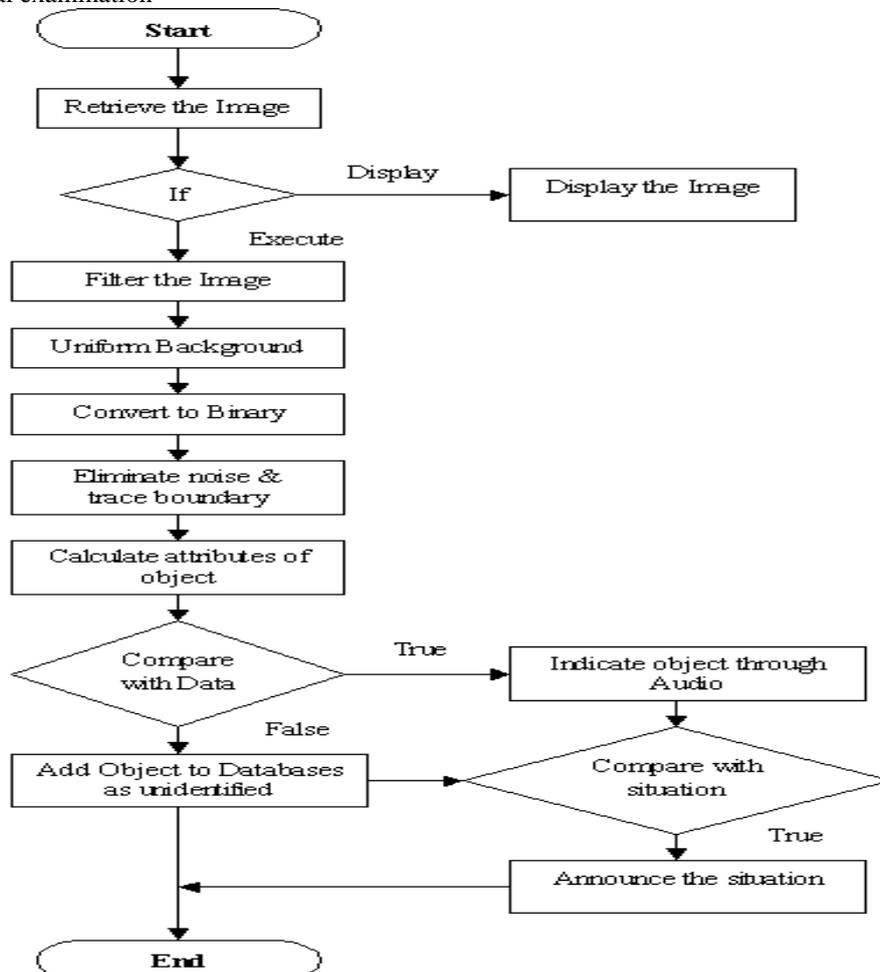


Figure 2: Flow chart for Circumstantial examination

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## B. Registration of an Object

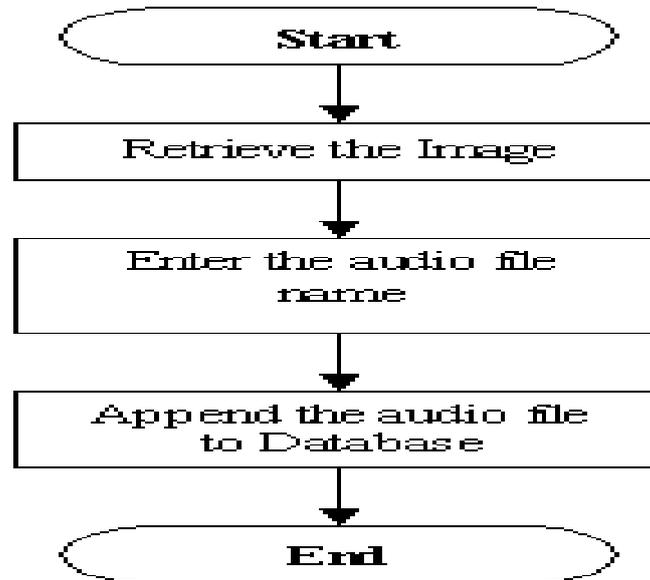


Figure 3: Flow chart for Registration of an Object

Flow charts Figure 2 and Figure 3 respectively give the total flow of the modules designed in pictorial representation. Figure 2 give the flow for object identification, situation analysis and also object recognition. Figure 3 give the flow of registering the unidentified objects.

## V. RESULTS AND SIMULATION

Stage 1: The given input image will be filtered. This process is done to remove the noise and to get uniform background (figure 5).

Stage 2: The filtered image (Sharper image) will be converted into grayscale image for recognizing boundary (figure 7).

Stage 3: The grayscale image is then examined in the database with situation patterns present and appropriate audio output will be given (figure 9).

### A. Filter the image:

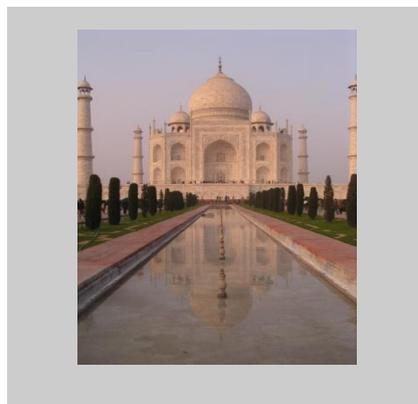


Figure 4: Input Image

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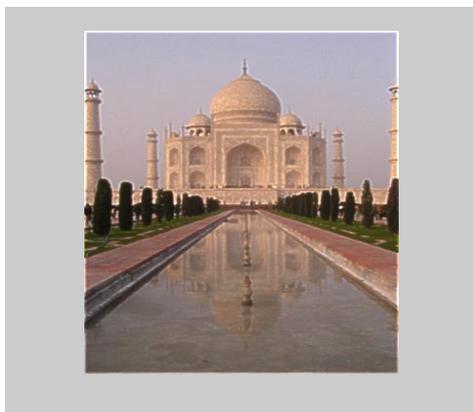


Figure 5: Sharper Image

B. Converting image into Gray scale image:

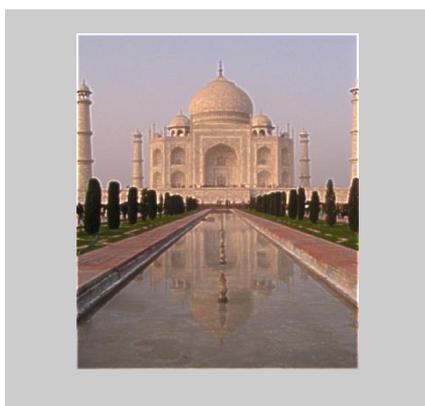


Figure 6: Sharper Image



Figure 7: Grayscale image

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C. Announcing the circumstance



Figure 8: Grayscale image for recognizing boundary

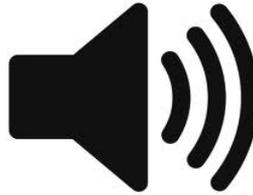


Figure 9: Announcing the circumstance (Output: The given input image is Taj Mahal)

## VII . CONCLUSION

This paper presents an approach for solving the problem of scene analysis of blind person by taking a static image as input and processing it using our image processing algorithms to identify the objects as well as scene and produce output in audio format. Circumstantial examination is a fundamental component of rational virtual humans. It is a central part of models of virtual humans and critical elements of efficient reasoning and planning systems. This necessitates the development of models with human-like characteristics, such as personality, rationality and emotion. The system is expected to represent its conscience at any time

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## BIOGRAPHY

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