OTI-BOT
TECHNICAL GUIDE

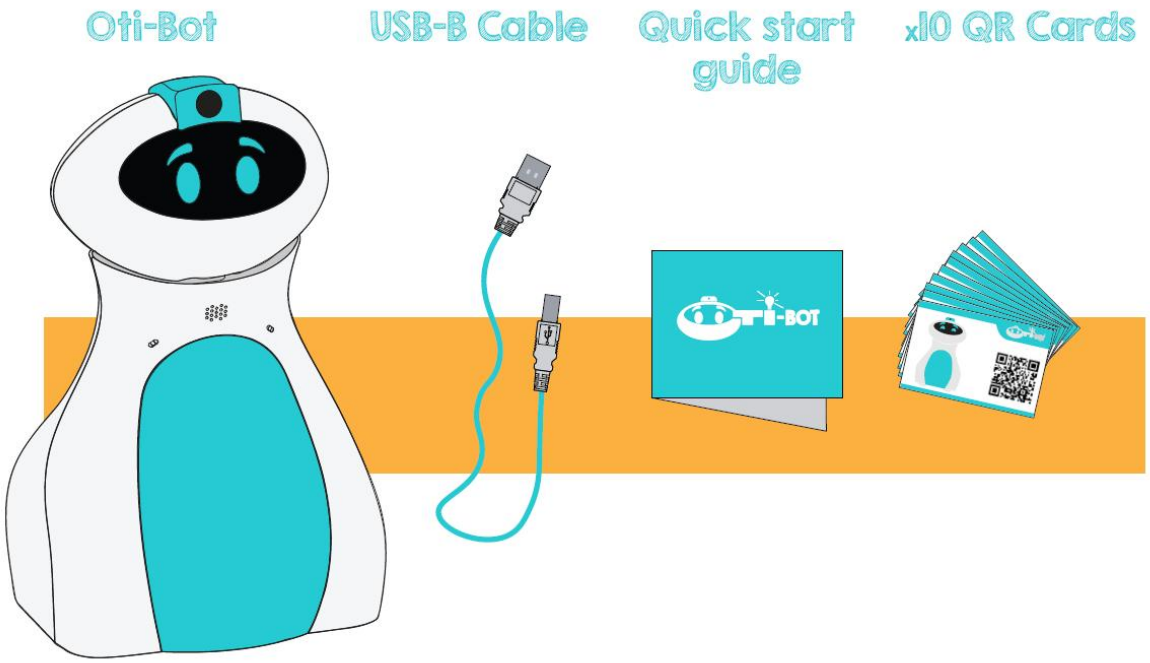
CONTENTS

GETTING READY TO GO WITH OTI-BOT

When you receive your Oti-Bot we advise that you **charge it for 4 hours before use.**

In the box you should find:

- Your Oti-Bot
- A USB cable for charging and data transfer
- A set of QR codes
- A quick-start guide

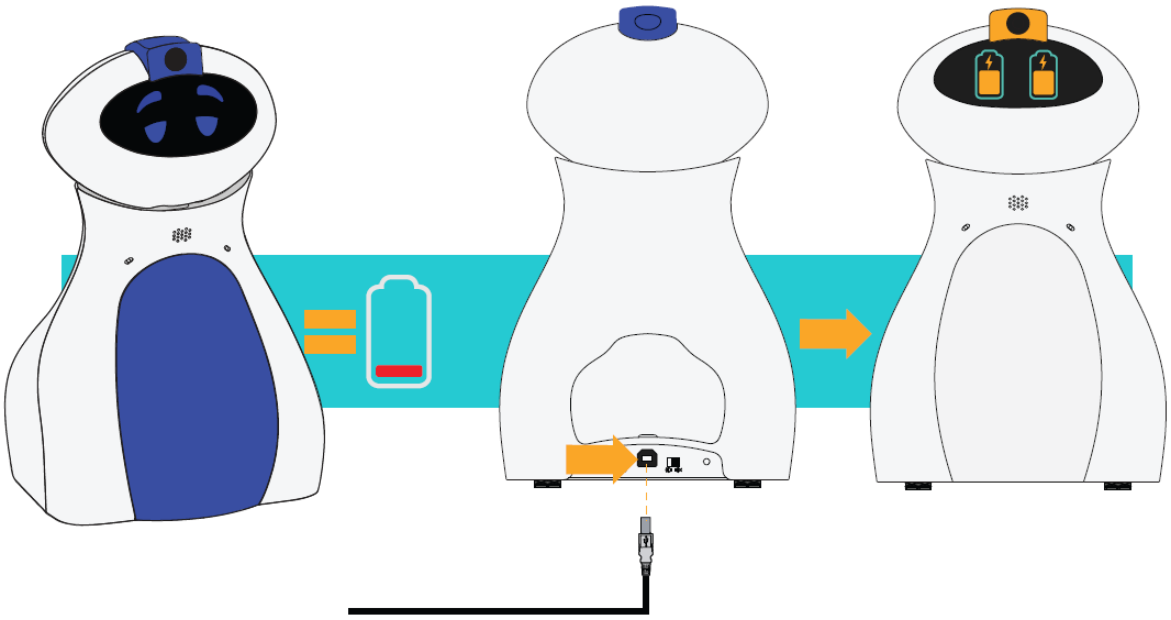


The Apps for Oti-Bot can be found here for iOS and here for Android. Please note that the Oti-Bot App can only be accessed on tablet devices.

