The Report is Generated by DrillBit Plagiarism Detection Software

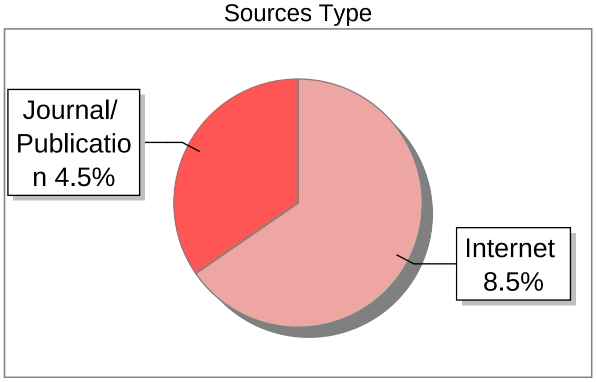
Submission Information

Author Name	YUKTA DIVAKAR
Title	HOVERHORIZON
Paper/Submission ID	3400331
Submitted by	phoclibrary@mes.ac.in
Submission Date	2025-03-13 14:29:05
Total Pages, Total Words	5, 2068
Document type	Research Paper

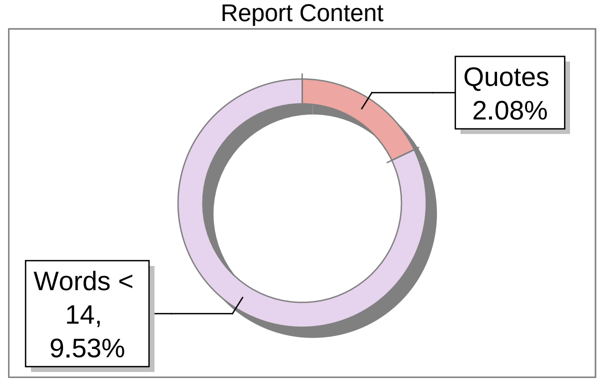
Result Information

Similarity **13 %**

Sources Type



Report Content



Exclude Information

Quotes	Not Excluded
References/Bibliography	Not Excluded
Source: Excluded < 14 Words	Not Excluded
Excluded Source	**0 %**
Excluded Phrases	Not Excluded

Database Selection

Language	English
Student Papers	Yes
Journals & publishers	Yes
Internet or Web	Yes
Institution Repository	Yes

A Unique QR Code use to View/Download/Share Pdf File

DrillBit

DrillBit Similarity Report

13	21	B	A-Satisfactory (0-10%) B-Upgrade (11-40%) C-Poor (41-60%) D-Unacceptable (61-100%)
SIMILARITY %	MATCHED SOURCES	GRADE	

LOCATION	MATCHED DOMAIN	%	SOURCE TYPE
1	www.mdpi.com	1	Internet Data
2	dblp1.uni-trier.de	1	Internet Data
3	www.dx.doi.org	1	Publication
4	www.mdpi.com	1	Internet Data
5	cioms.ch	1	Publication
6	A Roadmap towards a Space-based Radio Telescope for Ultra-Low Frequency Radio As by Bentum-2020	1	Publication
7	en.wikipedia.org	1	Internet Data
8	pubs.drdc-rddc.gc.ca	1	Internet Data
9	www.nature.com	1	Internet Data
10	www.irjmets.com	1	Publication
11	www.mdpi.com	1	Internet Data
12	khartoumspace.uofk.edu	<1	Internet Data
13	IEEE 2015 23rd Iranian Conference on Electrical Engineering (ICEE) -	<1	Publication

14	Computer Vision Models to Categorize Art Collections According to the Visual Con by Rosado-2019	<1	Publication
15	cpur.in	<1	Publication
16	docplayer.net	<1	Internet Data
17	moam.info	<1	Internet Data
18	www.academia.edu	<1	Internet Data
19	www.knivesandtools.com	<1	Internet Data
20	www.nzsar.govt.nz	<1	Publication
21	www.theassignmenthelpline.com	<1	Internet Data

HOVERHORIZON
(Camera-based Drone for Disaster Management)

