BAASYIR
Smart Glass System

Blind individuals face challenges to independence due to limited resources. We introduce the 'BAASYIR' smart glasses, utilizing YOLOv7 and YOLOv7-Tiny using BAASYIR dataset for Real-Time indoor obstacle detection. Our approach achieved promising results.Implemented on a Raspberry Pi 3 Model B+, the BAASYIR smart glasses bridge technology and the visually impaired's needs.

Literature Review

In our research, we thoroughly reviewed the literature on object detection, particularly emphasizing its application in devices like smart glasses. We explored the progression from early models such as R-CNNs to more sophisticated architectures like YOLOv7 and YOLOv7-tiny, highlighting their impact on enhancing detection accuracy, speed, and computational efficiency. This comprehensive analysis underscores the significant advancements in object detection technologies, essential for developing real-time, resource-efficient applications.

Research Methodology

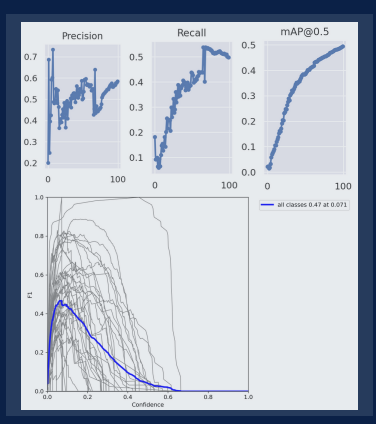
Our study explores object detection with YOLOv7 and YOLOv7-tiny, covering three main areas: theory, design, and experiments. Each part gives insight into how we approach and implement these advanced models

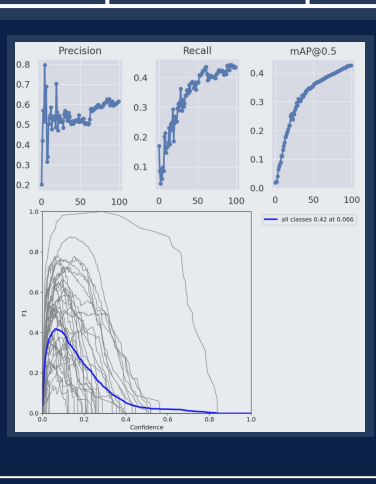
- theoretical Formalization: This section would elaborate on the mathematical and theoretical underpinnings of object detection algorithms, particularly focusing on the principles guiding the YOLOv7 and YOLOv7-tiny models.
- Algorithm Design: Here, the focus would be on the architectural design of the models, highlighting the innovative features and optimizations that enable these models to achieve high accuracy and efficiency in object detection tasks.
- Experimental Design: This part would detail the practical implementation of the models, including data preparation, model training and testing protocols, and the hardware and software environments used in the experiments.

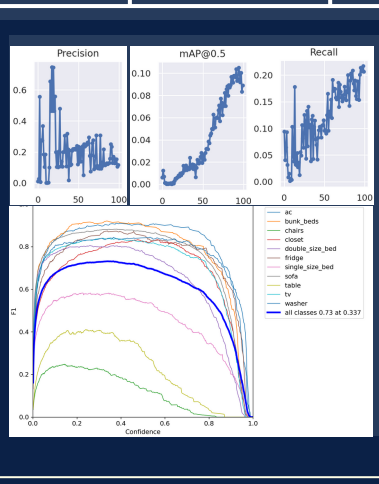
Results and Discussion

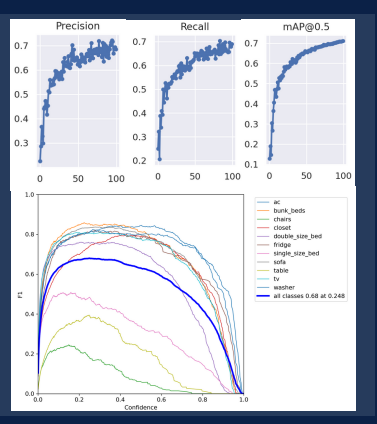
This table presents the comprehensive results of our object detection experiments, comparing the performance of YOLOv7 and YOLOv7-tiny models on different datasets, providing a clear overview of each model's capabilities in real-world applications.

Model	YOLOv7	YOLOv7 Tiny	YOLOv7 Furniture	YOLOv7 Tiny Furniture	YOLOv7 Baasyir	YOLOv7 Tiny Baasyir
Dataset	MS COCO	VisDrone-2019	Furniture	Furniture	Baasyir	Baasyir
mAP	52.0%	34.5%	75.3%	71.1%	49.4%	42.7%









Conclusion and Future Work

In our conclusion, we introduced the BAASYIR smart glasses, leveraging deep learning with computer vision. We utilized both YOLOv7 and YOLOv7-tiny models for optimal performance, balancing accuracy and computational efficiency. Future work will aim to expand the dataset for more real-world relevance and enhance the hardware for everyday practicality. This sets the stage for further advancements in assistive technologies, focusing on iterative improvements in software and hardware to better accommodate the needs of users.

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