CHARGING AND CONNECTION

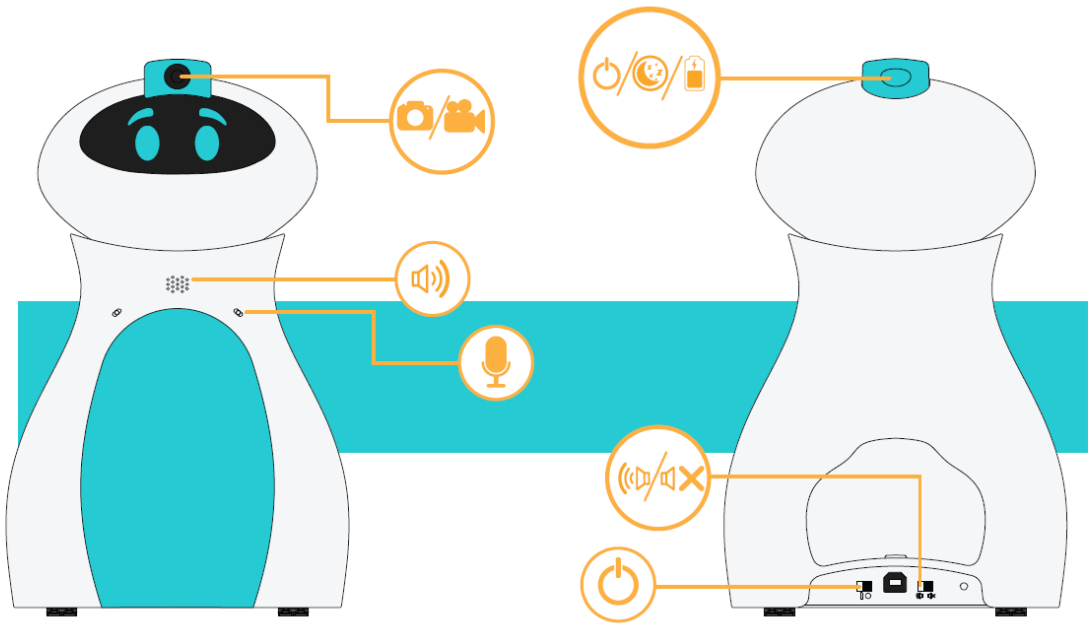
HOW DO I CHARGE OTI?

Oti-Bot is supplied with a USB cable in his box, this is used for both charging and data transfer. When you first receive Oti, please charge him for a minimum of **4 hours** prior to use.

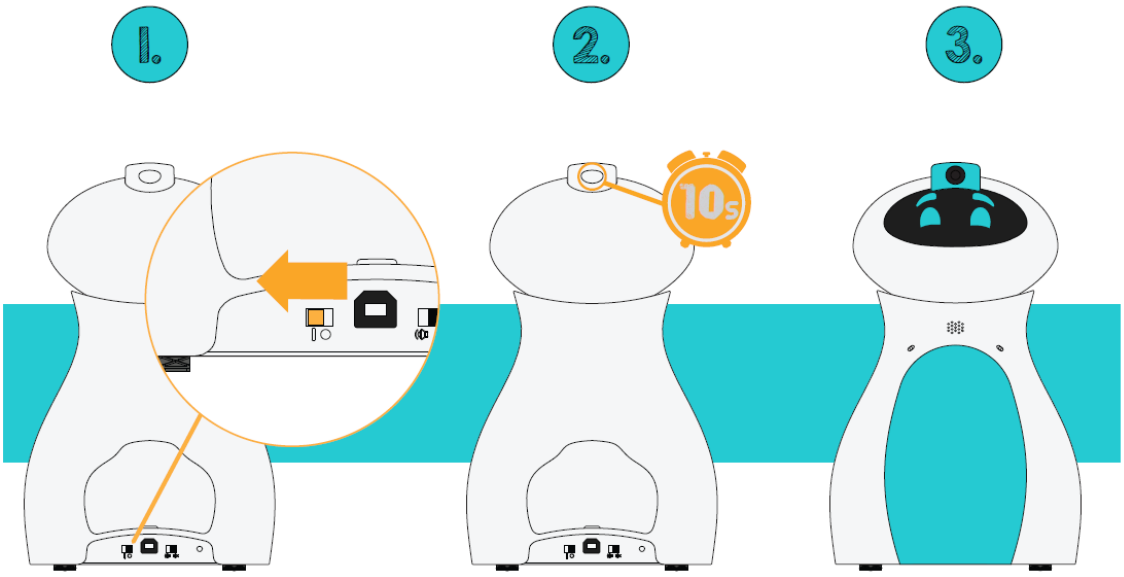


HOW DO I TURN OTI ON?

