MASK DETECTION & ALERT SYSTEM

Design Project

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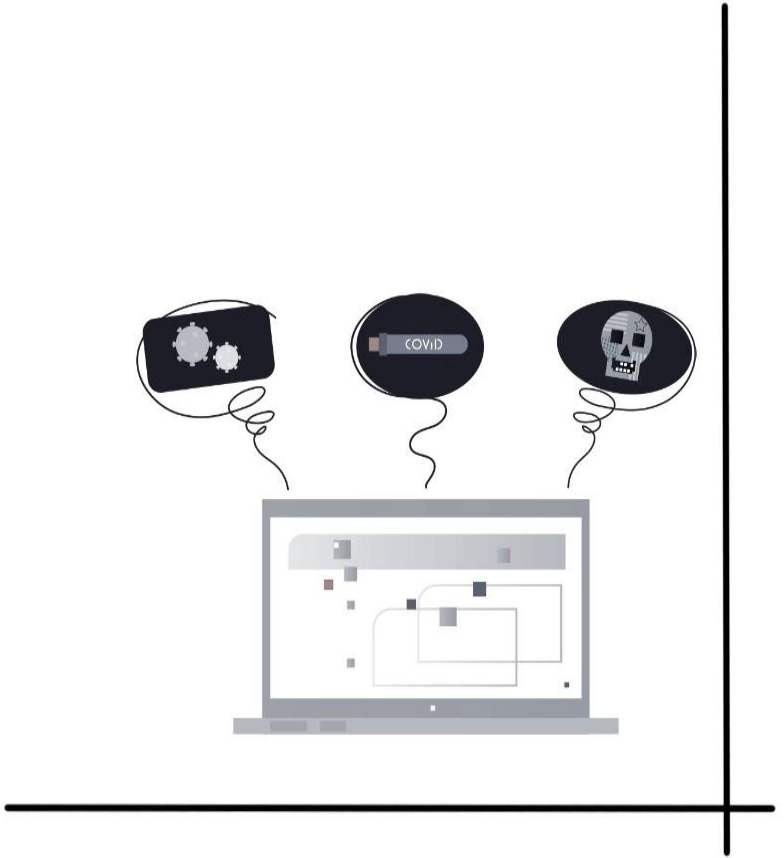
Relevance in Current situation

Even after doctors and health experts have firmly recommended the usage of masks to prevent contracting Covid-19, many fail to do so. It has come to a point where people have to be reminded time and time again to wear a mask. But then an effective system to do so has not been implemented yet.

The Solution

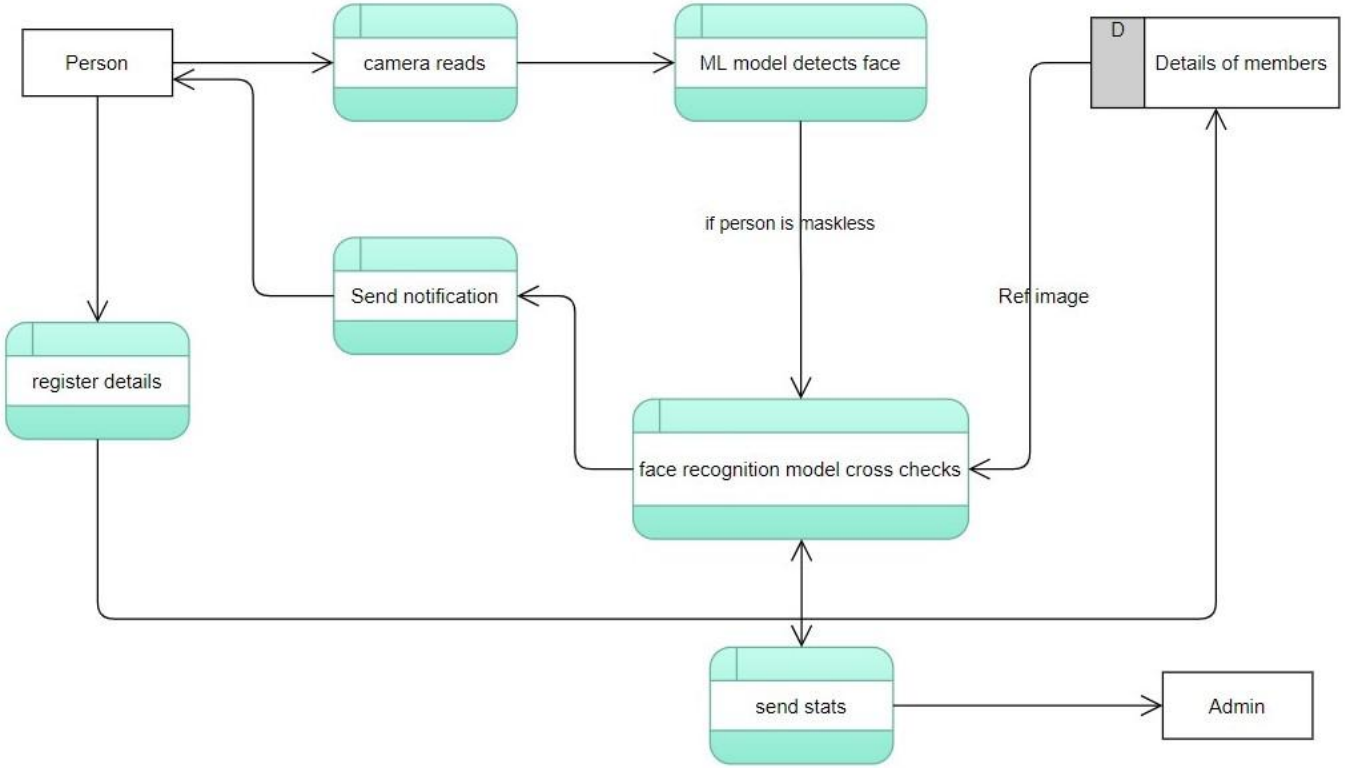
A real time mask detection and alert system, specifically created for organisations that function in buildings and not public spaces.

