CR-Scan Ferret 3D Scanner

User Manual

Small Build   Great Capture

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1. Introduction

CR-Scan Ferret is a revolutionary 3D scanner that offers versatility and convenience. Using it with the mobile APP or desktop software, the scanner will provide you with a high-quality model under both indoor and outdoor lighting conditions. The scanner comes equipped with a special depth calculation chip developed by our company, reducing the computational requirements for both mobile phones and PCs. As a result, scanning becomes a smoother experience. Due to its small size and portability, this scanner is perfect for carrying around. It can quickly scan objects such as large and medium-sized furniture while completing figurine with high precision. The scanner is also equipped with a high-resolution RGB camera that supports color scanning. The resulting models can be directly used for 3D printing without any further processing.

2. Specification

Technology	Binocular Dual Camera Infrared Light
Working distance	150mm – 700mm
Single Capture Range	820mm x 560mm@700mm
Single- frame Precision	Up to 0.1mm
Minimum point distance/Resolution	0.16mm
Minimum scan volume	50mm×50mm×50mm
Alignment	Feature/color
Scanning Speed	Up to 30fps
Color Scanning	Yes
Color Camera Resolution	1080p@30fps
Applicable scenario	Indoor/ Outdoor scanning <30000Lux@ 0.4m
Light Source	Class1 NIR
Scanner Weight	105g
Scanner Dimensions	120*30*26mm
Data transmission	USB3.0 Type-C
Operating Systems	Windows 10/11 (64-bit), Android 10/11/12
Output Format	PLY, OBJ, STL
3D Printing Compatible	Yes

3. Packing List

Snail gimbal

Allen wrench

Mobile phone clip

USB cable for computer

Portable bag

CR-Scan Ferret

Rechargeable handle   USB cable for smartphone & rechargeable handle

4. Hardware Connection

Smart phone connection

A: CR-Scan Ferret

B: Android phone

C: Rechargeable handle

D1: USB Type-C

D2: USB Type-C

D3: USB Type-A

Make sure to connect the scanner, Android mobile phone and handle correctly. Showed as the picture above, D1, D2, D3 should be connected to the scanner, the mobile phone, and the handle respectively.

Computer Connection

CR-Scan Ferret can be driven directly by computer. Make sure the scanner is connected to a USB 3.0 or above port, because USB 2.0 will not supply sufficient operating current.

5. Software Installation

System Requirements

	Windows 10\11 (64-bit) Memory: ≥8G **Computer: USB3.0 , 8 gen i5 CPU or higher**	
	Android: ≥Android 10.0 Memory: ≥8G **Smartphone: USB3.0**	Software icon

Software&firmware link:
https://www.creality.com/pages/download-cr-scan-ferret   QR core

Recommended smartphone

Samsung	Google	Moto	Vivo	Nubia	One plus	OPPO
S21	Pixel 7 Pro	Razr 2	X90 pro+	redmagic 8 Pro	10 pro	Find X6 Pro
S21FE	Pixel 7	Edge 30 fusion	X90 pro	redmagic 8 Pro+		
S21 +	Pixel 6 Pro	Edge +	X80 pro			
S21 Ultra	Pixel 6					
S22	Pixel 5					
S22+						
S22Ultra						
S23						
S23+						
S23 Ultra						

6. Workflows

```
┌─────────────────────────┐
│         Start           │
│      Creality Scan      │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│        Connect          │
│ Connect the scanner     │
│    CR-Scan Ferret       │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│        New Scan         │
│ Adjust scan configuration│
└─────────────────────────┘
            │
            ▼
┌─────────────────────────────────────────┐
│                 Preview                  │
│      1.Aim at the scanning target.       │
│ 2.Adjust the brightness in IR Camera     │
│           (Default auto).                │
│ 3.Move the scanner to the "Perfect"      │
│              distance.                   │
└─────────────────────────────────────────┘
            │ Start
            ▼
┌─────────────────────────┐
│          Scan           │
│   Start/Pause Scanning. │
└─────────────────────────┘
            │ Complete Scanning / Next
            ▼
┌─────────────────────────┐
│      Optimization       │
│ Optimize scanned point  │
│         cloud           │
└─────────────────────────┘
            │ Next
            ▼
┌─────────────────────────┐
│          Mesh           │
│ Meshlization and generate│
│       the model         │
└─────────────────────────┘
            │ Next
            ▼
┌─────────────────────────┐
│     Color Mapping       │
│    Texture the model    │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│        Complete         │
│   Export/Share Model    │
└─────────────────────────┘
```

7. Guide for Scanning

Scan objects

In order to ensure model quality, the scan-suitable objects are divided to 5 types according to their dimensions shown as the table below.

Large objects>50cm	20cm<Medium object>50cm	Small objects<20cm	Face	Body

Feature type

○ **Geometry:**

This scanning mode is ideal for capturing objects with intricate geometric details and irregular shapes. However, it may not be well-suited for objects with many planes or circles. This mode is particularly recommended for scanning materials such as plaster portraits and handmade items.

○ **Texture:**

This scanning mode is best suited for objects with rich texture features and intricate color patterns. However, it may not be effective when scanning objects with solid colors or repetitive textures. It is highly recommended to use this mode when scanning objects such as tables with wood texture.

Texture mode is very useful because it can be used to scan various object when it is allowed to affix or draw markers on the surface of the objects.

It is not recommended to highlight reflective (metal or plated surface), translucent and transparent (glass cup, glasses) objects. Such scanning objects need to be dusted (liquid foundation, flour, dry

cleaning shampoo, developer) and then scanned. It is not recommended to scan objects that are easily deformed (such as soft bags, animals).

Not recommended object

High reflective	Transparent	Ductile
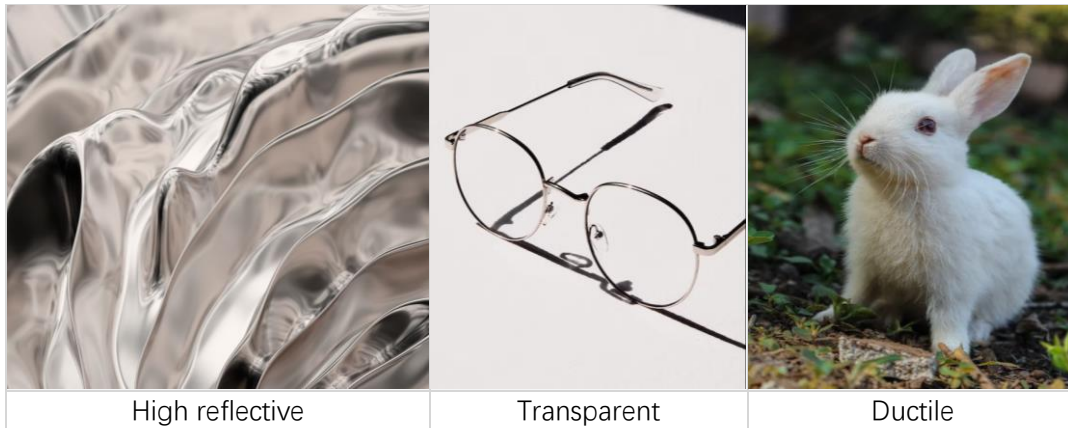
Optimization mode

- ○ **Fast:** Faster scanning, but the accuracy in this mode is relatively lower than with Hi-Quality scans.
- ○ **Hi-Quality:** Added to meet users' needs for higher-precision data capturing. In Hi-Quality mode, the processing time for point cloud fusion/mesh/texture operations will be relatively longer.

Color map

- ○ **Map/Color**: The final processed result of the model is attached with a color map(Creality Scan can only export color objects in the .PLY & .OBJ file formats).
- ○ **No map/No Color**: The final processed model appears as a solid color without any color information, only the shape information is captured.
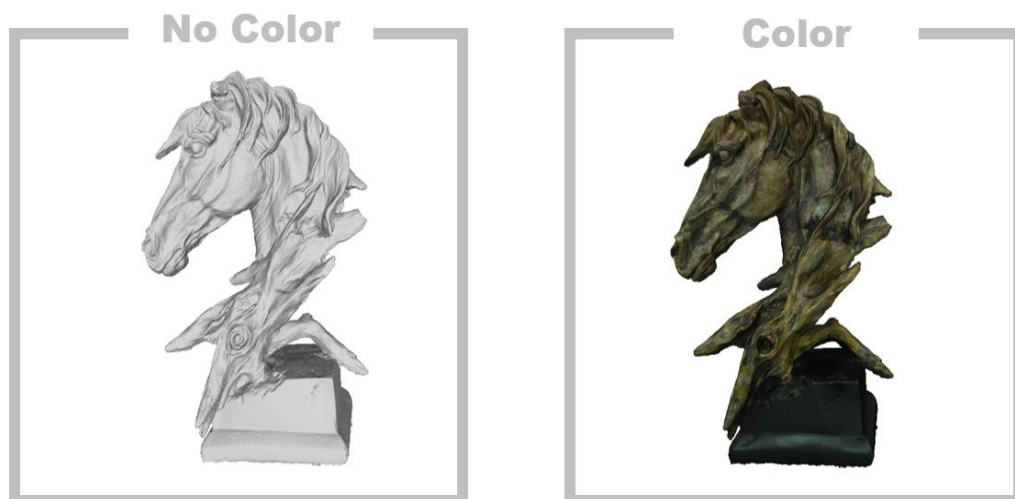
8.Guide for APP :

