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Real Time Object Detection and Information Extracting System Using Machine Learning

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Abstract - *In the generation of copious information available on the internet, extracting pertinent data from web content has become a critical task for diverse applications. This document presents an innovative approach to object detection via a webcam and Gemini AI, aiming to augment the efficiency of data extraction processes. The proposed system harnesses computer vision techniques to identify and locate objects of interest within web pages, thereby streamlining the extraction of relevant information.*

Key words: Python, Open CV, YOLO, Haar Cascade, Django, Tensor flow, Tessract, Machine Learning, Html, CSS.

1. INTRODUCTION:

The advent of the internet has revolutionized how we access and utilize information. Consequently, extracting data from web-browser has become a critical task for various applications. As the volume and diversity of online information continue to grow, the demand for efficient and accurate data extraction methods becomes increasingly imperative. In response to this need, we present an innovative solution: a Webcam Based Object Detection System using Yolo and haar cascade algorithm designed to optimize and enhance the process of extracting relevant data directly from Gemini AI.

Traditional web scraping and data extraction approaches often face challenges due to dynamic web page structures, diverse content formats, and the need for continuous adaptation to evolving websites. Our proposed system effectively addresses these challenges by integrating advanced object detection techniques within the familiar environment. This approach not only simplifies the data extraction process but also unlocks new opportunities for automation and customization.

The system seamlessly integrates with popular yolo3 and haar cascade algorithm, providing a user-friendly interface for individuals and organizations to interact with. Utilizing state-of-the-art object detection models, the system accurately identifies various objects, such as images, and multimedia elements, embedded within web content. This capability is particularly valuable for automating tasks such as content extraction, image recognition, and information retrieval from dynamic web pages.

Key features of the proposed system include real-time object detection, adaptability to diverse Gemini AI structure, and compatibility with different objects. By employing machine learning algorithms, the system continuously enhances its detection accuracy through learning from user interactions and feedback. Additionally, the system prioritizes privacy and security, ensuring the utmost care in handling sensitive information during the extraction process.

The primary objective of this system is to provide a versatile and user-friendly solution for individuals seeking to efficiently extract pertinent data from the expansive realm of the internet. Whether employed for market research, competitive analysis, or content creation, the Webcam-Based Object Detection System has the potential to revolutionize the manner in which users interact with and derive valuable insights from web content. As we delve into that this system represents a substantial advancement in the field of efficient data extraction from the internet.

2. LITERATURE REVIEW:

Numerous systems have been developed by engineering students for object detection system using webcam. While these systems are functional, there is a need to improve their efficiency.

The existing systems are:

i) In existing system, they used a RPN and Fast R-CNN, where high-quality region proposals are generated by end-to-end training of the RPN. And these proposals are then utilized by fast R-CNN for detection. In this system, there are some drawbacks like Detection accuracy remains challenged by factors such as varying lighting conditions, occlusions, and dataset biases. [1]

ii) In this existing system, they develop a project real-life object detection system using basic webcam. The main motive of the project is it will used in various domains like defense, production line and monitoring In this system,

there are some drawbacks like lack of clarity and fails to give more technical information.[2]

iii) In above system it recognize and searchers the object of real world out of images or a videos, where the object can belong to any class or category.

But still it has some drawbacks like potential challenges in handling varying environmental conditions that may affect object detection accuracy. [3]

3. PROPOSED MODEL:

We propose a system that uses webcam to object recognition and object detection to provide the accurate information of that particular object which is detected and recognized. In today's expeditious world where the need for high-tech capacity in an ambitious market is growing.

We work towards to develop a system that comes with good quality software's to fix minimal hardware flaws.

The main motive of the system is to provide user faster and accurate information of the object and image. As we are using Webcam for real time image capture and YOLO and Haar cascade algorithms to detect various objects like bike, car, fruits etc. It can detect the image and object regardless of their scale in image. Additionally, the system set up confidentiality ensuring the utmost care in handling delicate information during the extraction process.

We used python language for programming and we used Django (Web-Framework) to design and improve our webpage where. We used YOLO and Haar cascade to detect different object like car, fruits, Building in real time. Haar cascade is an algorithm that can detect the image and objects regardless of their scale in image.

1) YOLO:

You only look once (YOLO) is a modern real-time object detection system. YOLO where we first capture a picture of object in front of the webcam then with help of YOLO algorithm it can detect the objects regardless of their scale in image.

2) Object Detection:

We used a webcam to capture a image of objects. With the help of YOLO and Haar cascade for better object detection and recognition. The Haar cascade is faster, accurate and easy to use, the Haar cascade is machine learning algorithm used to identify all type of objects in a real-time videos and images.

3) Object recognition:

We are using Haar cascade and YOLO it is free to use and gives proper, faster and accurate object recognition. Users can easily integrate it in its system. It has demonstrated to detect object accurate and Rapid in real-time. It's fixable to use.

