An Audio Enabled Real Time Text Recognition Assistive Technology for Disabled People

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ABSTRACT:

Assistive technologies are being developed for Visually impaired people in order to live confidently. This project work proposes a camera-based assistive text reading framework to help disabled persons read text labels and product packaging from hand-held objects in their daily lives. The project work is framed into three stages . First, Image capturing – Using a mini camera ,the text which the user need to read get captured as an image and have to send to the image processing Platform. Secondly, Text recognition – Using text recognition algorithm, the text will get filtered from the image. Finally, Speech output - A filtered text will be passed into this system to get an audio output. This project work can be able to insist the disabled people in their daily life. The entire application will run on ARM processor.The ARM7 family includes the ARM7TDMI, ARM7TDMI-S, ARM720T, and ARM7EJ-S processors. The ARM7TDMI core is the industry's most widely used 32-bit embedded RISC microprocessor solution. Optimized for cost and power-sensitive applications, the ARM7TDMI solution provides the low power consumption, small size, and high performance needed in portable, embedded applications.

Keywords:

DWT; FDCT; Euclidean Distance Metric; Feature Extraction; Handwritten Character Recognition; Bounding Box; Mean Vector, ARM7 LPC2148, Emic2.

INTRODUCTION:

Character recognition is required once the knowledge ought to be decipherable each to humans and to a machine and different inputs can\'t be predefined. as compared with the opposite techniques for automatic identification, optical character recognition is exclusive therein it doesn\'t need management of the method that produces the knowledge.

the form variation of written characters causes the misclassification, so multiresolution of handwrit- 10 characters is very important for the right recognition. exploitation multiresolution we will cut back the dimensions of charac- ters while not losing the essential characteristics of characters, so a lot of accuracy and higher recognition rate may be achieved victimization multiresolution. The intensive appli- cations of written Character Recognition (HCR) in recognizing the characters in bank checks and automobile plates etc. have caused the event of var-ied new HCR systems like optical character recognition (OCR) sys- tem. There square measure such a lot of techniques of pattern recognition like example matching, neural networks, syntactic analysis, riffle theory, hidden Andre Markoff models, Bayes- ian theory and minimum distance classifiers etc. during this paper, efforts are created to develop automatic written character recognition system for English language with high recognition accuracy and minimum classification time. written cha-racter recognition may be a difficult downside in pattern recognition space. the issue is especially caused by the massive variations of individual expressive style. to urge high recognition accuracy and minimum classification time for HCR, we\'ve applied multiresolution technique victimisation DWT/FDCT and EDM. A multiresolution analysis (MRA) or multiscale approximation (MSA) is that the style methodology of most of the much relevant separate rippling transforms (DWT) or quick distinct Curvelet re-work.The identity of every image is found by examination the extracted options with descriptions of the image categories obtained through a previous learning section.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m n o p q r s t u v w x y z

Finally discourse info is employed to reconstruct the words and numbers of the first text. within the next sections these steps and a few of the ways concerned square measure delineate in additional detail.

Input Character (Image):

In the complement of a binary image, zeros become ones and ones become zeros; black and white within the reversed. represented complement of AN intensity or RGB image, every element price is ablated from the utmost element price supported by the category (or one.0 for double-precision images) and also the distinction is employed because the element price within the output image. within the output image, dark areas become lighter and lightweight areas become darker. The mix of qualities or options that distinguishes one person, group,or factor from another

Preprocessing on Edge Detection:

Morphological image process may be a assortment of non-linear operations associated with the form or morphology of options in a picture. morphological operations bank trust on the relative ordering of picture element values, not on their numerical values, and so square measure particularly suited to the process of binary pictures.

» The matrix dimensions specify the dimensions of the structuring component.
» The pattern of ones and zeros specifies the form of the structuring part.
» An origin of the structuring component is sometimes one among its pixels, though typically the origin are often outside the structuring part.

Morphological operations also can be applied to greyscale pictures such their light-weight transfer functions area unit unknown and thus their absolute constituent values square measure of no or minor interest


PREWITT Edge Operator:

Prewitt operator is employed for edge detection in a picture. It detects 2 varieties of edges: Horizontal edges; Vertical Edges Edges square measure calculated by victimisation distinction between corresponding constituent intensities of a picture. All the masks that square measure used for edge detection are called by-product masks. as a result of as we\'ve got expressed over and over before during this series of tutorials that image is additionally a proof therefore changes in an exceedingly signal will solely be calculated victimisation differentiation. therefore that's why these operators also are known as as spinoff operators or spinoff masks.

