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INSTANTANEOUS OBJECT IDENTIFICATION AND INTIMATION FRAMEWORK FOR TYPHLOTIC PEOPLE

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Abstract

Blind people face several problems in their life, one of these problems that is the most important one is detection the obstacles when they are walking. Our research is on obstacle detection in order to reduce navigation difficulties for visually impaired people. Moving through an unknown environment becomes a real challenge when we can't rely on our own eyes. To help the blind people the visual world has to be transformed into the audio world with the potential to inform them about objects. In this paper algorithm for real time detection and tracking of object is proposed by deep learning. Object recognition is one of the major applications in deep learning. It can be done by many ways, like by using pre-trained model using CNN(Convolution Neural Network), transfer learning or from the scratch by feeding n number of datasets to recognize the object with more number of epochs to increase the accuracy of the result. The model is trained with more than lakhs of images to recognize the object.

1. Introduction

Navigation in unfamiliar and dynamic spaces is a challenge for people with visual impairments. In regions with increased traffic flow, visually challenged people have trouble overcoming barriers. This necessitates the visually challenged to be dependent on the help of others, resulting in a reduced quality of life. We conducted a survey on the problems faced by the visually challenged in which over 150 people participated. One of the major challenge reported is to utilize public transport in a self-reliant manner. Unfortunately, there are about 441 million people who are either fully or partially visually impaired people across all countries.

2. Literature Survey

In this work we explore a combination of methods that allow us to analyze and study hyper-local environmental phenomena. Developing a unique application of monoplotting enables visualization of the results of deep-learning object detection and traditional object tracking processes applied to a perspective view of a parking lot on aerial imagery in realtime. Additionally, we propose a general algorithm to extract some scene understanding by inverting the monoplotting process and applying it to digital elevation models. This allows us to derive estimations of perspective image areas causing object occlusions. Connecting the real world and perspective spaces, we can create a resilient object tracking environment using both coordinate spaces to adapt tracking methods when objects encounter occlusions. We submit that this novel composite of techniques opens avenues for more intelligent, robust object tracking and detailed environment analysis using GIS in complex spatial domains provided video footage and UAS products.

On-line object tracking is an essential technology in computer vision. Object tracking systems need to reduce their energy consumption because the technology is increasingly being utilized for battery-operated systems, e.g., driving assist systems, smartphones, drones and so on. To tackle this problem, dynamic frame-rate optimization has been proposed. This approach optimizes the frame-rate on the basis of target object speed by taking into account the energy trade-off between the image capturing and tracking processes. In order to improve tracking accuracy, the approach selects a frame-rate based on a specific fixed value.

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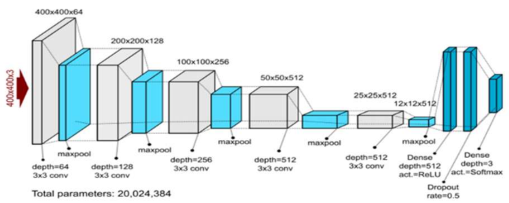
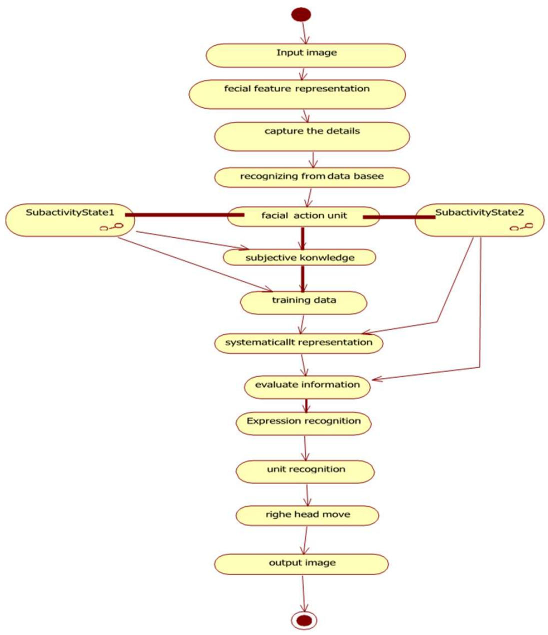
3. System Design

The architecture consists of eight layers: five convolutional layers and three fully-connected layers. But this isn't what makes AlexNet special; these are some of the features used that are new approaches to convolutional neural networks:

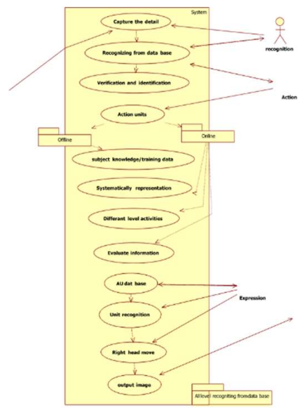


AlexNet uses Rectified Linear Units (ReLU) instead of the tanh function, which was standard at the time. ReLU's advantage is in training time; a CNN using ReLU was able to reach a 25% error on the CIFAR-10 dataset six times faster than a CNN using tanh.

This is the MATLAB graphics system. It includes high-level commands for two-dimensional and three-dimensional data visualization, image processing, animation, and presentation graphics. It also includes low-level commands that allow you to fully customize the appearance of graphics as well as to build complete graphical user interfaces on your MATLAB applications.



In order to understand how different image processing filters work, it is a good idea to begin by understanding what frequency has to do with images.



4. Implementation

Facial expression recognition systems usually try to recognize either six expressions or the AUs. Over the past decades, there has been extensive research on facial expression analysis.

Image-based approaches, which focus on recognizing facial actions by observing the representative facial appearance changes, usually try to classify expression or AUs independently and statically. This kind of method usually consists of two key stages.

The common weakness of image-based methods for AU recognition is that they tend to recognize each AU or certain AU combinations individually and statically directly from the image data, ignoring the semantic and dynamic relationships among AUs, although some of them analyze the temporal properties of facial features. Model-based methods overcome this weakness by making use of the relationships among AUs, and recognize the AUs simultaneously. Lien employed a set of Hidden Markov Models (HMMs) to represent the facial actions evolution in time.

The classification is performed by choosing the AU or AU combination that maximizes the likelihood of the extracted facial features generated by the associated HMM. Both methods exploit the temporal dependencies among AUs. They, however, fail to exploit the spatial dependencies among AUs. Besides modeling the spatial and temporal relationships among AUs, we also make use

of the information of expression and facial feature points, and more importantly, the coupling and interactions among them.

The idea of combining tracking with recognition has been attempted before, such as simultaneous facial feature tracking and expression recognition, and integrating face tracking with video coding. However, in most of these works,

the interaction between facial feature tracking and facial expression recognition is one-way, i.e., facial feature tracking results are fed to facial expression recognition.

The face is one of the most powerful channels of nonverbal communication. Facial expression provides cues about emotion, intention, alertness, pain, personality, regulates interpersonal behavior, and communicates psychiatric and biomedical status among other functions. Within the past 15 years, there has been increasing interest in automated facial expression analysis within the computer vision and machine learning communities. This chapter reviews fundamental approaches to facial measurement by behavioral scientists and current efforts in automated facial expression recognition. We consider challenges, review databases available to the research community, approaches to feature detection, tracking, and representation, and both supervised and unsupervised learning.

The recognition of facial gestures and expressions in image sequences is an important and challenging problem. Most of the existing methods adopt the following paradigm. First, facial actions/features are retrieved from the images, and then facial expressions are recognized based on the retrieved temporal parameters. Unlike this main stream, this paper introduces a new approach allowing the simultaneous recovery of facial actions and expression using a particle filter adopting multi-class dynamics that are conditioned on the expression.

For each frame in the video sequence, our approach is split in two consecutive stages. In the first stage, the 3D head pose is recovered using a deterministic registration technique based on Online Appearance Models. In the second stage, the facial actions as well as the facial expression are simultaneously recovered using the stochastic framework with mixed states. The proposed fast scheme is either as robust as existing ones or more robust with respect to many regards. Experimental results show the feasibility and robustness of the proposed approach.

5. Conclusion

In our paper, we focused to eliminate the need for dedicated tracking devices to lower the infrastructure requirements to support location tracking of vehicles. This led to being cost-effective and providing better services to the organization than the existing system. Since our project is cross-platform compatible, we can update the project to accommodate any future requirements.

The project was built for the majority of users who use Android smartphones as their primary device. However, in future, we expect to cater the needs of iOS users as well.

Moreover, there is scope for building a dedicated location tracking device using Arduino Uno and a GSM Module.

6. References

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