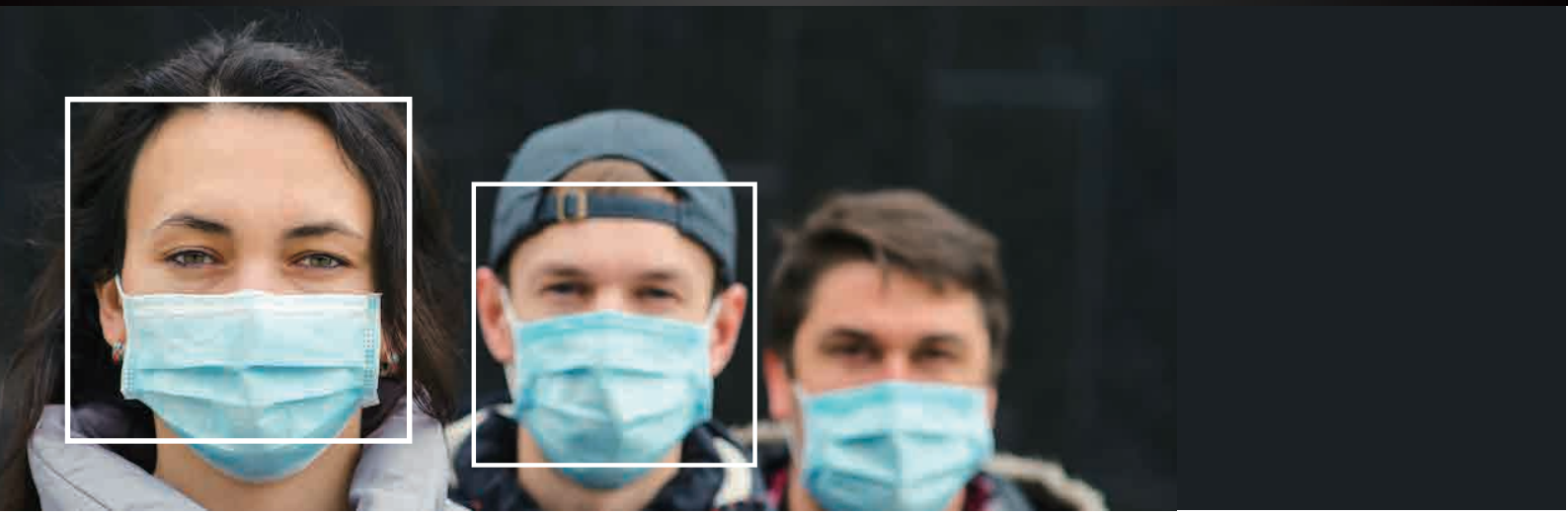
Principle of Access Control with Mask Detection

MASK DETECTION

Face masks have become a part of daily lives in the age of the coronavirus. To prevent people from acquiring the coronavirus, respiratory or infectious pathogen, and blocking larger particles from sneezes or coughs of asymptomatic people, face-covering with surgical or face masks is mandatory in many places such as office buildings, hospitals, public transportation facilities or even retail stores and restaurants.

ZKTeco's leading-edge facial recognition solution with mask detection can quickly identify and track everyone in a crowd as they move about and simultaneously help recognize guests and personnel who are not wearing masks and restrict access.



What is ZKTeco Access Control with Mask Detection

Mask detection technology uses a Computer Vision algorithm to detect if a person is wearing a face mask while acquiring and analysing face data before access granted.

Besides identifying people wearing masks, ZKTeco's security system with this technology is more expeditious, convenient, and reliable in monitoring mask-wearers and passers-by trying access the restricted areas. The solution is flexible and easy for people to deploy.

In some situations, face masks are mandatory or even recommended. Access control with mask detection is a simple solution to help reduce the risk of getting infected, and also a good reminder to wear masks before entering the controlling areas.

