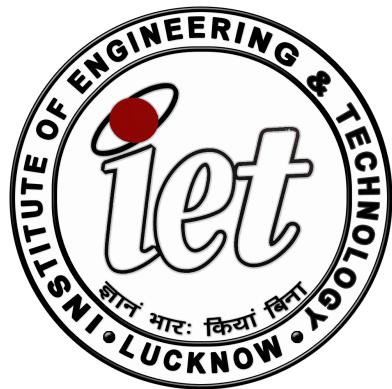


Institute of Engineering and Technology, Lucknow

Department of Computer Science and Engineering

INTRUSION DETECTION SYSTEM

PROJECT REPORT



B. Tech IT (VI Sem)

Session 2017 - 2018

Software Engineering Lab CS 652

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SOFTWARE REQUIREMENT SPECIFICATION FOR

Intrusion Detection System based on Python and OpenCV

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ACKNOWLEDGEMENTS

I have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and organizations. I would like to extend my sincere thanks to all of them. I am highly indebted to my faculty members for their guidance and constant supervision as well as for providing necessary information regarding the project & also for their support in completing the project. I would like to express my gratitude towards my parents & team members for their kind cooperation and encouragement which help me in completion of this project. I would like to express my special gratitude and thanks to industry persons for giving me such attention and time. My thanks and appreciations also go to my colleague in developing the project and people who have willingly helped me out with their abilities.

ABSTRACT

A face recognition system is one of the biometric information processes, its applicability is easier and working range is larger than others, i.e. fingerprint, iris scanning, signature, etc. The system uses a combination of techniques in two topics; face detection and recognition.

The face detection is performed on live acquired images without any application field in mind. Processes utilized in the system are facial feature extraction and face image extraction on a face candidate using dlib's state-of-the-art face recognition built with deep learning.

The system is able to recognize and identify any person and give prompt alerts if the face is not recognised.

System is also capable of detecting and recognizing multiple faces in live acquired images.

1. INTRODUCTION

1.1 Purpose

The aim of the project is to:

- i.** To implement Intrusion Detection System with the help of Face recognition (in terms of motion).
- ii.** To develop an application for Face Recognition for detection of any intrusions in the system.

1.2 Scope

A face recognition system is one of the biometric information processes, it's applicability is easier and working range is larger than others, i.e.; fingerprint, iris scanning, signature, etc. The system uses a combination of techniques in two topics; face detection and recognition. The face detection is performed on live acquired images without any application field in mind. System is also capable of detecting and recognizing multiple faces in live acquired images.

This project is aimed to design an intelligent intrusion detection system that will be able to recognize and identify any person and give prompt alerts if the face is not recognised.

1.3 Overview

Reading human facial expressions can help us in our day-to-day activities such as in security issues, gaming technology, marketing and advertising and expert system.

It is found that most surveillance facial recognition systems only automatically check every person against a database of known suspects.

This makes it hard for securities to catch someone who has the intentions of stealing or about to do any forbidden act.

2. FUNCTIONAL REQUIREMENT

2.1 System Requirement Phase

The purpose of this phase is to determine project's main goal and how the system will function. All possible requirements of the system to be developed are captured in this phase.

2.1.1 Analysis Phase

In this phase analysis of the user's requirement is carried out. This is to determine the scope of the users.

Thing to be cogitated are:

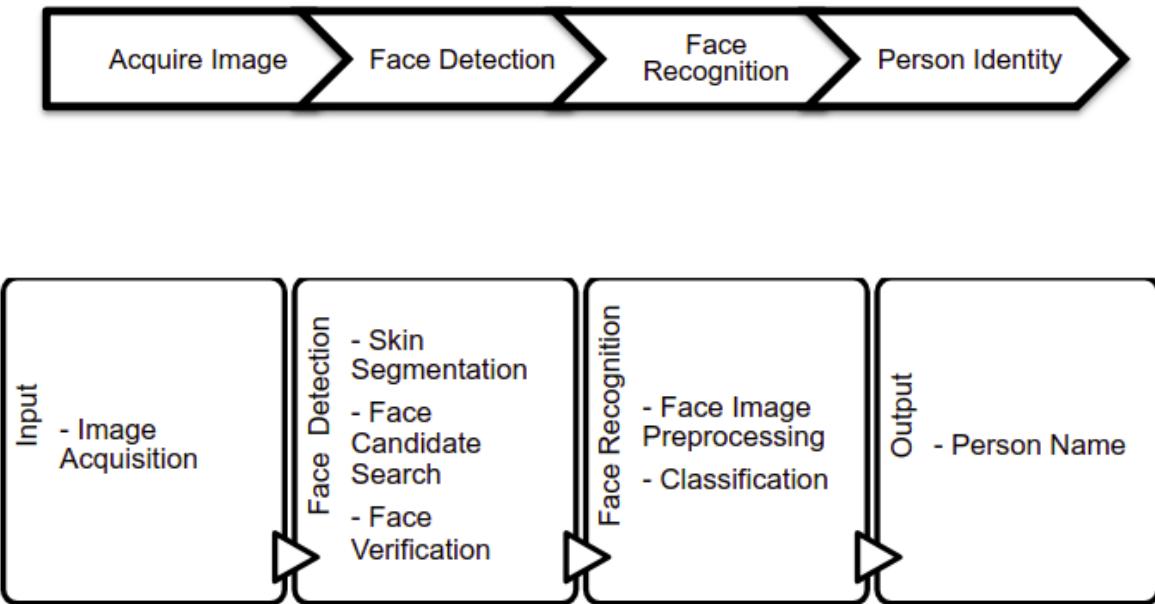
- Scope of users
- Purpose of the system
- Suitable equipment's (camera, laptop etc.)

The overall purpose of the analysis phase is to define the project goals that have been determined in the requirements phase into defined functions and operation of the intended system.

2.1.2 Design Phase

This is the plan of how the system will look like and how it works. It describes the desired features and operations in detail and may include screen layouts, process diagrams, pseudocode and other documentation. A sample of the project is developed in this phase. Design focuses on high level design like, what programs are needed and how are they going to interact, low-level design (how the individual programs are going to work), interface design (what are the interfaces going to look like) and data design

(what data will be required). During these phases, the software's overall structure is defined and the logical system of the product is developed in this phase. It also helps in specifying hardware and system requirements and also helps in defining overall system architecture.



2.1.3 Implementation and Unit Testing Phase

This phase is considered to be the longest phase of the software development life cycle. This is so because this is where the code is created and work is divided into small programs that are referred to as units. This phase include unit testing whereby units will be tested individually for their functionality before the whole system. Unit testing mainly verifies if the modules also known as units meet project specifications.

2.1.4 Testing Phase

This is the main testing phase in the SDLC, as the project is divided in small modules in the previous phase then the modules will be integrated together to test the system as whole. This is to make sure that the modules work together as intended by the developer (as in the specifications) and

required by users. It also checks for bugs, errors and ensure the system is able to work in the intended platform. After ensuring that the product had solved the problem the system is then delivered to the customers

2.1.5 Maintenance / Operation Phase

Not all problems can be seen directly, but they occur with time and as other problems they needs to be solved. Usually these kinds of problems come in picture after the practical use of the system they are never found throughout the development life cycle. This phase of the Waterfall Model is considered to be very long, it never ends. The changes that occur after the product is handed to the users must not affect the main operation of the system, so a system must be developed in a way that it will adapt to change.

2.2 Data Flow Diagram

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its *process* aspects. Often they are a preliminary step used to create an overview of the system which can later be elaborated.