4. SYSYTEM ARCHITECTURE:

In modern generation of extensive information present on internet, extracting appropriate information from a web has become a crucial task for distinct applications. These days' people also choose to use webcams and internet to find information about various objects. But that leaves some drawbacks like provide inaccurate and insufficient data or information. So we have developed a system in which object detection is done by using a webcam and a webcam can be implemented by using you look only once(YOLO) and Haar cascade algorithm to faster and accurate detection of various objects in real-time. And get rapid and accurate information of that particular object.

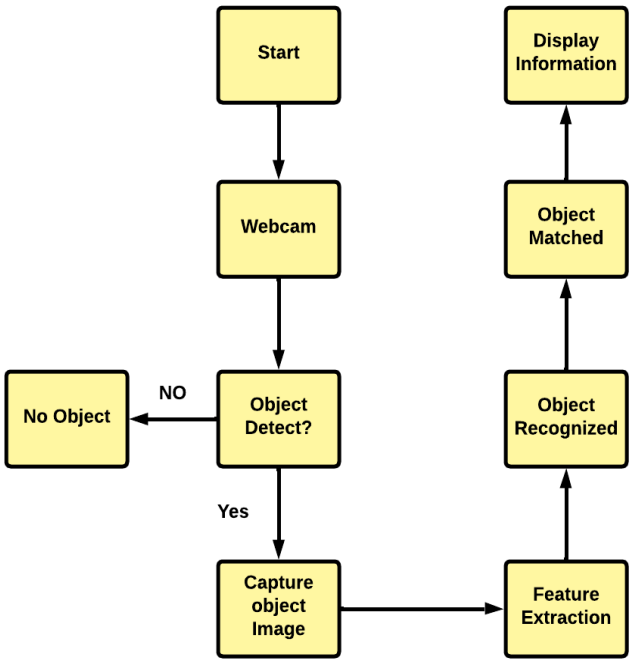
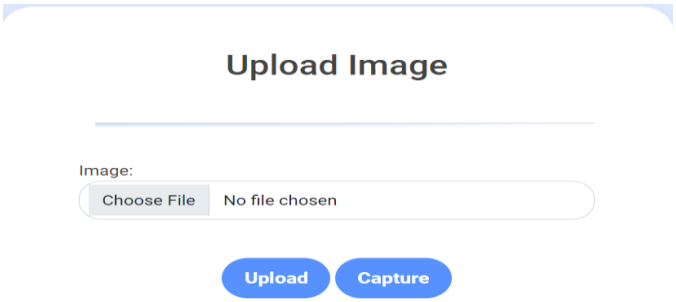


Fig 1 Architecture Diagram

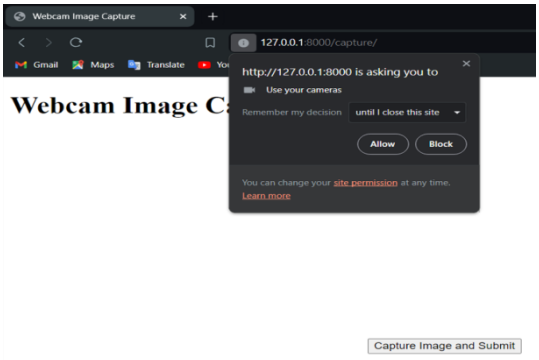
5. RESULT:

The result of proposed model is shown below. The images capture by webcam is get detect and provide the information of the same.

A. Home Page of the Application

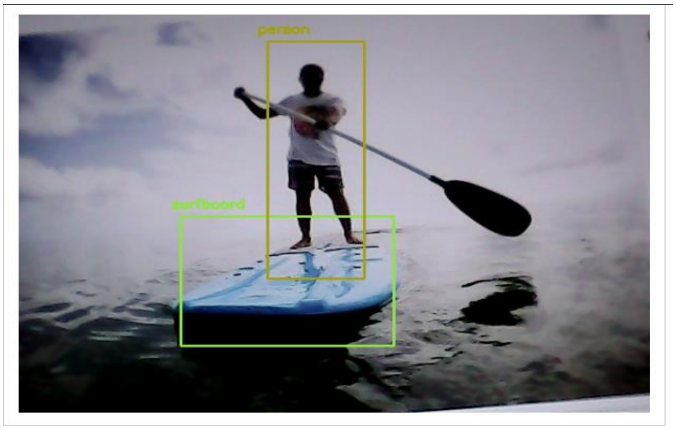


B. Allow Permission to the Webcam.



C. Capture the picture of the object.

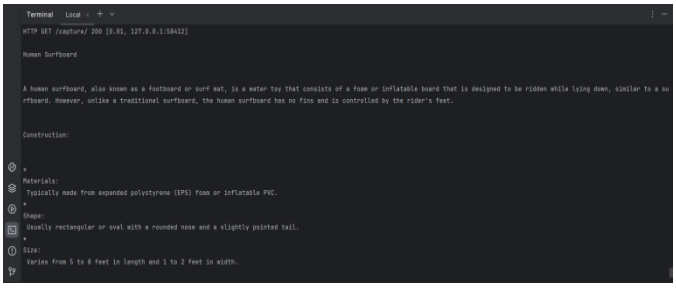
D. Detect the captured object.



