Innovative Technology

INTELLIGENCE IN VALIDATION

ICU

USER GUIDE

Document Name:	ICU USER GUIDE
Document Version:	1.3
Date of Release:	27th August 2020
Version	*Amendment*
1.1	Updated **Control Out** electrical characteristics
1.2	Mounting Instructions Added, Section 6.0 Updated 16Way 'Serial' pinout
1.3	Added recommendation to restart device in red box at end of section 1.1.1 Removed 1.2.2 – Adding IP cameras Added section 2.1 – Powering Up ICU Device Added 3.1.1 – Adding a Mask Action Inserted 7.0 Using Customer local application (REST API)

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1 REGISTERING YOUR DEVICE

1.1 Overview

To register your ICU device, you must log on to the ICU device and register that ICU device to your user account. You logon to the ICU device via the network connection.

1.1.1 Logging onto the ICU device

To log on to the device you must plug the ICU device into the network and find the IP address of the device.

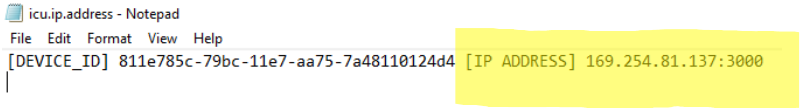
1. Insert the USB key and Ethernet cable. Power up the unit

2. Remove USB once blue light shows on ICU

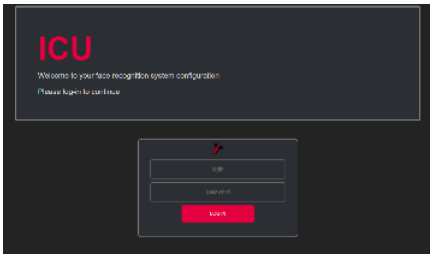
3. Insert USB into PC and open the new text file

icu.ip.address

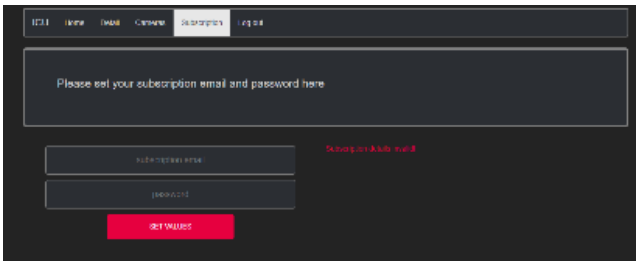
4. Type the IP address into any browser (Google Chrome is recommended)



5. To access your device, enter:
   Login: admin Password: admin123



6. You will now be prompted to enter your account details. Enter your details as supplied by Innovative Technology.



You have now successfully registered your new ICU to your online account.

It is recommended you restart the device after plugging in your camera

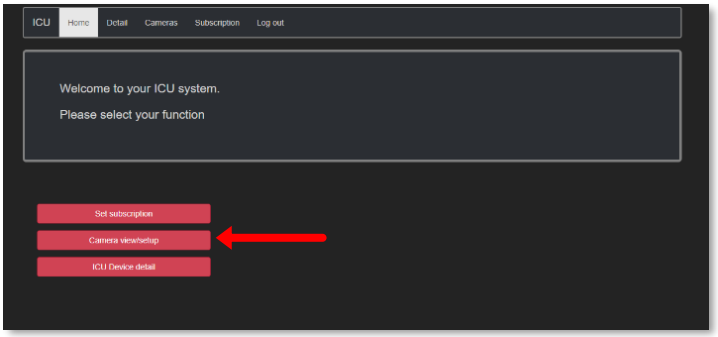
1.2 Setting up your camera(s)

USB and IP cameras can be use with the ICU Device

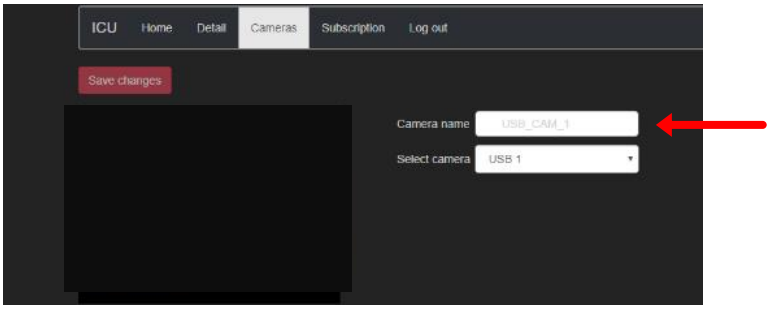
1.2.1 USB Cameras

1. Plug USB camera into either USB port

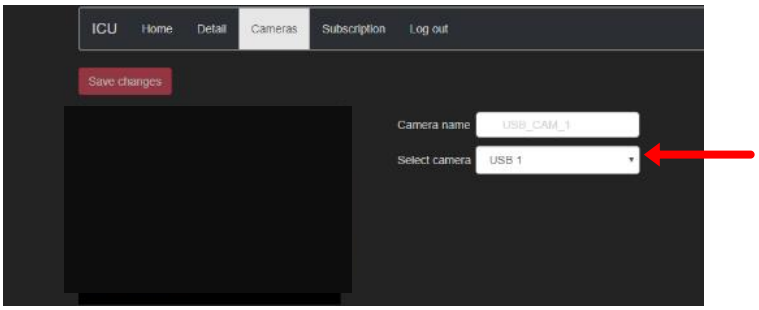
2. Click 'Camera view/setup'.
   This will open the camera configuration page



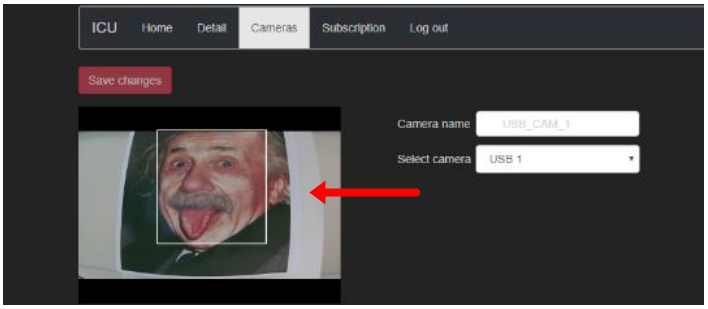
3. Enter Camera Name
   This name will refer to this camera throughout your account



4. Select USB input



5. Once connected you will see a live view from your camera



You can connect 2 cameras per ICU device

Now you have registered your device and installed your cameras.
Next is to login to your on-line account and configure your unit.

2 CONFIGURING YOUR DEVICE

2.1 Power up your ICU Device

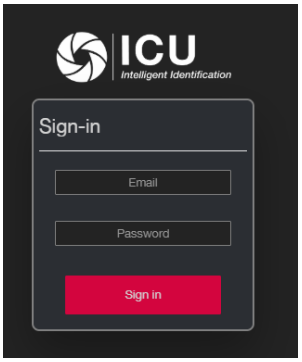
b) Insert Ethernet cable and USB Camera

a) Insert Power cable. When LED turns blue Device is powered up (approx. 60s)

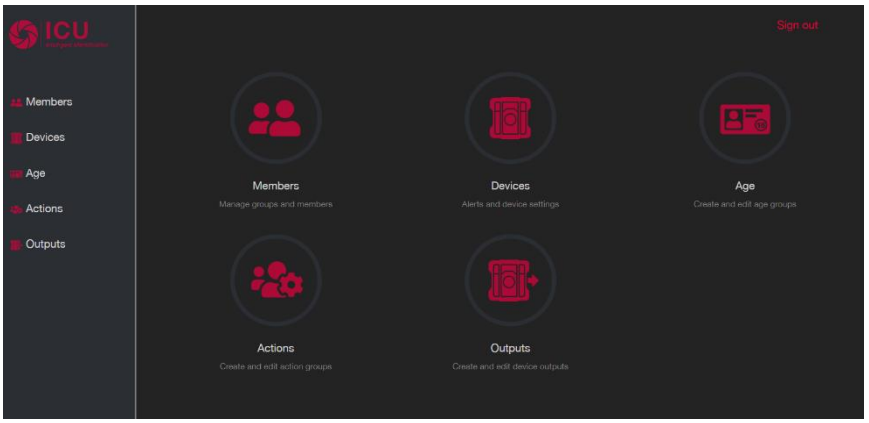
2.2 Logging onto your account

1. Login to your on-line account to configure your unit(s)

Web address: https://icu.innovative-technology.com/



2. Enter your email and password as provided by ITL – this will open your ICU dashboard



Please ensure your ICU Device is connect to Network so any change can be synced with the Device