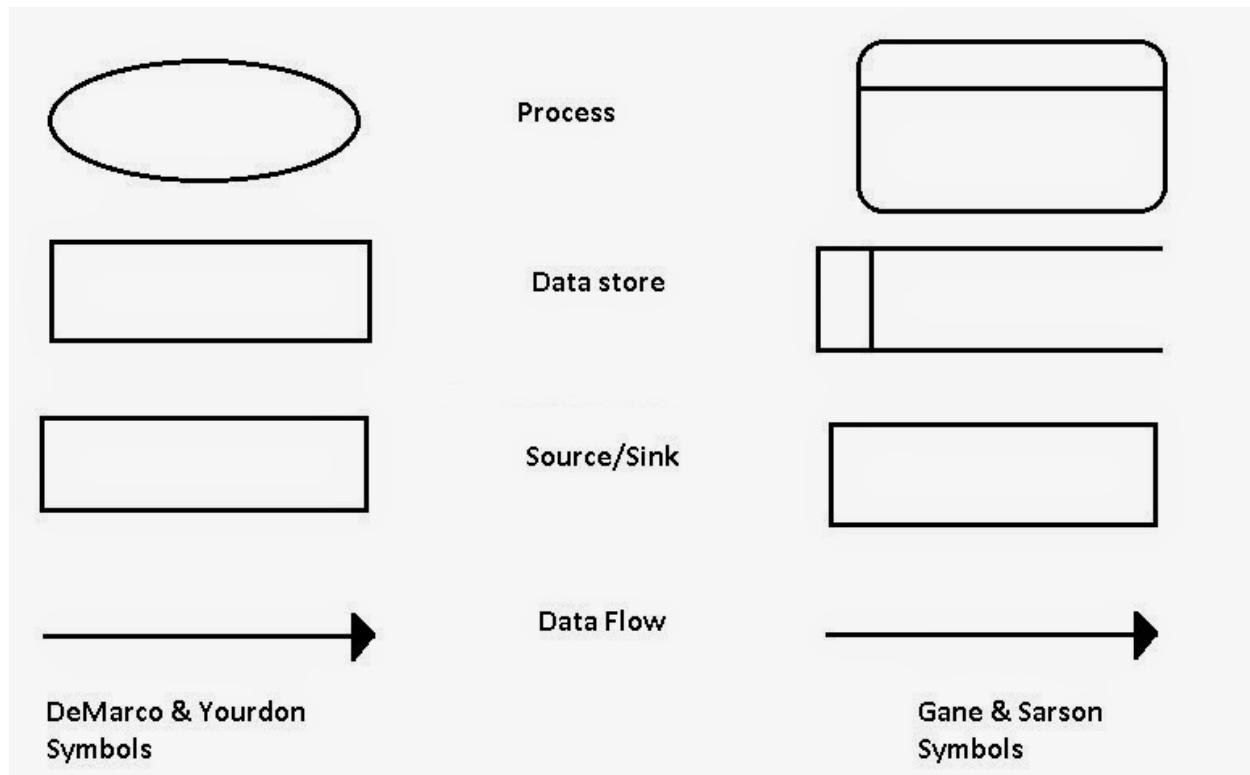
DFDs represent the following:

1. External devices sending and receiving data
2. Processes that change that data
3. Data flows themselves
4. Data storage locations

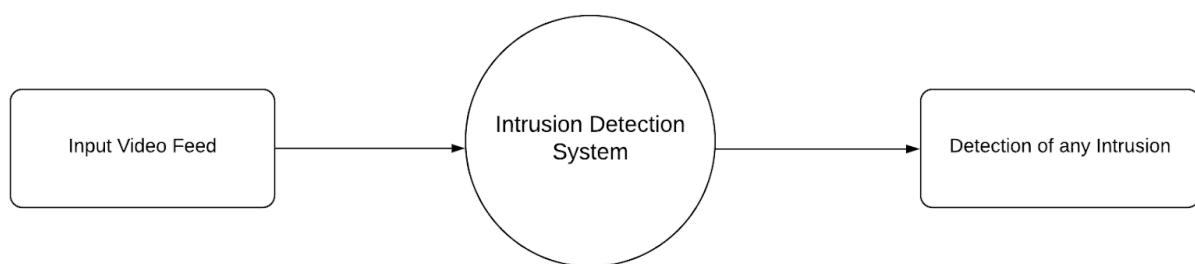
DFDs are the method of choice over technical descriptions for three principal reasons:

- DFDs are easier to understand by technical and nontechnical audiences.

