# DETECTING HUMAN LIFE DURING FIRE

**A PROJECT REPORT**

***Submitted by,***


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***Under the guidance of,***

**Mr. Santhosh Kumar K L**

***in partial fulfillment for the award of the degree of***

**BACHELOR OF TECHNOLOGY**

**IN**

**COMPUTER SCIENCE AND ENGINEERING**

**(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)**

**At**



**PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING**

**PRESIDENCY UNIVERSITY**


**JANAUARY 2025**

# PRESIDENCY UNIVERSITY

## PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

## CERTIFICATE

This is to certify that the Project report "DETECTING HUMAN LIFE DURING FIRE" being submitted by "SAFIA RAFI, SHILPA NAGARAJ, NIKITH MURALI, SOHAN S, MOHAMMED FARDEEN SHARIFF" roll number(s)"20211CAI0159 ,20211CAI0161, 20211CAI0093, 20211CAI0177, 20211CAI0152" in partial fulfillment of the requirement for the award of the degree of Bachelor of Technologyin Computer Science and Engineering is a Bonafide work carried out under my supervision.

16.01.2025

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## DECLARATION

We hereby declare that the work, which is being presented in the project report entitled **Detecting Human Life During Fire** in partial fulfillment for the award of Degree of **Bachelor of Technology** in **Computer Science and Engineering**, is a record of our own investigations carried under the guidance of **Mr. Santhosh Kumar K L, Assistant Professor**, Presidency School of Computer Science & Engineering, Presidency University, Bengaluru.

We have not submitted the matter presented in this report anywhere for the award of any other Degree.

| Name(s) | Roll No(s) | Signature(s) |
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# ABSTRACT

Fire emergencies pose critical challenges for rescue teams, primarily due to reduced visibility from smoke, flames, and debris. To address these, this project introduces an advanced **Human Detection System Using Fire**, leveraging state-of-the-art deep learning and computer vision techniques to enhance rescue operations. Core technologies include **YOLOv8** for real-time human detection, **Open CV** for image processing, and advanced video enhancement methods like **Contrast Limited Adaptive Histogram Equalization (CLAHE)** and de-hazing algorithms to upscale low-quality footage. The system marks detected humans with green bounding boxes and identifies key postures—standing, lying down, or crouching—using convolutional neural networks (CNNs) and pose estimation frameworks like **Media Pipe Pose**.

The system integrates multimodal data from **thermal cameras**, **RGB cameras**, and **depth sensors**, ensuring robust detection even in challenging fire environments. Real-time processing and a multi-modal alert system—visual, auditory, and haptic feedback—enhance situational awareness for first responders. Tested in simulated environments, the system achieves over **92% accuracy** in human detection and **90% posture classification accuracy**.

Innovative features include drone compatibility, real-time data analysis, and modular design, making it adaptable for diverse scenarios like industrial fires, residential incidents, and disaster management. Limitations, such as occasional inaccuracies in extreme smoke or dynamic heat sources, are addressed through continuous learning and future integration of enhanced sensors.

This project represents a leap forward in emergency response technologies, offering a scalable, efficient, and life-saving solution for fire-related rescue missions, ultimately improving outcomes and reducing casualties.