Home Page:
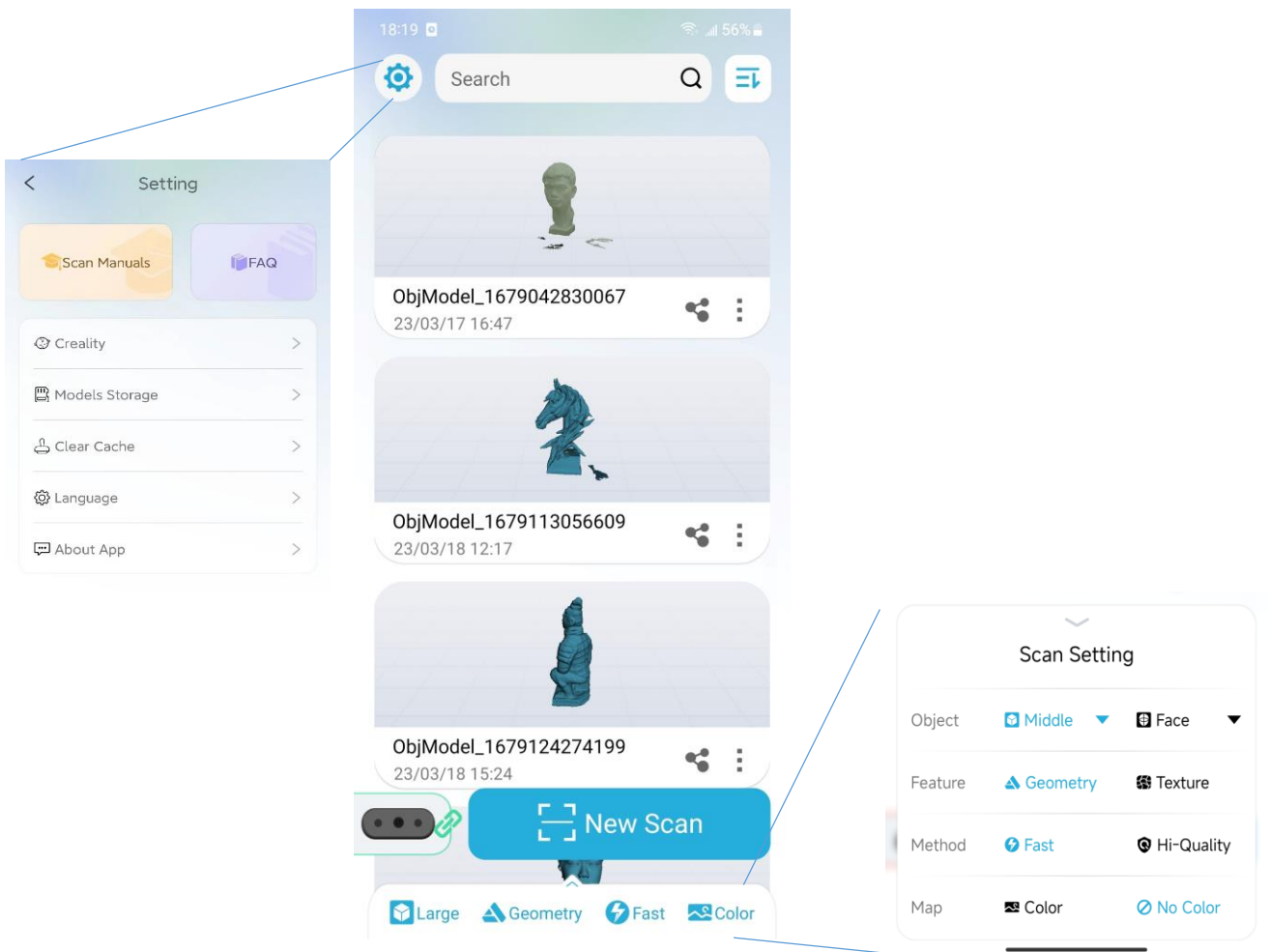
The main area of the home page displays a list of models scanned in history. The list shows the scan results of all completed optimization and subsequent steps.

Top Bar Functions:

● **Setting Button** : Setting Page Entry;

  In the setting page, information of scanner is delivered to help better utilization. Meanwhile, any question can be asked on Facebook when Creality icon is clicked.

● **Page Entry Search Box** : Used to retrieve the corresponding name of the model;

● **List Order Switch Button** : Used to switch the list order, which is divided into two types: from the latest to the earliest and from the earliest to the latest.

<u>Bottom Bar Functions:</u>

- **Device connection function** : Used to display the connection status of the scanner, with red indicating disconnection and green indicating a connected device. Users can click on this area to view the device's serial number.

- **Configuration Function :** In this area, users can access the scanning configuration options and view the current selection. Clicking on it will expand and show specific configurations for selection. Refer to the configuration description for more information.

- **Start Scanning Function** : Used to initiate scanning based on the parameters set in the scanning configuration item. Please ensure that the scanner is connected and has sufficient storage space before starting the scan.

Preview
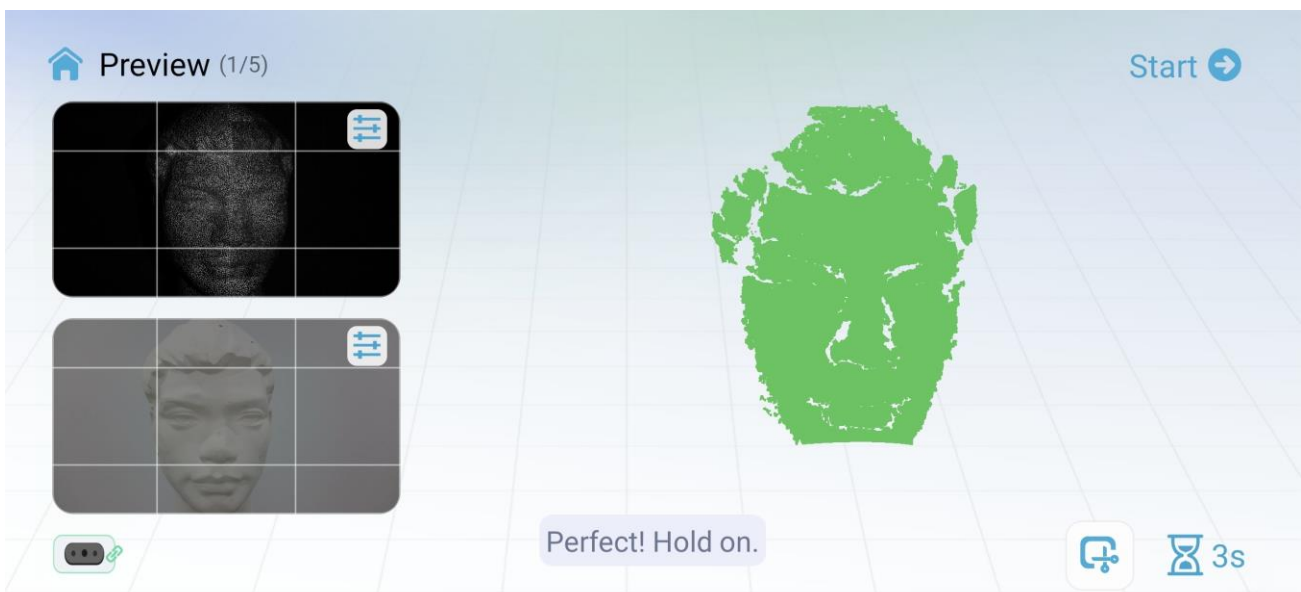
The preview phase mainly provides RGB images/depth images, IR images, and real-time point clouds for preview, alignment, and judgment of the current point cloud quality. The RGB/depth preview window and IR preview window provide nine squares for alignment of the scanner's field of view. It is recommended to keep the scanning portion in the center area of the preview window.

The IR preview window supports adjusting the IR exposure method (automatic/manual, default automatic). The exposure level of the IR image affects the integrity and quality of the point cloud. The red portion of the IR window indicates that the area is overexposed, and it is recommended to manually adjust the exposure pull down to prevent it from displaying red. The blue portion of the IR window indicates that the area is underexposed, and it is recommended to manually adjust the exposure pull up to prevent it from displaying blue. The adjustment effect can be viewed in combination with the RGB/depth preview window for depth changes. Generally speaking, the more complete the depth is on the scanned target, the better the quality of the point cloud is.

Overexposure

Normal exposure

Underexposure

The RGB/depth preview window supports adjusting the RGB exposure mode (automatic/manual, default automatic). If you find that RGB is overexposed or too dark, you can appropriately adjust the exposure level. This preview window also supports the display of depth images, which can be superimposed on RGB images by adjusting the depth translucency.

