Automatic Number Plate Recognition

White paper

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Introduction

Using a CCTV camera with "**Temperature Detection**" it is possible to detect high body temperatures in people, giving a possible early warning someone has a fever and may have Covid-19.

Rapid identification of a fever is a great help to screening and protecting staff or visitors of any business, it's contactless so chances of spreading a virus are lowered and it is easy and fast to implement and manage too.

CCTV Cameras equipped with "**Temperature Detection**" are actually a "**2 in 1**" device, they have a standard IP CCTV camera and an additional Infrared detection module that can read the thermal temperature of a human by the Infrared they give off.

Temperature Detection cameras that help with the detection of fevers and Covid-19 are known as ITDCs and can be roughly split into two groups, long range and short range cameras.

Temperature Screening with CCTV
– the basics of Body Temperature Measurement

This a basic article for CCTV installers and business owners on the human bodies core temperature ranges and how it can be measured by CCTV equipment. This article isn't and does not claim to be a medical reference point for diagnosis of fever.

When a person has a fever and is unwell their core temperature rises. The human body is remarkable at maintaining a stable "**core**" operating temperature although this temperature can vary a small amount from person to person.

For a healthy adult the internal body temperature is typically 37 °C but this can vary throughout the day.

As people age their core temperature lowers slightly, with someone over 70 having a typical core body temperature of 36 °C as opposed to a 40 year old at 37 °C.

One of the most accurate ways to measure this core body temperature is through an oral thermometer or one that reads the temperature inside the ear canal. The ear canal has several arteries close to it that flow to the "**hypothalamus**" so it provides a good indication of internal body temperature as the hypothalamus role amongst other things is to help control body temperature.

The head itself is the body part that is closer than all other body parts to the core internal body temperature, in fact the feet can be as much as 8 degrees cooler than the head.

On the head itself, the forehead is the best possible place for distance temperature monitoring of body temperature as it is relatively easy to "**see**" and capture this temperature. It's also a relatively reliable indicator of the body temperature as arteries close to the inner corners of the eyes provide a good infra red source of the core body temperature that is then transmitted from the centre lower section of the forehead.

Most but not all temperature monitoring CCTV cameras will attempt to read the temperature from the forehead and low down in between the eyes.

So what is a normal body temperature and what should the CCTV camera be set on?

Based on a normal body temperature of 37 °C we suggest the camera is configured to detect "**abnormal temperatures**" at 38 °C and above†. Although you may wish to lower this so that you have the ability to detect smaller abnormalities in temperature in a "**better to be safe than sorry manner**".

Human Body Temperature Guide -

- ▶ Normal body temperature = 37 °C
- ▶ Low grade fever temperature = 37.2 – 38 °C
- ▶ Fever temperature = 38 °C or higher
- ▶ Dangerously high = 41 °C or higher
- ▶ Fatal = 43 °C or higher can be fatal

Disclaimer: Please be aware the above is meant as a guide only and not a medical reference article. If you have any medical concerns please contact a doctor or specialist.

† *People's skin temperature can be affected by other factors. Typically temperature detection screening cameras have an accuracy of around 0.3 degrees so we would suggest setting the trigger point to between 37.7 – 38 °C.*

How to

- Use CCTV Technology to Help Protect Staff & Customers

Low cost Compact ANPR camera

... use vehicle registrations to open gates, trigger alarms or send alerts !

RoboPlate Low cost
6-22mm ANPR Eyeball
Order Code: ROBOPCZ22

PowerZoom ANPR camera

... use vehicle registrations to open gates, trigger alarms or send alerts !

RoboPlate PowerZoom
5-50mm ANPR Bullet
Order Code: ROBOPMZ50

~~Temperature Detection cameras can be roughly split into two groups, long range and short range cameras.~~

1 - Do a site survey

It's really important to get acquainted with your site and even more so with your client's expectations. Just as you would for their burglar alarm system or normal CCTV system they will have specific needs that they will want you to meet.

Assuming they want to capture a vehicle's number plate on entry to a particular area, you'll need to consider where vehicles will be positioned and at what angle when they enter that area.

