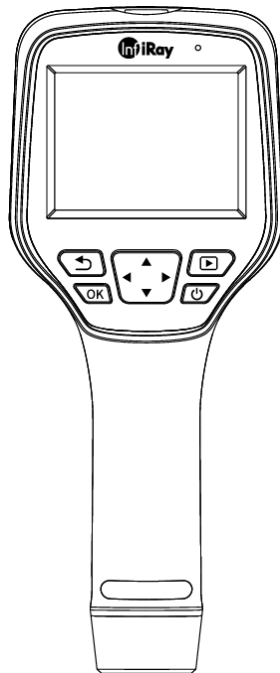# M200 Series

Handheld Thermal Camera

User Manual V1.0.1

IRay Technology Co., Ltd.
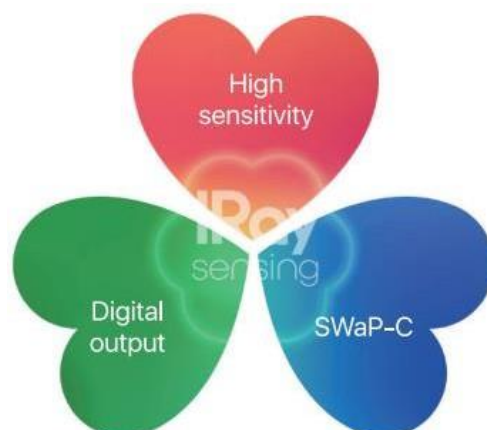
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Introduction to IRay Technology

IRay Technology Co., Ltd. concentrates on developing infrared thermal imaging technologies and manufacturing relevant products, with completely independent intellectual property rights. IRay is committed to providing global customers with professional and competitive infrared thermal imaging products and solutions. The main products include IRFPA detectors, thermal imaging modules, and terminal thermal imaging products.

With R&D personnel accounts for 48% of all employees, 662 intellectual property projects in terms of IRay have been authorized and accepted: 522 patented technologies authorized and accepted in China (including those for integrated circuit chips, MEMS sensors design and manufacture, Matrix III image algorithms and intelligent precise temperature measurement algorithms, etc.); 16 patented technologies authorized and accepted overseas; 86 software copyrights; and 38 integrated circuit layout designs. （The statistic data is up to April,2021）

IRay products have been applied in various fields, including epidemic prevention and control, industrial thermography, security and fire control, night vision observation, automatic driving, Internet of Things, AI, and machine vision.

Table of Contents

1. Notices to the User

1.1 Calibration

We recommend that you conduct calibration once a year.

1.2 Accuracy

For very accurate results, we recommend that you wait 5 minutes after you have started the camera before measuring a temperature.

1.3 Manual Update

The user manual will be updated from time to time. Please contact our company to get the latest version.

1.4 Scope of Application

This manual is applicable for all products in a range, which means that parts of the manual may not apply to a particular model.

2. Quick Start Guide

Steps to Start:
1. Charging ● 5V 1A or 5V 2A power adapter and USB cable can be used to charge the device. ● You can charge the device by connecting the USB cable in the accessory to the computer. Note: This method of charging takes longer time than using the power adapter. ● Charging base can also be used to charge the battery.
2. Power on Long press the power button ⏻ to start the device.
3. Target Searching Point the thermal camera at the object of interest.
4. Image Capturing Click the trigger button to capture the image, and record the video by long pressing the trigger button.

5. Analysis by PC Software

Run the client after downloading the software to PC, and then use a USB cable or SD card to import data for further analysis.

Note: please import the files naming XX-IR.jpg (Infrared images with temperature data) and files naming XX-DC.jpg (visible images) together.

6. Analysis by App

Download and install the App on the mobile device and run the App. Open camera Wi-Fi, then connect the mobile device to the hotspot of the camera, and import the data for further analysis.

3. Product Introduction

3.1 Camera（ View from the front）
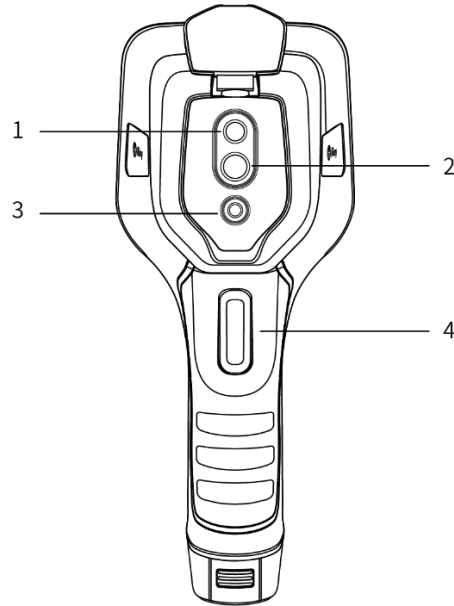
Figure 3.1 Component Introduction of M200A

No.	Component Introduction
1	Digital Camera
2	Infrared Lens
3	Laser Pointer
4	Trigger