Depth diagram
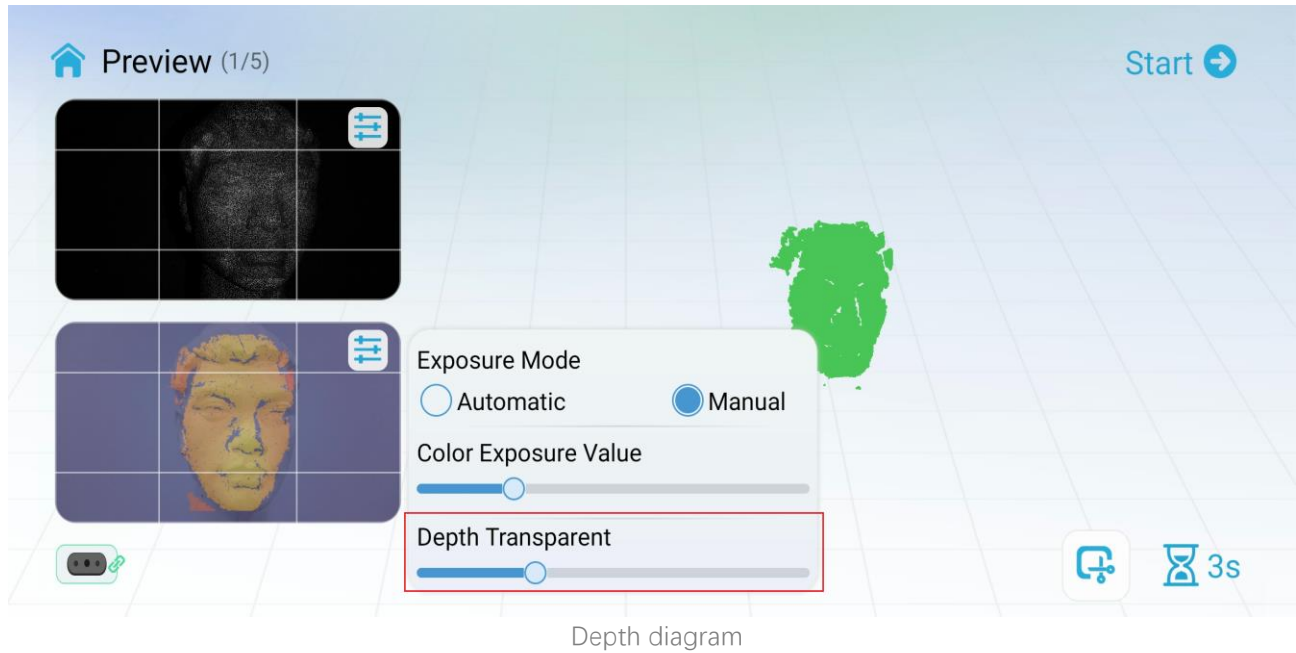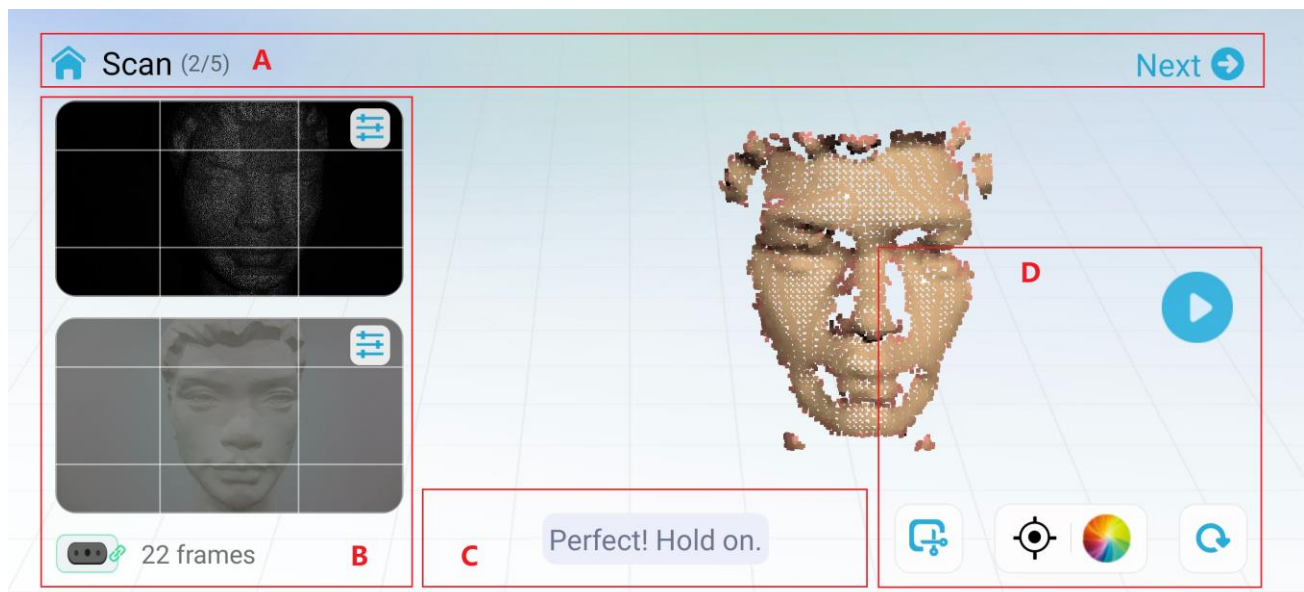
Scanning

The main body of the page is a 3D rendering area, and the scanning phase is used to display a point cloud. The point cloud is divided into two parts, one is the current frame, and the other is the scanned point cloud. The current frame in red indicates poor point cloud quality, and the current frame in green indicates successful tracking and registration. The scanned point cloud is displayed in a quality chromatographic mode by default.

When displayed in orange, it indicates that the scanned part is of poor quality and requires repeated scanning. When displayed in green, it indicates that the scanned part is of good quality and meets the quality requirements for generating the model.

The 3D rendering area supports interaction during the pause phase, and its interaction methods are as follows:

Single finger rotation	Two-finger press and move (with haptic feedback)	Two-finger zoom in/out

Area A

This section mainly displays the current process stage. Click Next to proceed to the next stage of processing.

Home button, used to leave the scanning process and return to the home page。

Area B mainly displays the preview area of scanning.

This section is the same as the preview stage, and includes an IR preview window (above) and an RGB/depth preview window (below). See the preview chapter for details of its configuration items.

 : Indicating the device connection status, cannot be clicked.

Area C

Reminder area, displaying guidance that includes using distance reminders, keeping the scanner scanning at the reminder "Perfect".

Area D mainly displays the control area of scanning.

/ : Click to start (continue) / pause scanning;

 : Refresh button, click to clear all the scanned point cloud and restart a new scan.

 : Back to the right button, click to initialize the object rendering scale and display it in the center.

 / / : The display mode switch button can be switched to three modes: solid color display mode, color display mode (map needs to set as color), and quality mode. Click to switch the current mode, and the quality spectrum mode is default.

 / : Planar-clipped state/planar state: The current frame point cloud in the Planar-clipped state will be removed from the plane, that is, the background plane will not enter the scanned point cloud during scanning. It can be used to scan small and medium-sized objects placed on a large plane. The planar state will not remove the background plane.

Other scanning suggestions

How to judge whether the scan is sufficient:

● Judge whether the scanning target is complete, and conduct multi-angle scanning

● Judge whether the color of the scanned point cloud has changed from red to green as a whole based on the quality spectrum mode
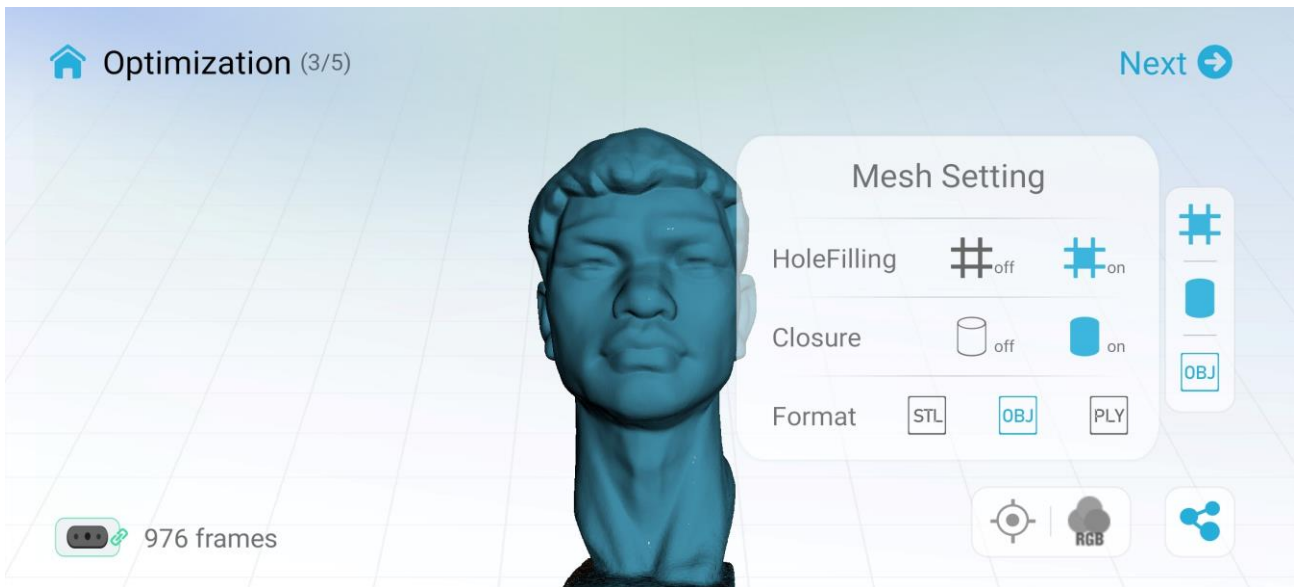Once satisfied, you can click Next to perform point cloud optimization.
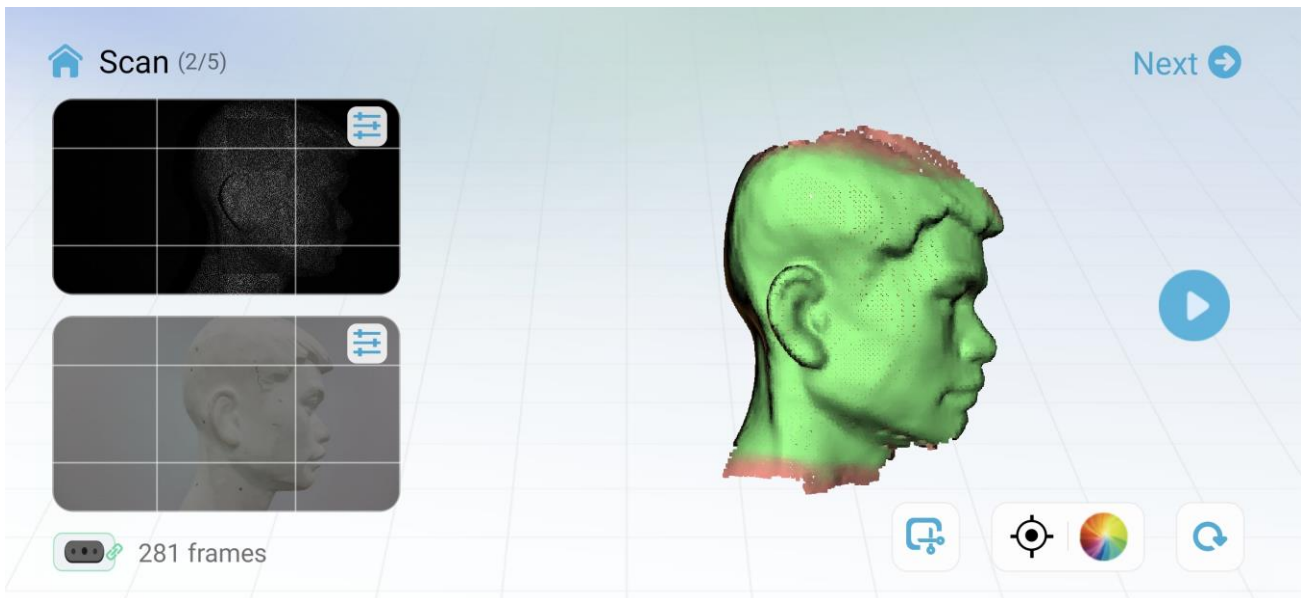
Good scanning indicated by Quality spectrum
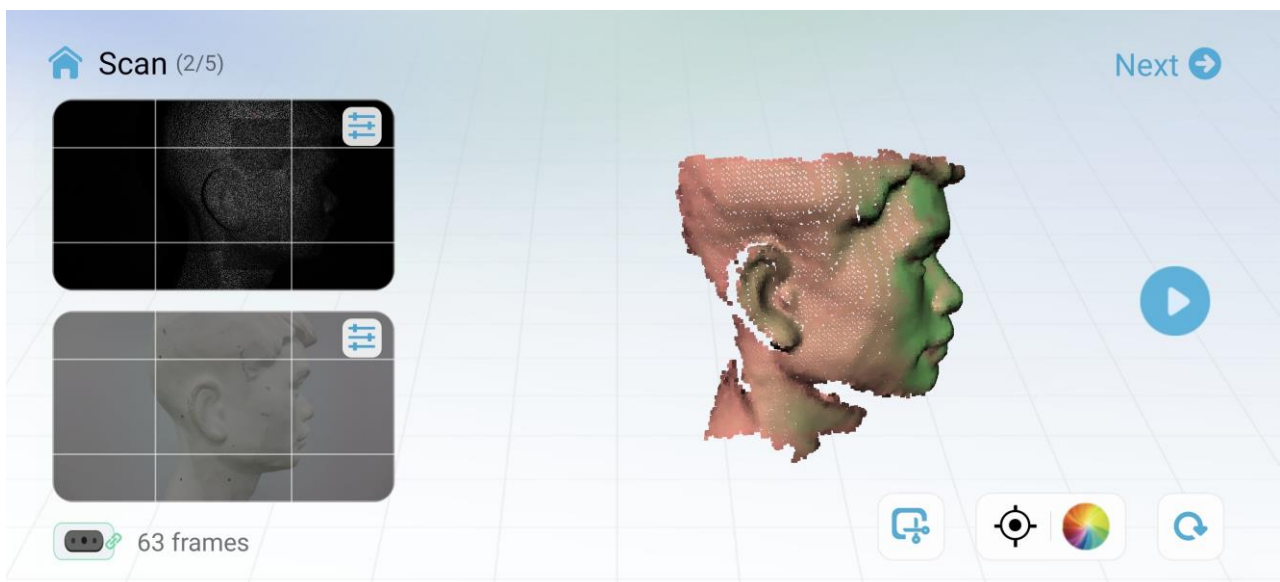
Poor scanning indicated by Quality spectrum