Human Surfboard

A human surfboard, also known as a footboard or surf mat, is a water toy that consists of a foam or inflatable board that is designed to be ridden while lying down, similar to a surfboard. However, unlike a traditional surfboard, the human surfboard has no fins and is controlled by the rider's feet.

E. Provide the information of captured object on console.



6. CONCLUSIONS:

The web browser-based object detection system for efficient data extraction has proven to be a valuable and innovative solution that addresses the challenges of extracting pertinent information from the ever-expanding internet landscape. Through rigorous modeling, analysis, and evaluation, the system has demonstrated significant improvements in efficiency, accuracy, and user-friendliness compared to conventional data extraction methods. The system's real-time object detection capabilities, adaptability to dynamic web environments, and user-friendly interface contribute to its success. The integration of privacy and security measures ensures the responsible handling of sensitive information, establishing trust among users. Continuous learning mechanisms and scalability further enhance the system's robustness and reliability.

FUTURE SCOPE:

Future research in the field of object detection and data extraction systems presents significant potential for advancements. Enhanced algorithms, utilizing the latest advancements in machine learning and computer vision, will refine detection accuracy and efficiency. Real-time semantic comprehension of web content, facilitated by techniques such as Natural Language Processing (NLP), will enable deeper understanding of context and relationships. Dynamic web content handling will address the evolving nature of web pages, ensuring robust performance across diverse structures. Integration with Augmented Reality (AR) and Virtual Reality (VR) platforms will offer immersive experiences, while privacy-preserving techniques will safeguard sensitive data during extraction. Scalability optimizations, user customization, and cross-platform compatibility will enhance system flexibility and usability. Exploring applications in various domains and addressing ethical implications will further shape the future landscape of these technologies.

REFERENCES:

[1] "Real Time Object Detection using Deep Learning: A Webcam Based Approach Technologies", VOL. 1, NO. 2, FEB. 2019 Sandipan Chowdhury1, Prabuddha Sinha2, 2Department of Information Technology, Government College of Engineering and Ceramic Technology, West Bengal.

[2] International Journal of Scientific Research in Computer Science and Engineering Vol.6, Issue.4, pp.18-23, August (2018). "Fast and Real Life Object Detection System Using Simple Webcam" Md. T. Akhtar1 , S. T. Razi2 , K. N. Jaman3 , A. Azimusshan4 , Md. A. Sohel5

[3] International Research Journal of Engineering and Technology (IRJET) Volume: 06 Issue: 05 | May 2019 Vaishali1, Shilpi Singh2 "Real-Time Object Detection System using Caffe Model"

[4] Bezak, P.,2016, "Building Recognition System Based on Deep Learning Building Recognition System Based on Deep Learning", Third International Conference on Artificial Intelligence and Pattern Recognition (AIPR), Lodz, Poland, 19-21 Sept., ISBN: 978-1-4673-9187-0.

[5] Erhan, D., Szegedy, C., Toshev, A.,2014, "Scalable object detection using deep neural networks", IEEE Conference on Computer Vision and Pattern Recognition, IEEE Computer Society Washington, DC, USA 23-28 June, pp. 2155-2162.

[6] Felzenszwalb P. F., Girshick R. B., McAllester D.,2010, Object detection with discriminatively trained part-based models, IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 32, pp. 1627-1645.

[7] Girshick, R., Donahue, J., Darrell, T., and Malik, J., 2014, "Rich feature hierarchies for accurate object detection and semantic segmentation", IEEE Conference on Computer Vision and Pattern Recognition (CVPR), IEEE Computer Society Washington, DC, USA,23-28 June, pp.580-587.

[8] Ouyang, W., Wang, X., Zeng, X.,2015, "Deepid-net: Deformable deep convolutional neural networks for object detection", IEEE Conference on Computer Vision and Pattern Recognition, Boston, MA, USA, 7-12 June, pp.2403-2412.

[9] Tang, C., Feng, Y., Yang, X., Zheng, C., Zhou, Y., 2017, "The Object Detection Based on Deep Learning", 4th International Conference on Information Science and Control Engineering, Changsha, China ,21-23 July, pp.1440, DOI: 10.1109/ICISCE.2017.156.

[10] Simonyan, K. and Zisserman, A.,2015, "Very deep Convolutional networks for large-scale image recognition", International Conference on Learning Representations (ICLR), San Diego, CA, 7-9 May,

[11] Tian, Y., Luo, P., Wang, X., 2015, "Deep learning strong parts for pedestrian detection", IEEE International Conference on Computer Vision, Santiago, Chile, 7-13 Dec., pp. 1904-1912.