Short Hand Recognition using Canny Edge Detector

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Abstract—Manually written shorthand frameworks were contrived to empower essayists to record data on paper at quick speeds, preferably at the speed of discourse. While they have been in presence for a long time it is just since the seventeenth Century that across the board utilization showed up. A few shorthand frameworks thrived until the presentation what’s more, across the board utilization of electronic recording and correspondence machines in the 1970’s. From that point forward, shorthand utilization has been in fast decrease, yet has not yet turned into a lost aptitude. Pitman shorthand has been appeared to have extraordinary focal points as a methods for quick content passage which is especially pertinent to hand-held gadgets in portable situations. This paper presents advance and basic research issues for a Pitman/Renqun Shorthand Online Recognition System. For discovery of such shorthand canny edge identifier is utilized. Acknowledgment and interpretation trials are accounted for which show a right acknowledgment and translation rate of around 90% is at present conceivable.

Keywords—Steganography, Tachygrapy, Canny edge detector.

I. INTRODUCTION

Shorthand is an abbreviated symbolic writing method that increases speed and brevity of writing as compared to longhand, a more common method of writing a language. The process of writing in shorthand is called stenography, from the Greek stenos (narrow) and graphein (to write). It has also been called brachygraphy, from Greek brachys (short) and tachygraphy, from Greek tachys (swift, speedy), depending on whether compression or speed of writing is the goal. Many forms of shorthand exist[1]. A typical shorthand system provides symbols or abbreviations for words and common phrases, which can allow someone well-trained in the system to write as quickly as people speak. Abbreviation methods are alphabet-based and use different abbreviating approaches. Several autocomplete programs, standalone or integrated in text editors, based on word lists, also include a shorthand function for frequently-used phrases. Many journalists use shorthand writing to quickly take notes at press conferences or other similar scenarios. Shorthand was used more widely in the past, before the invention of recording and dictation machines[3]. Shorthand was considered an essential part of secretarial training and police work, as well as useful for journalists. Although the primary use of shorthand has been to record oral dictation or discourse, some systems are used for compact expression. For example, healthcare professionals may use shorthand notes in medical charts and correspondence. Shorthand notes are typically temporary, intended either for immediate use or for later typing, data entry, or (mainly historically) transcription to longhand, although longer term uses do exist, such as encipherment: diaries (like that of the famous Samuel Pepys) being a common example[3].

II. METHODOLOGY AND IMPLEMENTATION

With a specific end goal to comprehend the procedure of edge discovery some fundamental terms and clarification in regards to a picture, edge, outline, and so forth must be known, consequently to fulfill this necessity this area is presented. At that point the "Vigilant Edge Detection Algorithm" is examined. Because of the impediment of shrewd edge discovery, Block Level Canny Edge recognition is proposed. Essentials of Image Processing: Image preparing has numerous applications in the field of restorative and protection; thus there is more concentrate on picture processing. The fundamental terms in picture handling are as per the following: Image: It is the rectangular course of action which comprises of section and line savvy pixel esteem portrayal. Picture is two dimensional portrayal of the three dimensional view[5]. The Digital picture is spoken to as a square grid comprises pixel esteems. The portrayal is appeared in figure 1.

| 40 | 42 | 4344 | 45 |
| 42 | 52 | 5354 | 55 |
| 60 | 66 | 6729 | 70 |
| 51 | 254 | 1535 | 85 |
| 48 | 70 | 7172 | 80 |

Figure 1: Image Representation and pixel indication

The RGB picture implies it has three planes; they are red, blue and green. Every pixel speaks to the single shading. Along these lines if each plane pixel esteem ranges from 0 to 255, at that point entire picture extend up to 255. The Gray scale
picture speaks to the pixel esteem in the scope of 0 to 255. As it speaks to as shade of dark, along these lines it is going between 0 to (28-1). The pixel values represented utilizing 8 bit parallel numbers. The ordered picture comprises of a framework of pixel values alongside the shading map. The twofold picture has the pixel esteem as either „0“ or „1“. If the brilliant or whiteness in the picture is spoken to as „1“ then the dim is spoken to as „0“ or else the other way around. Contingent upon the application the shading maps are picked. A picture is taken for instance to delineate diverse shading maps and is appeared in Figure 2. For investigation and pattern recognition of image the basic step is image segmentation. Image segmentation is utilized to bunch the pixels. What's more, the gathering is made with the end goal that adjoining gatherings of pixels are not indistinguishable[4]. The picture segmentation procedures are of two sorts. They are: (i) Local Segmentation and (ii) Global Segmentation.