Abstract— *Disasters are sudden events that create widespread disruption, loss of life, and damage to property and the environment, resulting from natural causes like earthquakes and floods or man-made disasters like industrial accidents. Disaster management involves technologies and measures to mitigate their impact through adequate preparedness, response, and recovery. Adequate response and recovery from disasters largely rely on quick and efficient search and rescue (SAR) operations. Traditional SAR solutions are often slow, resource-based, and unsafe due to hostile environments and dangerous weather patterns. Although drones are now being touted as an important tool for disaster management, existing solutions fall short when applied to efficient real-time human identification, autonomous flying after, and flawless data consolidation. To address these shortfalls, the drone system is equipped with a camera and the You Only Look Once version 8 (YOLOv8) deep learning model for real-time detection of humans. The system has an onboard ground station for real-time monitoring of flight path, media feed management, and improved coordination with search and rescue teams. Through the utilization of advanced computer vision technology, our intended system enhances situational awareness, significantly reducing response time and improving search and rescue efficiency. The implementation of the system aims to improve victim identification accuracy, optimize resource utilization, and allow for rapid decision-making in disaster zones.*

Keywords — Disaster scenarios, Real-time human detection, Continuous flight path tracking, YOLO version 8, Disaster-stricken areas, SAR.

I. INTRODUCTION

Natural disasters like earthquakes, floods, landslides, and hurricanes cause immense loss of life, large-scale destruction, and economic loss. Following such devastating events, timely and effective search and rescue (SAR) operations are essential to find survivors and deliver instant relief. But conventional SAR techniques mostly depend on manpower efforts, which can be time-consuming, labor-intensive, and unsafe because disaster zones are often unpredictable and dangerous places. The rescuers have to face challenges like crashed buildings, washed-away areas, and uneven land, causing the work to proceed at a slow pace and putting more human life at risk. This technology not only enhances the efficacy and timeliness of rescue missions but also lessens rescue teams' risk by limiting their exposure to dangerous terrain.[1]

Recent developments in drone technology, artificial intelligence (AI), and computer vision have opened up new avenues for enhancing disaster response activities. Drones offer a unique advantage in SAR operations by providing aerial surveillance, accessing remote or hazardous locations, and delivering real-time situational awareness. Upon being equipped with AI-based object detection software, these drones can efficiently monitor large areas, detect survivors, and transmit vital information to rescuers, cutting down the response time significantly and maximizing the resource utilization. In detecting human beings from high-flying camera images of drones, conventional methods mainly detect human beings, employing full-body feature-based cues.[5]

UAVs that are used today can be categorized into two. The first is those which are fully operated/controlled by man. Intelligent component usage is not common in these UAVs and are mostly used for cinema and video capture-based operations [4]. This type of UAV can also be used for crucial operations such as search and rescue but are comparatively less efficient because they always demand human resources. The second group of UAVs contain smart components, and there are UAVs in which certain parts are fully autonomous for flying. Object detection and recognition parts are normally embedded into UAVs, but some UAVs do not consist of these. In these, the object detection and recognition section is independently processed (on a processing server) and is kept continuously connected to the UAV and server. New technologies in drones, artificial intelligence (AI), and computer vision have brought new opportunities for improving disaster response operations. But these UAVs have limited capabilities since they always need connectivity.[5] So to overcome this using real-time human detection with YOLOv8.

This paper presents a camera-based drone system designed to enhance SAR operations by integrating real-time object detection, automated navigation, and seamless data transmission. The system leverages state-of-the-art deep learning models for accurate human detection, ensuring that survivors are quickly identified and located, for that YOLOv8 has been used. A framework for human recognition by detecting the human body regions with YOLOv5 and Haar cascade classifier.[5] But YOLOv8 is more accurate than YOLOv5, especially for larger model sizes, it is slightly slower than YOLOv5 but still fast enough for real-time applications. Additionally, the automated flight control mechanism optimizes search patterns, reducing human intervention and improving operational efficiency. The collected visual data is transmitted to a ground station in real-time, enabling coordinated efforts between drone operators and rescue teams. By combining AI-driven analytics with autonomous drone capabilities, this system aims to enhance the effectiveness of disaster response operations, ultimately saving more lives and minimizing risks to SAR personnel.

II. Literature Survey

Drone-based artificial intelligence has significantly advanced disaster management, emphasizing accurate object detection and recognition[1].The integration of real-time flying object detection using YOLOv8 enhances UAV capabilities in identifying aerial threats and obstacles[2].UAV systems designed for disaster and crisis management in smart cities utilize AI-powered analytics for improved situational awareness and emergency response[3].Victim detection using drones in wide-area search and rescue operations leverages AI algorithms to optimize efficiency in disaster-stricken regions[4].High-altitude UAVs equipped with AI-based body region detection have improved human recognition capabilities, aiding rescue missions [5].Additionally, extracting unambiguous drone signatures through high-speed camera analysis enhances drone tracking and classification[6].Finally, millimeter-wave drones integrated with computer vision assist in wireless beam prediction, improving communication reliability in UAV networks[7].These advancements collectively strengthen UAV applications in disaster management, surveillance, and communication.