3.2 Buttons（View from the rear）
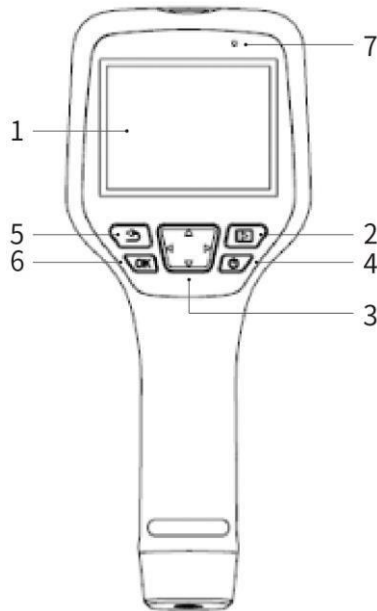
Figure3.2 Introduction to Buttons

No.	Component Introduction
1	Touch screen
2	Gallery button Press to open the gallery. Long press to perform image uniformity correction. Long press to perform manual shutter.
3	Navigation button Make selections for the menu, settings, gallery by clicking up/down/left/right.
4	Power/Laser button Long press to turn on/off. When the camera is on, short press the button to turn on/off the laser pointer.
5	Back button Short press to cancel the operation or return to the previous menu. Long press to perform image uniformity correction.
6	Enter button Click OK to confirm the operation.
7	Microphone It's used to record voice notes after image capturing.

3.3 Connector and Memory Card
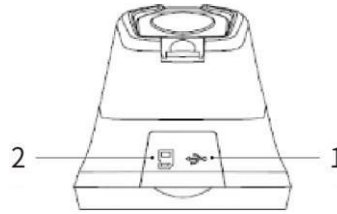
Figure3.3 Illustration of Connector and Memory Card

No.	Component Introduction
1	USB Interface ● Connect a USB cable with the power adapter for charging. ● Connect a USB cable to a computer to charge or transfer data.
2	SD Card ● Standard MicroSD card, standard 32GB，Max 32GB. ● The SD card can be taken out and transfer data to PC or other devices with a card reader.

3.4 User Interface

Figure3.4 User Interface

No.	Interface Introduction
1	Main Menu: measurement parameters, measurement mode, image mode, color palettes and other settings can be set.
2	Sub Menu: specific options can be set, such as a specific color palette.
3	Temperature measurement spot: measurements of center spot, high/low temperature spot tracking, custom spot, custom line, custom region measurement are available.
4	Center spot temperature: the temperature of the center spot is displayed.
5	Date and time: date and time are displayed.
6	Battery capacity: the remaining battery capacity is displayed.
7	Temperature range: the temperature range in the current screen can be displayed.

4. Operation Instruction

4.1 Charging

4.1.1 Charge with a Power Adapter

1. Plug the power adapter into the socket.
2. Use a USB cable to connect the adapter and the camera to charge.

Note：It takes about 3h to get the device fully charged.

4.1.2 Charge with a Computer

1. Use a USB cable to connect the thermal camera to the computer to charge.

Note: when charging with a computer, the computer should be turned on, and the charging time is longer than using an adapter.

4.1.3 Charge with a Charging Base

1. Connect the power adapter and the charging base with a USB cable, and plug the power adapter into the socket.
2. Take out the battery and place it correctly in the charging base to charge.

Note：When the battery is not placed, the indicator of the charging base flashes; the indicator turns red when the battery is placed and charging; the indicator becomes green when the battery is fully charged.

4.2 Power On/Off

1. Press the power button continuously to start the device.
2. Press the power button about 3 seconds to turn it off.

4.3 Image Capturing/Video Recording

1. In the observation interface, adjust the focus ring till the image is clear. Short press the trigger button to take the photo. Long press the trigger button to start recording video, and finish recording by releasing the trigger button.
2. Tap the save button on the screen or click OK to save the picture. Tap other buttons on the screen or use the navigation button + OK to make recording annotation, scan the QR code to name the file, or cancel saving photos.