Oti has two switches; one on his base near the charging port and one on the top of his head.



To turn Oti on, firstly, ensure that the switch near his charging port is in the on position. Secondly, firmly hold the head button on for 10 seconds.



Oti takes roughly 30 seconds to boot up, but this only needs to be done once a day.

HOW DO I TURN OTI OFF?

During the course of the school day there is no need to fully shut Oti down.

It is possible to put Oti to sleep by quickly tapping his head button twice.

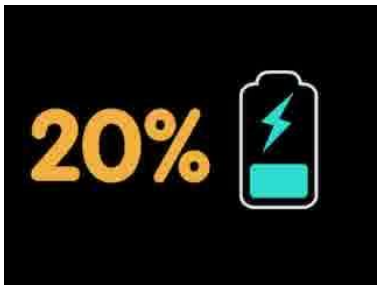
Oti will fall asleep himself after a 10 Minute period of inactivity.

At the end of the day you can shut Oti down fully by holding his head button firmly, continue to hold until the progress bar reaches the top of Oti's face. Once he has been shut down this way you can turn off the switch at his base.

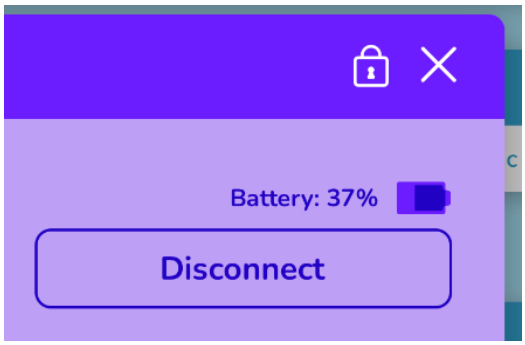
HOW DO I CHECK OTI'S CHARGE STATUS?

There are three ways to check Oti's battery level.

Firstly, a short single tap on his head button will display the battery level on his face.



Secondly, The charge level is also reported in the app when Oti is connected.



Thirdly, only while on Charge the Charge Status LED is Lit; it will turn from Red (Charging) to Green (Fully Charged) as the charge completes. Oti charges faster if Oti is Shut Down and the Power Switch is in the Off Position.

HOW DO I CONNECT TO THE APP?

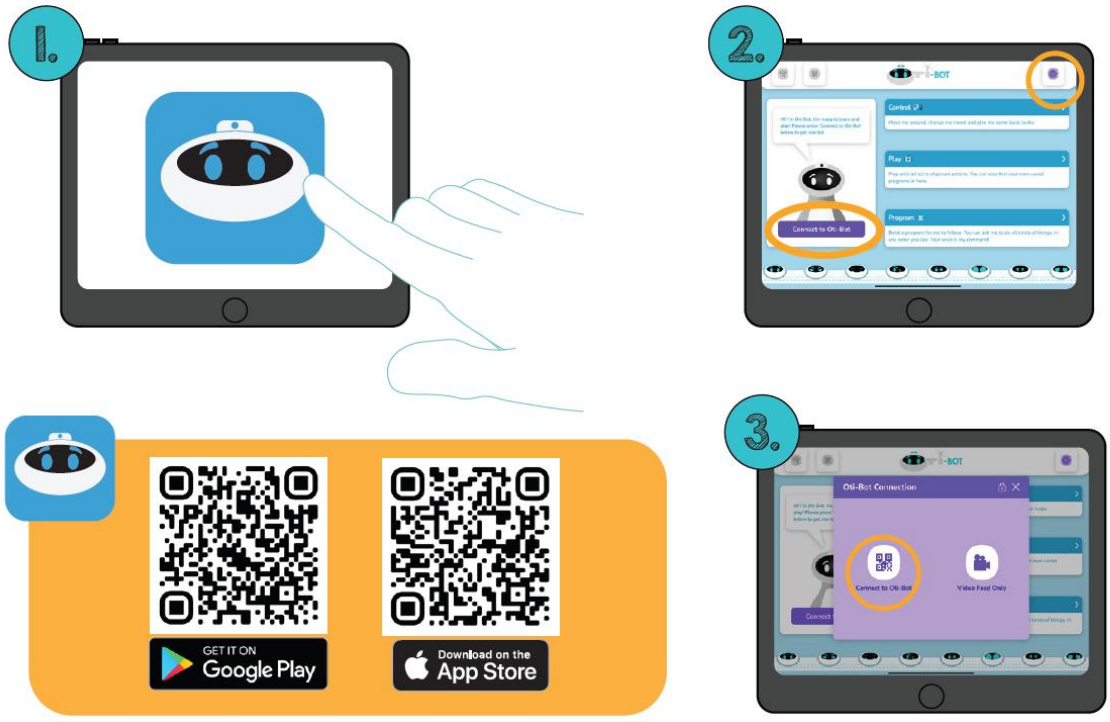
Oti's app can be found in both the iOS and Google Play stores. It is free to download.