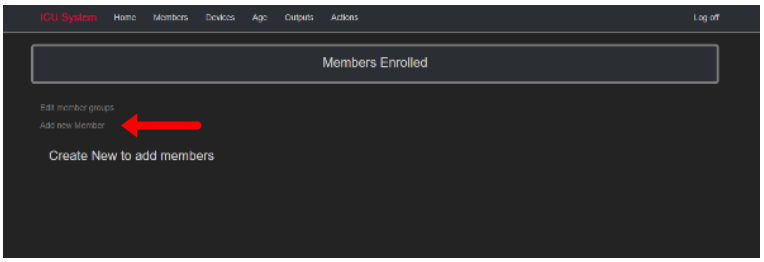
2.3 Members

Members are faces which can be added to your account. Once added to your account these Members will be shared with all ICU Devices registered with your account

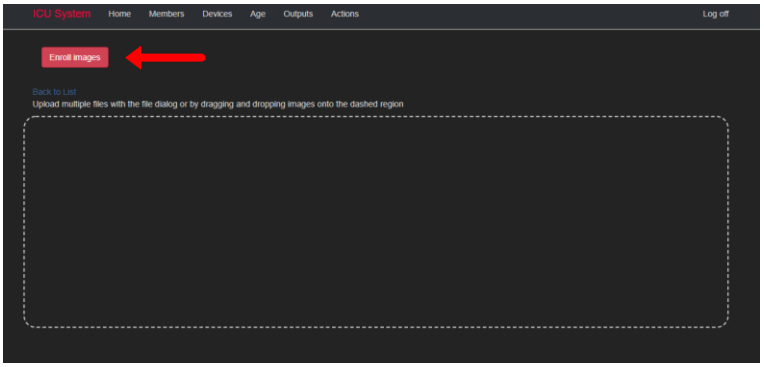
2.3.1 Adding Members

1. Click on Members

2. Click on Add New Member

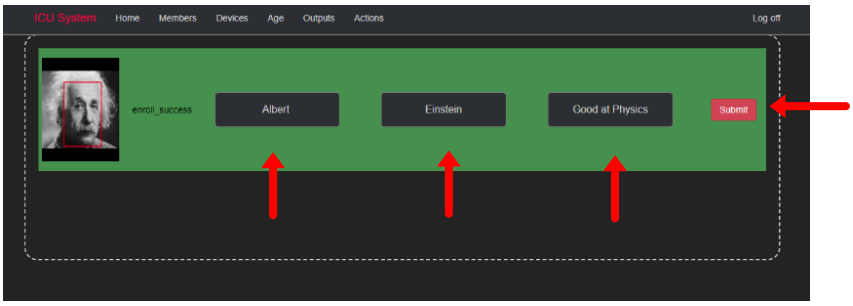


3. Simply drag and drop single or multiple image files into the dashed area. Click on Enroll Members to add each face



Your images will be automatically checked and saved to optimal format

4. Enter the details for the member
   Click on submit



You have now added member(s) to your account.

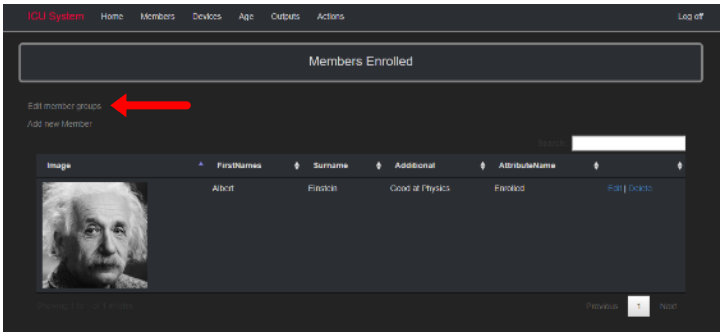
Next step is to create Groups and add members to specific Groups

2.4 Groups

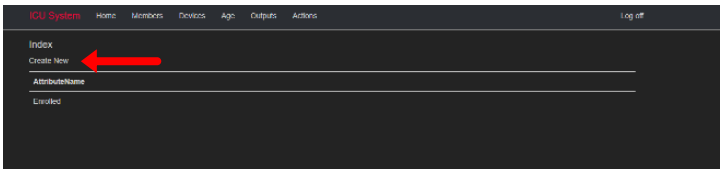
Groups are a collection of Members. Once you have populated your Groups with your Members, specific Actions can be defined

2.4.1 Creating a Group

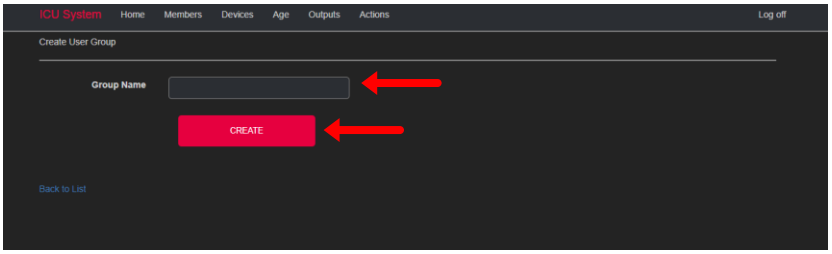
1. Click Edit Member Groups



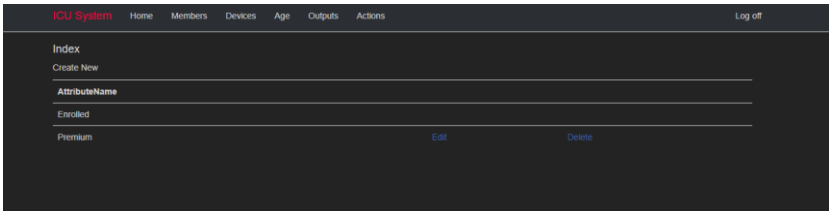
2. Click Create New



3. Enter Group Name
   Click Create



All your created Groups will now appear in the table

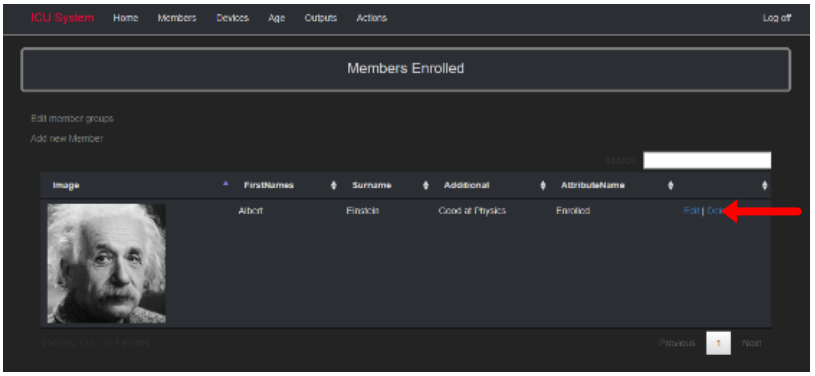


You can define as many different Groups as you wish. These definitions will be shared will all Devices connected to your account

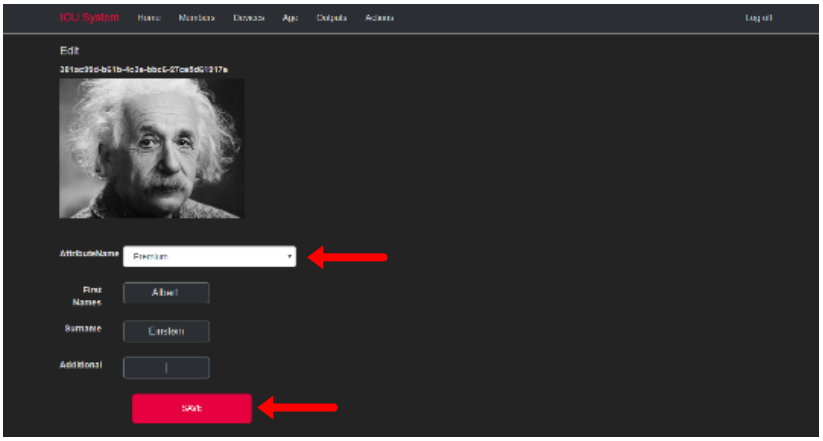
2.4.2 Adding Members to Groups

The default group for any added Member is Enrolled. Any Member can be added to any created groups as follows:

1. Click on Members from the ICU Dashboard
   Click Edit



2. Any created Group will appear in the drop-down menu
   Select the Group and click Save



That specific Member is now part of that specific Group.

Specific ICU Device Actions can now be setup to respond to the defined Groups.

First, you must define the Outputs for a Device.

