DEEP LEARNING ASSESSMENT OF MISSING CHILD IDENTIFICATION USING CNN

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ABSTRACT

This paper presents a novel use of deep learning methodology for identifying the reported missing child from the photos of multitude of children available, with the help of face recognition. The public can upload photographs of suspicious child into a common portal with landmarks and remarks. The photo will be automatically compared with the registered photos of the missing child from the repository. Classification of the input child image is performed and photo withbest match will be selected from the database of missing children. For this, a deep learning model is trained to correctly identify the missing child from the missing child image database provided, using the facial image uploaded by the public. The Convolutional Neural Network (CNN), a highly effectivedeep learning technique for image based applications is adopted here for face recognition. Face descriptors are extracted from the images using a pre-trained CNN model VGG-Face deep architecture.Compared with normal deep learning applications, our algorithm uses convolution network only as a high level feature extractor and the child recognition is done by the trained SVM classifier. Choosingthe best performing CNN model for face recognition, VGG-Face and proper training of it results in a deep learning model invariant to noise, illumination, contrast, occlusion, image pose and age of the child and it outperforms earlier methods in face recognition based missing child identification.

Keywords: CNN,VGG Face deep architecture

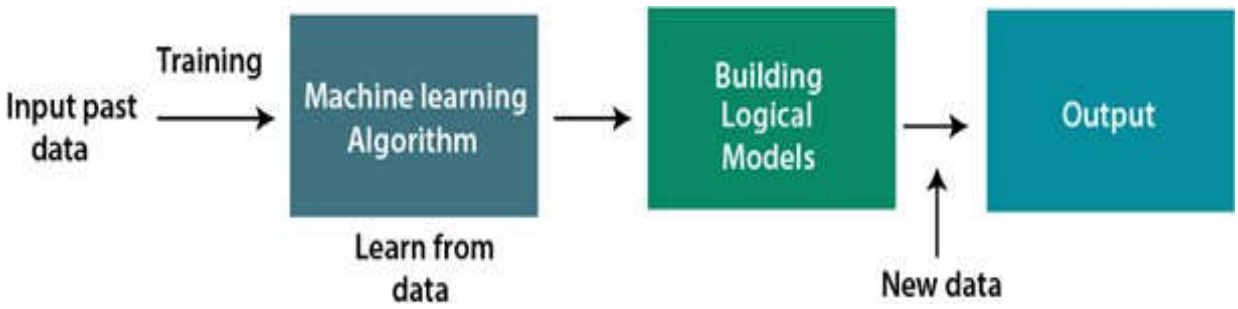
INTRODUCTION

Children are the greatest asset of each nation. The future of any country depends upon the rightupbringing of its children. India is the second populous country in the world and children represent a significant percentage of total population. But unfortunately a large number of children go missing every year in India due to various reasons including abduction or kidnapping, run-away children, trafficked children and lost children. A profoundly upsetting reality about India's missing youngsters is that while on a normal 174 kids disappear each day, half of them remain untraced. Youngsters who disappear might be taken advantage of and manhandled for different purposes. According to the National Crime Records Bureau (NCRB) report which was refered to by the Ministry of Home Affairs (MHA) in the Parliament (LS Q no. 3928, 20-03-2018), more than one lakh kids (1,11,569 in real numbers) were accounted for to have disappeared till 2016, and 55,625 of them remained untraced till the year's end.Many NGOs claim that estimates of missing children are much higher than reported. Mostly missing child cases are reported to the police. The child missing from one region may be found in another region or another state, for various reasons. So regardless of whether a kid is discovered, it is hard to distinguish him/her from the announced missing cases. A system and approach for fostering an assistive apparatus for following missing kid is depicted in this paper. A thought for keeping a virtual space is proposed, with the end goal that the new photos of youngsters given by guardians at the hour of detailing missing cases is saved in a storehouse. The public is given provision to voluntarily take photographs of children in suspected situations and uploaded in that portal. Automatic searching of this photo among the missing child case images will be provided in the application. This supports the police officialsto locate the child anywhere in India. When a child is found, the photograph at that time is matched against the images uploaded by the Police/guardian at the time of missing. Sometimesthe child has been missing for a long time. This age gap reflects in the images since aging affects the shape of the face and texture of the skin. The feature discriminator invariant to aging effects has to be derived. This is the challenge in missing child identification compared to the other face recognition systems. Also facial

appearance of child can vary due to changes in pose, orientation, illumination, occlusions, noise in background etc. The image taken by public may not be of good quality, as some of them may be captured from a distance without
the knowledge of the child. A deep learning [1] architecture considering all these constrain is designed here. The proposed system is comparatively an easy, inexpensive and reliable methodcompared to other biometrics like finger print and iris recognition systems..

Additionally, CAMSOM has better and precision in catching the limits of the articles set discretionarily in a multi-object scene, while the presentation of BSOM in multi- object scenes exceptionally relies upon the course of action of the items. Contrasted with the energy minimization strategies, the proposed strategy can precisely and rapidly merges to the sunken limits, though slope vector stream (GVF) and vector field convolution (VFC) whichare two notable energy minimization techniques stall out in nearby minima and can't continue to the furthest limit of the concavity.

Methods	Classifiers/ Techniques	Key Features	Dealing with	Data Sets Used
Eye blinking [88]	LRCN	- Use LRCN to learn the temporal patterns of eye blinking. - Based on the observation that blinking frequency of deepfakes is much smaller than normal.	Videos	Consist of 49 interview and presentation videos, and their corresponding generated deepfakes.
Using spatio-temporal features [84]	RCN	Temporal discrepancies across frames are explored using RCN that integrates convolutional network DenseNet [68] and the gated recurrent unit cells [85]	Videos	FaceForensics++ data set, including 1,000 videos [86].
Intra-frame and temporal inconsistencies [87]	CNN and LSTM	CNN is employed to extract frame-level features, which are distributed to LSTM to construct sequence descriptor useful for classification.	Videos	A collection of 600 videos obtained from multiple web-sites.
Using face warp-ing artifacts [92]	VGG16 [90] ResNet50, 101 or 152 [91]	Artifacts are discovered using CNN models based on resolution inconsistency between the warped face area and the surrounding context.	Videos	- UADFV [93], containing 49 real videos and 49 fake videos with 32752 frames in total. - DeepfakeTIMIT [52]
MesoNet [83]	CNN	- Two deep networks, i.e. Meso-4 and MesoInception-4 are introduced to examine deepfake videos at the mesoscopic analysis level. - Accuracy obtained on deepfake and FaceForensics data sets are 98	Videos	Two data sets: deepfake one constituted from online videos and the FaceForensics one created by the Face2Face approach [100].



Assortments of fundamental information types are accessible: numbers (floating point, complex, and unlimited-length long integers), strings (both ASCII and Unicode), records, and dictionaries. Python bolsters object-situated programming with classes and various inheritances. Code can be gathered into modules and packages. The language underpins raisingand getting exemptions, bringing about cleaner mistake handling. Data types are firmly and powerfully composed. Blending inconsistent sorts (for example endeavoring to include a stringand a number) makes an exemption be raised, so blunders are gotten sooner. Python contains propelled programming highlights, for example, generators and rundown comprehensions. Python's programmed memory the board liberates you from having to physically distribute andfree memory in your code.

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