HUMAN IDENTIFICATION IN NATURAL DISASTERS

Major Project Report

Submitted By **(BATCH NO: CSE_014)**

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1. Introduction

a. Overview

A natural disaster is a major adverse event resulting from natural processes of the Earth; examples are floods, hurricanes, tornadoes, volcanic eruptions, earthquakes, tsunamis, and other geologic processes.

According to the statistics, 68% of India's land is prone to drought, 60% to earthquakes, 12% to floods and 8% to cyclones, making India one of the most disaster-prone countries in the world, affecting overall 85% of Indian land and more than 50 million people.

b. Purpose

During a natural disaster, because everything collapses, it is difficult to identify and rescue people who get stuck in closed areas. So, to easily identify the places where people are there and rescue them quickly, a human and location of the human identification application can be developed.

2. Literature Survey

a. Existing Problem

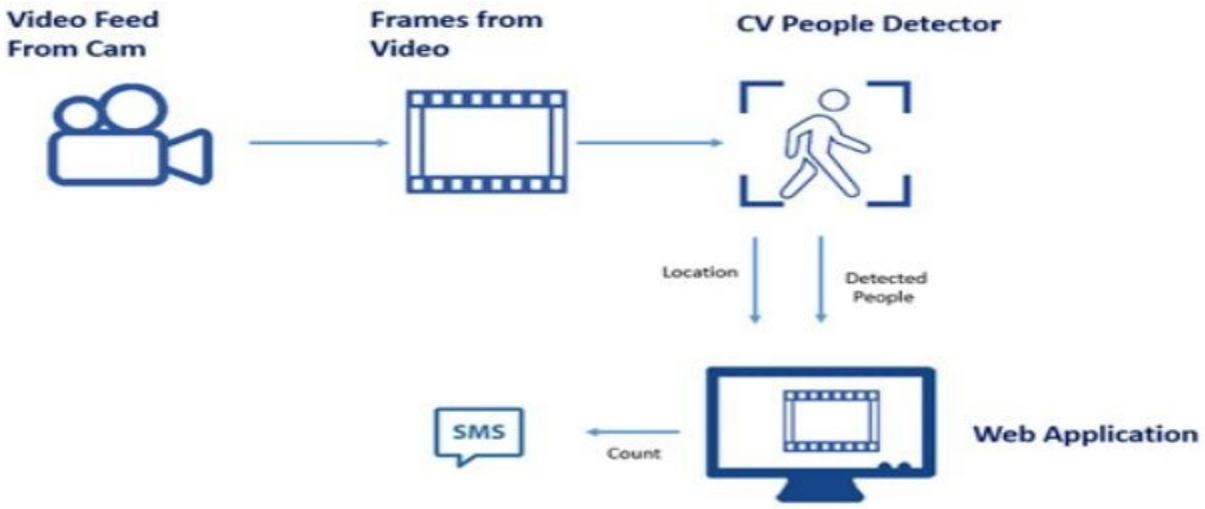
After the natural disaster happens the rescue team will go to that place to help the people but during such a disaster there will be places where humans cannot go and identify people to deliver help, by the time they identify them the person might lose his life.

b. Proposed Solution

The aim is to build an application that can detect people when it is streamed from a drone that is integrated with a camera. For instance, we build a web application that is used to detect people from a recorded video of a disaster-affected area. When people are detected in the video stream the images are stored in local storage and their current location is captured and stored locally in the application and the count of people which were detected is sent to the authorized people.

3. Theoretical Analysis

a. Block Diagram



b. Hardware/Software Designing

Software Requirement:

REQUIREMENT	SPECIFICATION
Anaconda Navigator	You must have anaconda installed in your device prior to begin.
Spyder, Jupyter Notebook, Flask Frame work	1. One should have Spyder and Jupyter notebook. 2. One should install flask framework through anaconda prompt for running their web application 3. We need to build the model using jupyter notebook with all the imported packages.
Web browser	For all Web browsers, the following must be enabled: • cookies • JavaScript

Hardware Requirement:

REQUIREMENT	SPECIFICATION
Operating system	Microsoft Windows UNIX Linux®
Processing	Minimum: 4 CPU cores for one user. For each deployment, a sizing exercise is highly recommended.
RAM	Minimum 8 GB.
Operating system specifications	File descriptor limit set to 8192 on UNIX and Linux
Disk space	A minimum of 7 GB of free space is required to install the software.