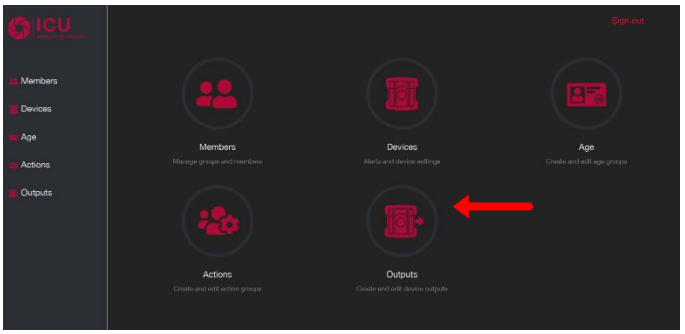
2.5 Adding Outputs

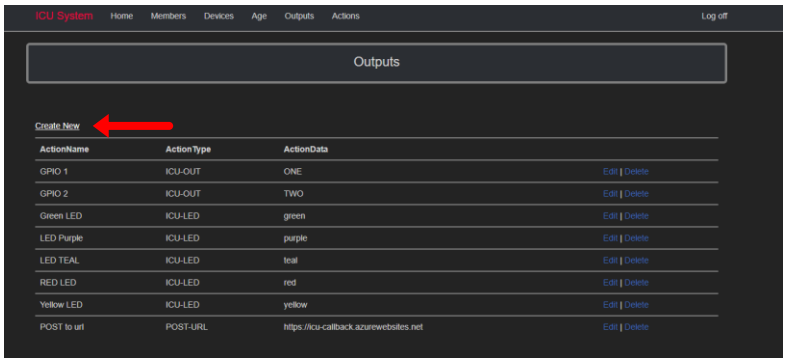
ⓘ Outputs are how you want the ICU Device to respond when presented with a specific Group

Output	Description
Control OUT 1	Open Collector Drivers (Drive solenoids)
Control OUT 2	
Serial	Comm port (SSP). Compatible with ITL note validators
Post URL	JSON post sent to specified URL
ITL-Relay	Trigger smart relay located on Network

2.5.1 Creating an Output

1. Click Outputs from the main ICU Dashboard
   This will open a list of all created Outputs
   You can edit an existing Output or Create a New Output



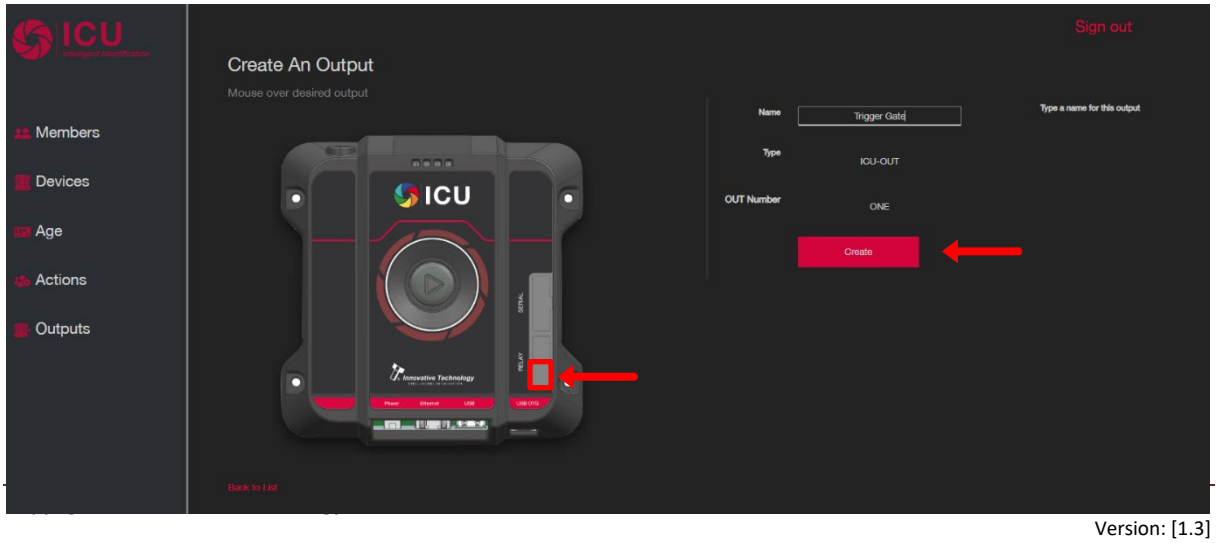


2. To create a new output
   Click on *Create New*

To select which output, click on the desired output on the ICU Device image

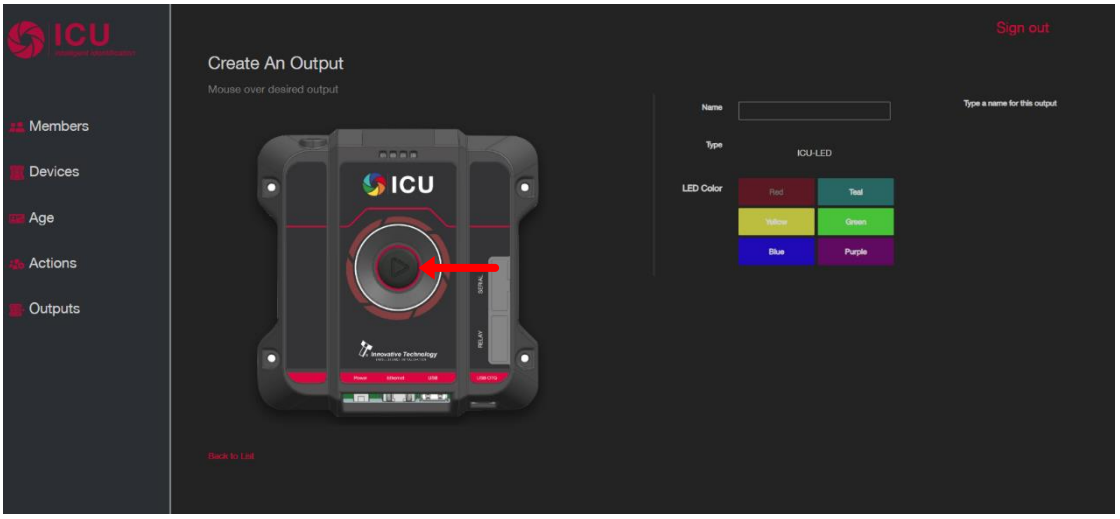
Example 1 : To define an output on Control Out One

Click on ControlOut One on the Device image



1. Click on *ControlOut One* on the Device image
2. This will open the adjustable parameters
3. Chose a name for this output
4. Click Save

Example 2 : To define an output on Device LED



1. Click on LED on the Device image
2. Chose a name for this output
3. Click the desired colour of the LED
4. Click on Save

These new Outputs will now be added to the table of defined Outputs.

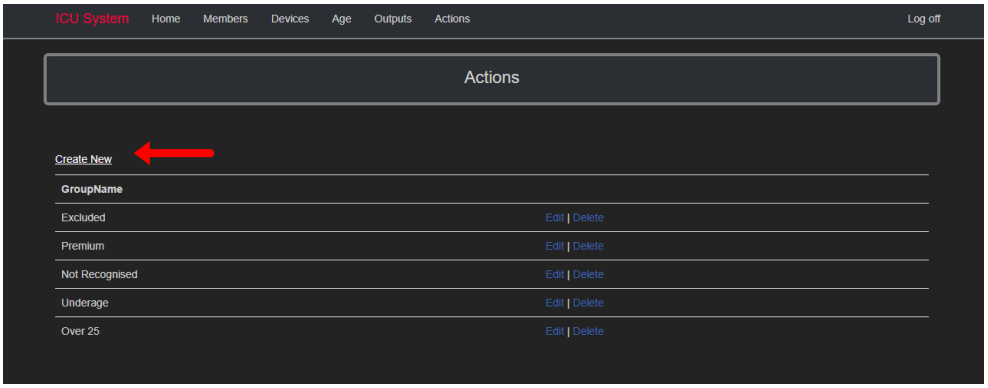
2.6 Adding Actions

Actions are one or many Outputs you wish to perform in response to a Member of a specific Group