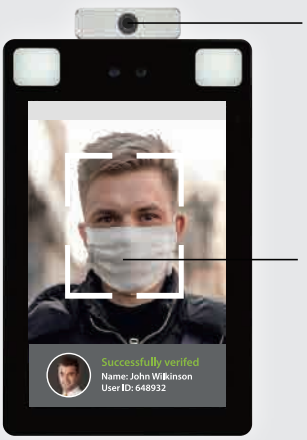
- **Safer**
Touchless measurement to avoid physical contact

- **Faster**
Mask detection in half a second per person

- **Smarter**
Detection with Computer Vision, significantly reducing the FAR

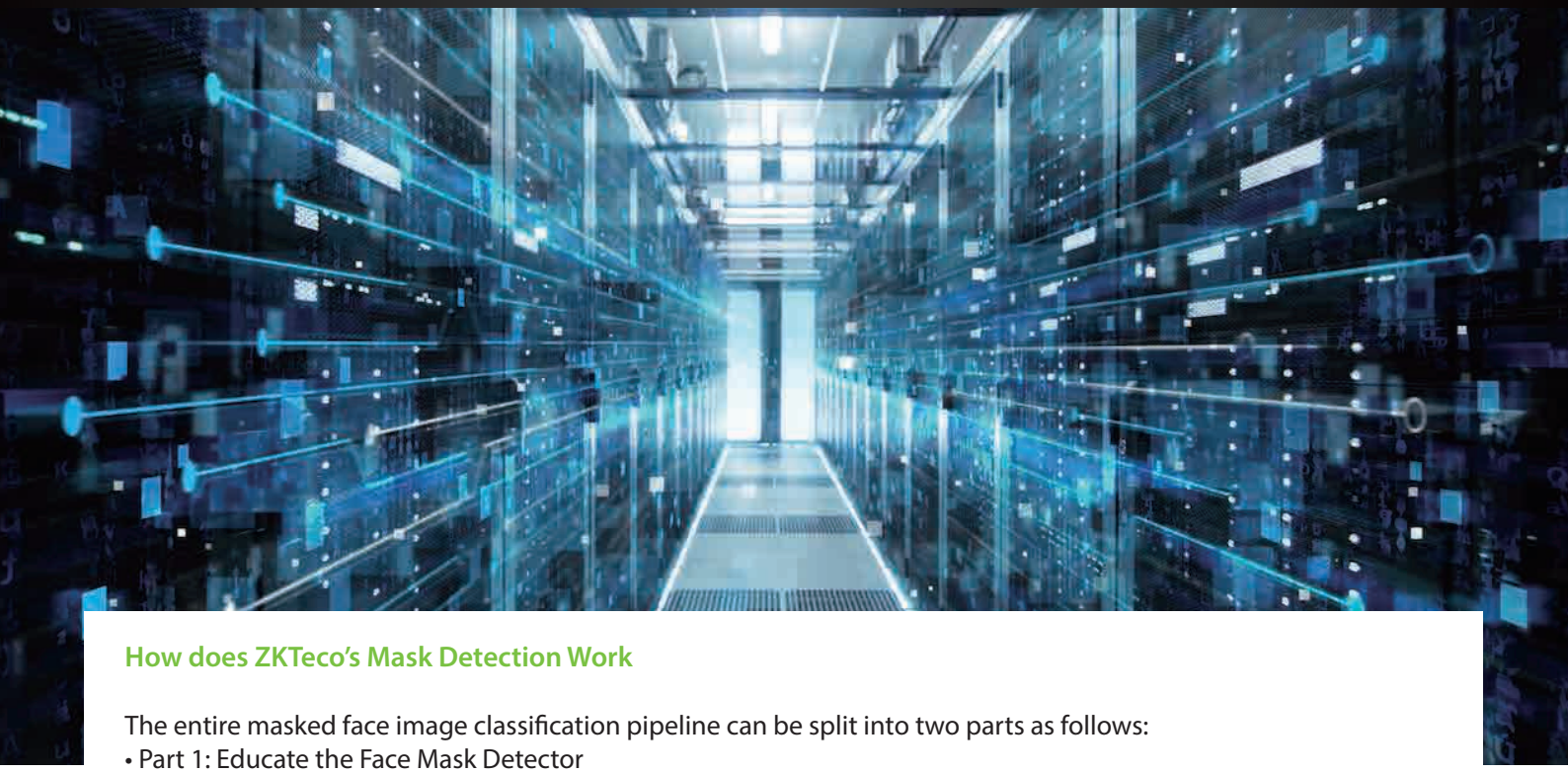
Main Functions of Access Control with Mask Detection

Mask detection technology is dominant in recognizing and identifying a human face, whether he/she is wearing a face mask. Through the wide-angle of the lens, face data acquired by the access control terminal will be instantly compared with those face data stored in the database.



