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A Survey on Portable Camera-Based Assistive Text and Product Label Reading From Hand-Held Objects for Blind Persons

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Abstract: *For blind person new approach a camera-based assistive text reading framework to help read text labels and product packaging from hand-held objects in their daily lives. To seperate the object from cluttered backgrounds or other surrounding objects in the camera view, first developed an efficient and effective motion based method to define a region of interest (ROI) in the video basking the user to shake the object. This method unfairly moving object region by mixture-of-Gaussians-based background subtraction method. In the extracted ROI, text localization and recognition are carried to obtain text information. To automatically localize the text regions from the object ROI, 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 binarizedand recognized by off-the-shelf optical character recognition software.*

Keywords: Assistive devices, distribution of edge pixels, hand-held objects, optical character recognition (OCR),stroke orientation, text reading, and text region localization.

I. INTRODUCTION

Reading is necessary in today's society. Text is everywhere in the form of printing reports, receipts, bank statements, restaurant menus, product packages, instructions on medicine bottles etc. And while optical aids, video magnifiers, and screen readers can help blind persons and those with less vision to access documents, there are few devices that can provide better access to common hand-held objects such as product packages and objects printed with text such as prescription medication bottles.

This paper presents a prototype system of assistive text reading. There are three main parts included scene capture, data processing, and audio output. The scene capture component collects scenes containing objects of interest in the form of images or video. The data processing component is used object-of-interest detection and text localization to obtain image regions containing text, and text recognition. The recognized text codes is informed by audio output component to the blind user. A Bluetooth earpiece with minimicrophone is employed for speech output. The main contributions of this paper are:

1) a novel motion-based algorithm are used to solve the aiming problem for blind users by their simply shaking the object of interest for a brief period.

2) a novel algorithm of automatic text localization to obtain text regions from complex background and multiple text patterns.

3) a portable camera-based assistive framework to aid blind persons reading text from hand-held objects.

1. Literature Survey

A) Detecting and reading text in natural scenes X. Chen and A. L. Yuille[2] ,proposes an algorithm for detecting and reading text in natural images. The algorithm is meant for use by blind and visually impaired subjects walking through city scenes. This text includes stereotypical forms – such as street signs, hospital signs, and bus numbers as well as more variable forms such as shop signs, house numbers, and billboards. This paper selects this feature set guided by the principle of informative feature . calculate joint probability distributions of these feature responses on and off text, so weak classifiers can be obtained as log-likelihood ratio tests.

B) Automatic detection and recognition of signs from natural scenes .This paper presents an method to automatic detection and recognition of signs from natural scenes, and its application to a sign translation task. The proposed approach embeds multiresolution and multistate edge detection, adaptive searching, colour analysis, and affine rectification in a hierarchical framework for sign detection, with different emphases at each phase to handle the text in different sizes, orientations, colour distributions and backgrounds by Xilin Chen, Jie Yang, Jing Zhang, Alex Waibel[3].

C) Wearable Obstacle Avoidance Electronic Travel Aids for Blind: A Survey Dimitrios Dakopoulos and Nikolaos G. Bourbakis, Fellow [4]presents a comparative survey among portable/wearable obstacle detection/avoidance systems (a subcategory of ETAs) in an effort to inform the research community and users about the capabilities of these systems and about the progress in assistive technology for visually impaired people. The survey is depend on various features and performance parameters of the systems that classify them in categories, giving qualitative–quantitative measures. Finally, it offers a ranking, which will serve only as a reference point and not as a critique on these systems.

D)Texture-based approach for text detection in images using support vector machines and continuously adaptive mean shift algorithmThe above paper presents by Kwang In Kim, Keechul Jung, and Jin Hyung Kim[5] a novel texture-based method for detecting texts in images. A support vector machine (SVM) is used to analyse the textural properties of texts. External texture feature extraction module is not used, but rather the intensities of the raw pixels that make up the textural pattern are fed directly to the SVM, which works well even in high-dimensional spaces. Next, text regions are identified by applying a continuously adaptive mean shift algorithm (CAMSHIFT) to the results of the texture analysis.

E)Text Detection in Natural Images Based on MultiScale Edge Detetion and ClassificationLong Ma, Chunheng Wang, Baihua Xiao[6] propose, a robust method for textdetection in color scene image. The algorithm is depend on edge detection and connected-component. multi-scale edge detection is achieved by Canny operator and an adaptive thresholding binary method. the filtered edges are classified by the classifier trained by SVM combing HOG,LBP and several statistical features, including mean, standard deviation, energy, entropy, inertia, local homogeneity and correlation. k-means clustering algorithm and the binary gradient image are used to filter the candidate regions and re-detect the regions around the candidate

text candidates. Finally, the texts are relocated accurately by projection analysis.

Comparison between existing system and proposed system

By studying this paper To analyse the accuracy of the localized text regions, compare them with ground truth text regions and characterize the results with measures call precision, recall, and f-measure regions. Table I indicates comparison of existing system with paper proposed system,

Table I Comparative analysis of the Existing systems & proposed system

Existing system	Precision(%)	Recall(%)	F_measure(%)
HinnerBeck	62	67	62
AlexChen	60	60	58
Ashida	55	46	50
HWDavid	44	46	45
Proposed system	69	56	60

III SYSTEM ARCHITECTURE

This paper presents a prototype system of assistive text reading. As illustrated in Fig. 3, the system framework consists of three functional components: scene capture, data processing, and audio output.

Scene capture

The scene capture component collects scenes containing objects of interest in the form of images or video. In our prototype, it corresponds to a camera attached to a pair of sunglasses.

Data processing component

The data processing component is used for deploying our proposed algorithms, including.

1. **Object-of-interest detection**:-To selectively extract the image of the object held by the blind person from the cluttered background or other neutral objects in the camera view.
2. **Text localization: -** To obtain image regions containing text, and text recognition to transform image-based text information into readable codes.

Audio output component

The audio output component is to inform the blind person of recognized text codes. A Bluetooth earpiece with mini microphone is used for speech output. This simple hardware configuration ensures the portability of the assistive text reading system.

ADVANTAGES

- Extract text information easily from complex backgrounds.
- Propose a text localization algorithm that combines rule based layout analysis and learning-based text classifier training.
- System is portable.
- Easy to operate.
- Accuracy is more than Existing system.

APPLICATIONS

- For blind people in mall, public place etc.
- For Illiterate people.

IV.CONCLUSION

This paper focuses a prototype system to read printed text on hand-held objects for assisting blind persons In order to solve the common aiming problem for blind users, This method can effectively distinguish the object of interest from background or other objects in the camera view. Adjacent character grouping is performed to calculate candidates of text patches prepared for text classification. An Ad boost learning model is employed to localize text in camera-based images. Off-the-shelf OCR is used to perform word recognition on the localized text regions and transform into audio output for blind users

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