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Top Tip Always try and capture the number plate from the front of a vehicle as the rear can often be blocked or obscured by other vehicles or accessories such as bike racks or trailers.
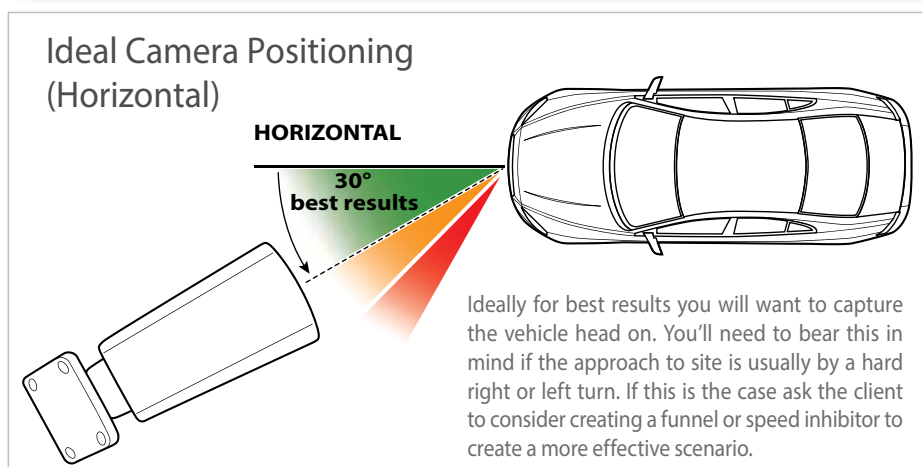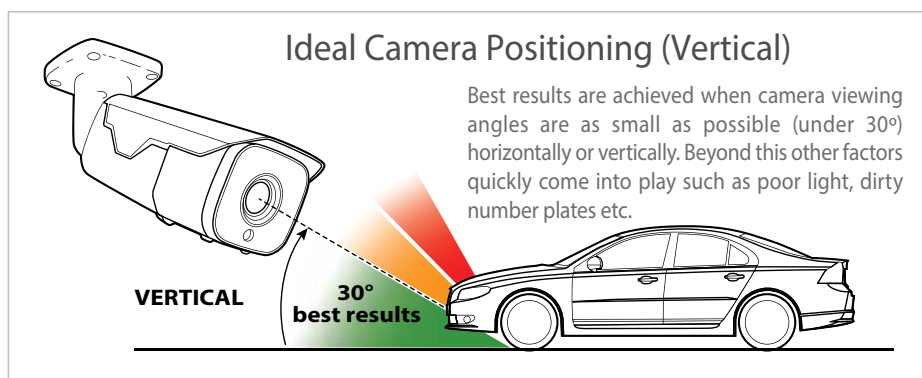
2 - Get the right angle

Ideally for best results you will want to capture the vehicle head on. You'll need to bear this in mind if the approach to site is usually by a hard right or left turn. If this is the case ask the client to consider creating a funnel or speed inhibitor to create a more effective scenario.

Automatic barriers, gates, bollard or more cost effective solutions such as speed bumps or narrowing of the entrance using kerbing or shrubbery can all help to control the direction, speed and flow of the vehicles to enable the camera to have a longer exposure to the number plate at a better angle for maximum effectiveness.

Text under image

Ideal Camera Positioning (Vertical)

Best results are achieved when camera viewing angles are as small as possible (under 30°) horizontally or vertically. Beyond this other factors quickly come into play such as poor light, dirty number plates etc.

VERTICAL   **30° best results**

Ideal Camera Positioning (Horizontal)

HORIZONTAL

30° best results

Ideally for best results you will want to capture the vehicle head on. You'll need to bear this in mind if the approach to site is usually by a hard right or left turn. If this is the case ask the client to consider creating a funnel or speed inhibitor to create a more effective scenario.

3 - Positioning

In an ideal world your ANPR camera would be fitted dead ahead of the approaching vehicle at the same height as the licence plate but in reality this is entirely impractical especially given that you will want to get a cable to the camera too.

Consider suitable locations up to a 35m radius of your capture area that you can run cable to and decide where the camera might be mounted. Although an ideal height would be around 1m this could be quite tricky but avoid a downward pointing angle of over 30° as that makes it hard for the camera to obtain the relevant data.

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4 - Get the right camera and lens

Once you established viable locations, it's then time to pick your ANPR camera usually depending on style and lens size.

A model like the RoboPlate Eyeball (model: ROBOPCZ22) has a 6-22mm varifocal lens and a discrete, compact case design that is a great solution for a gate post. Zoomed in to the full 22mm setting it would offer you a full view of a licence plate at 3m or the full width of the car at 10m.

The RoboPlate PowerZoom Bullet camera (model: ROBOPMZ50) has an even more powerful 5-50mm lens and at a working distance of 35m has been rigorously tested for consistently good results. This model might be a preferred choice to be sited on a building looking across a car park to a gate or entrance.