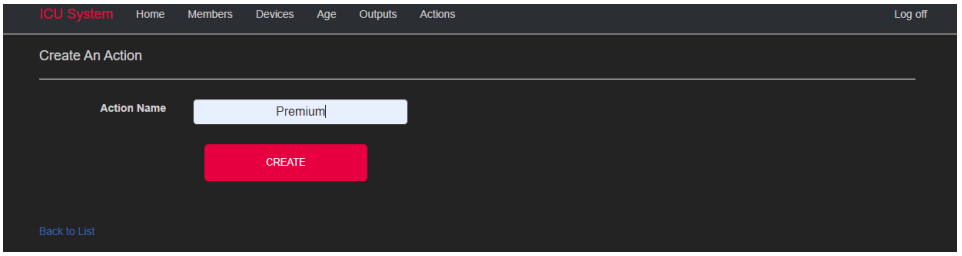
2.6.1 Creating a new Action

1. Click Actions from the main ICU Dashboard

2. This will open a list of all created Actions
   You can edit an existing Action or Create a New Action
   To create a new Action click Create New



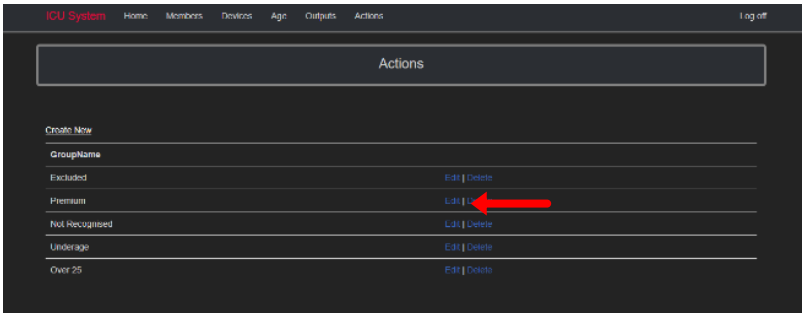
3. Enter the name of the Action and click Create



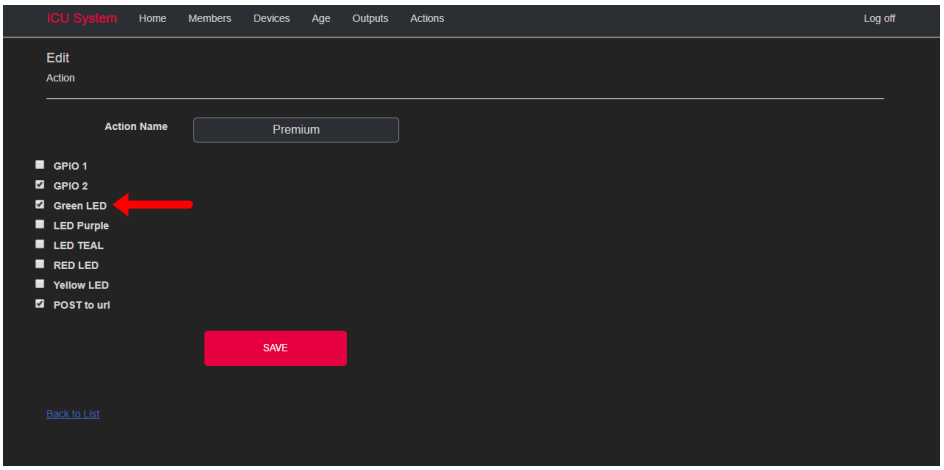
You have now created a new Action. You can now edit this Action to add Outputs

2.6.2 Adding Outputs to Actions

1. Click Edit on a specific Action



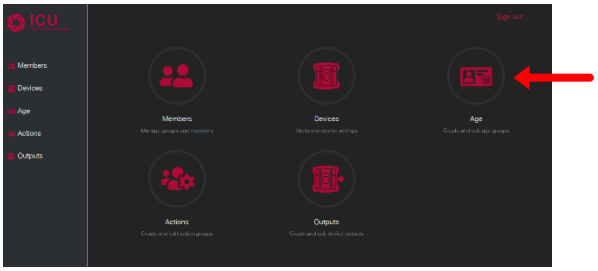
2. This will open all available Outputs to assign to the specific Action
   To assign an Action simply click the checkbox next to it



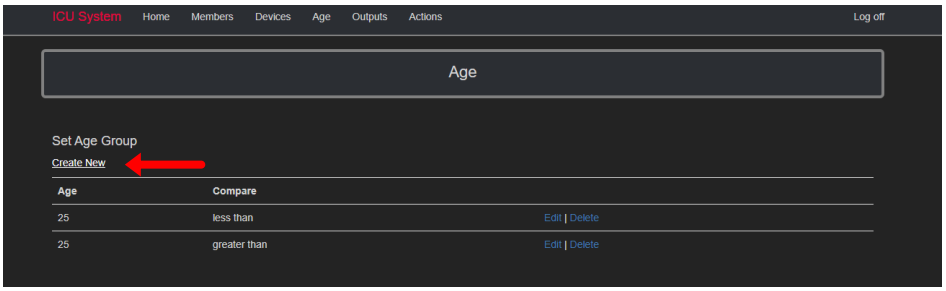
2.6.3 Adding an Age Action

With ICU it is possible to return an age estimation. Some applications may require an Action depending on the age of the returned. This section will detail how to setup the age-related Actions.

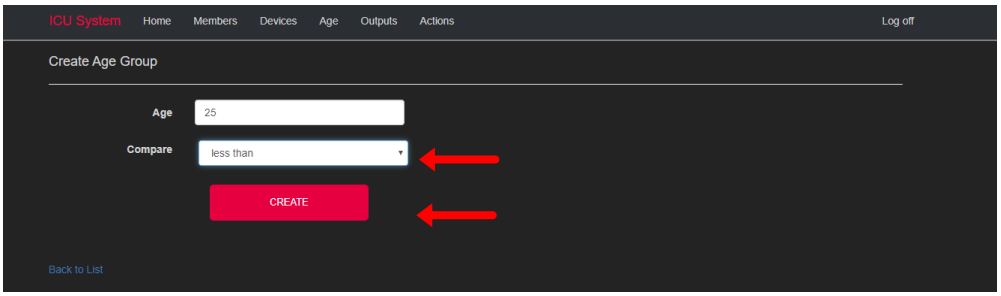
1. Click on Age from the main ICU Dashboard
   This will display any age specific Actions previously defined



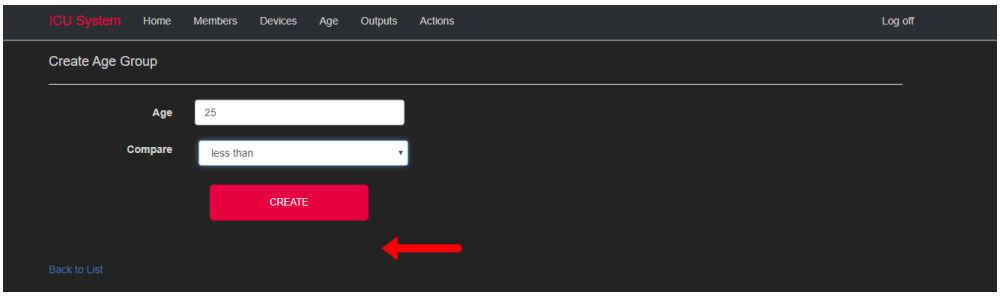
2. Create a new Action by clicking Create New



3. Specify an age
   Specify a comparison i.e. if Age < 25 etc.



4. Click on Create to add the new Age Action

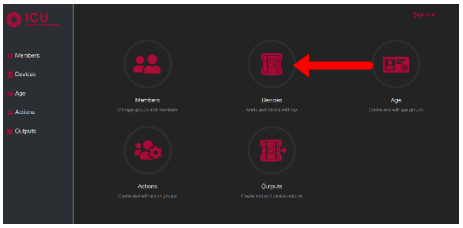


The defined Actions can now be applied to a specific device.