4.4 View Photos/Videos

The pictures you took are saved in the SD card, and you can follow the below steps to view them at any time.

1. Enter the image archive by clicking gallery button.

2. Select the picture or video you want to view by pressing the navigation button or screen.

3. Press OK or click the image or video to view it in full screen. Select the delete option and then confirm to delete the current item. Select the rename option and confirm to rename the current item.

4. When in the preview interface, click the multiple button in the upper right corner of the screen, then select the image or video to be deleted, and delete the selected items by pressing the delete button.

5.Return to observation interface by clicking the gallery button, back button or touching the screen.

4.5 Measurement Mode

In the observation interface, press OK shortly to enter the main menu, and select "Measurement Settings" with the navigation button. Press OK again to enter the secondary menu, select different measurement modes by shifting left or right on the navigation button, and press OK to save your option.

In the observation interface, click anywhere on the screen to enter the main menu. Then click "Measurement Settings" to select the desired measurement mode, and make it effective by clicking the screen area.

4.6 Measurement Parameters

In the observation interface, press OK to enter the main menu, use the navigation button to select the "parameter setting", then press OK again to enter the secondary menu. Select different temperature measurement parameters by shifting left or right, and press the enter button to parameterize. After setting, press OK again to save your option.

In the observation interface, click anywhere on the screen to enter the main menu. Click "Parameter Setting" to set the parameter. After finishing the setting, click the screen area to take effect.

● **Emissivity**: in order to obtain more accurate measurement results, you need to set the emissivity according to the target to be measured before each measurement, instead of using the default configuration. Emissivity refers to the ratio of the radiant ability of an object to the radiant ability of a blackbody at the same temperature, which is relative to the reflectivity of the object. The lower the emissivity, the higher the proportion of energy being reflected. The higher the emissivity, the lower the proportion of energy being reflected. For example, the emissivity of human skin is 0.98, and the emissivity of printed circuit boards is 0.91. For more information on emissivity, you can refer to the quick start guide in the package or inquire from other sources.

● **Ambient temperature**: the reflection temperature of the object surface will affect the measurement

result, especially when the object emissivity is low or the object temperature and the reflection temperature differ greatly, this effect will increase. So the result needs to be compensated to eliminate influences of the surface reflection temperature. However, it is usually difficult to determine the reflected temperature of an object. The ambient temperature can be used to replace the reflected temperature in actual measurement.

● **Distance**: distances have effects on the measurement results. In order to get accurate measurement, distance information of the object is necessary for the thermal camera to compensate the result.

4.7 Palettes

In the observation interface, short press OK to enter the main menu, and select "palette setting" with the navigation button. Press OK again to enter the sub menu, select different palettes by shifting left and right on the navigation button, and then press the enter button to save your option.

In the observation interface, click anywhere on the touch screen to enter the main menu. Click "palette setting" to choose a palette and save your option by clicking the screen area.

4.8 Image Mode

4.8.1 Image Mode Introduction

Four image modes are available.

● Thermal Fusion: an image fused to a certain scale between an infrared image and a visible image
● PIP: infrared image superimposed at the center of the visible image
● Thermal imaging: infrared images
● Digital camera: visible images

Note: For better dual-light image effects, when in PIP or thermal fusion modes, you need to set the actual distance, that is, the approximate distance from the thermal camera to the object. If the preset registration parameters cannot meet the requirements, you can also manually perform fusion registration in the settings.

4.8.2 Setting Steps

In the observation interface, press OK shortly to enter the main menu, and select "image mode" through the navigation button. Then press OK again to enter the secondary menu, there different image mode can be selected by shifting left or right on the navigation button. Save your option by pressing enter button.

In the observation interface, click any place on the screen to enter the main menu. Click "image mode" and select the desired image mode, and then click on the screen area.

4.9 Non-uniformity Correction

4.9.1 Non-uniformity Correction Introduction

Non-uniformity correction is used to compensate for non-uniformity of detector pixels or non-uniformity caused by other optical interference. When there is more noise in the image, non-uniformity correction is needed, which is common when the ambient temperature changes rapidly.

4.9.2 Non-uniformity Correction Operations

In the imaging interface, long press the back button or the gallery button to perform non-uniformity correction.

4.10 Contrast Adjustment

In the observation interface, the contrast of the infrared image can by adjusted by sliding up and down the arrow button on the "temperature range " on the right side of the screen.
Press "A" in the upper right corner of the interface to return to auto-contrast mode.

4.11 Digital Zoom

In observation interface, press left or right navigation button to perform Max. 4×digital zoom.
Note: this function is only enabled under infrared mode or visible mode.