There are two ways to connect to the app:

- As the Primary user "Connect to Oti-Bot" – you can fully control the robot
- As the secondary user "Video Feed Only"– you cannot control the robot but you can view the livestream

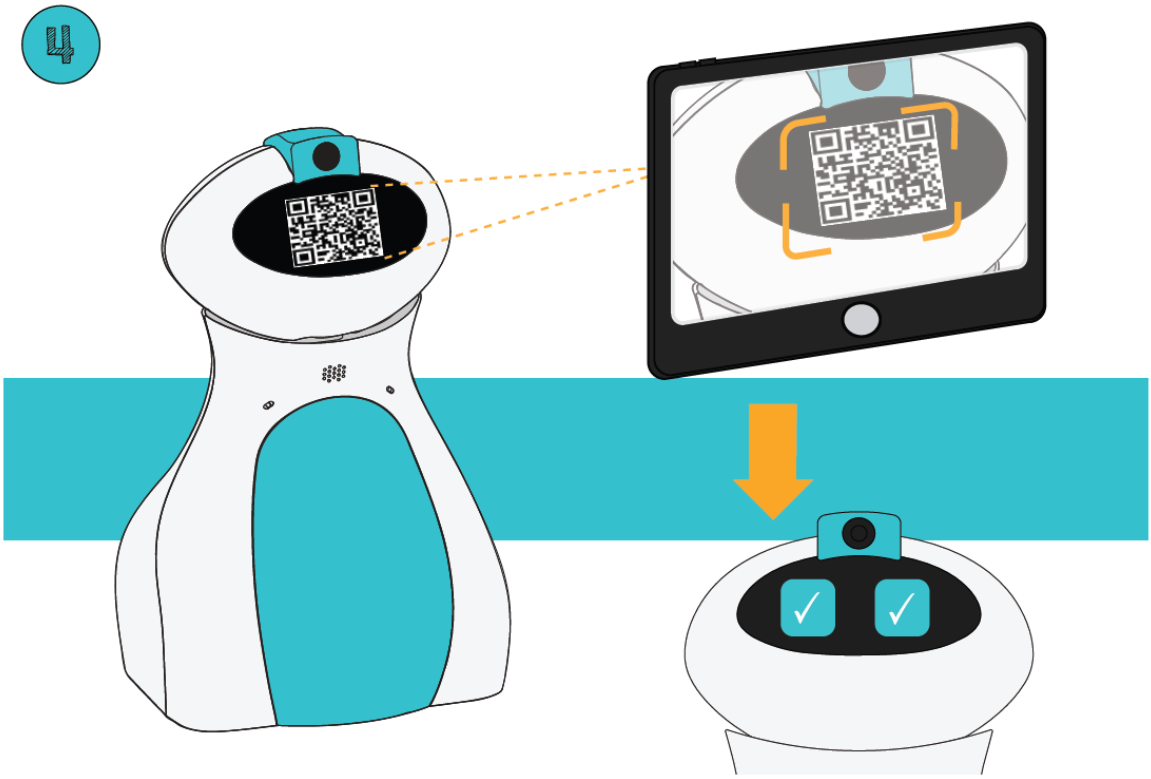
There can only be one primary user, but there can be two additional users.

When Oti boots up his face becomes a QR code. Using the app select from the two options below:

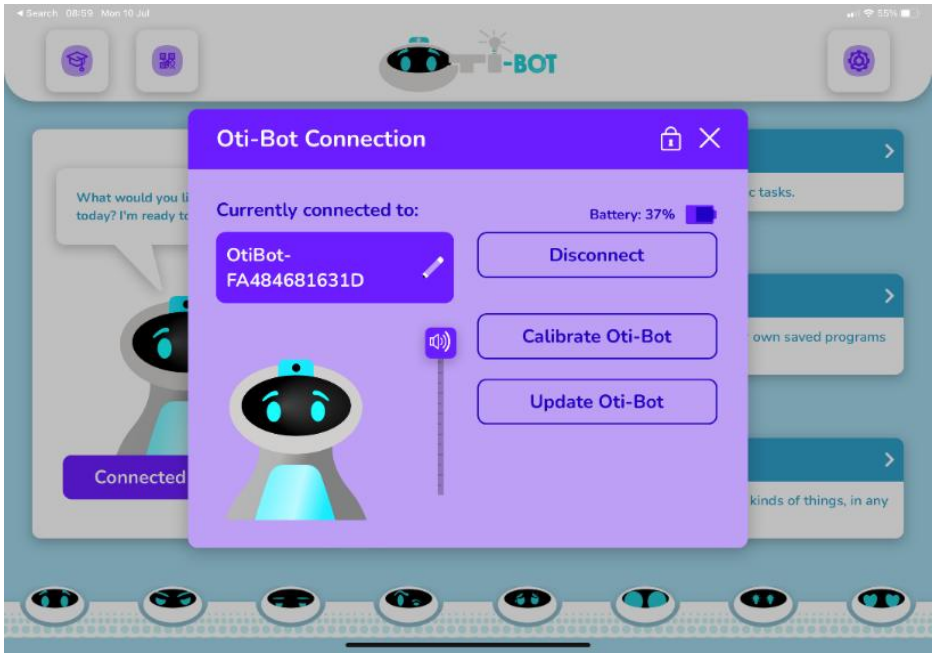


In most cases you will be connecting as the primary user and therefore will select "Connect to Oti-Bot".

Once this option is selected the camera will open on the app. Line this up with the QR code on Oti-Bot's face to connect.



The first time you connect a tablet to an Oti-Bot it may take a few seconds longer to connect – this will be quicker for subsequent connections. Please allow all permissions to ensure a smooth connection – again these will only be requested the first time you connect a new tablet to Oti-Bot. Once Oti-Bot is connected you will be presented with this screen:

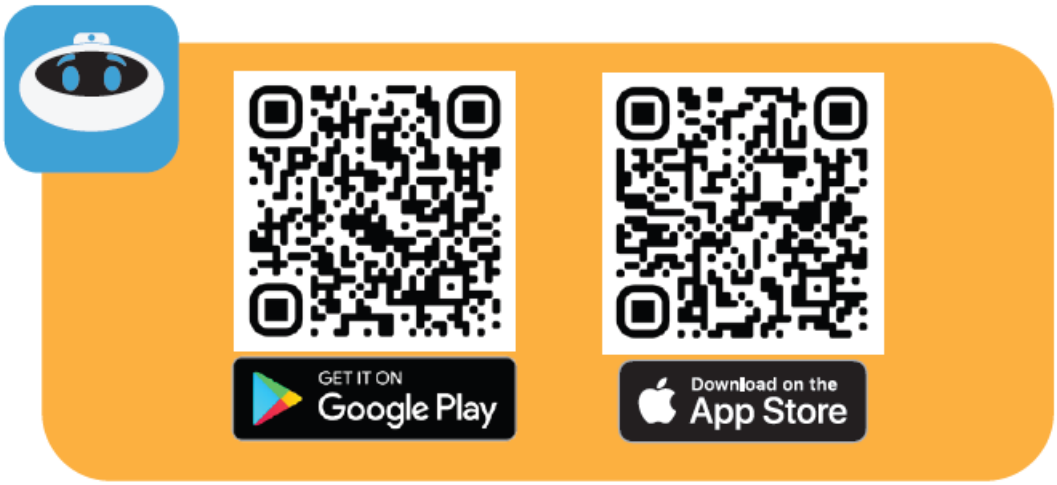


From here you can close this window and begin learning with Oti-Bot!

MY APP ISN'T OPERATING CORRECTLY – WHAT SHOULD I DO?

Please try these steps in this order:

1. Try restarting Oti-Bot and restarting the app.
2. Please check that your app does not need updating from the app store.



3. Try uninstalling and re-installing your app – please ensure that you accept all permissions when the app is launched for the first time.

CAN OTI CONNECT TO THE INTERNET?

No. Oti can only connect to a tablet device via the QR code connection method. Oti uses a wifi connection to allow sufficient bandwidth for a video stream, however he does not connect to the internet directly.