The system involves a real time detection of employees with no mask using cameras positioned strategically. Such people then receive an automated notification via an app that is required to be installed by everyone in the organisation.



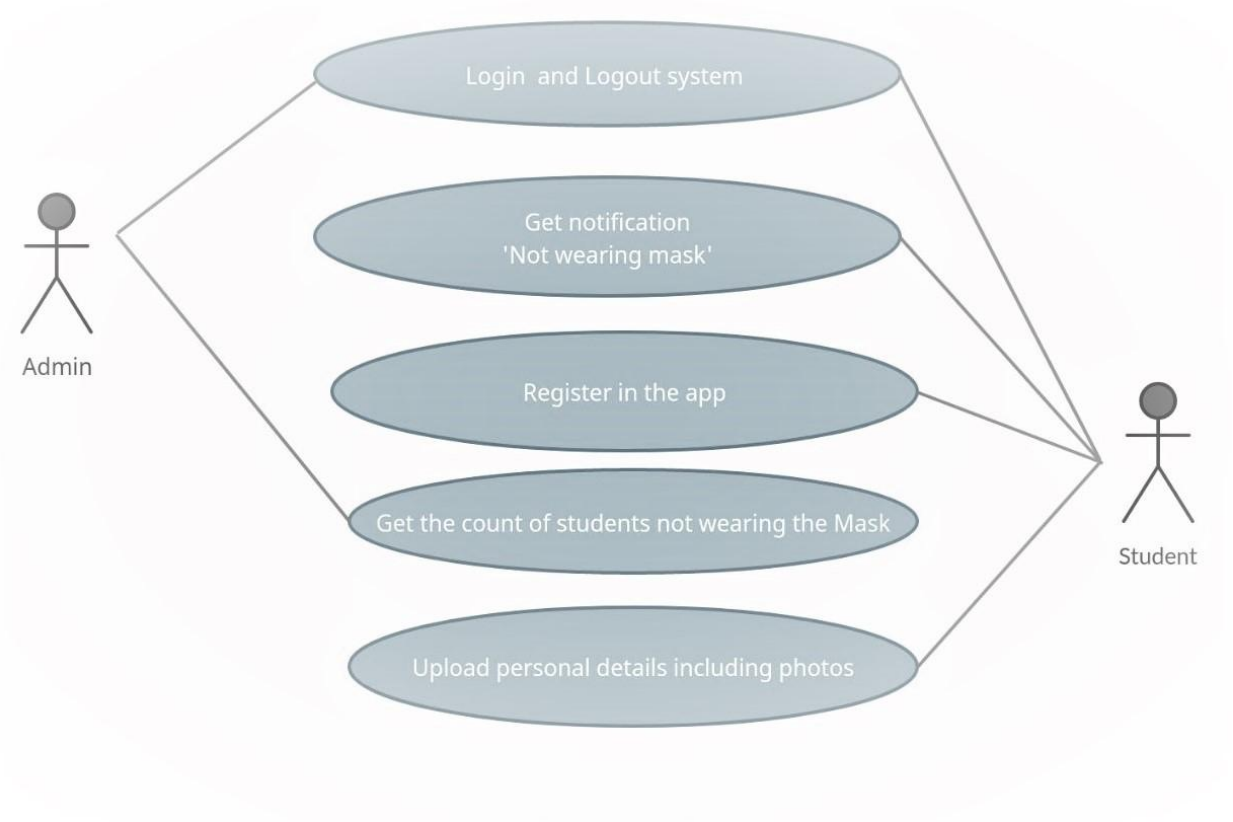
Overview

Logical data flow diagram



Overview

Use Case Diagram



Software Simulation

Hardware Components

- IR cameras

Platform

- Tensorflow

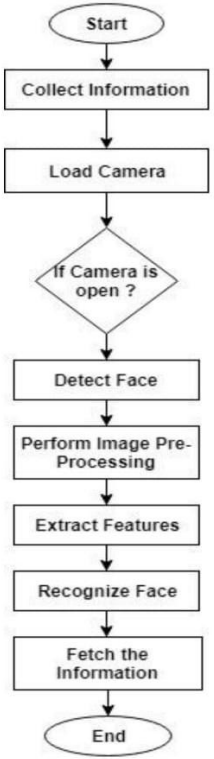
Library

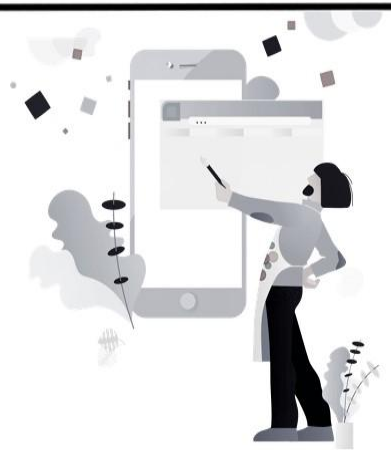
- Open Computer Vision

Detailed Explanation

- ML model is used for face mask detection.
- Viola Jones algorithm is a feature based approach in OpenCV
- Object based detection models already available in OpenCV in the aforementioned algorithm is made use of.
- Video live stream is obtained, converted to grayscale, classifier is used, cascaded and the face mask detection is completed.
- If the person in question is maskless, his face is cross checked with photos of all the members of the organisation stored in a database(here, firebase) using LBPH algorithm