ROBOPMZ50

ROBOPCZ22

Text under image

22mm Lens at *3m*

VO68 JDG

22mm Lens at *10m*

VO68 JDG

Text under image

💡 **Did You Know ?**

The standard UK number plates measure 51cm wide and the average saloon car around 2 metres.

5 - Keep it real

Obviously if you would find it hard to read a number plate with your own eyes at day or night in the position you opt for then chances are it isn't a great spot for your camera either. You'll need to make sure on installation that your camera is in perfect focus, no vegetation or other objects obstruct its view, no bright security or spotlights blind the camera view at night and so on. In short everything you would look out for when installing a standard CCTV camera.
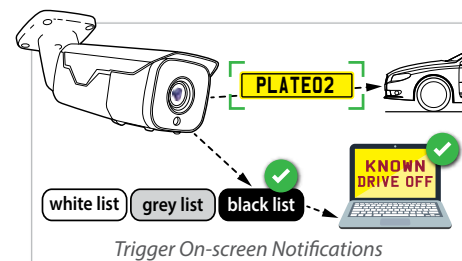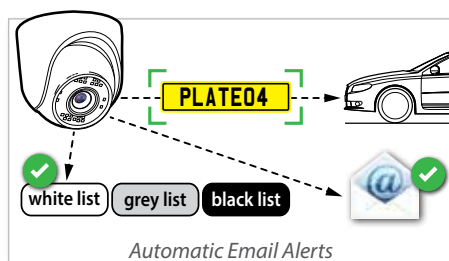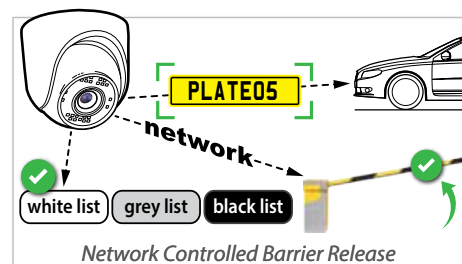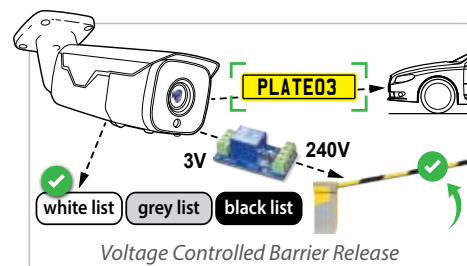
VO68 JDG

Text under image

6 - Meeting Customer Expectations

Ascertaining exactly what your customer is trying to achieve is key as it will determine your final choice of ANPR camera as well as any accessories or software that may be needed to achieve this. You'll need all this information to produce a realistic quote.

Brands like RoboPlate ANPR cameras have loads of features built in without the need for extra gear. From the camera itself you can capture, store and compare a number plate to a White, Grey or Black list saved on an on-board SD card. You can save captures to the card or upload them to the Cloud for remote storage. On a match you can trigger the built in low voltage relay to activate a 3rd party device such as opening a gate or barrier, activate an automatic MP3 player such as the VoiceOFF or a simple strobe or siren.

They can play a message for the camera itself depending on which list is matched and will even email you a snapshot of the match if you're off site. All this works with no NVR or extra software required.

PLATE03
3V   240V
white list grey list black list
Voltage Controlled Barrier Release

PLATE05
network
white list grey list black list
Network Controlled Barrier Release

PLATE04
white list grey list black list
Automatic Email Alerts

PLATE02
KNOWN DRIVE OFF
white list grey list black list
Trigger On-screen Notifications

7 - Enhanced Features for Enterprise Users

Whilst the aforementioned features are really great, it may be that your client requires just a little bit more to manage vehicle access to their site. This is where additional software comes in.

Written in the UK by British software engineers, the RoboPlate Command Centre software give extra functionality to the RoboPlate cameras including full vehicle database management, extra lists (up to 20), audio & visual notifications for operators, triggering off network relays, emails and VoiceOFF announcements to name just a few.

A low cost widget can also be used as a basic addition to the cameras to provide an instant pop up notification over a network of any number plate list match to an operator such as a Receptionist. It can add a handy audio alert too!
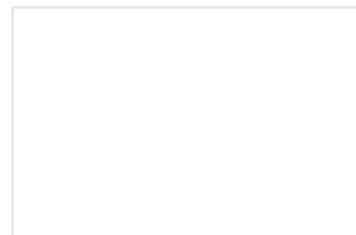

Manage, control and organise your ANPR cameras & database with the powerful
RoboPlate ANPR
Command Centre Software

Get Instant Pop Up Notifications of an ANPR List Match on your PC Screen with
RoboPlate RegWatch Widget

8. Keep your data secure

As with any CCTV images, ANPR data is considered to be personal data and as such would fall under the remit of the GDPR. It's good practice to have clear signage alerting any approaching vehicle that they will be recorded on CCTV for security purposes. The Who Is Watching Me range of warning signs can help clearly mark out the site.