"S Vedanth", "Udit Narayana K B" Drone-based Artificial Intelligence for Efficient Disaster Management (2024) [1] This study examines AI-powered drones using You Only Look Once v8 (YOLOv8) and infrared cameras for disaster response, achieving mAP50-95 of 0.685 indicating the model's ability to balance precision and recall across varying detection overlaps, for accurate victim detection. It enables fast aid delivery, automation, and safer rescues but faces data, weather, computation, battery, and occlusion challenges.

"Dillon Reis", "Jacqueline Hong" Real-Time Flying Object Detection with YOLOv8 (2024) [2] This study introduces a YOLOv8-based system for detecting flying objects, achieving 99.1% accuracy (mAP50) and 83.5% overall precision (mAP50-95) at 50 frames per second (fps) on 1080p videos. mAP50 measures detection with a relaxed accuracy threshold, while mAP50-95 tests performance at stricter levels. The system is fast, highly accurate, and works well even with small or hidden objects, making it great for drone surveillance and security.

"Friedrich Steinhäusler", "Harris V. Georgiou" Detection of Victims with UAVs during Wide Area Search and Rescue Operations (2023) [3] The CURSOR project introduces a specialized UAV fleet for rapid search and rescue, improving victim detection and situational awareness. It addresses challenges like limited flight time and adverse weather while aiming for scalable disaster response solutions.

"Wedad Alawad, Nadhir Ben Halima" An Unmanned Aerial Vehicle (UAV) System for Disaster and Crisis Management in Smart Cities (2023) [4] This study proposes a UAV system using Swarm Optimization Algorithms to improve search and rescue efficiency in smart cities. The system reduces response times and enhances disaster resilience through optimized path planning and real-time communication.

"Dinuka Wijesundara", "Lasith Gunawardena" Human Recognition from High-altitude UAV Camera Images by AI-based Body Region Detection (2022) [5] This study uses a hybrid detection method combining YOLOv5 and Haar classifiers to improve human recognition from high-altitude UAV images. Performance is measured by 98% accuracy in detection, while precision is ensured through body region-based identification (head, upper body, lower body). It offers efficient real-time processing and strong detection accuracy, but faces pose/clothing variability issues, dataset limitations, and computational constraints.

"Frank Billy Djupkep Dizeu, Michel Picard" Extracting Unambiguous Drone Signature Using High-Speed Camera (2022) [6] This paper introduces a drone detection method using high- speed cameras and discrete Fourier transform to identify unique propeller-induced signatures. The approach proves robust under various conditions, with potential for enhancement via machine learning integration.

"Gouranga Charan, Andrew Hredzak, Ahmed Alkhateeb" Millimeter Wave Drones with Cameras: Computer Vision Aided Wireless Beam Prediction (2022) [7] This study uses computer vision and ResNet models to predict optimal mmWave communication beams for drones, achieving 91% top-1 accuracy. Precision is measured in terms of beam selection accuracy, ensuring low-latency (4.36ms) real-time predictions. While it reduces beam training overhead and leverages existing drone cameras, it relies on line-of-sight data, requires high computational power, and depends on large training datasets.

III.Methodology

Several fundamental concepts underpin the "HOVERHORIZON (Camera based drone for disaster management)" project. These concepts are essential for understanding the project's methodology and goals:

1. Plan Mission:

   Assess disaster areas using satellite imagery, GIS (Geographical Information System), and reports. Define search zones and UAV flight paths for efficient resource allocation.

2. Control/Deploy UAV:

   Launch UAV with GPS navigation or manual control. Real-time telemetry allows mid-air adjustment according to conditions.

3. Capture and Transmit Data:

   High-resolution images and videos are captured by UAV using sophisticated sensors. Real-time data is transmitted to ground station through secure communication channels.

4. Analyze Data:

   YOLOv8 model analyzes data for object detection as well as identification of victims. AI sifts out false positives and plots survivor locations to plan the rescue

5. Re-deploy UAV:

UAV is redeployed to fill gaps or patrol new areas when necessary. Mid-air redirection provides adaptive response to developing situations.

6. Execute Rescue:

Rescue squads deployed based on data analysis with UAV-guided assistance. UAV offers real-time feedback, enhancing response speed and efficiency.

IV. System Architecture

As shown in the Fig 1 we can see the following steps:-

1. Ground Station :
- The Ground station serves as the control center where mission planning, UAV deployment, and data processing occur.
- Operators at the ground station perform the tasks Assign.Mission, Monitoring, Data Management.

2. User (Field Operator):
- The User is a field personnel responsible for deploying and controlling the UAV locally.
- Using a remote controller or a mobile application, the user can- set the flight path, adjust the drone’s altitude, and receives real-time visual feedback from the UAV.