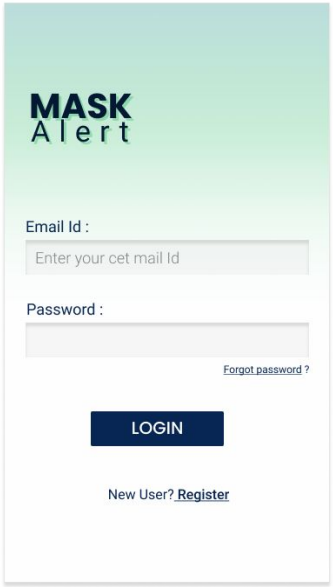
Face Recognition Workflow

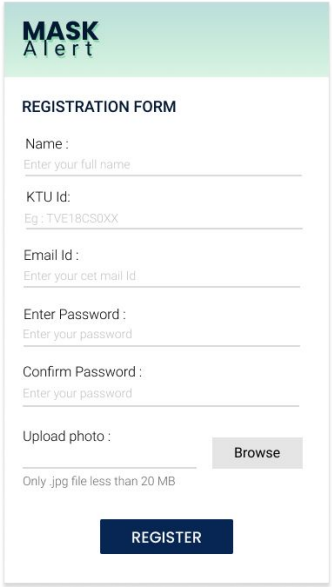


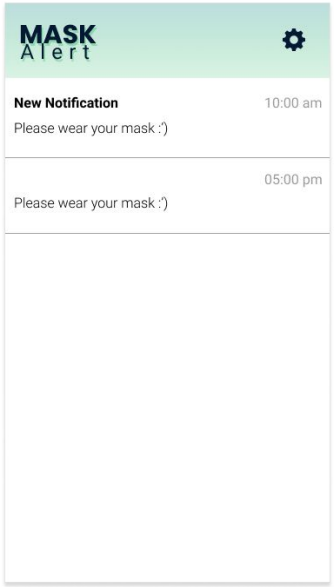


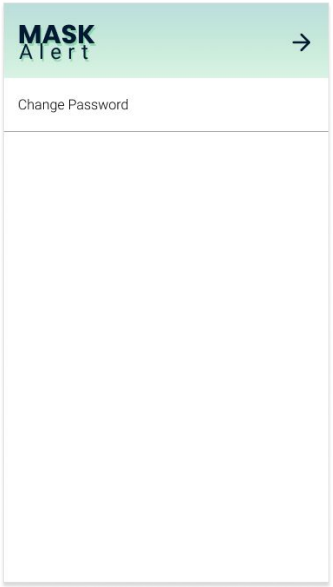
- Front-end of the app is made with flutter and back-end with firebase.
- App consists of a login, registration portal and notifications
