handwritten documents into structural text form and recognizing handwritten names.

Chapter 3

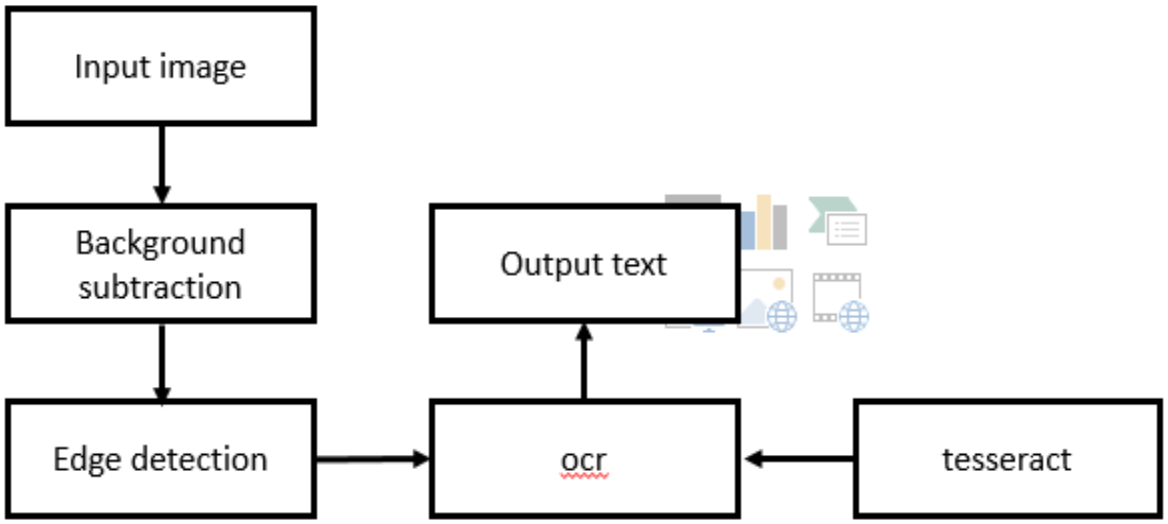
Existing system

- Traditional methods like Braille exist using which the blind people have to trace and read text, which is very slow and not very practical.
- Existing OCR systems are not automatic and require full-fledged computers to run and hence are not effective.
- K Reader Mobile runs on a cell phone and allows the user to read mail, receipts, fliers, and many other documents

Proposed system

- A low cost, automatic system for reading text books will be implemented that not only converts printed books to digital text, but also reads them as a audio output.
- Our proposed algorithm can effectively handle complex background and multiple patterns, and extract text information from both hand-held objects and nearby signage

Block diagram



Software required:

- Python
- Open cv

OCR:

ARCHITECTURE OF THE PROPOSED SYSTEM

The Architecture of the optical character recognition system on a grid infrastructure consists of the three main components. They are:-