DATA SET Creation:

Fig: Sample of characters written by 5 different persons

DWT method on Input Character:- The 2nd rippling rework has been wide applied in image process applications. There exists 2 rippling structure; (1) Pyramid-structured rippling rework that decomposes a proof into a collection of frequency channels with narrower bandwidths in lower frequency channels, helpful for signals that their vital data lies in low frequency Components; (2) Tree-structured rippling analysis that provides low, middle and high frequency decomposition that is completed by moldering each approximate and detail coefficients.
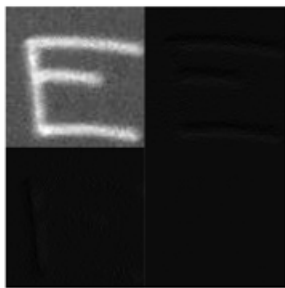

In Character Image analysis, the lower frequency elements reveal data concerning the overall properties (shape) of the character, that is clinically vital, and also the higher frequency decomposition provides data concerning the textural detail and internal patterns of the character image that is additionally vital within the edges. so the decomposition of all frequency channels area unit helpful during this application
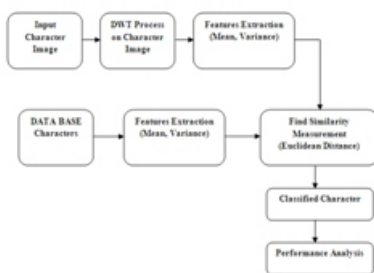

Therefore, the tree-structured rippling analysis will be additional informative for classification of character recognition.

Curvelet-based texture analysis in Non Melonoma Skin pictures:

Actually the ridgelet rework is that the core spirite of the curvelet rework. Associate in Nursing anisotropic geometric rippling rework, named ridgelet rework, was projected by Candes and Donoho.
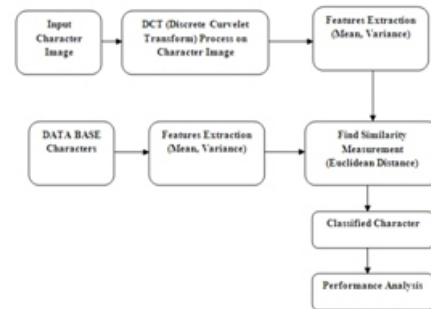
The ridgelet rework is perfect at representing straight-line singularities. sadly, world straight-line singularities area unit seldom discovered in ral applications. to research native line or curve singularities, a natural plan is to think about a partition of the image, then to use the ridgelet rework to the obtained sub-images. the trouble edgy improvement has been targeted totally on rising the beholding of pictures that don\'t seem to be clarity as a result of such a lot of sub bands. Noise removal and preservation of helpful data area unit vital aspects of image improvement. a good kind of strategies are projected to unravel the sting conserving and noise removal drawback for additional improvement. Curve Lets are taking part in a most role in several image-processing applications. The Curve Let decomposition of a picture is performed by applying their performance was terribly slow; thence, researchers developed a replacement version that is simpler to use and perceive. during this new methodology, the employment of the ridge let rework as a pre-processing step of curve let was discarded, so reducing the number of redundancy within the rework and increasing the speed significantly
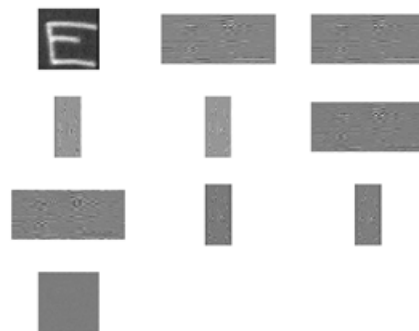
The primary a part of the tutorial reviews the motivation of " Why Curve let projected " and in brief reminds the history of application in time frequency house. Followed, the curve let rework structure is shown. The curve let rework will be rotten with four steps: (1) Sub band Decomposition (2) swish Partitioning (3) Renormalization (4) Ridge let Analysis. By inversing the step sequence with mathematic rewriting, it\'s ready to reconstruct the first signal that is termed inverse curve let rework.

There area unit some simulation experiments be shown for those 3 application severally with comparison of rippling rework and curve let rework.

Features Extraction:

Feature extraction involves reducing the number of resources needed to explain an oversized set of information. once playing analysis of complicated information one among the foremost issues stems from the amount of variables concerned. Analysis with an oversized variety of variables typically needs an oversized quantity of memory and computation power or a classification rule that overfits the coaching sample and generalizes poorly to new samples. Feature extraction may be a general term for strategies of constructing mixtures of the variables to induce around these issues whereas still describing the information with adequate accuracy.

Hardware Tools:
1) ARM7 LPC2148:

LPC2148 Microcontroller Architecture. The ARM7TD-MI-S is a general purpose 32-bit microprocessor, which offers high performance and very low power consumption. The ARM architecture is based on Reduced Instruction Set Computer (RISC) principles, and the instruction set and related decode mechanism are much simpler than those of micro programmed Complex Instruction Set Computers (CISC). This simplicity results in a high instruction throughput and impressive real-time interrupt response from a small and cost-effective processor core. Pipeline techniques are employed so that all parts of the processing and memory systems can operate continuously. Typically, while one instruction is being executed, its successor is being decoded, and a third instruction is being fetched from memory. The ARM7TDMI-S processor also employs a unique architectural strategy known as Thumb, which makes it ideally suited to high-volume applications with memory restrictions, or applications where code density is an issue.