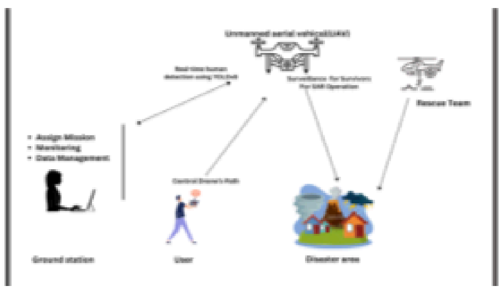


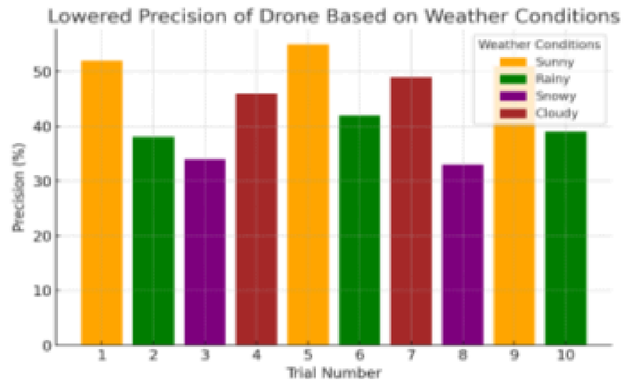
Figure 1: Architecture

3. Unmanned Aerial Vehicle (UAV):
- The UAV acts as the primary data acquisition tool in the system.
- The UAV captures and transmits aerial imagery of the disaster-stricken area.

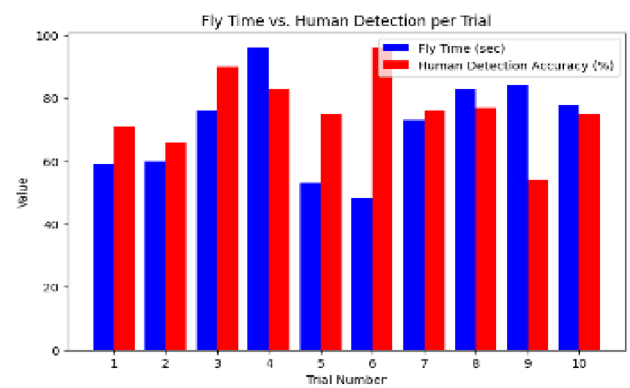
4. Disaster Area Surveillance:
- The UAV surveys the disaster area, detecting affected zones, collapsed structures, and stranded individuals.
- Data is sent back to the ground station for further analysis, allowing for informed decision-making.

5. Rescue team Deployment:
- Based on the analyzed data, a rescue team is dispatched to the identified loactions.
- It ensures precise and efficient rescue operations, minimizing response time and increasing the likelihood of saving lives.

IV. Result



This graph shows how the HOVERHORIZON drone performs in different weather conditions across multiple trials. The x-axis represents the trial numbers, while the y-axis shows the drone's precision in percentage.
Each weather condition is marked with a different color: orange for sunny, green for rainy, purple for snowy, and brown for cloudy. The results clearly indicate that the drone achieves the highest precision on sunny days, often exceeding 50%. On the other hand, performance drops significantly in rainy and snowy conditions, where precision falls close to 35–40%. Cloudy weather leads to moderate accuracy, usually between 45–50%.
These variations suggest that harsh weather, especially rain and snow, negatively affects the drone’s stability—likely due to poor visibility, wind interference, or sensor disruptions. This highlights the need for better navigation and adaptability in challenging conditions.



The evaluation of drone efficiency in disaster management relies on two critical parameters: Fly Time and Human Detection Accuracy. This study examines the relationship between these factors over multiple trials to assess the drone's reliability in real-world scenarios.
The data is comprised of 10 trials with each trial measuring the Fly Time (seconds) and the Human Detection Accuracy (%). Fly Time is the time the drone spends traveling to a target location, scanning the site, and coming back, and Human Detection Accuracy measures the effectiveness of onboard AI models to detect humans in disaster areas.
.

V. Conclusion

HOVERHORIZON is a pioneering disaster management innovation that tackles the issues of real-time victim identification and effective search and rescue. Utilizing state-of-the-art drone technology and YOLOv8 object detection, the system improves situational awareness, minimizes response time, and maximizes resource allocation. Through its autonomous flight tracking and effortless data integration, HOVERHORIZON guarantees precise victim identification and efficient coordination with SAR teams. This resolution greatly enhances the speed and accuracy of disaster response operations, the way for brighter, more independent emergency management systems.