Optimization

This stage is used to optimize scanned point clouds and display them. Point cloud optimization and subsequent stages automatically save model related results.

The 3D rendering area is used to display the model. The display mode supports solid color display mode, and the delivery method is the same as described in the scanning section.

 : Share button. After point cloud optimization and subsequent steps, the scanning results can be shared.

The inset picture above shows the configuration items for the next meshing step.

If Hole filling is on, the small holes will be filled with neighboring data in order to ensure the completeness of the model.

If Closure is on, the meshed model will be enclosed.

The meshed model can be saved as your choice in formats: stl, obj, ply.

Mesh
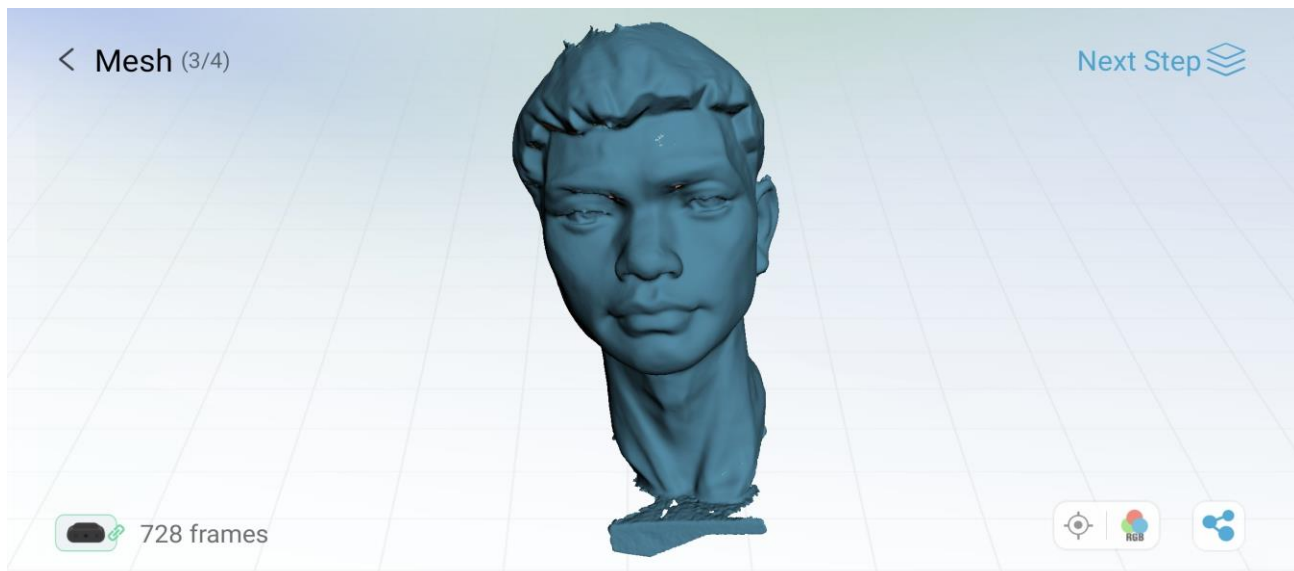
This stage is used to demonstrate the model after meshing. If use choose no color mode, this stage is the last stage of the process.

Color Mapping
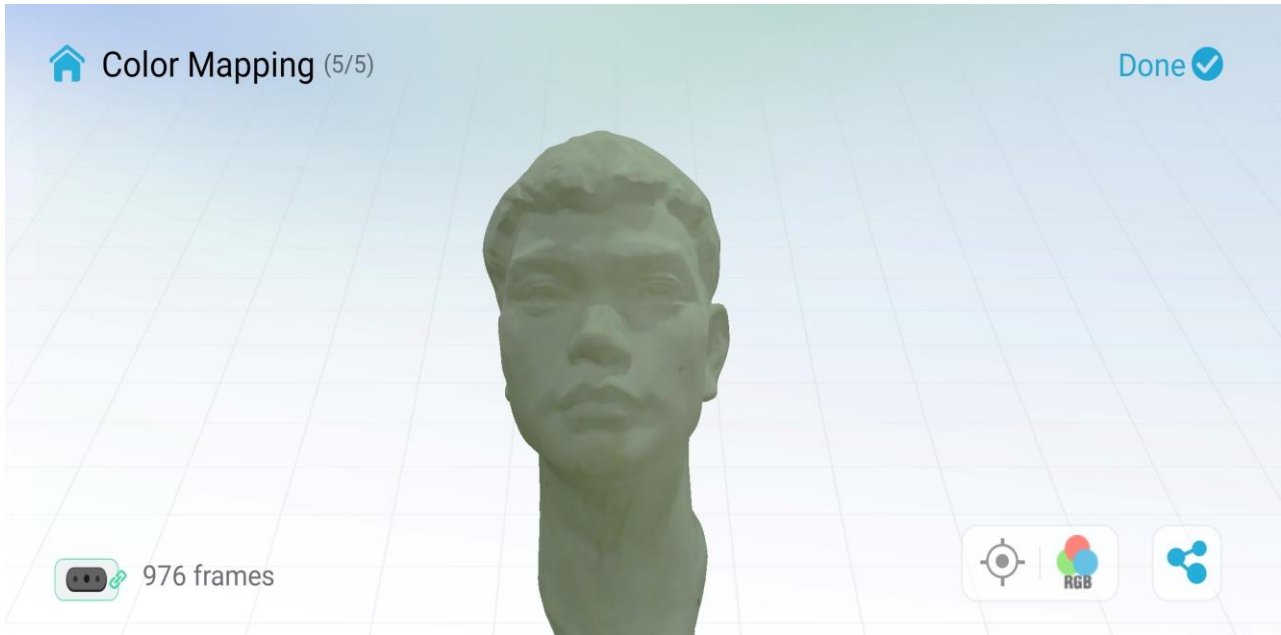
The last step of the scanning process is the generation and display of the mapped model.
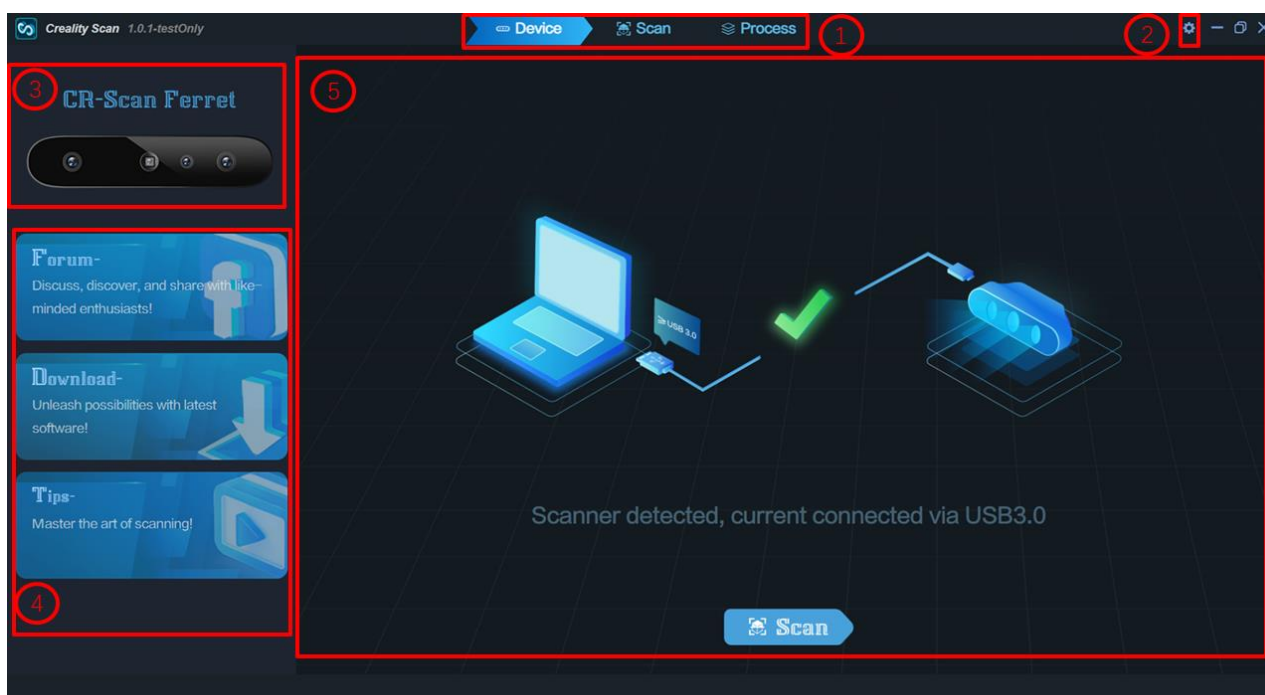
9. Guide for PC Software