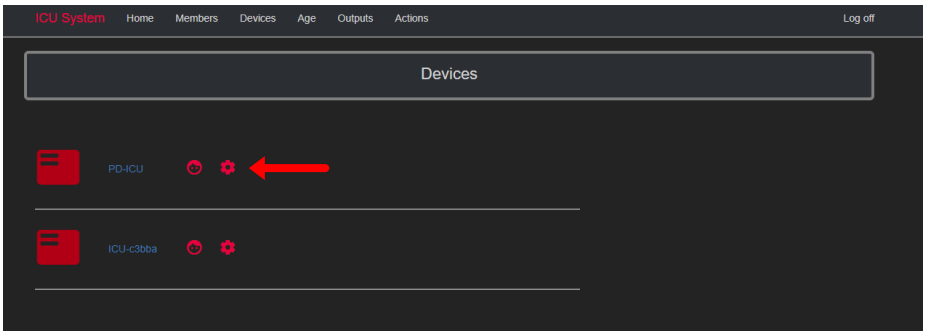
3 APPLYING ACTIONS TO SPECIFIC DEVICES

This section will detail how you can configure specific ICU Devices to react to specific Member Groups

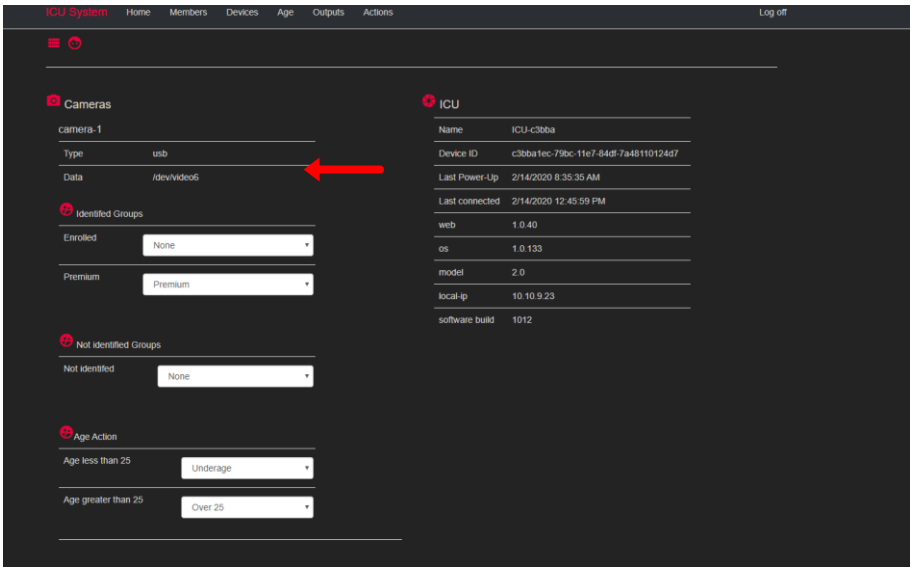
1. Click on Devices from the main ICU Dashboard
   This will display all ICU Devices registered to your account



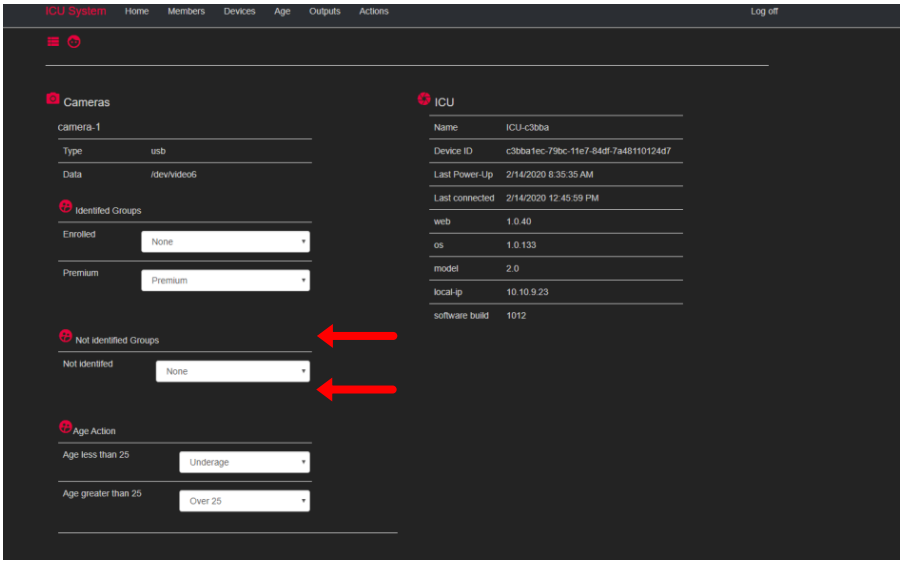
2. Click on the Settings icon to open information and configuration options for that Device



3. All Actions for specific cameras for that Device can be defined here



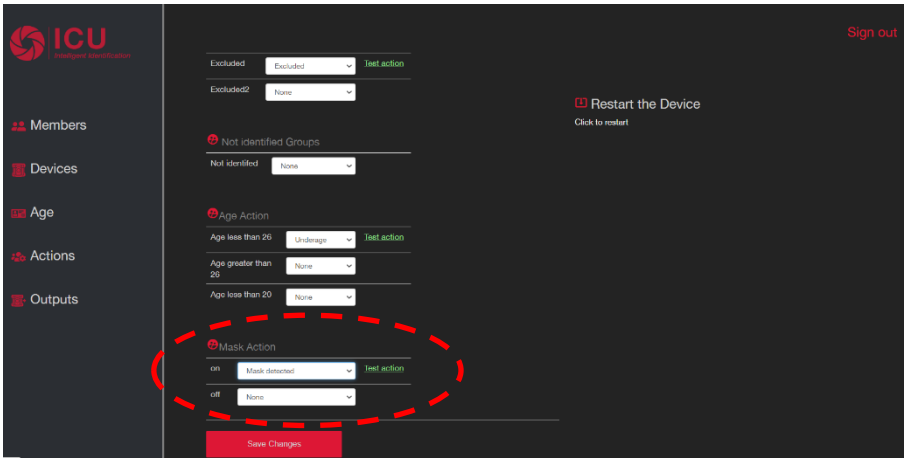
4. Defined Groups will appear
   Defined Actions can be assigned to specific Groups by the drop-down menu



3.1.1 Adding a Mask Action

Mask actions can be applied to specific devices. This feature will automatically appear on each device specific settings (if enabled).

Actions can be applied to both if a mask is detected and if a mask is not detected. Actions are defined as per section 2. To select an action simply chose from the drop-down menu.

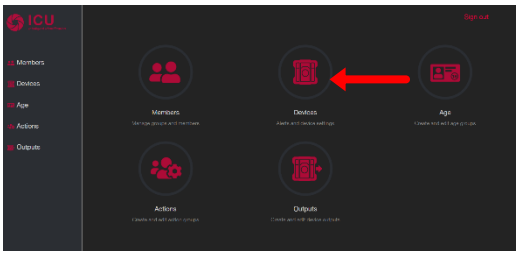


You have now configured your specific Device to react to faces presented to the attached cameras

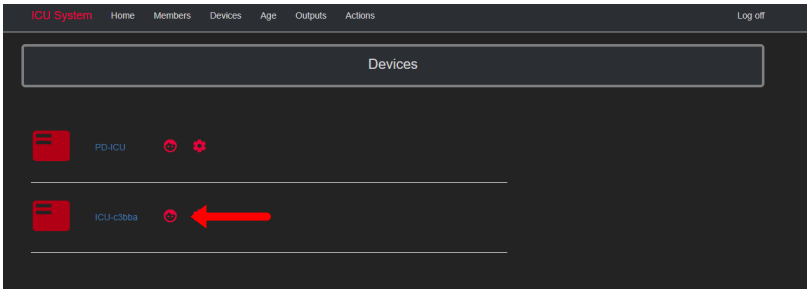
4 TESTING YOUR DEVICE CONFIGURATION

To test your Device configuration, you can present a member to the camera

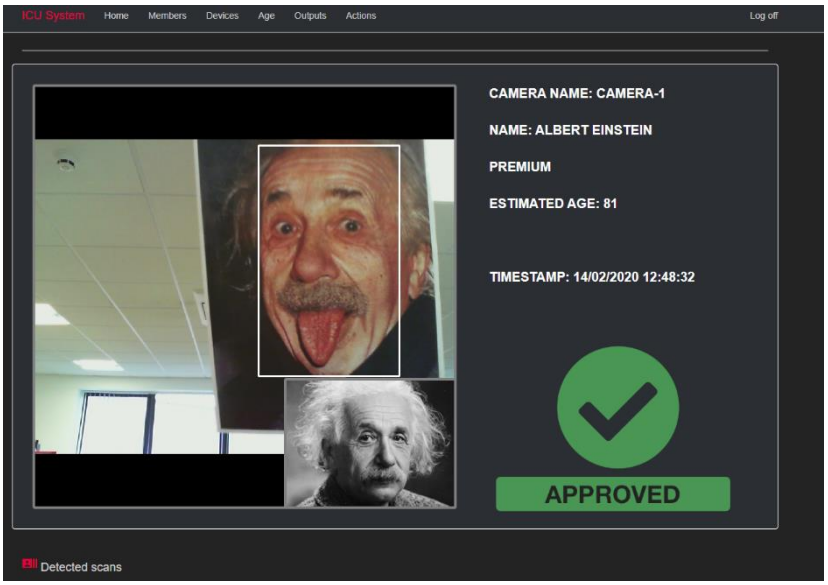
1. Click on Devices from the main ICU Dashboard