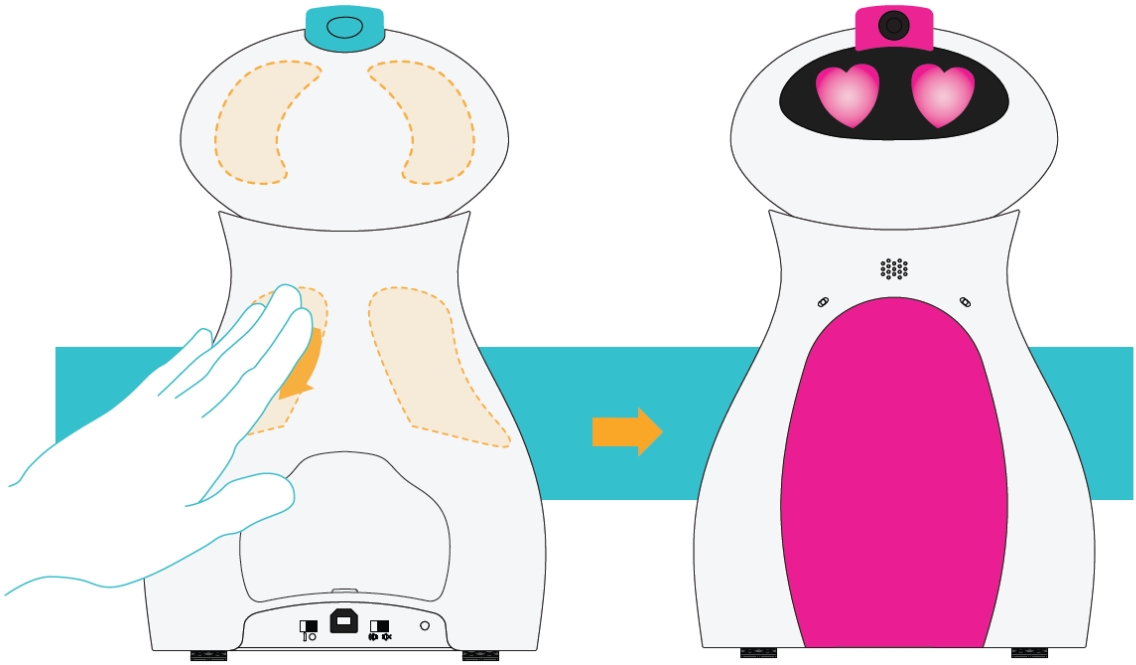
WHY DOES OTI DROP CONNECTION?

It is necessary to reconnect to Oti every hour. This is a built in security feature to ensure that the correct student tablet is still connected to Oti.

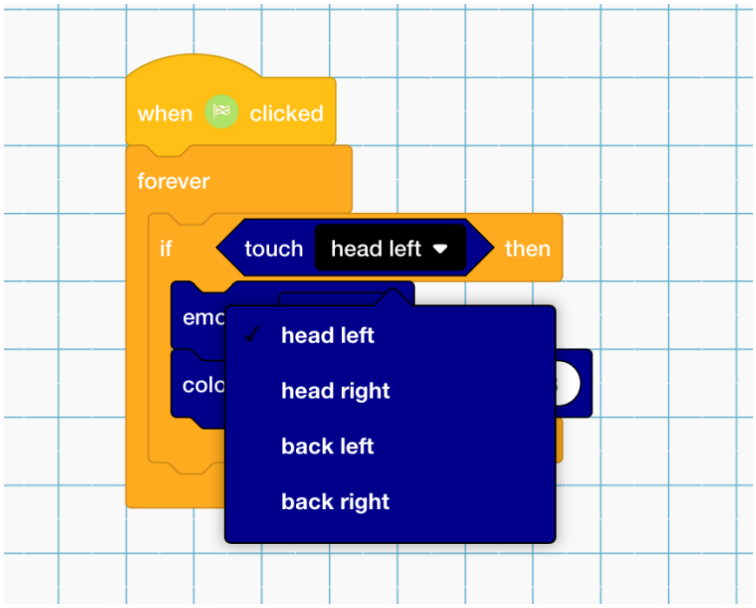
WHAT SENSORS DOES OTI HAVE?

CAPACITIVE TOUCH SENSORS

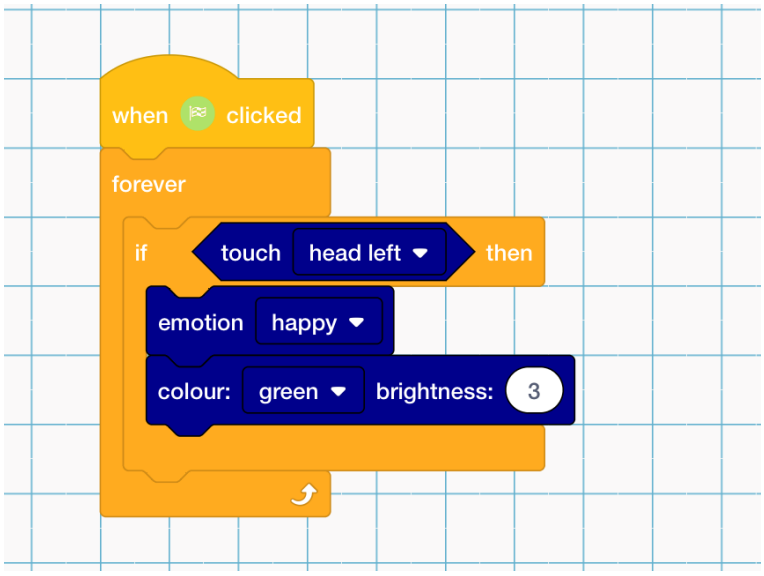
Oti has four capacitive touch sensors in his body, two in his head (on the left and right) and two in his body (on the left and right)