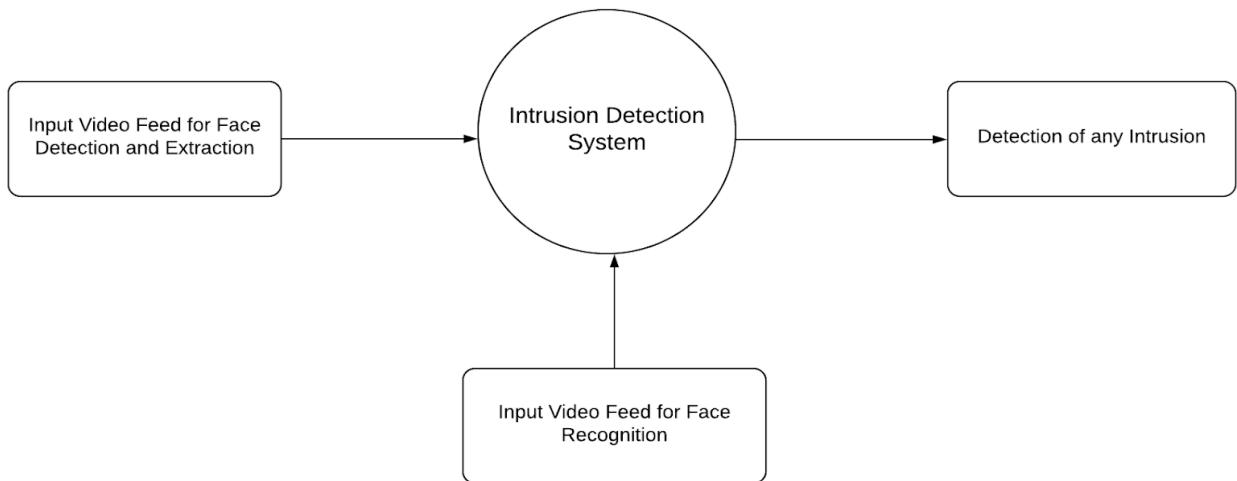
- DFDs can provide a high level system overview, complete with boundaries and connections to other systems.
- DFDs can provide a detailed representation of system components.



