# B V RAJU INSTITUTE OF TECHNOLOGY

(UGC Autonomous)
Vishnupur, Narsapur, Medak District

## Department of Computer Science and Engineering

## Mini Project – Zeroth Review

**Title : REAL TIME THINGS IDENTIFICATION USING YOLOv8 AND FLASK**


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# Literature Survey

| Year | Author Name | Title | Journal Name | Research Design | Conceptual / Theoretical framework | Proposed Framework | Major theme in paper | Future Ideas |
|---|---|---|---|---|---|---|---|---|
| 2024 | Preethi G., Shambavi Naik, Siri M. Kenchol, Shanta P. Jakalannanavar, Rachana M. S. | Object Detection Using FasterRCNN, YOLOv7 & YOLOv8 | Indiana Journal of Multidisciplinary Research (Ind J Multi Res), Vol. 4, Issue 3 | Comparative analysis of object detection algorithms, focusing on performance metrics like accuracy, speed, and usability. | Explores strengths and limitations of Faster R-CNN, YOLOv7, and YOLOv8 for different computer vision tasks | Development of a Flask-based frontend with authentication for secure, user-friendly testing of these models | Enhancing object detection efficiency and usability through advanced algorithm optimization and dataset preprocessing | Integrating real-time detection on diverse platforms, refining dataset techniques, and expanding to specific domains like medical imaging and environmental monitoring |
| 2023 | Moahaimen Talib, Ahmed H. Y. Al-Noori, Jameelah Suad | YOLOv8-CAB: Improved YOLOv8 for Real-time Object Detection | Karbala International Journal of Modern Science | Enhances YOLOv8 using Context Attention Block (CAB) and improved spatial attention techniques | Focuses on better feature extraction for small-object detection and multi-scale utilization | Introduced CAB for weak feature detection and a Coarse-to-Fine (C2F) strategy for improved accuracy | Real-time and precise object detection in challenging scenarios | Explore further optimization and real-world applications of YOLOv8 enhancements |

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| 2023 | Zhengxia Zou, Keyan Chen, Zhenwei Shi, Yuhong Guo, and Jieping Ye | Object Detection in 20 Years: A Survey | *IEEE* | Comprehensive literature survey | Categorization of object detection approaches into traditional and deep learning-based methods | No new framework, but a structured analysis of historical progress and state-of-the-art techniques | Trends in object detection, including real-time systems, precision-focused applications, and large-scale datasets | Exploration of zero-shot learning, domain adaptation, and integration with broader AI systems like robotics and AR |
| 2022 | Tausif Diwan, G. Anirudh, and Jitendra V. Tembhurne | Object detection using YOLO: challenges, architectural successors, datasets and applications | Multimedia Tools and Applications | Comparative analysis of single-stage versus two-stage object detectors | Highlights YOLO's architecture evolution and performance metrics | Discusses advancements in YOLO versions and their practical applications | Speed and efficiency of YOLO models compared to other architectures, with a focus on real-world adoption. | Suggestions for improving detection accuracy, expanding applications, and integrating with newer deep learning techniques |

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| 2022 | Abhinandan Tripathi,Manish Kumar Gupta | Object Detection using YOLO: A Survey | International Conference on Contemporary Computing and Informatics | Survey of YOLO's evolution and applications | YOLO's object detection capabilities, focusing on speed, accuracy, and use in real-time applications. | Discussion of various YOLO adaptations for specific tasks like blood cell counting and traffic surveillance | The paper emphasizes YOLO's rapid advancements, its real-time detection speed, and various specialized applications | Potential improvements in detection accuracy, speed optimization, and broader applicability in diverse domains |
| 2021 | Abhishek Sarda; Shubhra Dixit | Object Detection for Autonomous Driving using YOLO Algorithm | *IEEE Conference on Intelligent Engineering and Management (ICIEM)* | Custom YOLO model designed for autonomous vehicle object detection | Focused on low-cost computation for real-time object detection in autonomous systems | Utilized YOLO for object detection using a specialized dataset for autonomous driving | Improving safety and efficiency in autonomous driving via object detection | Explore enhancements for scalability and adaptability in various environments |