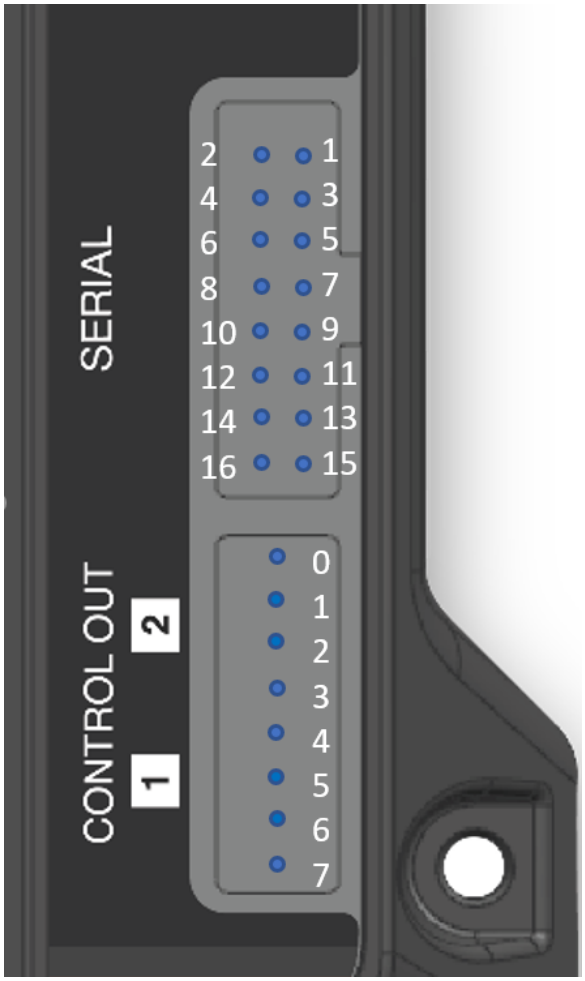
2. Click on the Face icon to open the Alerts page



3. This opens a page where you can monitor recent activity on that camera



5 DEVICE INTERFACE PINS



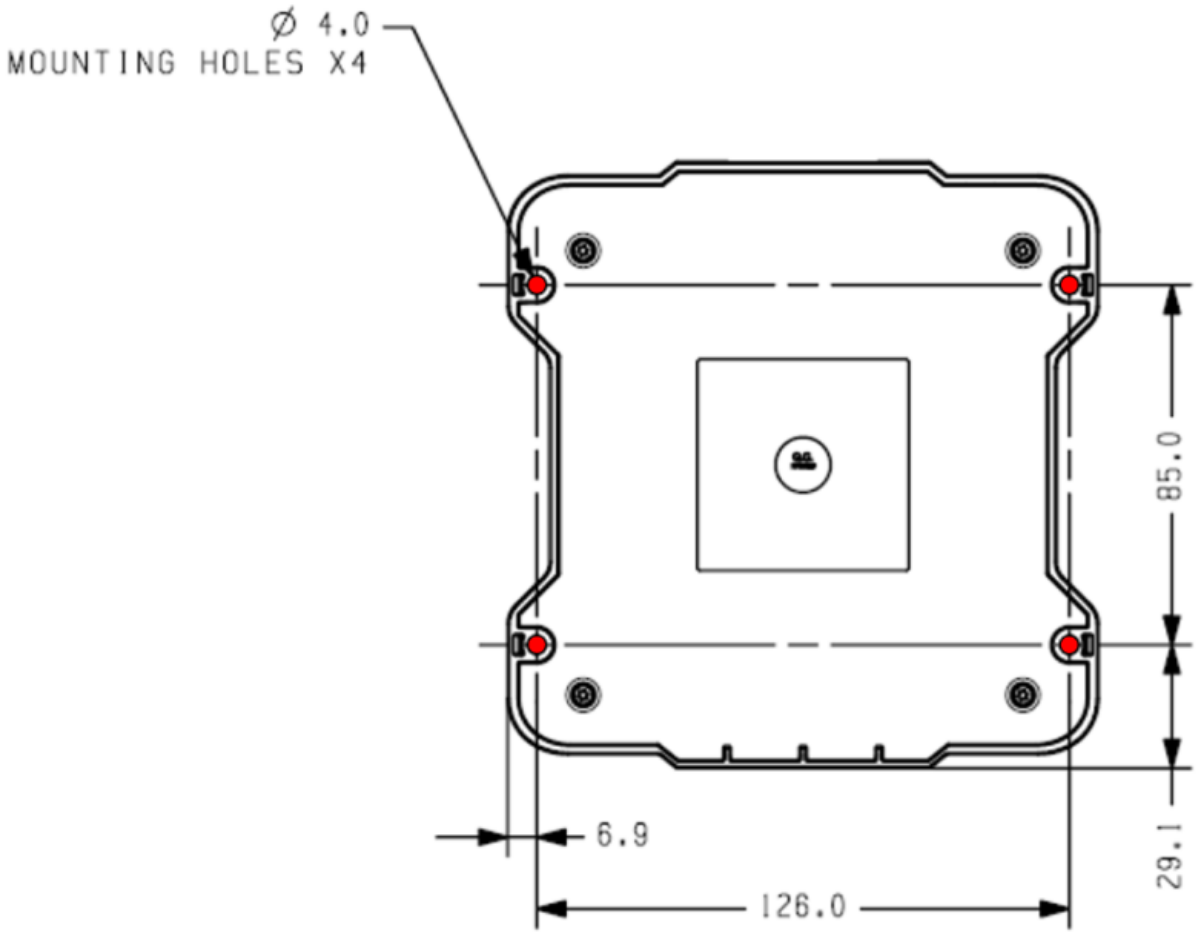
	Serial
PIN 1	Serial Data Out 1 (Tx)
PIN 2	Serial Data Out 2 (Tx)
PIN 3/4	Reserved for future use
PIN 5	Serial Data In 1 (Rx)
PIN 6	Serial Data In 2 (Rx)
PIN 7	Logic Input 1
PIN 8	Logic Input 2
PIN 9	Logic Output 1
PIN 10-13	NC – No internal connection
PIN 14	Logic Output 2
PIN 15	System $+V_{in}$
PIN 16	System 0V / GND

	ControlOUT
PIN 1/7	0V / GND
PIN 1/6	V_{out} for inductive loads
PIN 2/3	High current output driver 1
PIN 4/5	High current output driver 2

Control OUT 1 & 2 are Open Collector Drivers and are intended to be able to drive a load such as a solenoid

6 MOUNTING INSTRUCTIONS

The Device should be securely mounted to a flat surface using the 4 mounting holes provided. These are indicated in the diagram below.



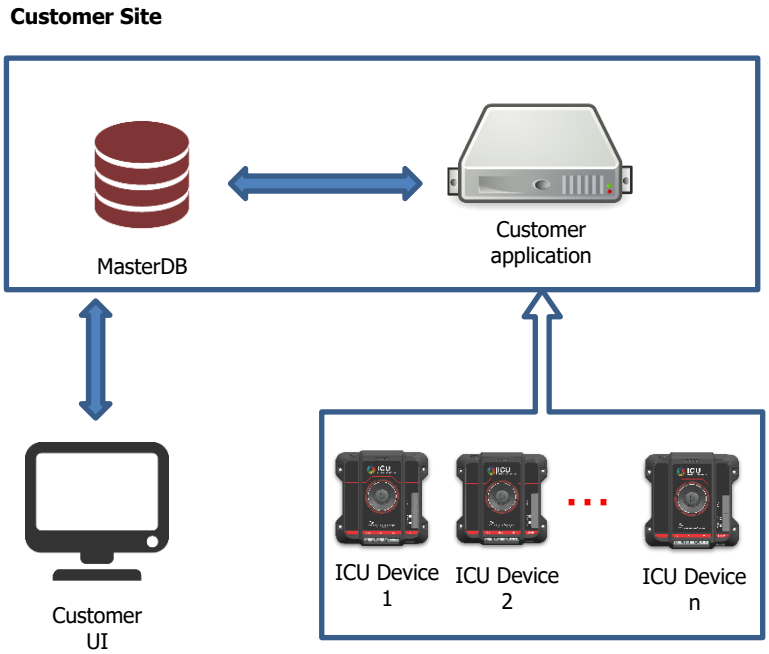
7 USING LOCAL CUSTOMER APPLICATION (REST API)

The customer application contains multiple REST API clients to communicate with individual ICU API services.

The customer application also controls and maintains the customer database.