Guide Popup
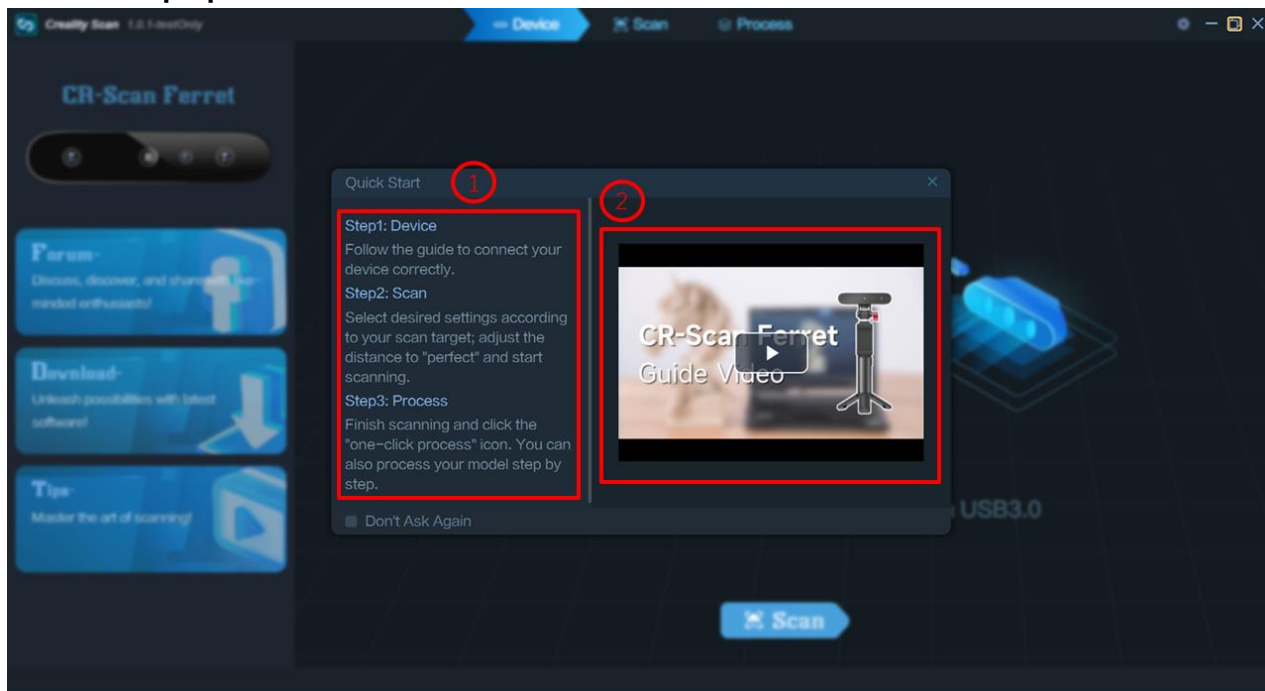
① **Guide Instruction:** Display the guidance in the form of words.
② **Guide Video:** Display the guidance through a video.

Confirm "Device is connected"

After opening Creality Scan, confirm the device connection status:

If the device is connected successfully, the popup displays: Device is connected. Do you want to start scanning? Otherwise, please check the connection.

When launch the Creality Scan software, the device UI is shown to users.

① **Main Menu:** The 'Device' command display the information of the scanner. The 'Scan' command brings up the Scan UI. The 'Process' command brings up the Process UI.

② **System Setting:** Specify language; link to this manual online.

③ Display figures of the scanner.

④ Display some websites.

⑤ Guide users to connect the scanner to their computers correctly through the animation shown on this region.

Icon [Scan] : Start scanning.

Setting before scan

Once connected successfully, the device is ready to scan. Press "Yes" on popup or [Scan] on Device page to enter the Project setting page. Configure the desired operational characteristics as described in Section 3. Project settting of the UI Introduction.
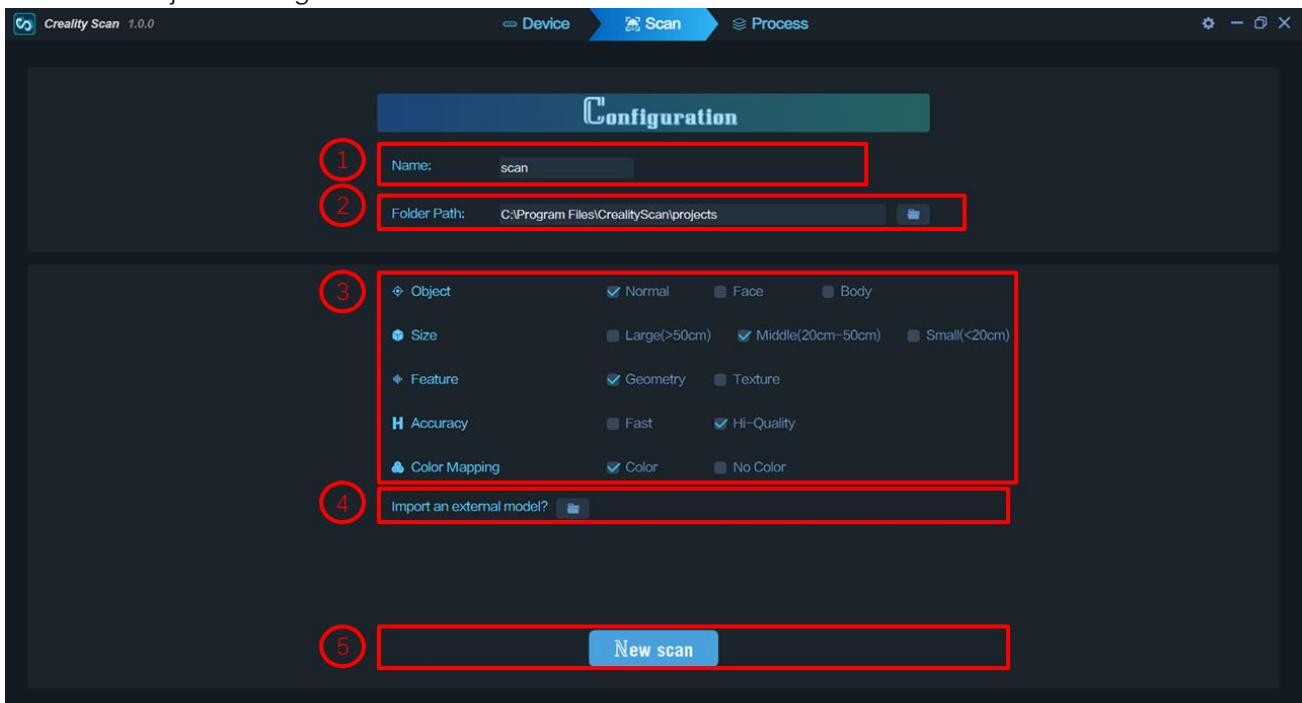
① **Name:** Display the default name of the model to be created. Rename it as needed.

② **Folder Path:** Display the file folder of the model to be saved. Change as needed.
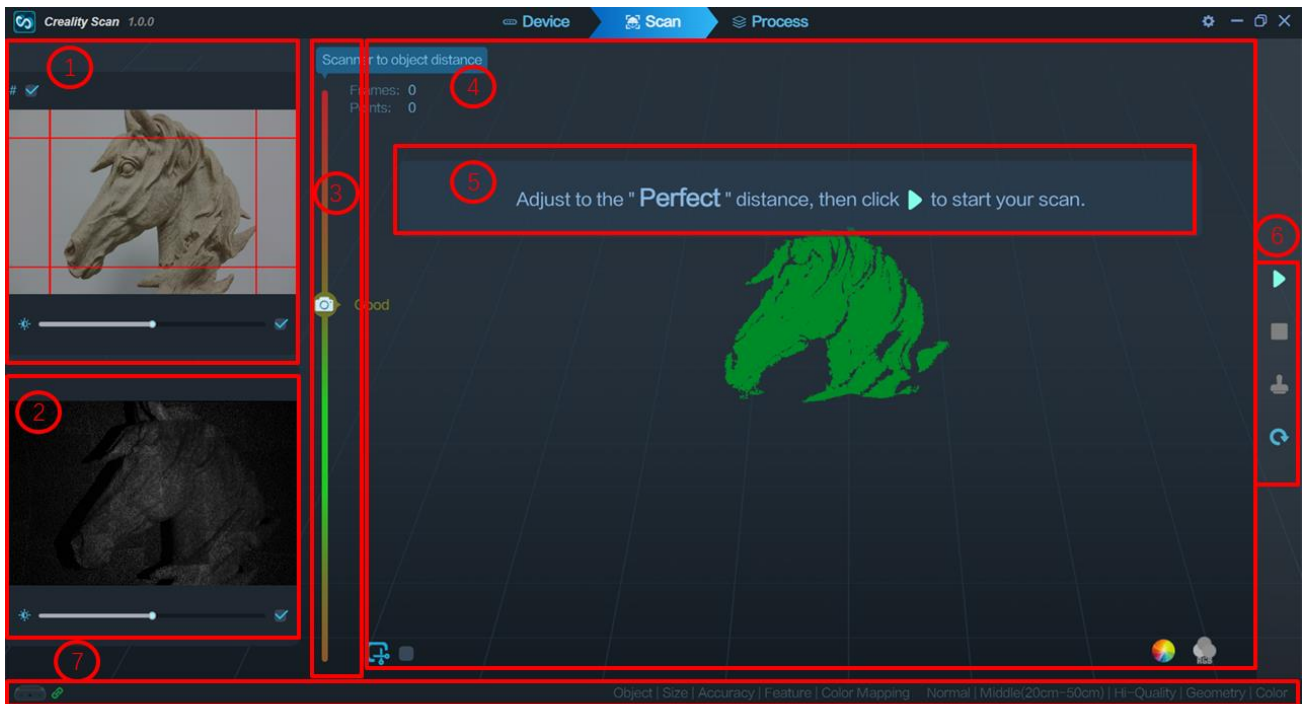
③ **Project Settings**

④ **Import an external model:** Import a 3D model in .PLY, .OBJ or .STL formats into Creality Scan to continue scanning and capture more details.