4.12 Other Settings

Other settings include date and time, unit, language and other items.
1）In the observation interface, press OK shortly to enter the main menu, and select "Settings" to enter other settings.
2）In the observation interface, tap anywhere on the screen to enter the main menu, and tap "Settings" to enter other settings.

4.12.1 Temperature Gear

- -20~150℃: the image details are better in this gear, and the maximum temperature measured is 150℃.
- 100~550℃: the image details are slightly worse in this gear, and the maximum temperature measured is 550℃.

4.12.2 Above/Below Alarm

- Temperature alarm setting for M200A: set the above alarm or below alarm
- Auto alarm capture switch: click to turn on or turn off the auto alarm capture
- Set the time interval for auto alarm capture
- Set number of captured images for auto alarm capture

4.12.3 Wi-Fi Setting

Click and enter WiFi setting interface.

- Hotspot Switch: turn on hotspot and set the network name and password, then click OK.

Note:

1) The specialized app is needed while this function is enabled. You need connect the hotspot manually after turning hotspot on, and you can transmit the saved pictures or videos to mobile device to perform secondary analysis.

2) Turn off hotspot when it is not used, or else the power consumption will be faster.

4.12.4 Set Image Capturing

Auto saving switch for manual image capturing: click to turn on or turn off the auto saving function for manual image capturing, off by default.

Timed image capturing: click to turn on or turn off the function of timed image capturing

Set the time interval for timed image capturing

Set the number of captured images for timed image capturing

4.12.5 Automatic Power-off

- 5Min: click to set automatically shut down after 5 minutes.
- 10Min: click to set automatically shut down after 10 minutes.
- 20Min: click to set automatically shut down after 10 minutes.
- Off: click to turn off the automatic shutdown function.

4.12.6 Dual-spectrum Alignment

- Dual-spectrum Fusion Alignment

This function can be used to manually align infrared and visible images. First select coarse tuning and fine tuning, and then perform image alignment by the touch screen or navigation keys. After finished, click OK or enter button to save the settings.

Notes: the dual-spectrum alignment can be adjusted via the touch screen, the alignment can be achieved

by dragging the infrared image up-down or left-right with fingers.

● Picture-in-picture Adjustment

This function can be used to adjust the position of the picture-in-picture. First select coarse tuning and fine tuning, and then adjust the position of the picture-in-picture by the touch screen or navigation keys. When finished, click OK or enter button to save the settings.

Notes: the PIP can be adjusted via the touch screen, press the infrared region to drag, press any corner of the infrared region to zoom in or zoom out.

4.12.7 System Settings

● **Device Information**

Click to check model, version, SD card capacity and SD card remaining capacity.

● **Date and Time**

Click to set the date and time.

● **Units of Measurement**

Temperature unit: switchable among Celsius, Fahrenheit, and Kelvin

Distance unit: switchable between meters and feet

● **Formatting the SD Card**

Click and then press OK to format the SD card as FAT32.

● **USB Mode**

There are two options for data transmission: USB disk and USB camera.