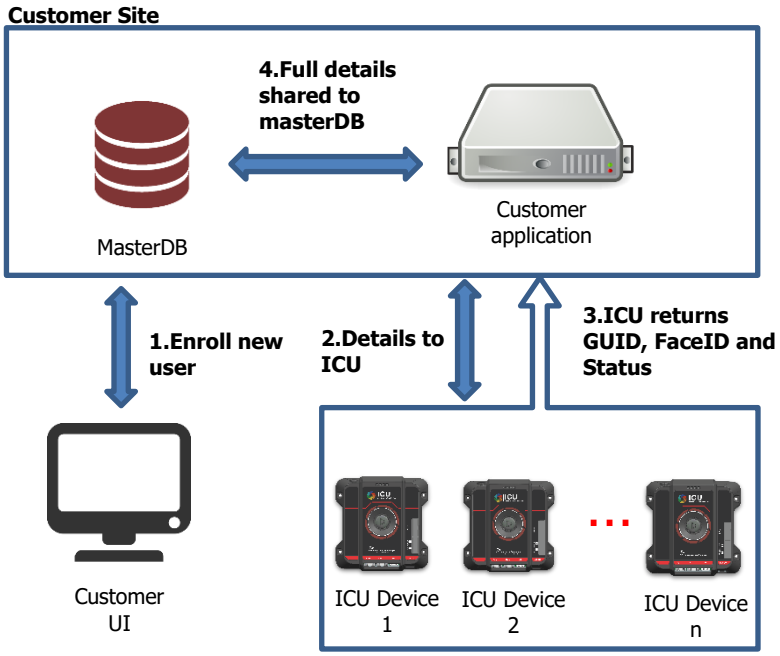
- All data will be saved local in a local customer MasterDB.
- The ICU device is an API service to the customer application client. The customer application communicates to the ICU device via the ICU REST API.
- An API will run on the ICU Device which will allow enrollment of new members.
-

Overview of Infrastructure



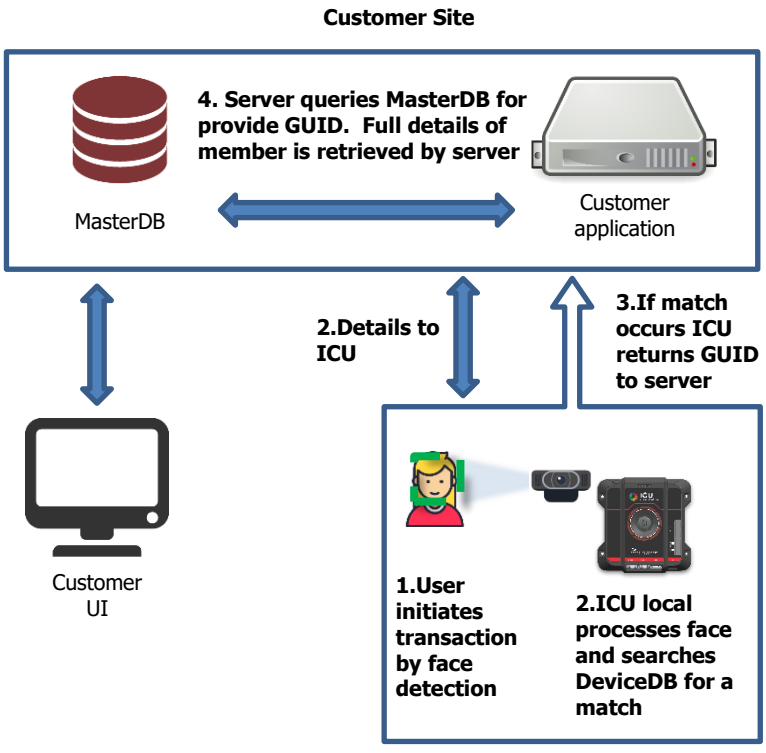
Customer application	*Contains REST API client.*
MasterDB	*Local database containing all information relating to every enrolled member*
Customer UI	*User portal to interact with the customer application. All tasks are initiated via the customer UI.*
ICU Device	*Configured to be a RESET API service to the customer application REST client. It is possible to control 1 to n amount of ICU Devices*

Scenario I: Enrolling a new member



1	*A command is sent to from customer UI to server*
2	*Server sends details to selected ICU Device to produce GUID, FaceID, Status*
3	*ICU returns GUID, FaceID, Status to server*
4	*Server creates new entry on MasterDB with returned details and additional personal details from enrollment*
5	*Application shares details (GUID, FaceID, Status) to all connected ICU devices*

Scenario II: Performing a recognition task



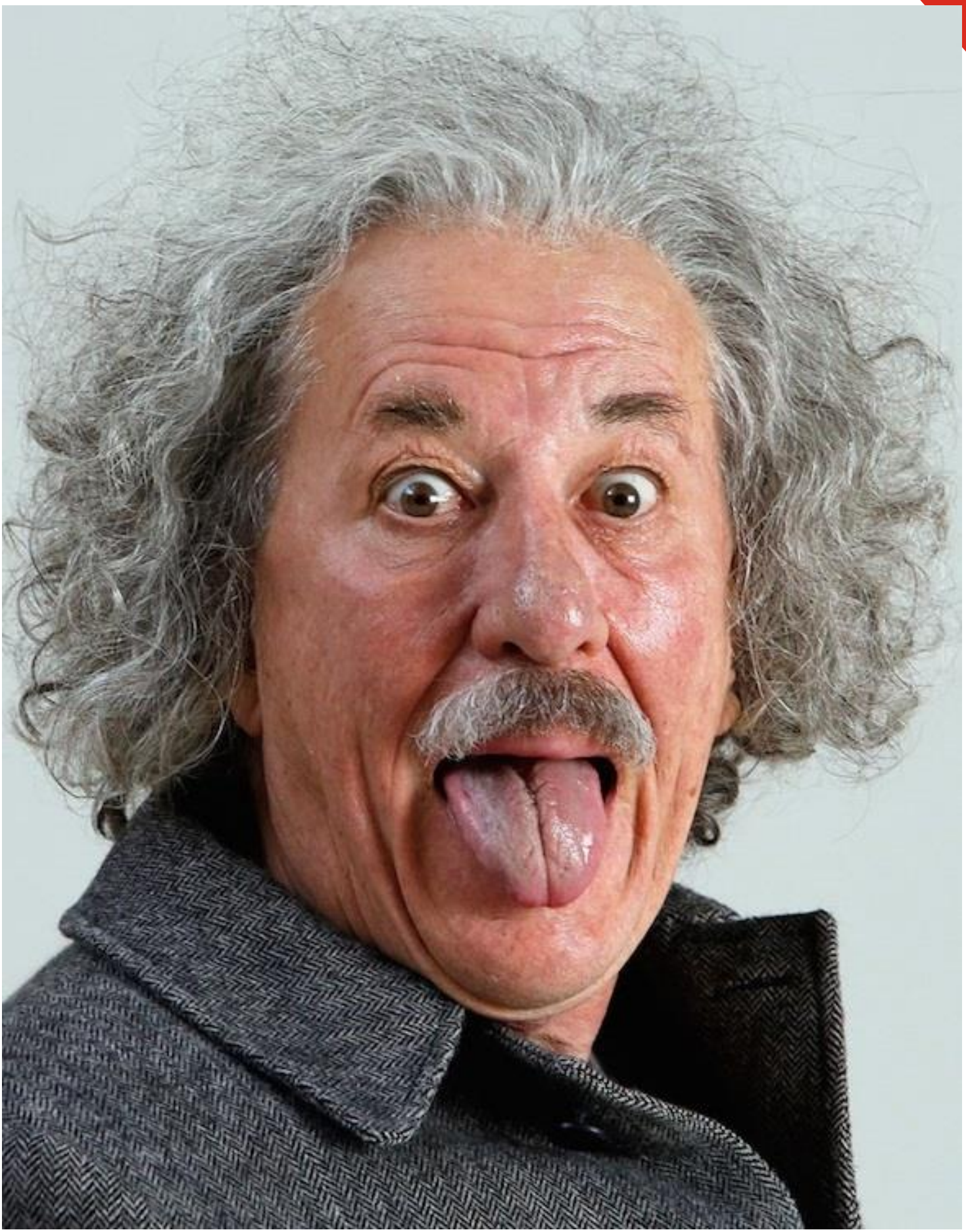
1	*Face detection initiates the transaction on the ICU Device*
2	*ICU Device produces a FaceID and searches DeviceDB for a matching stored entry*
3	*If a match is found ICU returns GUID and current live image to server. It also performs any configured Actions for that member. Estimated Age is also returned* *If no match is found ICU performs an age estimation and returns Age and live image to server. Any configured Actions relating to Age are also performed* *In both cases ICU DeviceID and subsequent camera and location is returned to customer application by device poll or API POST*
4	*Application creates queries MasterDB with returned GUID to retrieve member details. Member details can now be shared with customer UI.*
5	*Application can be configured to perform additional tasks – i.e. call a SMS API, store transaction detail etc*