Icon [folder] : Select file.

⑤ Icon [New scan] : Start a new scan.

Preview

After specifying the Mode, Optimization, Depth, Feature Texture options, press **New scan** to enter the scanning page. The left area of the 3D Model Preview window shows the distance. Place the scanner at an **"Perfect"** distance from the object and try to maintain it during scanning.

When click the **New scan** on the Project Setting UI, the scan UI is shown to users.

① **RGB Camera:** Display the image captured by the RGB Texture camera.

Icon **#** : This option aids in positioning the object to be scanned so that the cameras can see it.

Icon **☀** : Brightness can be manually adjusted for best results.

② **IR Camera:** Display the IR image captured with the current exposure setting.

Icon **☀** : Brightness can be manually adjusted for best results (the areas not displayed in red or blue). Although the software can automatically adjust to find the appropriate setting, remember to adjust manually to prevent exposure variations that may interfere with data capture.

③ **Scanning distance:** Place the scanner's distance to the object so that it is in the Perfect zone to ensure scanning accuracy. Adjust the optimal distance according to the prompt.

④ **3D Model Preview Window:** Display the 3D model data that will be captured when scanning starts or all of the data that has been captured after scanning has started. The view of the model may be dragged or zoomed in the 3D Model preview area by the mouse (Left Mouse Button: Rotate the model; Wheel: Zoom in/out).

Icon : Clip the point cloud on a plane during scanning.

Icon **Complete** : Stop the current scanning project and processing the point clouds on the Process UI.

⑤ **Prompt:** Display some prompts during scanning.

⑥ **Function Buttons:**

Icon ▶ / ⏸ : Start / pause scanning.

Icon ⏹ : Stop the current scanning project and processing the point clouds on the Process UI.

Icon ⟟ : Deleting all the point clouds which have been stored.

Icon ↻ : Deleting the entire project to start over from Project Setting.

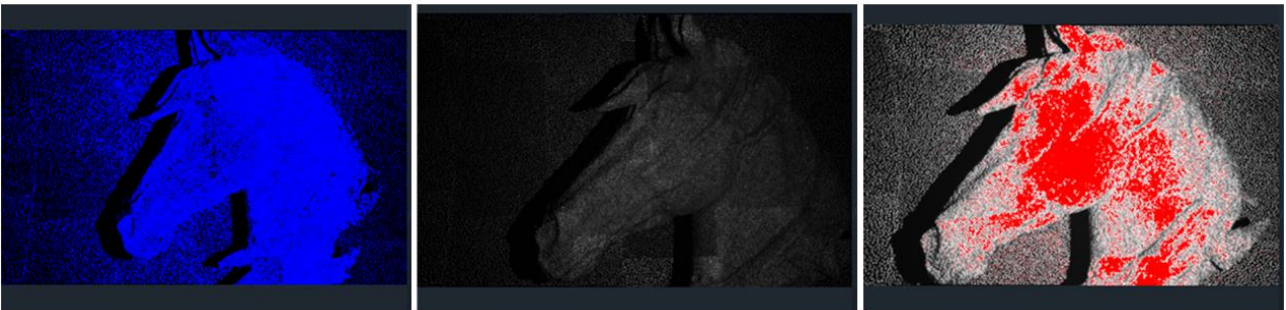⑦ **Status Bar:** Display the device connection and project settings.

Adjust the brightness in Depth Camera

Adjust the Sun Icon ☀ ━━━━●━━━━ on the smaller display. If available, try Auto first, but switch back to Manual before capturing data to prevent lockups.

Under-exposure   Perfect

Over-exposure

Start or Pause Scanning

Click ▶/⏸ to Start/Pause scan. During scanning, please make sure the point cloud in the Depth Camera window is adequate and the distance bar remains "Perfect". Move the scanner slowly and deliberately during scanning while keeping a relatively fixed distance.

After clicking Pause, it is possible to resume scanning (say, after repositioning either the scanner or the object being scanned).

Clip Plane

Click ⊡ icon to clip the plane which may bring bad influence during scanning . This function is highly recommended when you scan a small target on the table.

Complete Scanning

Click 🌈 to display the quality map. You should scan your target adequately until the whole quality map turns green.
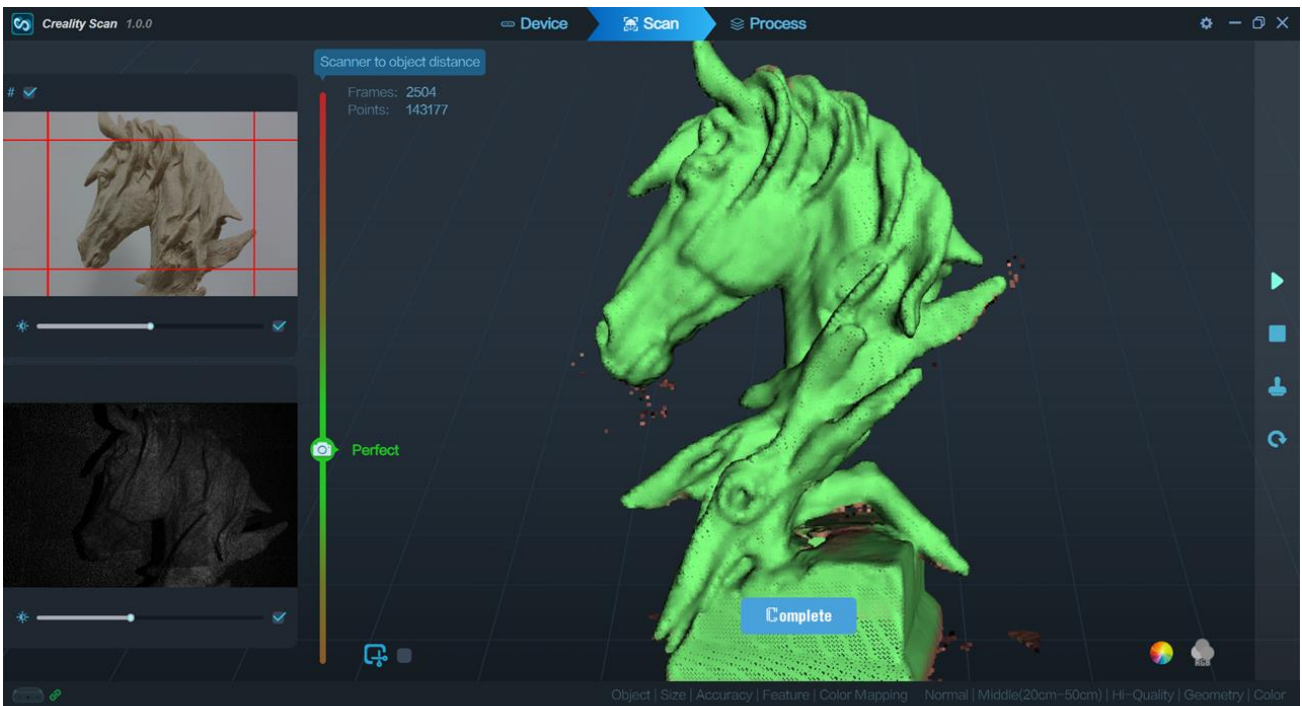
If the point cloud is desired, click   Complete icon and "Yes" button in the popup to complete scanning. After this, users will enter the Process page to further process the data.
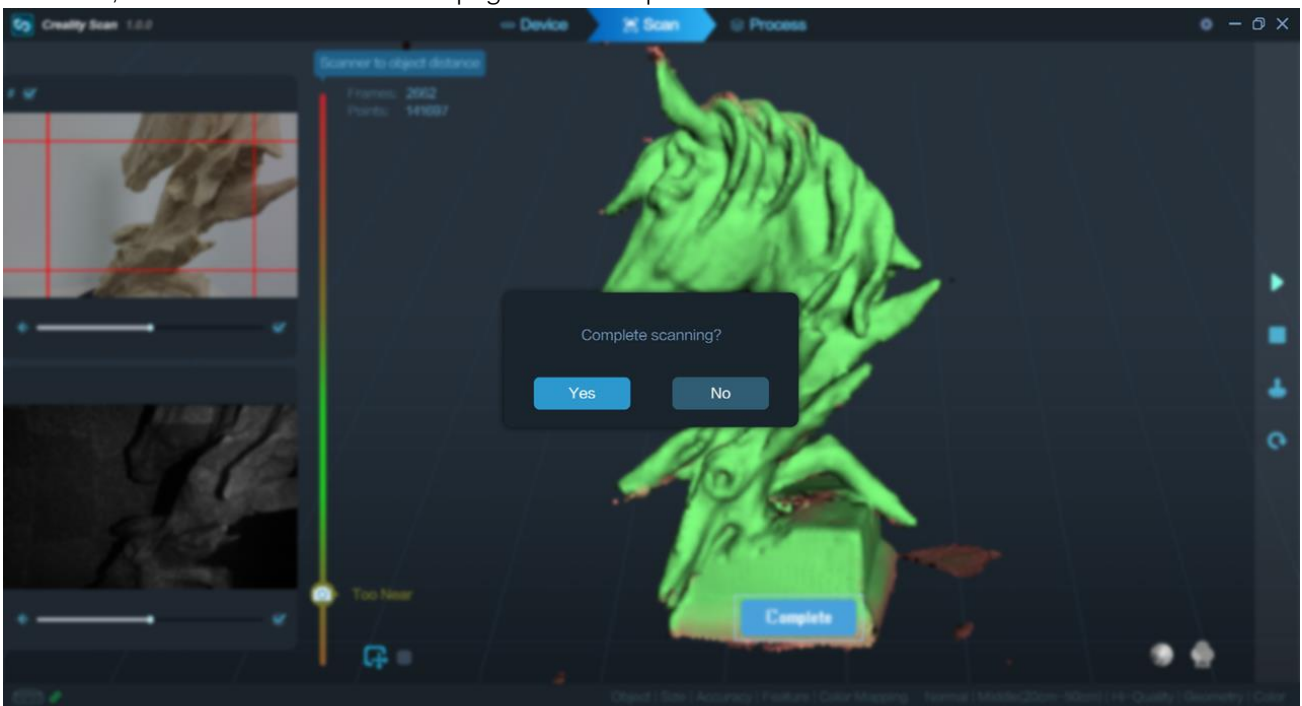
Fuse Point Cloud