- Scanner
- OCR Hardware or Software
- Output Interface

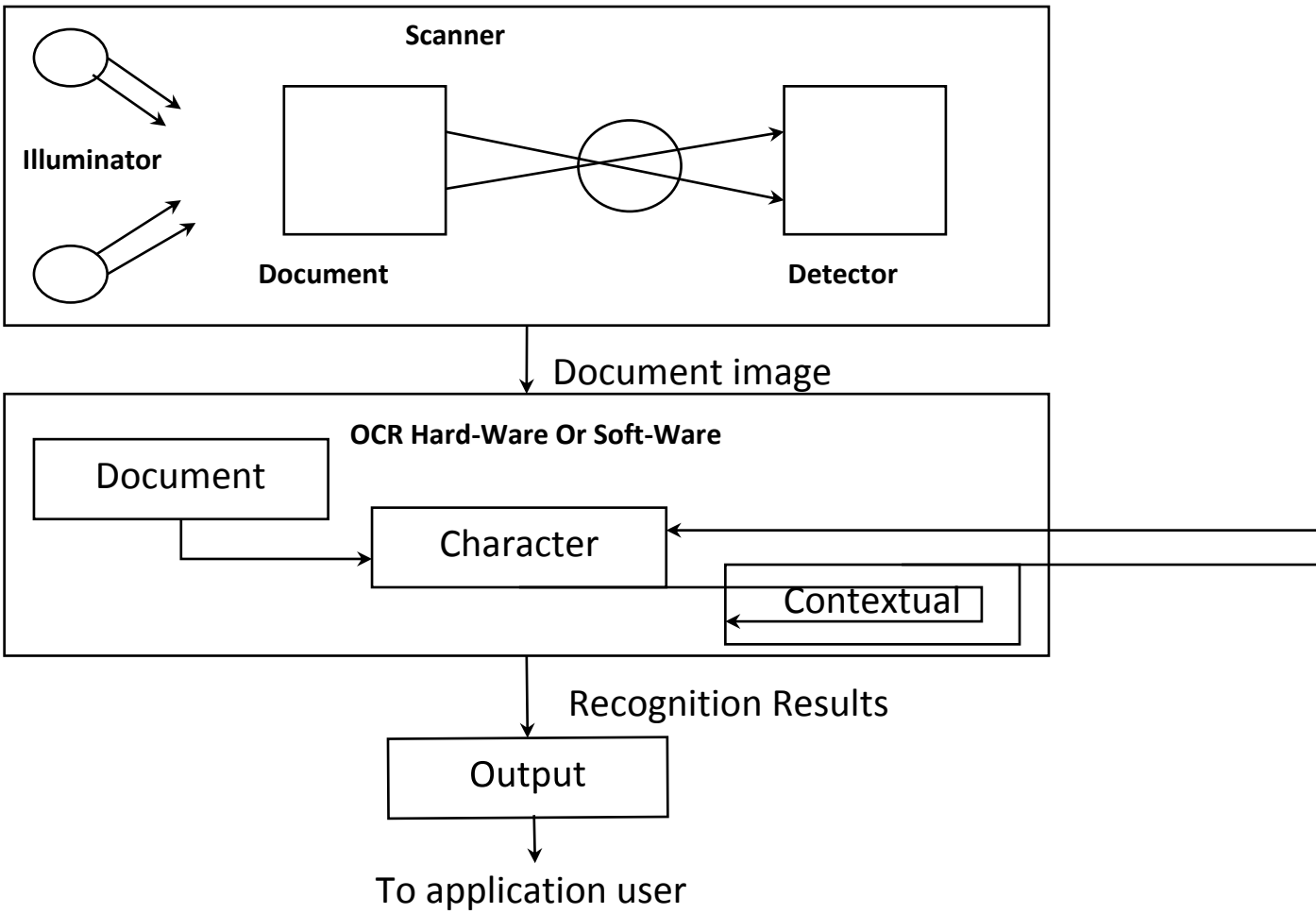


Figure.1: OCR Architecture

INTENDED AUDIENCE AND READING SUGGESTIONS

In this section, we identify the audience who are interested with the product and are involved in the implementation of the product either directly or indirectly. As from our research, the OCR system is mainly useful in R&D at various scientific organizations, in governmental institutes and in large business organizations, we identify the following as various interested audience in implementing OCR system:-

- The scientists, the research scholars and the research fellows in telecommunication institutions are interested in using OCR system for processing the word document that contains base paper for their research.
- The Librarian to manage the information contents of the older books in building virtual digital library requires use of OCR system.
- Various sites that vendor e-books have a huge requirement of this OCR system in-order to scan all the books in to electronic format and thus make money. The Amazon book world is largely using this concept to build their digital libraries.

Now we present the reading suggestions for the users or clients through which the user can better understand the various phases of the product. These suggestions may be effective and useful for the beginners of the product rather than the regular users such as research scholars, librarians and administrators of various web-sites. With these suggestions, the user need not waste his time in scrolling the documents up and down, browsing through the web, visiting libraries in search of different books and … The following are the various reading suggestions that the user can follow in-order to completely understand about our product and to save time:-

- It would help you if you start with Wikipedia.com. It lets you know the basic concept of every keyword you require. First learn from it what is OCR? And how does it work based on a Grid infrastructure?
- Now you can proceed your further reading with the introduction of our product we provided in our documentation. From these two steps you completely get an in-depth idea of the use of our product and several processes involved in it.
- The more you need is the implementation of the product. For this you can visit FreeOCR.com where you can view how the sample OCR works and you can try it.

PROBLEM STATEMENT:

- Traditional methods like Braille exist using which the blind people have to trace and read text, which is very slow and not very practical.

- Existing OCR systems are not automatic and require full-fledged computers to run and hence are not effective.
- Reader Mobile runs on a cell phone and allows the user to read mail, receipts, fliers, and many other documents

A feasibility study is a high-level capsule version of the entire System analysis and Design Process. The study begins by classifying the problem definition. Feasibility is to determine if it's worth doing. Once an acceptance problem definition has been generated, the analyst develops a logical model of the system. A search for alternatives is analyzed carefully. There are 3 parts in feasibility study.

2.1 TECHNICAL FEASIBILITY

Evaluating the technical feasibility is the trickiest part of a feasibility study. This is because, at this point in time, not too many detailed design of the system, making it difficult to access issues like performance, costs on (on account of the kind of technology to be deployed) etc. A number of issues have to be considered while doing a technical analysis. Understand the different technologies involved in the proposed system before commencing the project we have to be very clear about what are the technologies that are to be required for the development of the new system. Find out whether the organization currently possesses the required technologies. Is the required technology available with the organization?.