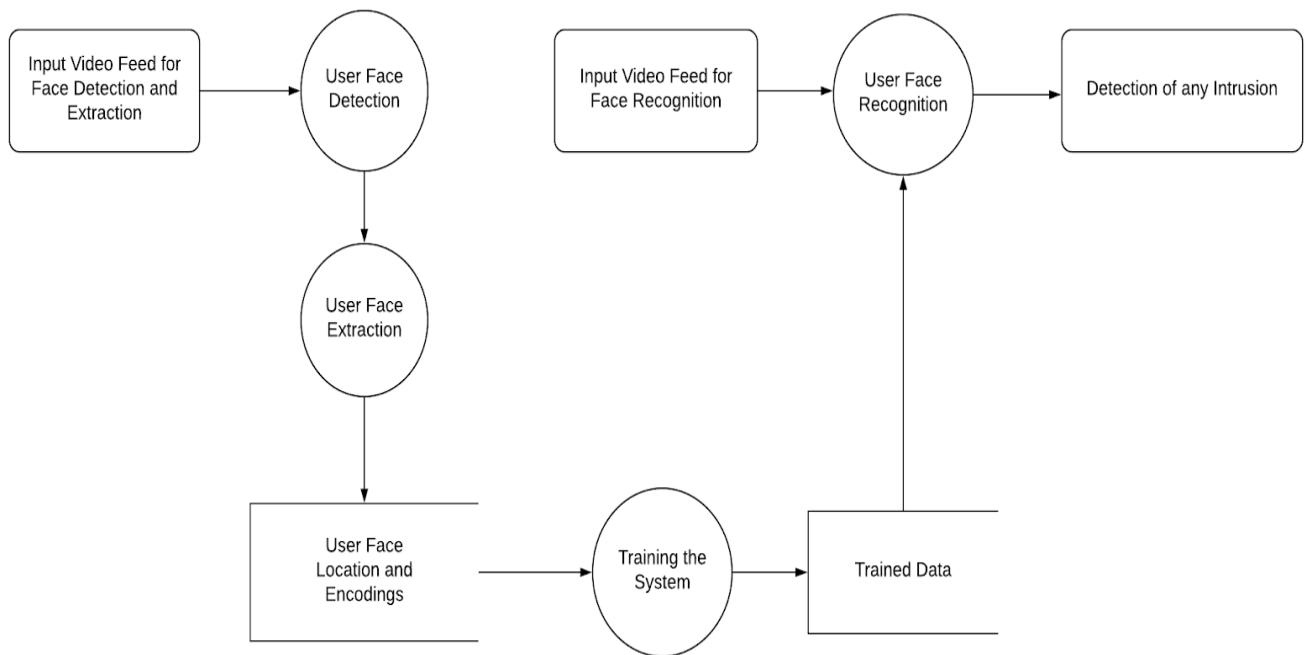
LEVEL 0



LEVEL 1



LEVEL 2



3. INTERFACE REQUIREMENT

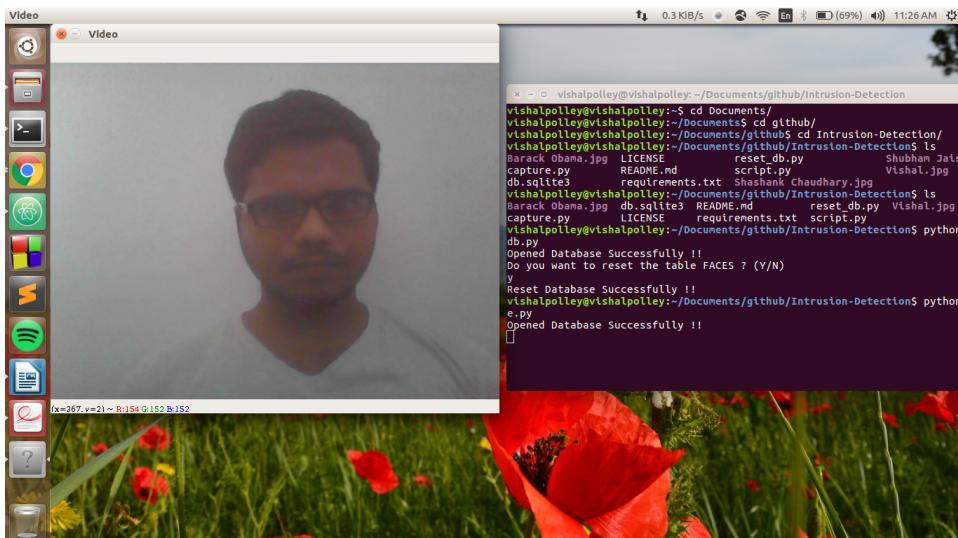
3.1 Hardware Requirement

- i. 32/64 bit system with minimum 2GB of RAM
- ii. Webcam with minimum resolution of 2MP.

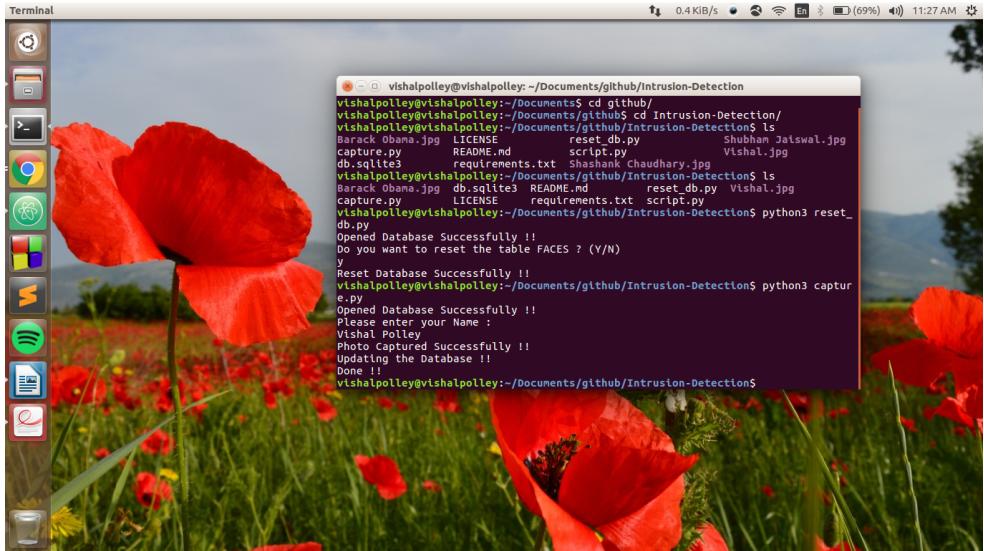
3.2 Software Requirement

- i. cmake
- ii. dlib
- iii. Python 3
- iv. OpenCV (Python Module)