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| 2021 | Shasha Li, Yongjun Li, Yao Li, Mengjun Li, and Xiaorong Xu. | YOLO-FIRI: Improved YOLOv5 for Infrared Image Object Detection | IEEE Access | focuses on improving infrared image object detection using an enhanced version of YOLOv5, called YOLO-FIRI | multiscale detection to improve accuracy and efficiency | proposed framework integrates optimizations like channel compression, a new attention module | enhancing detection performance in challenging infrared environments | exploring image fusion methods to further improve detection accuracy by merging infrared and visible images |
| 2019 | Wei Fang,Lin Wang | Tinier-YOLO: A Real-Time Object Detection Method for Constrained Environments | *IEEE Access* | focuses on developing a lightweight version of the YOLO model, called Tinier-YOLO | integration of fire modules and dense connections to enhance feature propagation | combines YOLO's object detection approach with network compression techniques | detection accuracy and computational efficiency, with potential applications in real-time systems | enhancements to detection accuracy, particularly for small objects |

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|---|---|---|---|---|---|---|---|---|
| 2020 | Tanvir Ahmad, Yinglong Ma, Muhammad Yahya, Belal Ahmad, Shah Nazir, Amin ul Haq | Object Detection through Modified YOLO Neural Network | Scientific Programming | Modified YOLOv1 neural network with enhanced loss function and detection algorithms | Focused on improving feature recognition and object localization | Developed a refined loss function to enhance detection accuracy | Improving YOLOv1 for more efficient object detection | Further enhancement of detection capabilities for real-time applications |
| 2018 | Lv Chao, Wang Jiaan, and Deng Tianyuan | Object Detection Based on YOLO Network | Information Technology and Mechatronics Engineering Conference (ITOEC) | YOLO's capabilities to overcome challenges like image noise, blurring, and jitter | particularly focusing on its use for improving detection of traffic signs in various real-world conditions | integrates traditional image processing with deep learning to handle these issues more effectively | enhancing detection accuracy by training YOLO on degraded image | refining the integration of YOLO with additional image enhancement techniques |

# Existing System

Commercial solutions like Amazon Recognition, Google Cloud Video Intelligence, and Microsoft Azure Cognitive Services offer scalable, pre-trained models but can be costly and complex. Open-source frameworks such as TensorFlow, OpenCV, and Detectron2 provide flexibility but require significant expertise to implement. In contrast, the proposed Flask web app stands out for its user-friendly interface, YOLOv8 integration for speed and accuracy, and support for diverse input options like images and video streams. By offering on-premise deployment and potential model customization, it addresses user needs for accessibility, data control, and flexibility, setting it apart from existing solutions.

# Problem Statement

Current object detection and pose estimation solutions are either complex to implement or not easily accessible. There is a need for a user-friendly platform that offers real-time processing of images, videos, and streams. This project aims to develop a web application using YOLOv8 for fast, accurate detection and pose estimation. The platform will provide customization options and intuitive outputs for diverse users and applications.

# Objectives

**Develop a User-Friendly Web Application for Real-time Object Detection:**

- Create an intuitive interface for users to interact with object detection features.
- Ensure easy uploading of images and selection of video sources.
- Provide straightforward controls for adjusting confidence thresholds.

**Leverage YOLOv8 for Efficient and Accurate Object Detection:**

- Utilize the YOLOv8 deep learning model for fast and precise object identification.
- Harness the power of YOLOv8 to achieve reliable detection results within images or video frames.

**Enable Real-time Object Detection Across Various Media Sources:**

- Implement functionality to handle diverse input sources seamlessly.
- Enable real-time object detection on static images, live webcam feeds, RTSP streams, and YouTube videos.
- Ensure the application's versatility in processing different types of media for object detection tasks.

# Tentative Proposed Model

**Real-time Processing**: Users can view detections and pose estimates in real-time, leveraging YOLOv8's efficiency and speed.

**Customization**: Users can adjust parameters like confidence thresholds and object classes, allowing fine-tuning of the detection process.

**Detection Results Overlay**: The system will overlay bounding boxes around detected objects and skeletons for pose estimation on the media.

**User Interface**: The website will feature an intuitive interface for easy interactions with the model, allowing users to upload or stream media and customize settings.