2.2 OPERATIONAL FEASIBILITY

Proposed project is beneficial only if it can be turned into information systems that will meet the organizations operating requirements. Simply stated, this test of feasibility asks if the system will work when it is developed and installed. Are there major barriers to Implementation? Here are questions that will help test the operational feasibility of a project:

- Is there sufficient support for the project from management from users? If the current system is well liked and used to the extent that persons will not be able to see reasons for change, there may be resistance.

- Are the current business methods acceptable to the user? If they are not, Users may welcome a change that will bring about a more operational and useful systems.
- Have the user been involved in the planning and development of the project?
- Early involvement reduces the chances of resistance to the system and in general and increases the likelihood of successful project.

Since the proposed system was to help reduce the hardships encountered. In the existing manual system, the new system was considered to be operational feasible.

2.3 ECONOMIC FEASIBILITY

Economic feasibility attempts to weigh the costs of developing and implementing a new system, against the benefits that would accrue from having the new system in place. This feasibility study gives the top management the economic justification for the new system. A simple economic analysis which gives the actual comparison of costs and benefits are much more meaningful in this case. In addition, this proves to be a useful point of reference to compare actual costs as the project progresses. There could be various types of intangible benefits on account of automation. These could include increased customer satisfaction, improvement in product quality better decision making timeliness of information, expediting activities, improved accuracy of operations, better documentation and record keeping, faster retrieval of information, better employee morale.

2.4 TRAINING

Training is a very important process of working with a neural network. As seen from neural networks, there are two forms of training that can be employed with a neural network. They are namely:-

1. Un-Supervised Training

2. Supervised Training

Supervised training provides the neural network with training sets and the anticipated output. Unsupervised training supplies the neural network with training sets, but there is no anticipated output provided.

2.4.1 UNSUPERVISED TRAINING

Unsupervised training is a very common training technique for Kohonen neural networks. We will discuss how to construct a Kohonen neural network and the general process for training without supervision.

What is meant by training without supervision is that the neural network is provided with training sets, which are collections of defined input values. But the unsupervised neural network is not provided with anticipated outputs.

Unsupervised training is usually used in a classification neural network. A classification neural network takes input patterns, which are presented to the input neurons. These input patterns are then processed, and one single neuron on the output layer fires. This firing neuron can be thought of as the classification of which group the neural input pattern belonged to. Handwriting recognition is a good application of a classification neural network.

The input patterns presented to the Kohonen neural network are the dot image of the character that was hand written. We may then have 26 output neurons, which correspond to the 26 letters of the English alphabet. The Kohonen neural network should classify the input pattern into one of the 26 input patterns.

During the training process the Kohonen neural network in handwritten recognition is presented with 26 input patterns. The network is configured to also have 26 output patterns. As the Kohonen neural network is trained the weights should be adjusted so that the input patterns are classified into the 26 output neurons. This technique results in a relatively effective method for character recognition.

Another common application for unsupervised training is data mining. In this case you have a large amount of data, but you do not often know exactly what you are looking for. You want the neural network to classify this data into several groups. You do not want to dictate, ahead of time, to the neural network which input pattern should be classified to which group. As the neural network trains the input patterns will fall into similar groups. This will allow you to see which input patterns were in common groups.

2.4.2 SUPERVISED TRAINING

The supervised training method is similar to the unsupervised training method in that training sets are provided. Just as with unsupervised training these training sets specify input signals to the neural network.

The primary difference between supervised and unsupervised training is that in supervised training the expected outputs are provided. This allows the supervised training algorithm to adjust the weight matrix based on the difference between the anticipated output of the neural network, and the actual output.

There are several popular training algorithms that make use of supervised training. One of the most common is the back-propagation algorithm. It is also possible to use an algorithm such as simulated annealing or a genetic algorithm to implement supervised training

2.5 INTRODUCING KOHONEN NEURAL NETWORK

The Kohonen neural network differs considerably from the feed-forward back propagation neural network. The Kohonen neural network differs both in how it is trained and how it recalls a pattern. The Kohonen neural network does not use any sort of activation function. Further, the Kohonen neural network does not use any sort of a bias weight.

Output from the Kohonen neural network does not consist of the output of several neurons. When a pattern is presented to a Kohonen network one of the

output neurons is selected as a "winner". This "winning" neuron is the output from the Kohonen network. Often these "winning" neurons represent groups in the data that is presented to the Kohonen network. For example, in an OCR program that uses 26 output neurons, the 26 output neurons map the input patterns into the 26 letters of the Latin alphabet.

The most significant difference between the Kohonen neural network and the feed forward back propagation neural network is that the Kohonen network trained in an unsupervised mode. This means that the Kohonen network is presented with data, but the correct output that corresponds to that data is not specified. Using the Kohonen network this data can be classified into groups. We will begin our review of the Kohonen network by examining the training process.