● **Restore Factory Settings**

Click and then press OK to restore the settings to the factory settings.
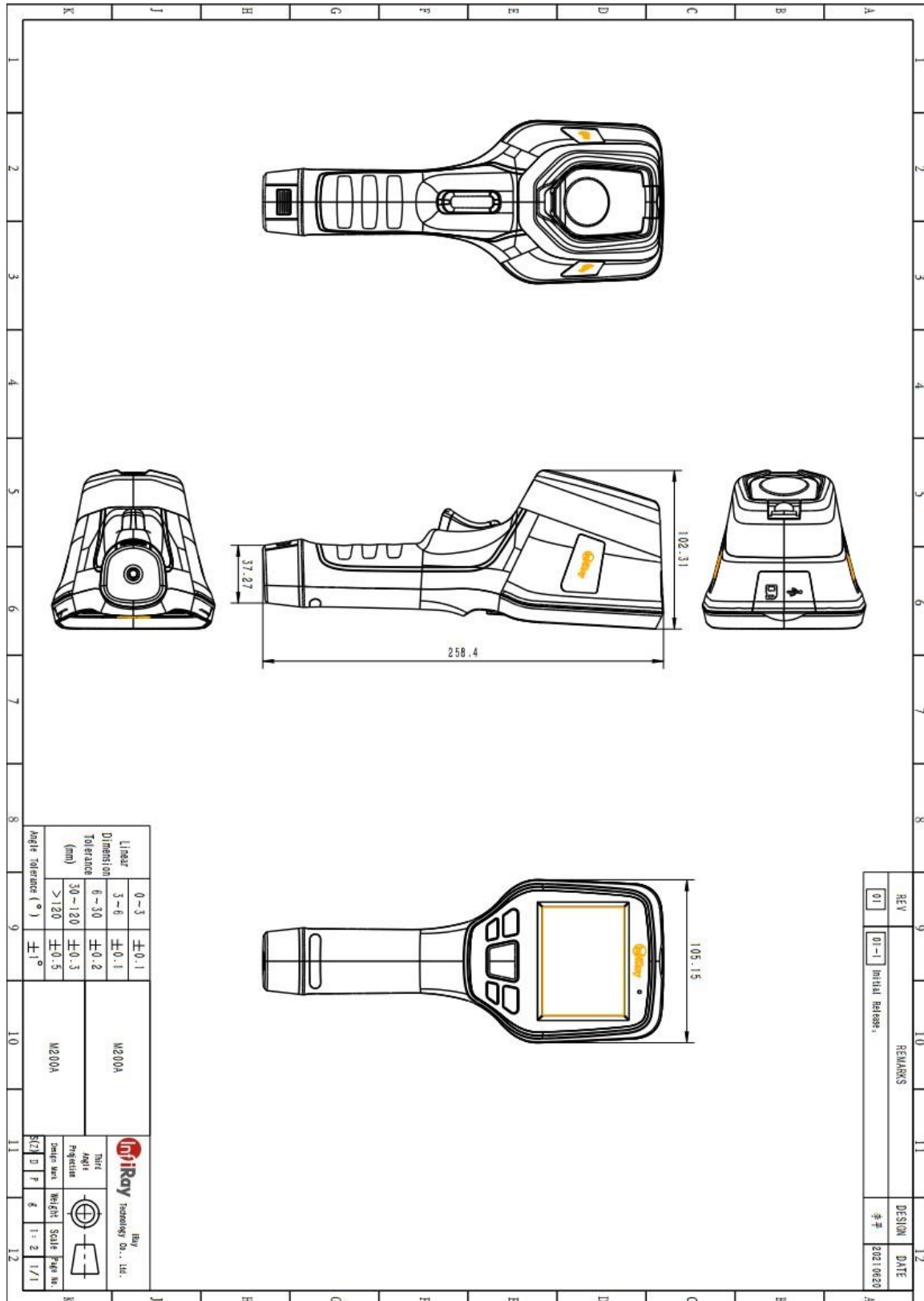
5. **Structural Drawings**

Figure5.1 Structural Drawings for M200A

6. Important Notices

To avoid damage to others and yourself, or your device, please read all the below information carefully prior to using this device.

1. Please do not point to the Sun and other high-intensity radiation source directly.

2. Ideal working temperature is-10℃～50℃.

3. Do not touch the lens with your hands or other things.

4. Do not touch the device with wet hands.

5. Do not wipe and clean your device with diluent.

6. Please do not wrongly connect the attached cables to avoid damage to the device.

7. Please take care to avoid static electricity.

8. Please do not disassemble the device. If there is any problem, please contact our company for professional maintenance.

7. Support and Service

7.1 Technical Supports

System training can be carried out for users' technical staff and operators.

7.2 After-sales Services

M200 series handheld thermal cameras, developed by our company, are guaranteed of good after-sales service for device maintenance and repair. If you have any request, please contact us.

8. Company Information

IRay Technology Co., Ltd.

Website：www.infiray.com

Tel：86-0535-3410623

Fax：86-0535-3410610

Mail：sales@iraytek.com

Add：No.11 Guiyang Street, YEDA, Yantai, Shandong Province, P.R. China.

9. FCC Warning

§ 15.19 Labeling requirements.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

§ 15.21 Information to user.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

§ 15.105 Information to the user.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.

-Increase the separation between the equipment and receiver.

-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-Consult the dealer or an experienced radio/TV technician for help.

Body-Support Operation

This device was tested for typical body-worn operations. To comply with RF exposure requirements, a minimum separation distance of 0cm must be maintained between the user's body and the handset, including the antenna. Third-party belt-clips, holsters, and similar accessories used by this device should not contain any metallic components. Body-worn accessories that do not meet these requirements may not comply with RF exposure requirements and should be avoided. Use only the supplied or an approved antenna.

Worth comes from Service

Technical Support

Hotline：

400-883-0800

24h Hotline:

400-998-3088

Customized Services