- For admin a web page is designed with front using flutter and again, back-end with firebase
- The admin receives a statistics of people not wearing masks at regular intervals of time.

User interface of the App









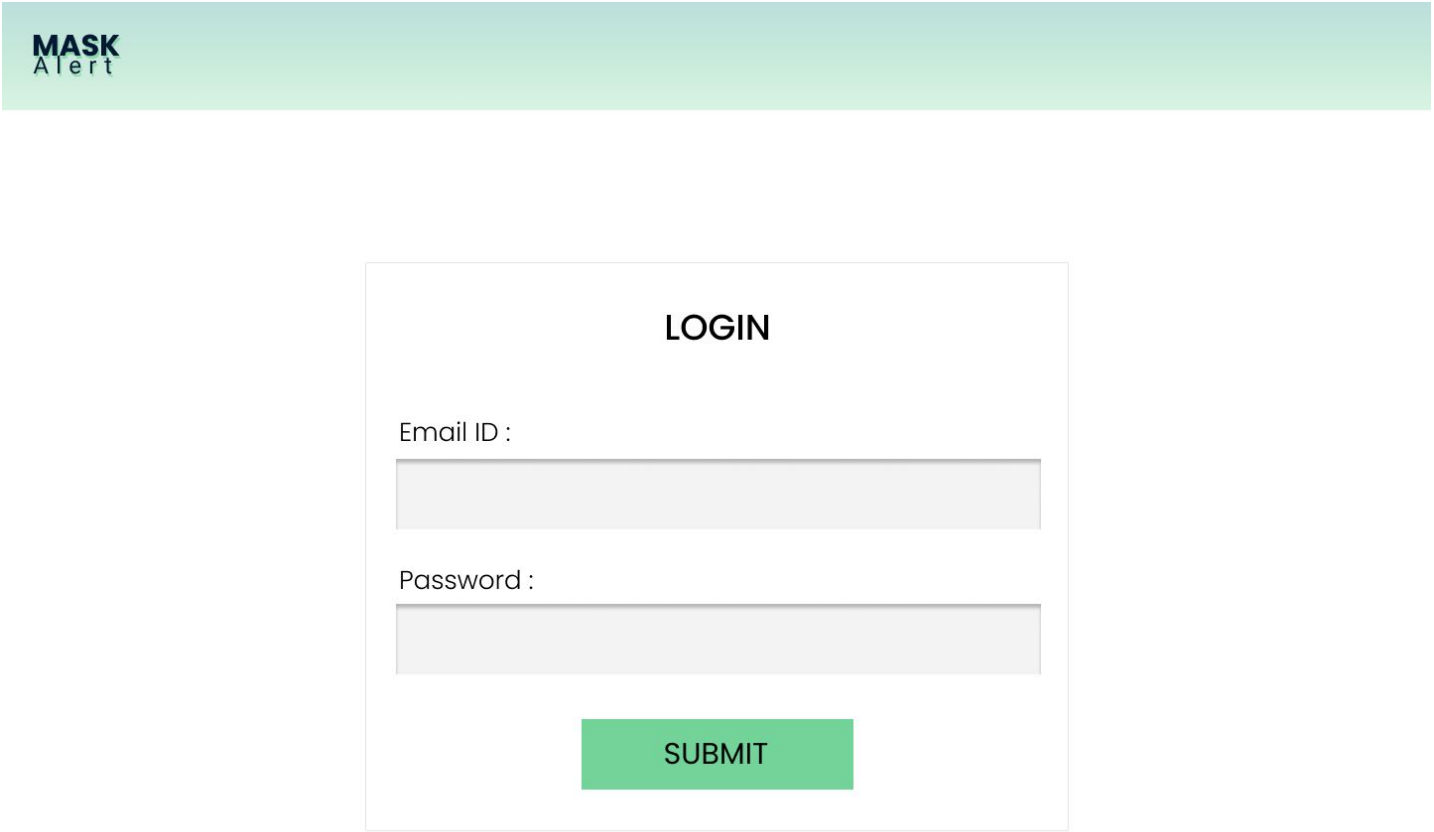
User Interface of the Website

MASK
Alert

ANALYSIS

Date	Time Gap	No mask count
19/12/2020	9:00 AM - 10:00 AM	20
-	- -	-
-	- -	-
-	- -	-