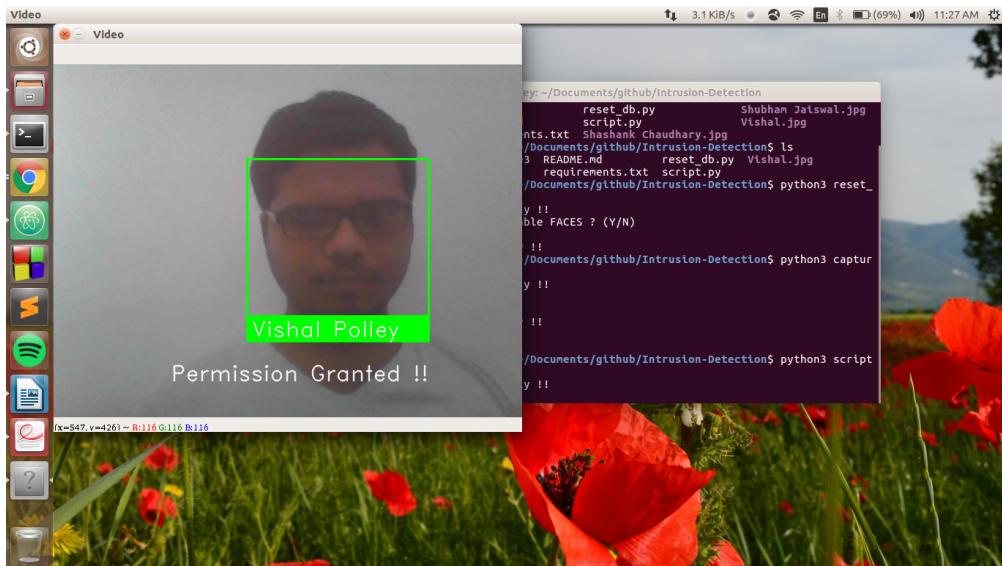
4. SYSTEM IMPLEMENTATION



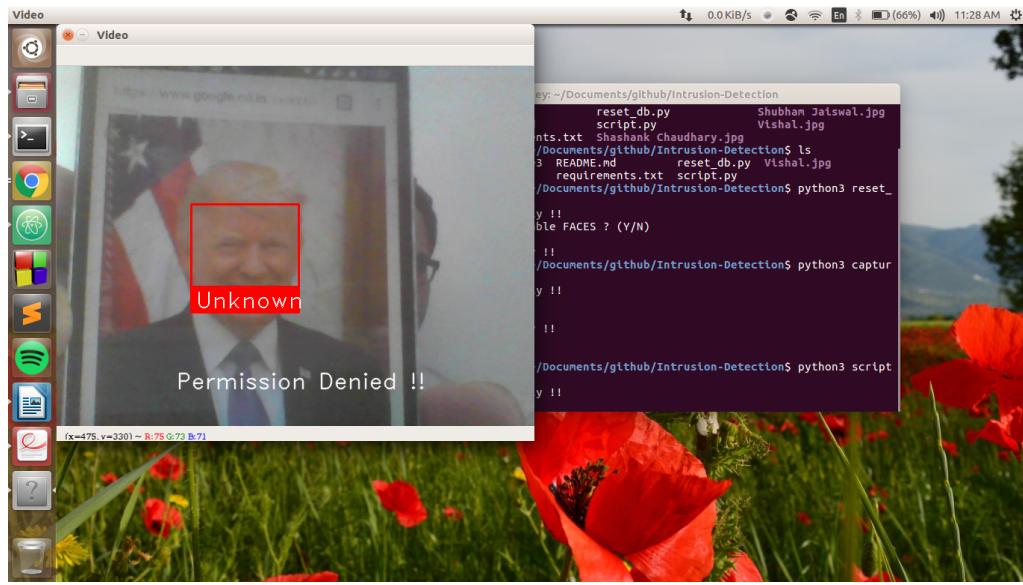
Face Detection and Extraction of Image



Saving and Training of Image



Detection of Pre Trained Image (Permission Granted)



Detection of Intrusion (Permission Denied)

5. Performance Requirement

The architectural diagram shows the flow of events for the facial expression recognition intelligent system for intrusion detection. The camera captures the movements concentrating on the head and in the motion detection module the face will be detected together with the head pose estimation.

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