The next step is to fuse the scanned 3D point clouds to obtain a better point cloud model. There are two ways to achieve this function. In the automatic mode, the default parameters are used for point cloud fusion optimization. In the manual mode, you can configure the desired resolution of the point cloud (i.e. dot pitch). The smaller the dot pitch, the better the detail of the 3D model.
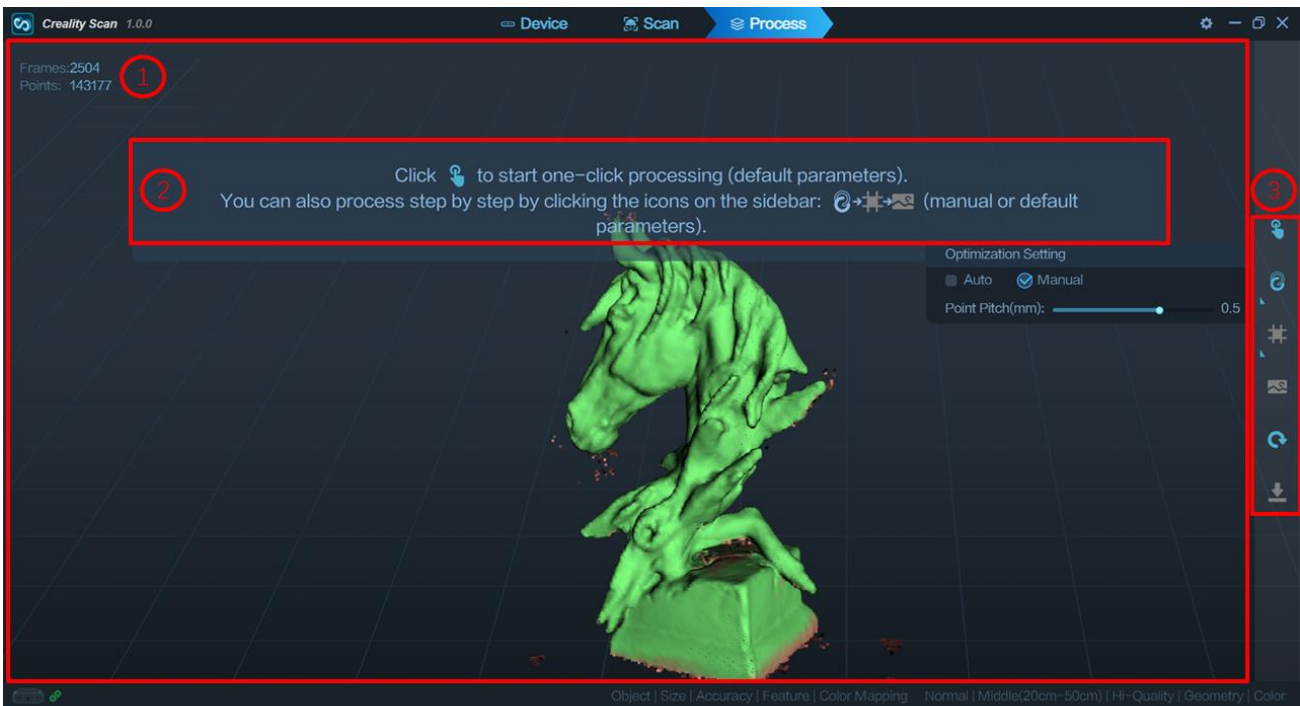
① **3D Model Preview Window:** Display the 3D model data that will be captured when scanning starts or all of the data that has been captured after scanning has started. The view of the model may be dragged or zoomed in the 3D Model preview area by the mouse (Left Mouse Button: Rotate the model; Wheel: Zoom in/out).

② **Prompt:** Display some prompts during processing.

③ **Function Buttons:**

Icon One-Click-Processing. One click to complete all processing.

Icon Point cloud optimization. Integrate scanned point clouds to obtain high-quality point cloud models. There are two ways to do this. Automatic mode uses default parameters for point cloud fusion optimization. Manual mode allows you to configure parameters by yourself.

Icon Meshing. Convert the scanned 3D point cloud data into triangles. There are two ways to achieve this function. In the automatic mode, nets are constructed with the default parameters. In the manual mode, you can configure the parameters yourself. If "No Color" is selected when the Scan Mode is defined, the model only consists of point cloud and mesh information. If the "Color" option is selected, then the model will also contain the color information of each point.

Icon Texturing. It will generate a UV map for coloring the mesh model.

Icon Clear scanning. It will clear all the scanned data to re-start a new scanning.

Icon Export the completed 3D model. Format. PLY, .OBJ & .STL, are supported. The point cloud will be exported simultaneously when the mesh file is exported.

Meshing

Click to start converting the scanned point cloud data into a mesh. There are two ways to achieve this function. In the automatic mode, mesh model is constructed with the default parameters. In the manual mode, you can configure the parameters yourself. You can set the number of the desired faces, the level of Denoise,

whether to fill holes, and whether to get a closed model. The higher the level of Denoise, the smoother the mesh. The hole filling mode automatically fills the holes in the model. Closed mode automatically generates a geometric closed 3D model for a model with missing surfaces. If you select no color when defining the scan mode, the model consists of only point clouds and mesh information. If the color option is selected, the model will also contain color information for each point.
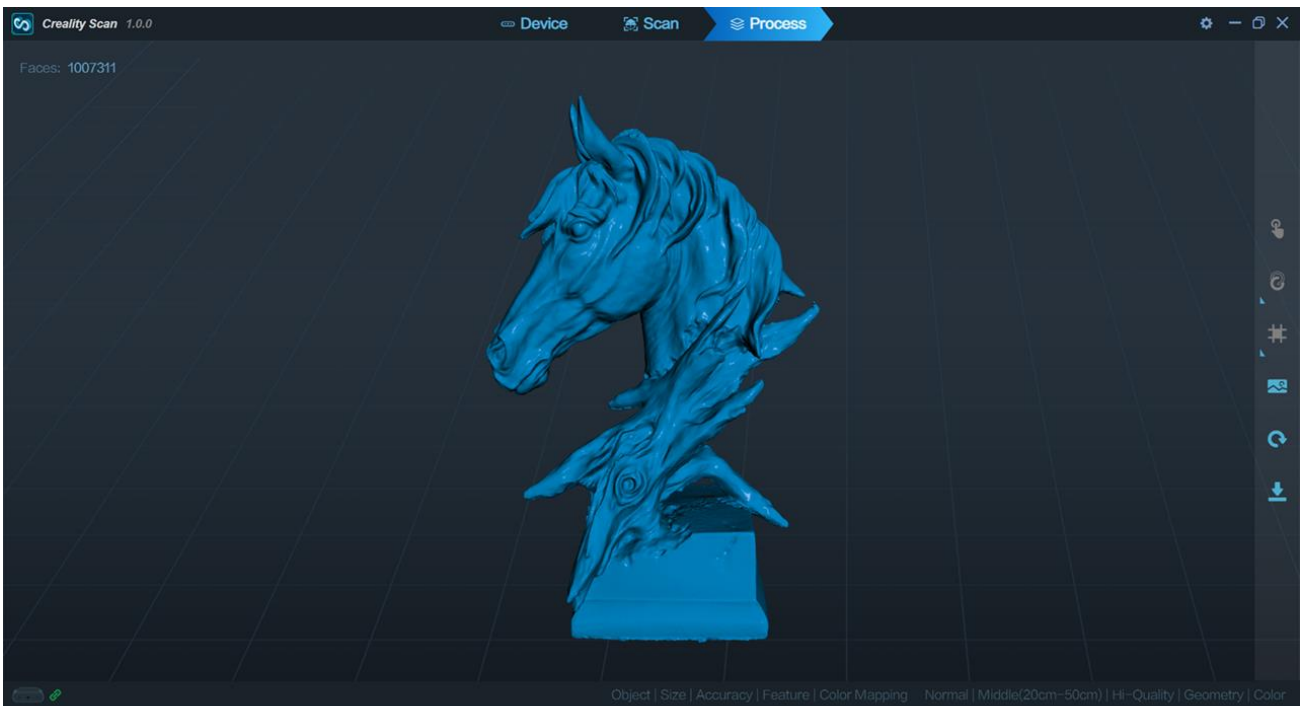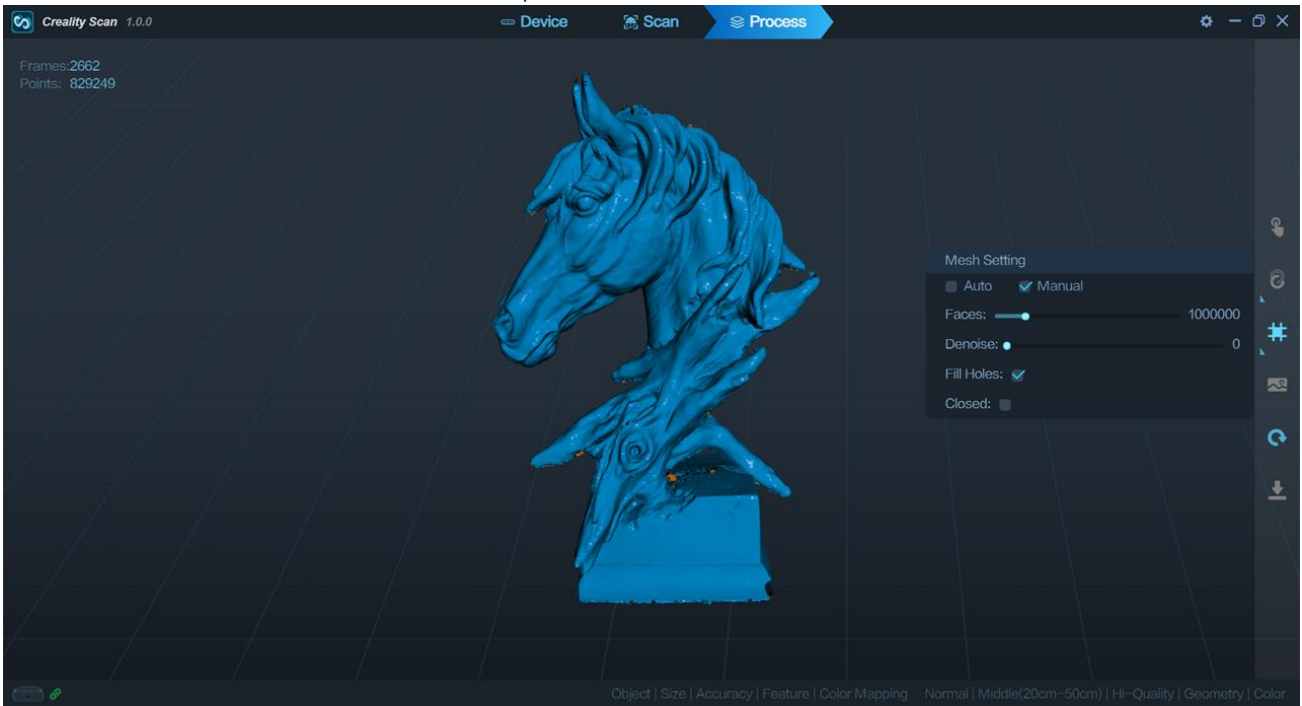
Texturing