Text under image

DPA Compliance Kit
Includes 20x Evidence DVDs with unique ID stickers and seals, 1x A3 and 1x A4 warning signs, 20x warning stickers and date compliance log book.

Order code: **DPA100**

SIG650   SIG550   SIG102

CCTV Warning Signs & Stickers
With FREE registration to the "Who Is Watching Me" scheme

A3 Sign Order Code: **SIG650**
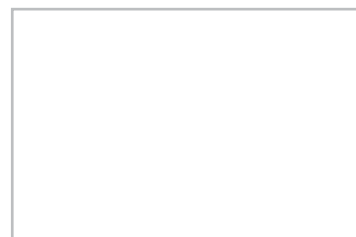*A4 Sign Order Code:* **SIG550**
A5 Sticker Order Code: **SIG102**

More detailed info on the RoboPlate range can be viewed here >

RoboPLATE®

What Should you Buy for your Business?

Business type 1 - Appointments or have low volume "walk in and wait"

If your business has few visitors and they tend to book in or you have a small amount of "**walk ins**" then the short range reader is a great choice. It's easy, low cost and user friendly. You will find staff and visitor will soon tend to "**re-use**" it throughout the day for self-reassurance that they don't have a fever. This solution is very good for any business that uses waiting rooms etc, such as doctors, dentists, showrooms, surgeries, vets, hairdressers, barbers, health clubs, council buildings and offices that deal with the public.

Suits appointments or walk in and wait type businesses such as hairdressers

Business type 2 - Busy shops with browsers and buyers or public access such as libraries

If your business has a lot of "**walk in buy or browse**" shoppers (or visitors) you are better having the long range detection system so that it can alert you when someone is in the store who is abnormally hot and may have a fever. The camera and software can save a picture of the person who has the high temperature so staff can take appropriate action (The short range system also takes snapshots). You may need more than one long range camera or have short range ones located at the tills or check out for added protection.

The perfect technological solution for your business maybe a mixture of short and long range heat detection cameras but we trust the above helps in your conclusion of how best to protect your staff and customers.

Long range cameras suit businesses with walk in and browse shoppers

In Conclusion…

Whilst the use of CCTV technology may seem expensive to protect your staff and customers, in reality by controlling the spread to keep your staff healthy and protected, the investment in this technology may actually save you money by keeping the business going with the least amount of problems in this difficult time.

Camera Style	✓ Pros	✗ Cons
RoboPlate Low cost 6-22mm ANPR Eyeball Best for …	Simultaneous multiple detection, longer range, no subject participation needed. Rapid scanning. Automatic reading (Captures as people walk past).	More expensive.
RoboPlate PowerZoom 5-50mm ANPR Bullet Best for …	Built-in monitor, gives immediate feed back, self contained, low cost, built-in facial recognition. Semi-automatic reading (Captures from a pose).	Needs subject to participate and stand in front of the monitor.

The Data Protection Act & Temperature Detection CCTV

If you already have CCTV in your business you may have already taken steps to ensure that you comply with the Data Protection Act. If the temperature detection cameras are the first CCTV items in your building it would be wise for you to read up on how it affects your business on our dedicated website **www.WhoIsWatchingMe.org**.

You can buy simple off the shelf products and kits to help your CCTV system to comply with the act such as these:

DPA Compliance Kit
Includes 20x Evidence DVDs with unique ID stickers and seals, 1x A3 and 1x A4 warning signs, 20x warning stickers and date compliance log book.
Order code: **DPA100**

CCTV Warning Signs & Stickers
With FREE registration to the "Who Is Watching Me" scheme
A3 Sign Order Code: **SIG650**
A4 Sign Order Code: **SIG550**
A5 Sticker Order Code: **SIG102**

Technical Application Notes:

For ~~Long range temperature detection~~ cameras

You need to have good positioning of the camera to get the best results.