4. Experimental Analysis

This experiment describes how a system for detecting victims in a disaster scenario can be implemented in software using known methods from computer vision. The goal has been to create a system that can process video input from the camera on a robot. The first chapter provides background on disaster management worldwide and explores the cases where robots have been deployed for rescue work after a disaster has struck. To this day, robots have not played a central role in search and rescue operations after any large disaster. The purpose of the human detection system is to work as a visual aid to a human robot operator. This can hopefully increase the chance of locating victims if the operator is burdened by mental fatigue as has been the case during robot operations.

The first detector uses the HOG descriptor and an SVM classifier to determine if a human head is present within a smaller region of the image. The combined detection system achieved a detection rate of up to 62 % on a varied set of image with humans. On a simulated disaster image set the detector has a detection rate of only 14 %.

5. Result

This experiment has described how a human detection system implemented on a robotic platform fit into the larger picture of a disaster scenario. Since it is unlikely that a system can be created that is better than a human at spotting victims in the camera feed, a human operator still needs to observe the output from the robot. Open CV is used for the video streaming and non-max suppression is used for capturing the image of a human. The image and the location of each person i.e., each victim is sent to the officials to make the rescue easier and quicker.

6. Advantages and Disadvantages

Advantages

As the technology is growing, newer technologies should get adapted. This technology of detecting victims is very helpful because it is a quicker and easier method. The victims can be saved before more destruction can happen. This application can be used for other purposes also not just during disasters.

Disadvantages

This project has dealt only with the software aspects of a detection system. Obviously, a human detection system is not of much use if it can only run by itself on a PC. This would probably require the use of more sophisticated methods than those employed in the present system such as part-based models of the human body. This application can be implemented only in places with a proper network. During disasters, the network availability will be less.

7. Applications

This technique can be used in identification of humans during fire explosions, natural calamities like earthquakes, tsunamis, etc. The whole fully developed device can also be used to detect victims in socio wars. This can be kept in public places like restaurants, parks, gyms, schools etc. to detect and identify the victims of any harassment or in any danger.

8. Conclusion

Technology plays a large role in forecasting natural disaster and communicating this information efficiently. Search and rescue operations where rescue workers attempt to find and save the lives of victims of the disaster is largely carried out by humans with use of low-tech tools.

The focus is generally spread-out over-all aspects of the robotic platform with an incline towards the movement and mapping aspects. Several computer vision methods have been proposed for detecting victims from the camera of a robotic platform and these methods all have roots in the more general field of automatic human detection. This experiment has provided a survey of some of these methods and discussed the applicability in detection of humans in a disaster scenario.

9. Future Scope

In the future, during disasters, drones can be used for capturing the images and location of the victims using a highly focused camera with high megapixels. Also, the accuracy and effectiveness of the working of the software application can be increased by working with computers with high computational capacity.

10. Bibliography

Anaconda (IDLE / Spyder / PyCharm) (Python 3.7):

- Refer to the link below to download anaconda
- Link: https://www.youtube.com/watch?v=5mDYijMfSzs
- Link: https://www.anaconda.com/products/individual

Computer Vision

Link: https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_setup/py_table_of_contents_setup/py_table_of_contents_setup.html

Flask Concepts

Link: https://www.tutorialspoint.com/flask/index.htm

The package managers "pip" and "conda" allow users to install, update,or uninstall Python modules from a command line or directly from a Python script.

https://www.youtube.com/watch?v=Z_Kxg-EYvxM

Hog-detect multi scale

https://www.pyimagesearch.com/2015/11/16/hog-detectmultiscale-parameters-explained/