The key idea behind Thumb is that of a super-reduced instruction set. Essentially, the ARM7TDMI-S processor has two instruction sets:
•The standard 32-bit ARM set.
•A 16-bit Thumb set.
The Thumb set's 16-bit instruction length allows it to approach twice the density of standard ARM

code while retaining most of the ARM's performance advantage over a traditional 16-bit processor using 16-bit registers. This is possible because Thumb code operates on the same 32-bit register set as ARM code. Thumb code is able to provide up to 65% of the code size of ARM, and 160% of the performance of an equivalent ARM processor connected to a 16-bit memory system.

2)Text-to-Speech Module - Emic 2:

The Emic-2 was designed by Parallax in conjunction with Grand Idea Studio to make voice synthesis a total no-brainer. Simply connect the Emic-2 to a 5VDC power supply, connect a speaker to the speaker output (or 1/8" headphone jack) and send it a stream of serial text at 9600bps. The module contains all of the smarts necessary to parse the text into phonemes and then generate natural sounding speech, all your controller has to do is send serial strings.The command set for the module is entirely comprised of ASCII-based printable characters and allows you to change languages (English or Spanish), change between 9 different voices, and even control speech parameters on the fly. The module also communicates back to your system so you can get settings, version information and even "finished speaking" flags back from the board.

RESULT Analysis:

Accuracy:- Accuracy is additionally used as a applied mathematics live of however well a binary classification take a look at properly identifies or excludes a condition. That is, the accuracy is that the proportion of true results (both true positives and true negatives) among the entire variety of cases examined. to form the context clear by the linguistics, it\'s typically spoken because the \"rand accuracy. it\'s a parameter of the take a look at.
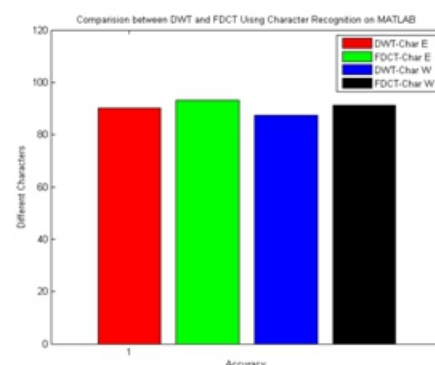
Classification / Recognition:

In testing section, every new image is analyzed and its principal options area unit situated. Then these principal options area unit compared with the principal options of image-space. If some match is found there, then the image is classed per the antecedently outlined rules. MEAN and Variance options primarily based Image Recognition on information Base to Input Character Recognition.
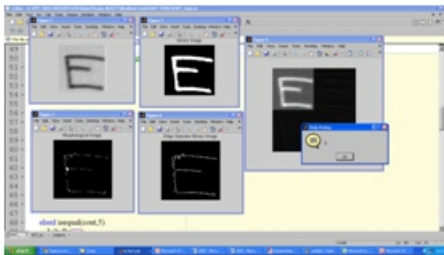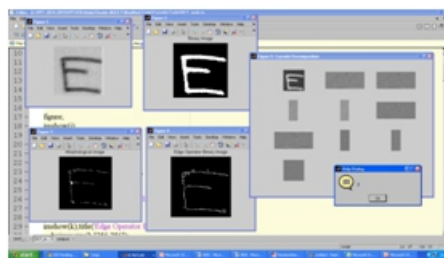

Fig: Wavelet Character Recognition

Fig: Curvelet Character Recognition

Conclusion:

In our Project We are implement on DWT based image resolution on Character recognition with in this resolution method we are getting features on LL;LH;HL and HH Sub bands on only Horizontal and Vertical Information Analysis with help of this method we got result on 60 to 70% accuracy matched In Our Modification Discrete Curve let Transform Based minimum 8 Sub bands Analysis on Horizontal; Vertical and Diagonal also we are extracting features faith help of these features We are getting improvement on minimum 70 To 80% Accuracy is Possible. In Our Modification Result on FDCT recognition accuracy is high for a specific level of multi resolution and applicable resolution of input character pictures on Compared with DWT. once average recognition accuracy is perfect (maxi- mum) for a specific level of multi resolution and applicable resolution of character pictures, here it\'s ninetieth on DWT and Our methodology on FDCT is ninety three Accuracy.

In Our projected methodology can|it\'ll} proven for each character will improved on options extraction and Accuracy improvement analysis.

Future Scope:

Multi Resolution Character Recognition on distinct Contour let rework on SVM or formal logic Neural Network Classifier analysis are increase accuracy on Mat laboratory ten Analysis.

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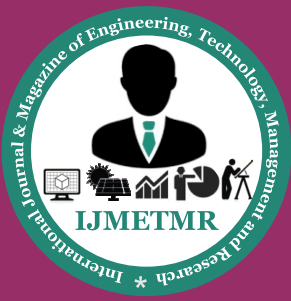
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