DON'T ~~Position the camera looking straight at an entrance to get customers walking in to the shop as this would get poor results.~~

~~Looking at an entrance from inside to outside can subject the camera to extreme changes in heat when the door is opened due to the infrared that is let in from sunshine so do not position the camera looking at the entrance. Similarly if it is looking out of a window it would create similar issues.~~

DO ~~Position the camera so that the area of observation is~~ **ENTIRELY** ~~internal, walls, back drop etc. When people walk in on a very cold day their skin may be a little cooler and on a very hot sunny day it may be a little hotter being heated by the sun just before entering. Ideally get the cameras to read people's temperatures when they are in a stable temperature controlled section of your business. Perhaps use some kind of flow control so they will walk towards your camera(s) a few seconds after entering.~~

DON'T Position the cameras in direct sunlight or in front of direct heat or IR sources such as heaters.

DO ~~Use the camera to inform the right people of a high temperature. Cameras such as the~~ ***HotHEAD™*** ~~range have a relay output and also built in audio so you can use this to alert someone they have a high temperature. However if you have multiple people in the shop this may be confusing so this feature is best switched off and software should be used to manage the detection.~~

~~The software is installed on a computer in the shop and an image of the staff or shopper with a high temperature is displayed as a pop up. The shop can then take the necessary actions based on their own procedure. To use the camera with the software the camera will need to be connected to the same local area network (LAN) as the computer.~~

DO ~~Use the camera to uphold regulations. Within the camera you can set it also to alert if someone is not wearing a mask. This is useful if you have a policy that masks should be warn at all times.~~

For Short range temperature detection cameras

DO   Position the camera so people can see them and the signage supplied with them. This encourages people to use them through their own volition.

In reception areas, the receptionist would ask the visitor to stand in front of the camera and monitor. It would then display the visitor's temperature. If it is a high temperature then the business would take the necessary steps depending on their own H&S procedures.

DON'T   Waste time with other over complicated systems. The short range temperature detection camera such as the *HotHEAD*™ "**Selfie**" is pretty much a plug and play solution and needs either installing on a wall or tripod (extra) as a mounting location. All it then needs is a power socket to plug it in to and use it. If you want to change any settings within the camera it would need a computer or laptop to connect to it to alter these. Typically a user may wish to alter the threshold for the high temperature etc.

DO   Use the camera to uphold regulations. Within the camera you can set it also to alert if someone is not wearing a mask. This is useful if you have a policy that masks should be warn at all times.

DO   Combine the camera with the software for a comprehensive system. If you connect the short range camera to a network you can use the software supplied to get notifications of high temperature detection.

HotHEAD™ *Temperature Detection CCTV Cameras - Shortform Specification*

HotHEAD™ "**Crowd**" Long Range camera – SEEK200

Temperature Range	30°C to 45°C	IR Range	Up to 15m
Temperature Accuracy	±0.5°C	Smart IR	Automatically Adjusts Intensity & Angle
Optical Resolution	2688 x 1520 (4MP)	Input Voltage	12V DC / PoE
Optical Lens Type	4mm Fixed	Consumption	12V: 500mA / PoE: 6.5W
Min. Illumination	Colour: 0.0089 Lux @ F1.6 / Black & White: 0.0018 Lux @ F1.6	Finish	White / Black
		Build	Metal Body
		Use	Internal Use Only
Day/Night Function	Mechanical (True Day/Night)	Dimensions	Ø140mm x (h) 125mm
Alarm Inputs	1		
Alarm Outputs	1		

HotHEAD™ "**Selfie**" Short Range camera – SEEK111

Monitor Screen Size	7"	Day/Night Function	Mechanical (True Day/Night)
Mount	Wall or Tripod (Sold Separately)	Alarm Outputs	1
Temperature Range	30°C to 45°C	Input Voltage	12V DC / PoE
Temperature Accuracy	±0.3°C	Consumption	12V: 2A / PoE: 20W (Max)
Optical Resolution	1920 x 1080 (2MP)	Finish	Silver / Black
Optical Lens Type	4.5mm Fixed	Build	Plastic Body
Min. Illumination	Colour: 0.01 Lux @ F1.2 / Black & White: 0.001 Lux @ F1.2	Use	Internal Use Only
		Dimensions	(h) 365 x (w) 125 x (d) 85mm

RoboPLATE®
ANPR Software & IP Cameras

ANPR SOFTWARE

Robo PLATE COMMAND CENTRE

ANPR COMMAND CENTRE

+ RegWATCH pop-up widget for PCS

COMPACT EYEBALL
6-22mm varifocal

No NVR needed!

PREMIUM BULLET
5-55mm varifocal

Introducing...

RoboPLATE®

ANP... Range

ROBOPL4TE