User Interface of the Website



Git log


Muhsina2188 committed 13 hours ago
0 parents
commit 59c2703f9e6c3f58eec9221fce2f1fb92684e1ec
Showing 62 changed files with 1,630 additions and 0 deletions.
Unified
Split
.gitignore +41 −0
.metadata +10 −0
README.md +16 −0
android/.gitignore +11 −0
android/app/build.gradle +63 −0
android/app/src/debug/AndroidManifest.xml +7 −0
android/app/src/main/AndroidManifest.xml +47 −0
android/app/src/main/kotlin/com/flutter/mask_alert/MainActivity.kt +6 −0
android/app/src/main/res/drawable/launch_background.xml +12 −0
android/app/src/main/res/mipmap-hdpi/ic_launcher.png BIN
android/app/src/main/res/mipmap-mdpi/ic_launcher.png BIN
android/app/src/main/res/mipmap-xhdpi/ic_launcher.png BIN
android/app/src/main/res/mipmap-xxhdpi/ic_launcher.png BIN
android/app/src/main/res/mipmap-xxxhdpi/ic_launcher.png BIN
android/app/src/main/res/values/styles.xml +18 −0
android/app/src/profile/AndroidManifest.xml +7 −0
android/build.gradle +31 −0
android/gradle.properties +4 −0
android/gradle/wrapper/gradle-wrapper.properties +6 −0
android/settings.gradle +11 −0
ios/.gitignore +32 −0
ios/Flutter/AppFrameworkInfo.plist +26 −0
ios/Flutter/Debug.xcconfig +1 −0
ios/Flutter/Release.xcconfig +1 −0
ios/Runner.xcodeproj/project.pbxproj +495 −0
ios/Runner.xcodeproj/project.xcworkspace/contents.xcworkspacedata +7 −0
ios/Runner.xcodeproj/project.xcworkspace/xcshareddata/IDEWorkspaceChecks.plist +8 −0
ios/Runner.xcodeproj/project.xcworkspace/xcshareddata/WorkspaceSettings.xcsettings +8 −0
ios/Runner.xcodeproj/xcshareddata/xcschemes/Runner.xcscheme +91 −0
ios/Runner.xcworkspace/contents.xcworkspacedata +7 −0
ios/Runner.xcworkspace/xcshareddata/IDEWorkspaceChecks.plist +8 −0
ios/Runner.xcworkspace/xcshareddata/WorkspaceSettings.xcsettings +8 −0
ios/Runner/AppDelegate.swift +13 −0
ios/Runner/Assets.xcassets/AppIcon.appiconset/Contents.json +122 −0

Costing Analysis

Initial costs

• Software	2,00,00 INR
• IR Camera (11)	77,000 INR
• Digital Video Recorder	12,000 INR
• Cable and wiring	10,000 INR
• Amazon Cloud	3,000 INR(per month)
• Net connection	2,000 INR(per month)

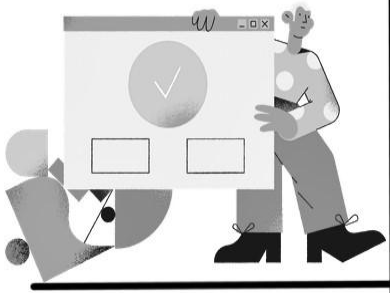
Costing Analysis

Recurring costs

AMC	20,00 INR P.A
Amazon cloud	36,000 INR P.A
Net Connection	24,000 INR P.A
Electricity	from premise P.A

Benefits

- Similar systems have been implemented in the past but were not effective.
- We have come to a point where it isn't enough to spot someone who isn't wearing a mask but also encourage them to do wear one.
- The addition of a personal alert mechanism/ notification element would encourage the wearing of masks rather than just spot someone who isn't wearing one.
- The notification part accelerates that sentiment.



Conclusion

- At this age, it is imperative for technology and healthcare to go hand in hand.
- But that isn’t always the case
- Our system contributes to help bridge that gap.

References

Real time face detection

LBPH Algorithm

Face Recognition study