The Texture function only applies to scan mode with the "Color" option selected (see Project setting on p. 9).

Click to apply texture to the model.

Export

Click to export the 3D model. Select a file name and. a file format (.PLY, .OBJ & .STL, are supported).

10. Tips

1. Scan targets
Suitable object: face, parts, sculpture, cultural relic, garage kit, toy, shoes, body.
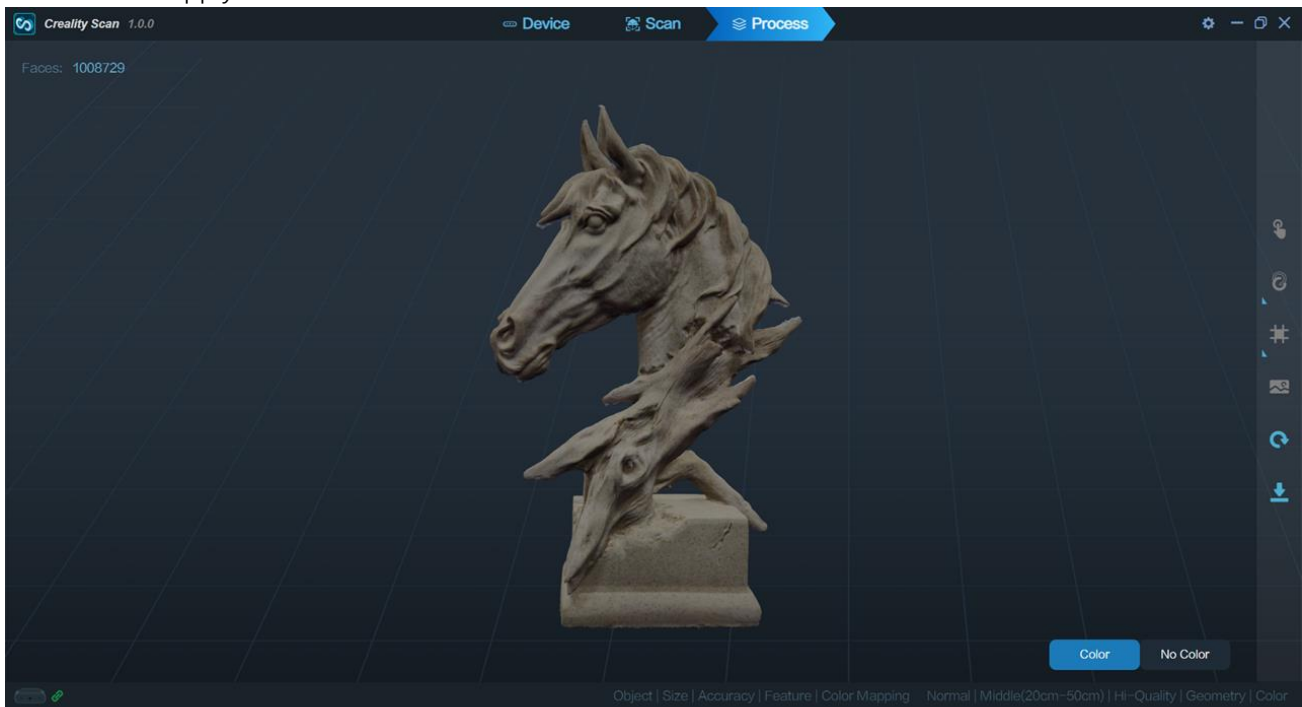Unsuitable object: superlarge object such as wall, room; micro parts; jewelry; ductile objects;
Specail treatment objects: transparent objects, metals,high reflective objects

2. Target size
Typical size: 5cm×5cm×5cm ~ 150cm×150cm×150cm
If you are experienced in scanning, you can challenge scanning larger or smaller objects.

3. Scan distance
Move the scanner at a perfect distance to your target according to the prompt.

4. Scan background
Less objects are expected in the view of the depth camera except your target.

5. Tracking lost
When tracking lost, aim the scanner at the scanned part of the target according to the prompt.

6. Exposure

If you want to obtain a better model, you should adjust the exposure yourself to avoid red or blue part appearing in IR image which means overexposure or underexposure respectively.

7. How to obtain a high quality model?

Hi-Quality mode should be chosen;

Move your hand or rotate the dial slowly during scanning;

Keep perfect distance according to the prompt during scanning;

Adjust the exposure yourself to avoid red or blue part appearing in IR image;

Keep scanning until all the parts you want are adequately scanned (the quality map turns green in quality mode);

Set smaller resolution when optimize the point cloud.

11. FAQs

1. Can the scanner be powered directly by a mobile phone, without using a charging handle?

If the mobile phone supports USB3.0 Type-C port, then it can power the scanner directly. However, this consumes a lot of power and we recommend using the charging handle for a stable power supply.

2. How to avoid tracking loss?

Return the scanner to the previous correct position and hold on for 2s to retrieve the image.

3. What is the scanning frame rate of the scanner?

The scanner provides depth images of 30fps, supports a scanning frequency of 30 fps theoretically. However, the actual scanning rate depends on the calculation power of the mobile phone or PC involved in the process. In practice, the scanning frame rate can be lower than 30 fps. We recommend using a device with high calculation power to achieve optimal results.

4. What system configuration is recommended for the scanner?

For mobile phones, it is recommended to use smart phones with USB3.0 interface and running memory of more than 8G, such as Samsung S22, S23, etc. For computers, it is recommended to use i5 or above with USB3.0 interface.

5. Does CR-Scan support USB2.0?

The scanner supports USB2.0, and the scanning frame rate will be limited by the lower data transmission rate. In order to adapt to USB2.0, the scanning accuracy will also be reduced.

6. How long can the charging handle support continuous scanning?

It can support more than two hours of continuous scanning by directly using the charging handle. Generally speaking, the scanning time of small and medium-sized objects is within 5min, that is, the charging handle can support 20 to 30 small and medium-sized objects.

7. How to restore the connection when the mobile phone scanner is disconnected?

Plug the USB cable on the handle of the rechargeable battery again.

8. Some Android phones show disconnection when they are disconnected from the scanner for a certain period of time. How to restore the connection?

If the device is disconnected for more than a certain time (for example, 10 minutes), some Android systems will automatically turn off the OTG connection, and the device status is always offline. The device can be connected only after the OTG switch is turned on in the Android system.

9. What are the influences of scanning effect?

① The model itself is too thin or too narrow with holes. There are reflective and transparent parts on the model. ② If there are other objects around during preview, remove the obstacles and rescan.

10. What are the limitation of scanning frame rate?

① The configuration of computers and mobile phones is too low, ② USB3.0 interface is recommended.

11.What do we do if "few point clouds" is showed?

  If the exposure time is too long or too short, you need to cancel the automatic exposure and manually adjust the exposure time.

12. The USB2.0 is detected while USB3.0 was connected.

Usb3.0 is compatible with USB2.0 and has four pins in common. If the usb3.0 is plugged in slowly, the four common pins are detected before the additional pins of usb3.0, the PC or smartphone will recognize the connection as usb2.0. The solution is to plug in usb3.0 quickly again.

13.How to deal with the warning "Invalid data" ?

    If the "Invalid data" warning constantly appear, please check the scan objects setting. While the medium objects are being scanned on a turntable and large objects option have been chosen, the scanner will give the warning. We suggest you resan the target using medium objects option and aim the scanner at the prominent part of the target texture or slow down the speed of scanning.