In the Local Segmentation, the piece of the picture is divided and it is practical contrasted with the worldwide division for the pixel information. The Global segmentation manages the division of the whole picture. This division contains more number of pixels contrasted with the nearby segmentation.

The Canny Edge Detection algorithm is the ideal calculation among the edge location calculations. The three fundamental criteria’s of the watchful edge identification are as per the following:
1. Low error rate: It is vital that edge happening in picture ought not be missed and there ought to be no reaction for non-edge.
2. Great Localization: The separation between the edge pixels as found by the indicator and the real edge is to be least.
3. Single Response: To have one reaction to a solitary edge. The calculation primarily has five stages in it. They are:

   **Step 1:** Computing the even \((G_x)\) and vertical \((G_y)\) slope of every pixel in a picture.

   **Step 2:** Using the above data the magnitude \((G)\) and course \((\theta)\) slope of every pixel in a picture is computed.

   **Step 3:** In this progression all non-maxima’s are made as zero that is concealment the non-maxima’s accordingly the progression is called Non-Maximal Suppression.

   **Step 4:** The high and low edges are measured utilizing the histogram of the inclination extent of the picture.

   **Step 5:** To get the proper edge map hysteresis thresholding is employed which will link between the weak and strong edges. The weak edges are taken into consideration if and only if it is connected to one of the strong edges or else it is eliminated from the edge map. The strong edge is the one whose pixel is greater than the high threshold and weak edge is one whose pixel value lays between high and low threshold[8].

   Then using that, the pixel strength and orientation of that gradient is computed. In the next step it finds the all maxima’s present the image then it keeps them as it is and removes the other non-maxima’s. The process is called as Non-Maximal Suppression. In the step 4 it makes the pixel is either the edge or non-edge, depending on the high and low thresholds set. If the pixel has higher value than the high threshold then it is treated as edge. If pixel value is less than the low threshold treated as non-edge. If pixel value is in between the high and low thresholds then it is a weak edge. Thus to detect edges in the image it considers two thresholds as high and low as shown in figure 4. Then finally the hysteresis thresholding is applied which can make a decision of the detected weak edge to be considered or left. The pixel is compared with the neighbouring pixels and if the weak edge is connected to that strong edge then it is considered as edge else it is removed from the edge map. The threshold is same for all the images. Due to this it has some limitations, when applied to the block level of the image. It gives some false edges in the plain region and fails to detect the some significant edges. In order to overcome from the above limitation an adaptive thresholding block and the block classification blocks are added along with the above blocks. And the threshold is set different based on the block. Thus the performance of the proposed block level canny edge detector is improved[7].
III. RESULTS

Figure 3: Binary Image of short hand

Figure 4: Short hand for the word “know”

Figure 5: Short hand for the word “the”
Figure 6: Shorthand for few English words.
IV. CONCLUSION

In this paper, a new way for the recognition and interpretation of Pitman shorthand is exhibited as a method of fast content passage on PDA’s and Tablet PC’s. The framework incorporates two noteworthy parts: Recognition Engine what’s more, Transcription Engine. In the acknowledgment motor, Shorthand diagrams are separated between a vocalized layout and a shortform in view of the quantity of pen-strokes used to make the framework. Shortforms, which speak to 30% to half of all shorthands, are perceived independently from vocalized traces utilizing a Template Coordinating Algorithm in which a positioned rundown of English words is delivered. The vocalized consonant layout is fragmented and characterized by a two-organize approach. In the translation motor, a Bayesian Network is utilized for the transformation from divided primitives to the effectively spelt English content. In this approach, a vocabulary is built as an accumulation of shorthand-framework models and a layout model is developed as a gathering of primitive hubs in a various leveled structure. Each model holds the Bayesian system presumption and the conviction (the probability) of every hub is refreshed utilizing different impedance calculations. Upon the entry of confirmation, models are initially chosen by the probability of the first and last primitive of a blueprint and besides chosen by the joint probabilities of all primitives of a diagram. Tests utilizing a sentence contains 10 shortforms and 10 vocalized traces composed by three gatherings of authors have demonstrated that the normal precision of the acknowledgment motor and the interpretation motor were 82.1% also, 92.86% individually. Perception of the three gatherings of journalists with various involvement in Pitman shorthand demonstrated that shorthand amateurs were undoubtedly ready to adjust their written work motor and interpretation framework. This reality likewise affirms our conviction that if a stenographer routinely utilized a programmed acknowledgment framework he will be compelled to create diagrams with predictable top notch given by the input of the interpretation framework. Future work needs to focus on improving the flexibility of both acknowledgment motor and interpretation motor.

REFERENCES