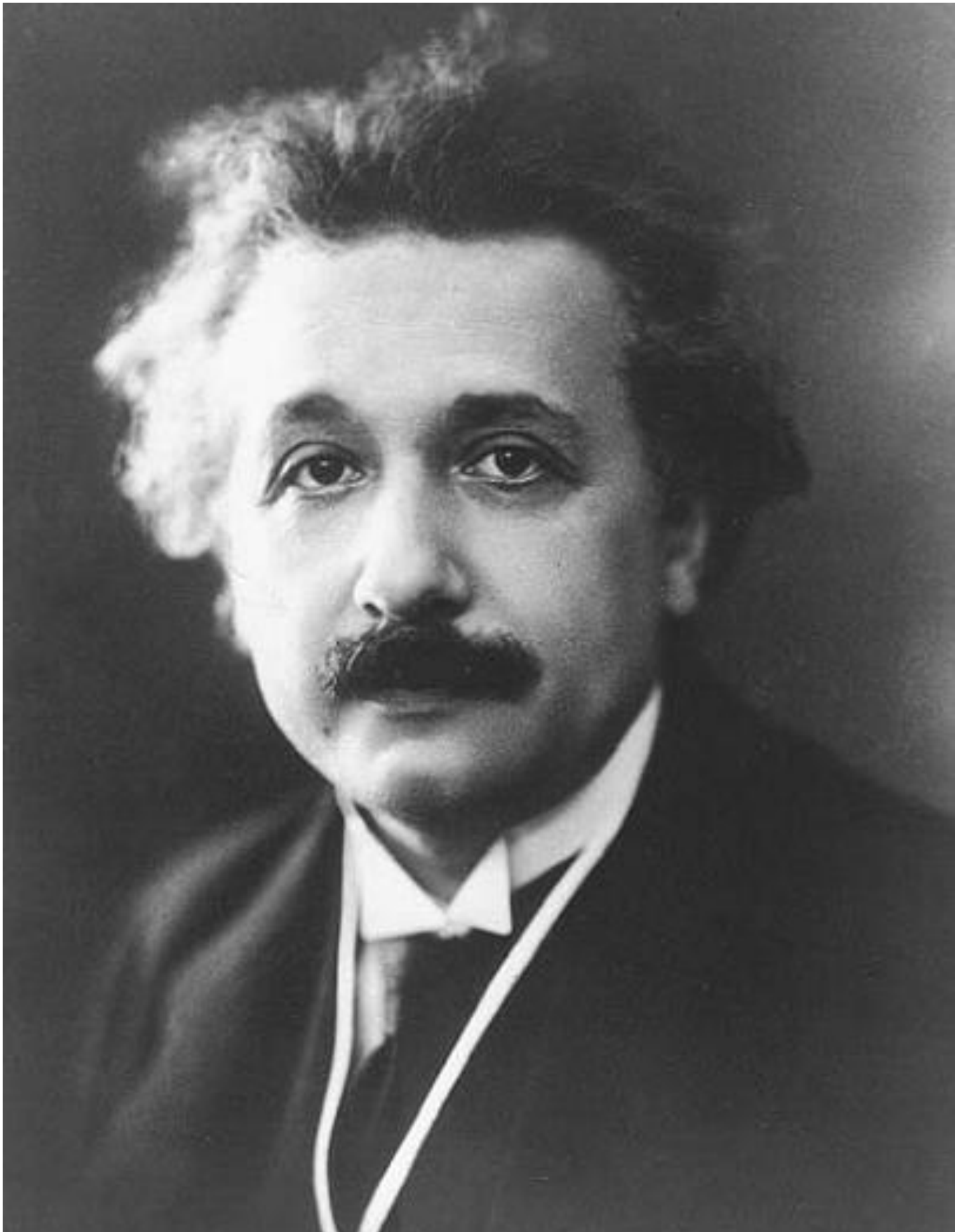
8 EXAMPLE FACES

The following faces can be used to test the ICU Device.

Test Members are also added by default.

TEST FACES	
Member	**Group**
1. Obama Real	Premium
2. Obama Fake	Excluded
3. Einstein Real	Premium
4. Einstein Fake	Excluded
5. Underage 1	Under 25
6. Underage 2	Under 25





9 GLOSSARY

Action	An **Action** is a **Device** response to a **Member** of a specific **Group** **Actions** are defined as 1 or more **Outputs**. For example, in gaming, you may have an excluded **Group** that consists of Excluded **Members**. You may have **Outputs** that 1) Disable a machine and 2) Send an Alert. The **Action** is defined as the 2 **Outputs** in response to the Excluded **Member**
API	An **API** (Application Programming Interface) allows one program to communicate with another program. For ICU, this enables customers to access the capabilities of the Algorithm (request **FaceID** and age estimation) without any hardware **Device**.
Control Out	This driver is intended to be able to drive up to two separate inductive loads for applications such as door access relays or solenoids. This drive duration is limited to 10 seconds but can be re-engaged within 100ms. A voltage source is provided by the ICU and the driver pin sinks the current. (details above)
Device	**Device** is the hardware component of the ICU solution. All processing is done locally on the **Device**. The Device has several **Interfaces** for easy integration with several external machines. The **Device** allows easy integration and in combination with the cloud solution, offers a *plug and play* solution for facial recognition.

DeviceID	This is a unique number which is assigned to each **Device**. The **DeviceID** can be used in the **JSON_POST** to determine the location from which the alert was posted.
DeviceDB	The **DeviceDB** is a database which is saved on the **Device**. This contains a **GUID**, **FaceID** and **GroupID.** This database allows the **Device** to operate both in real time (in response to a **Member**) and independent of an internet connection. It is not possible to extract any personal details from the **DeviceDB.**
Ethernet	**Ethernet** refers to one of the interfaces on the **Device**. The connection is a RJ45. **Ethernet** is used to connect to the **User_Account**, send **JSON_Posts** and connect to **IP Cameras**.
FaceID	The **FaceID** is a large number that the algorithm produces to describe a Face.
GroupID	The **GroupID** is a unique ID that can be assigned to a specific **Group**.
Group	A **Group** is a collection of **Members** which share some a common attribute. For example, **Members** can be defined as part of an *Excluded* **Group**. **Actions** can be associated with **Groups** – this means the **Device** will react in response to a specific **Group**. There is no limit to the number of **Groups** a user can define.
GUID	A **GUID** is a unique reference to a member in the database. The **GUID** is a single number which is common to both the **DeviceDB** and the **MasterDB**. When a **FaceID** is matched in the **DeviceDB** it is the **GUID** which is sent to the **User_Account** in order to query the **MasterDB** and return full details of the **Member.**

Interfaces	**Interfaces** are how the **Device** interacts with other machines. The interfaces available are USB (X 2), **Ethernet**, **Control_OUT** (X2) and Serial.
IP Cameras	**IP Cameras** are cameras which are not directly connected to the ICU Device. They are typically cameras which are located on and accessed via a network. ICU device uses the streaming protocol of **rtsp**.
JSON Post	A **JSON Post** is a method the end user can utilise in order to integrate the ICU **Device** with their own existing software platform. For example, the **JSON POST** can be interpreted by the customers software to post alerts to specific devices (i.e Phones, Tablets). The JSON post is authenticated (requires password) and contains the **GUID**, **FaceID,** age estimate and **DEVICE ID**
MasterDB	The **MasterDB** is the database in which all information relating to a **Member** can be stored. This includes **GUID**, **FACEID**, Name, Image, DOB etc. This database is stored in the cloud and can only be accessed via the **User_Account**.
Member	A **Member** refers to a face added to the database. **Members** can be arranged into member **Groups**. Each member will have an associated **FaceID**. **Member** information is stored in the **MasterDB**.
rtsp	**rtsp** is the protocol that the ICU **Device** uses in order to communicate with **IP cameras**.

User_Account	The **User_Account** is hosted in the cloud and is accessed by any browser enabled device. Each user has their own login details. Every **device** the user has is registered to the **User_Account** and as such, when a new **Member** is added all linked **Devices** are updated with the most up to date information. The **User_Account** is how users control all aspects of the ICU solution. The **User_Account** is used to setup all **Devices**, add **Members**, organise **Groups** and manage **Actions**. Any **Device** updates can be managed from the **User_Account**.