**Output Management**: Users can download or share processed outputs in various formats.

The platform's proposed model emphasizes **user accessibility** and **customization**, with **YOLOv8's robust object detection capabilities** enabling real-time applications in fields such as **security**, **robotics**, and **augmented reality**.

# Abstract

**Abstract**

This project focuses on developing a user-friendly web platform powered by the YOLOv8 model for advanced image classification, object detection, and human pose estimation. The platform allows users to upload images and videos or specify video sources such as YouTube links, RTSP streams, or webcam feeds for real-time processing. YOLOv8, a state-of-the-art algorithm known for its speed, accuracy, and efficiency, will be integrated to detect and localize objects and estimate human poses within media content.Key features include customizable detection parameters, such as confidence thresholds and object classes, with results displayed as annotated overlays on the media. Users will have options to download or share the processed outputs. The platform's intuitive interface and robust functionality make it suitable for applications in surveillance, security, robotics, augmented reality, and human-computer interaction. This project aims to provide a powerful yet accessible tool that leverages YOLOv8's capabilities to meet diverse real-world needs in computer vision.

# References


[1] P. G., S. Naik, S. M. Kenchol, S. P. Jakalannanavar, and R. M. S., "Object Detection Using FasterRCNN, YOLOv7 & YOLOv8," *Indiana Journal of Multidisciplinary Research*, vol. 4, no. 3, pp. 136-141, 2024. doi: 10.5281/zenodo.12674762

[2] **M. Talib, A. H. Y. Al-Noori, and J. Suad**, "YOLOv8-CAB: Improved YOLOv8 for Real-time Object Detection," *Karbala International Journal of Modern Science*, vol. 10, no. 3, pp. 34-45, 2024. doi: 10.33640/2405-609X.3339.

[3] **Z. Zou, K. Chen, Z. Shi, Y. Guo, and J. Ye**, "Object Detection in 20 Years: A Survey," *Proceedings of the IEEE*, vol. 111, no. 3, pp. 257-276, Mar. 2023, doi: 10.1109/JPROC.2023.3238524.

[4] **T. Diwan, G. Anirudh, and J. V. Tembhurne**, "Object detection using YOLO: challenges, architectural successors, datasets and applications," *Multimedia Tools and Applications*, vol. 82, no. 13, pp. 14823–14855, 2022. doi: 10.1007/s11042-022-13644-y

[5] **T. Ahmad, Y. Ma, M. Yahya, B. Ahmad, S. Nazir, and A. ul Haq**, "Object Detection through Modified YOLO Neural Network," *Scientific Programming*, vol. 2020, Article ID 8403262, 9 pages, 2020. doi: 10.1155/2020/8403262.

[6] **Abhinandan Tripathi,Manish Kumar Gupta**, "Object Detection using YOLO: A Survey," in Proceedings of the 2022 5th International Conference on Contemporary Computing and Informatics (IC3I), 2022, pp. xx-xx. doi: 10.1109/IC3I56241.2022.10073281.

[7] **Abhishek Sarda; Shubhra Dixit**,"Object Detection for Autonomous Driving using YOLO algorithm," in Proc. IEEE Int. Conf. on Intelligent Engineering and Management (ICIEM), 2021.doi: 10.1109/ICIEM51511.2021.9445365

[8] **S. Li, Y. Li, Y. Li, M. Li, and X. Xu**, "YOLO-FIRI: Improved YOLOv5 for Infrared Image Object Detection," *IEEE Access*, vol. 9, pp. 141861-141875, 2021. doi: 10.1109/ACCESS.2021.3120870.

[9] **Fang, W., Li, Y., Wang, Z., & Xu, X.** (2019). Tinier-YOLO: A Real-Time Object Detection Method for Constrained Environments. *IEEE Access*, 7, 158719–158728. https://doi.org/10.1109/ACCESS.2019.2961959

[10] **L. Chao, W. Jiaan, and D. Tianyuan**, "Object Detection Based on YOLO Network," Proc. IEEE 4th Information Technology and Mechatronics Engineering Conference (ITOEC), 2018, pp. 157-162. doi: 10.1109/ITOEC.2018.8740604.

# Thank You ……..