Infrared Temperature Sensor
Accurate temperature
Measurement deviation +/- 0.3℃

Face Detection
No need to touch the A&C terminal
Auto detection and identification of faces



How does ZKTeco's Mask Detection Work

The entire masked face image classification pipeline can be split into two parts as follows:
- Part 1: Educate the Face Mask Detector
- Part 2: Deploy the Face Mask Detector

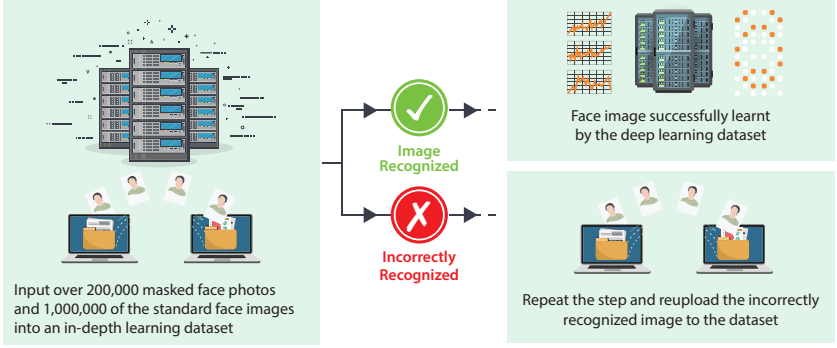
- Applied Deep Learning Technology: Resnet101
- Applied Deep Learning Tool: Pytorch

• Part 1: Educate the Face Mask Detector

1

Train a face mask detection with mass images

The first step is to input over 200,000 masked face photos and 1,000,000 of the standard face images into an in-depth learning dataset. Usually, the mask recognition deviation rate will be just 5 -10% after the first round comprehensive learning training.



2

Re-train with the rejected image

To raise the mask recognition deviation rate, repeat step one; this time, only upload incorrectly recognized photos into the deep learning network until the mask recognition accuracy reaches at least 99.8% in the lab environment.

3

Image differentiation

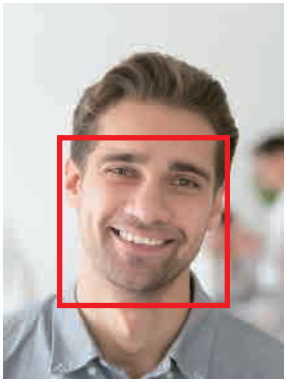
Once the face mask detector is well-trained, we can then move on to loading the mask detector, starting its face detection function, and classifying the image as "With mask" or "Without a mask". With the field application, the lowest acceptable standard will be at least 98% accuracy under 10,000 field test.

As the system learned, we can, therefore, apply the face mask detector in practice.

• Part 2: Deploy the Face Mask Detector

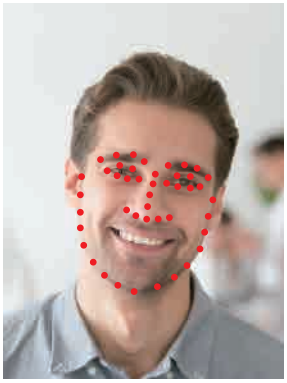
1 Face Detection

First, we need to apply face detection to compute the bounding box location of the face in the image.



2 Facial Landmarks Detection

Apply the facial landmarks, allowing the system to localize the eyes, nose, mouth, etc.



3 Mask Add-on

Get advantage of deep learning technology. The mask will be automatically applied to the faces that the mask is based on the facial landmarks to resize, rotate, and replace automatically.