It is also important to understand the limitations of the Kohonen neural network. Neural networks with only two layers can only be applied to linearly separable problems. This is the case with the Kohonen neural network. Kohonen neural networks are used because they are a relatively simple network to construct that can be trained very rapidly.

A "feed forward" neural network is similar to the types of neural networks that we are ready examined. Just like many other neural network types the feed forward neural network begins with an input layer. This input layer must be connected to a hidden layer. This hidden layer can then be connected to another hidden layer or directly to the output layer. There can be any number of hidden layers so long as at least one hidden layer is provided. In common use most neural networks will have only one hidden layer. It is very rare for a neural network to have more than two hidden layers. We will now examine, in detail, and the structure of a "feed forward neural network".

The Structure of a Feed Forward Neural Network

A "feed forward" neural network differs from the neural networks previously examined. **Figure 2.1 shows a typical feed forward neural network with a single hidden layer.**

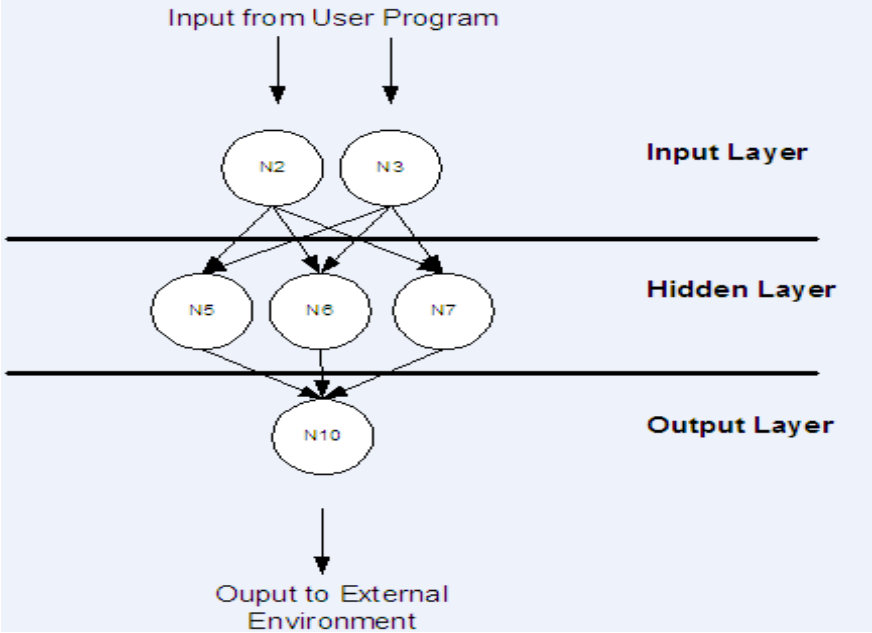


Figure 2 Feed Forward Neural Network

The Input Layer

The input layer to the neural network is the conduct through which the external environment presents a pattern to the neural network. Once a pattern is presented to the input layer of the neural network the output layer will produce another pattern. In essence this is all the neural network does. The input layer should represent the condition for which we are training the neural network for. Every input neuron should represent some independent variable that has an influence over the output of the neural network.

It is important to remember that the inputs to the neural network are floating point numbers. These values are expressed as the primitive Java data type "double". This is not to say that you can only process numeric data with the neural network. If you wish to process a form of data that is non-numeric you must develop a process that normalizes this data to a numeric representation.

The Output Layer

The output layer of the neural network is what actually presents a pattern to the external environment. Whatever patter is presented by the output layer can be

objects in the camera view, we propose an efficient and effective motion based method to define a region of interest (ROI) in the video by asking the user to shake the object. In the extracted ROI, text localization and recognition are conducted to acquire text information. To automatically localize the text regions from the object ROI, we propose a novel text localization algorithm by learning gradient features of stroke orientations and distributions of edge pixels in an Adaboost model. Text characters in the localized text regions are then binarized and recognized by off-the-shelf optical character recognition software. The recognized text codes are output to blind users in speech

I. INTRODUCTION

Of the 314 million visually impaired people worldwide, 45 million are blind. Recent developments in computer vision, digital cameras and portable computers make it feasible to assist these individuals by developing camera based products that combine computer vision technology with other existing commercial products such optical character recognition (OCR) systems. Reading is obviously essential in today's society. Printed text is everywhere in the form of reports, receipts, bank statements, restaurant menus, classroom handouts, product packages, instructions on medicine bottles, etc.

The ability of people who are blind or have significant visual impairments to read printed labels and product packages will enhance independent living and foster economic and social self-sufficiency. Today, there are already a few systems that have some promise for portable use, but they cannot handle product labelling