4 Mask Dataset Created

Repeat this process for all the input images, thereby creating our artificial face mask dataset.

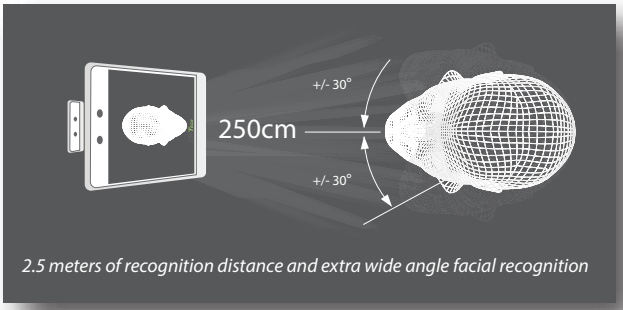
ZKTeco Access Control with Mask Detection Advantages

Proactive long-distance mask detection

Because of the combination with the visible light facial recognition technology, the recognition distance of ZKTeco's mask detection greatly extends to up to 2.5 meters, significantly boosting the maximum traffic rate for mask detection plus authentication checks.

2.5 meters

Mask Detection



2.5 meters of recognition distance and extra wide angle facial recognition

Touchless Sensor

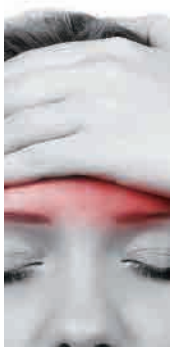
The facial recognition and non-contact features facilitate mask detection without touching. It is not only crucial for the safety of workers but also minimization of potential product contamination.

Extra-wide angle recognition (+/- 30 degrees)

While most of the algorithms only support a 15-degree facial recognition tolerance, ZKTeco's mask detection supports a much wider tolerance angle of 30-degree for facial recognition.

Fast, accurate and convenient

ZKTeco's mask detection is fast, accurate, and convenient to use. The response time (from screening to display) of a mask detection is typically about one-half seconds that might assist people in having fast track access to the monitored area.



Body temperature measurement

ZKTeco combines the technology with infrared temperature detection to provide accurate and fast temperature screening during identity verification.

Product Comparison

ZKTeco's Access Control with Mask Detection	Other Brands' Access Control with Mask Detection
✓ Detection Distance: Up to 2.5m	✗ Detection Distance: 0.5 to 1.5m
✓ Detection Time: 0.5s	✗ Detection Time: 1s
✓ Mask Detection Accuracy: >98%	✗ Mask Detection Accuracy: 95%
– Angle Tolerance: +/-30 degrees	– Angle Tolerance: +/-30 degrees
✓ Support Temperature Detection	✗ Do Not Support Temperature Detection

Temperature Detection

Masked Face Detection

Palm Recognition

Wide Range of Mask Detection Product

ZKTeco offers a wide range of high-quality products that meet the needs of global customers, from facial recognition terminals that all integrate with mask detection. With an emphasis on quality, technology, and cost-effectiveness, ZKTeco seeks to offer the best solution in a wide range of dimensions.

Proface X[TD]
Facial Recognition Terminal with Temperature Detection

SpeedFace V5L[TD]
Facial Recognition Terminal with Temperature Detection

SBTL8033
Touchless Entrance Control with Temperature Detection

+/- 30° Wide Pose Angle Acceptance

+/- 60° Wide Palm Pose Angle Acceptance

Proactive Facial Recognition

Speedy Recognition

Touchless for Better Hygiene

NEW Temperature Detection

NEW Masked Face

NEW Proactive Palm Recognition

ZKTeco Products Applications

ZKTeco's touchless biometric solution is a good fit for this situation that is preventing people or patients from touching the door handle. The solution has been widely used in many practical scenarios, including hospitals, educational institutes, factories, construction sites, shopping malls, IT parks, public transportation, banks, business organizations, small to medium enterprises, government organizations and so on.

Hospitals

Educational Institutes

Factories

Construction Sites

Shopping Malls

IT Parks

Public Transportation

Business Organizations

Small to Medium Enterprises

Banks

Government Organizations

The Leader Of Security And Time Management Solution

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