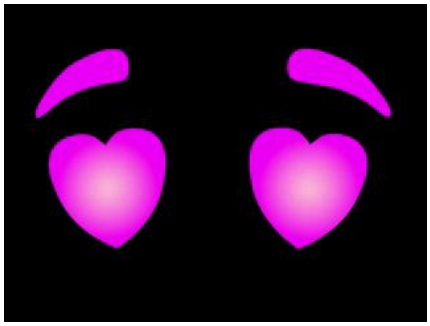
These can be programmed using the following block:



An example of one way this may be used is:

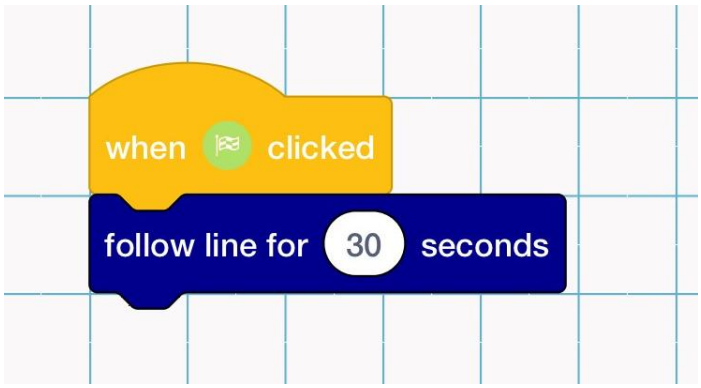


By default, and when not programmed by the user to do anything else, these sensors will cause Oti to display a love heart face when his head or back is touched. Occasionally you may also see this response from Oti when a program is running.

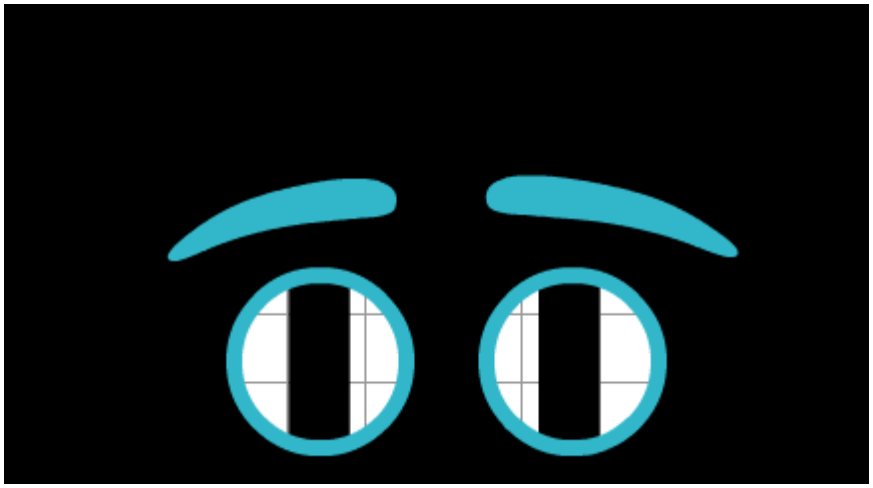


LINE FOLLOW SENSOR

Oti has a line follow sensor located on his underneath, in between his caterpillar tracks. This can be accessed using the following block:



When Oti is successfully following a line he will display this face:

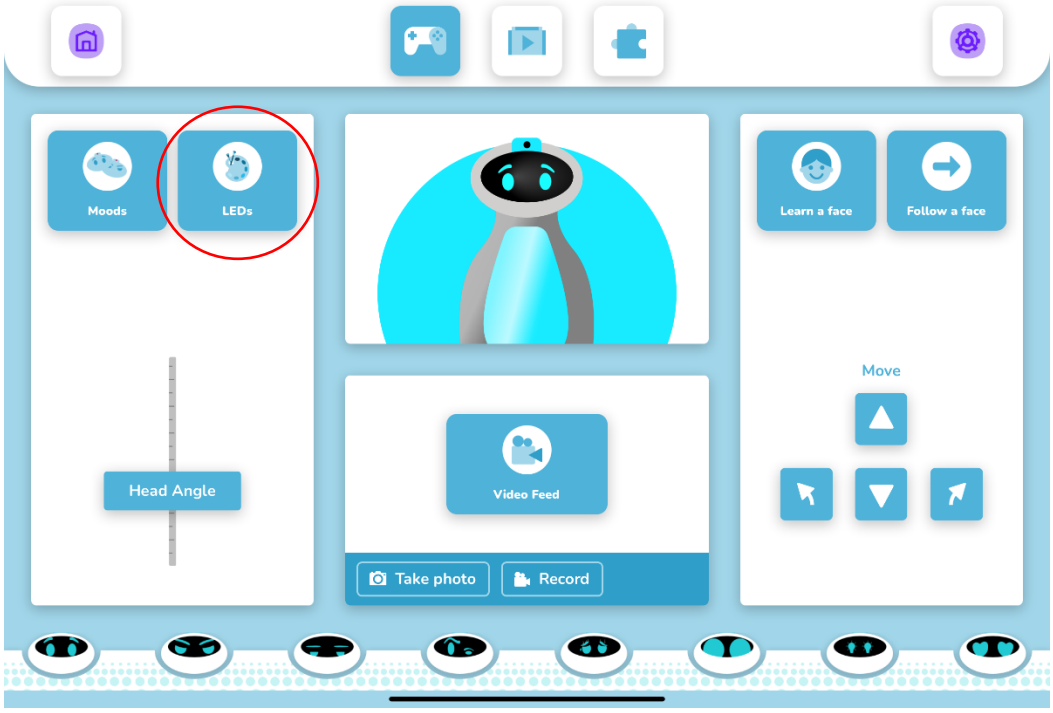


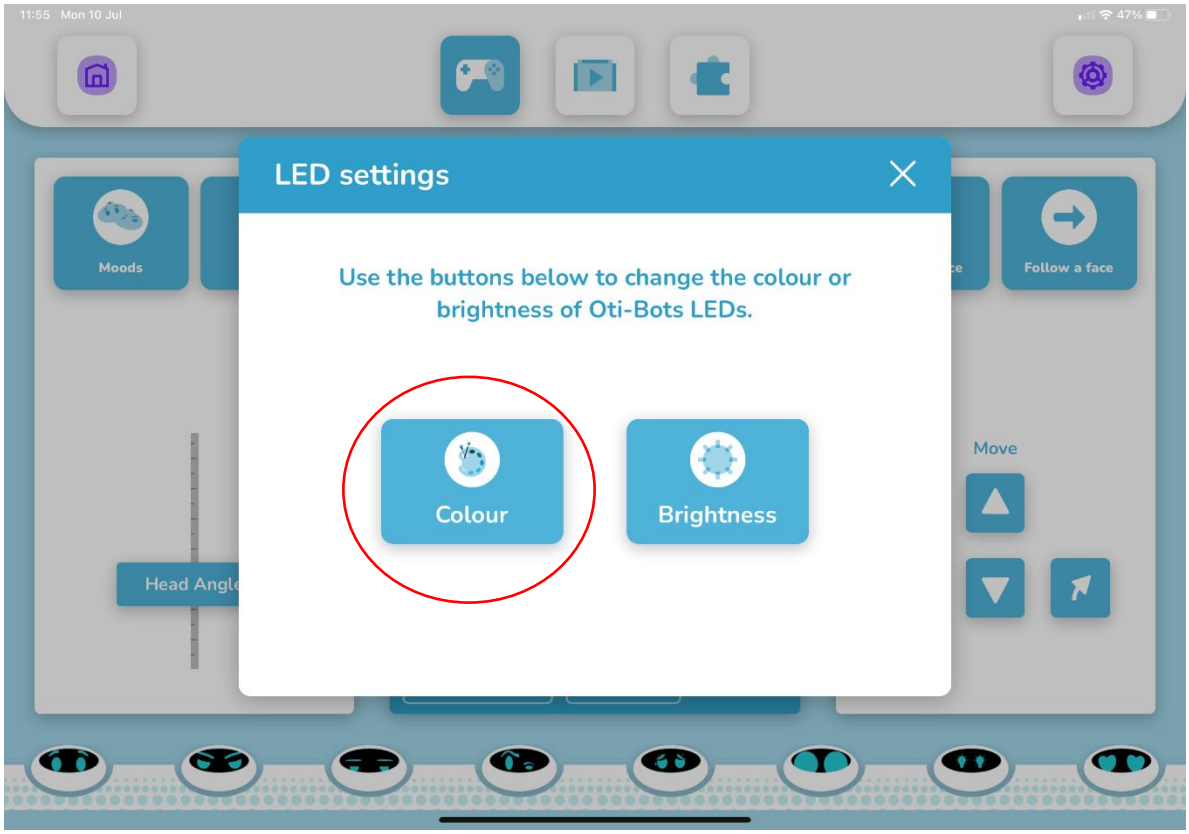
When Oti is in Line follow mode but still looking for a line, he will display the following image on his face:

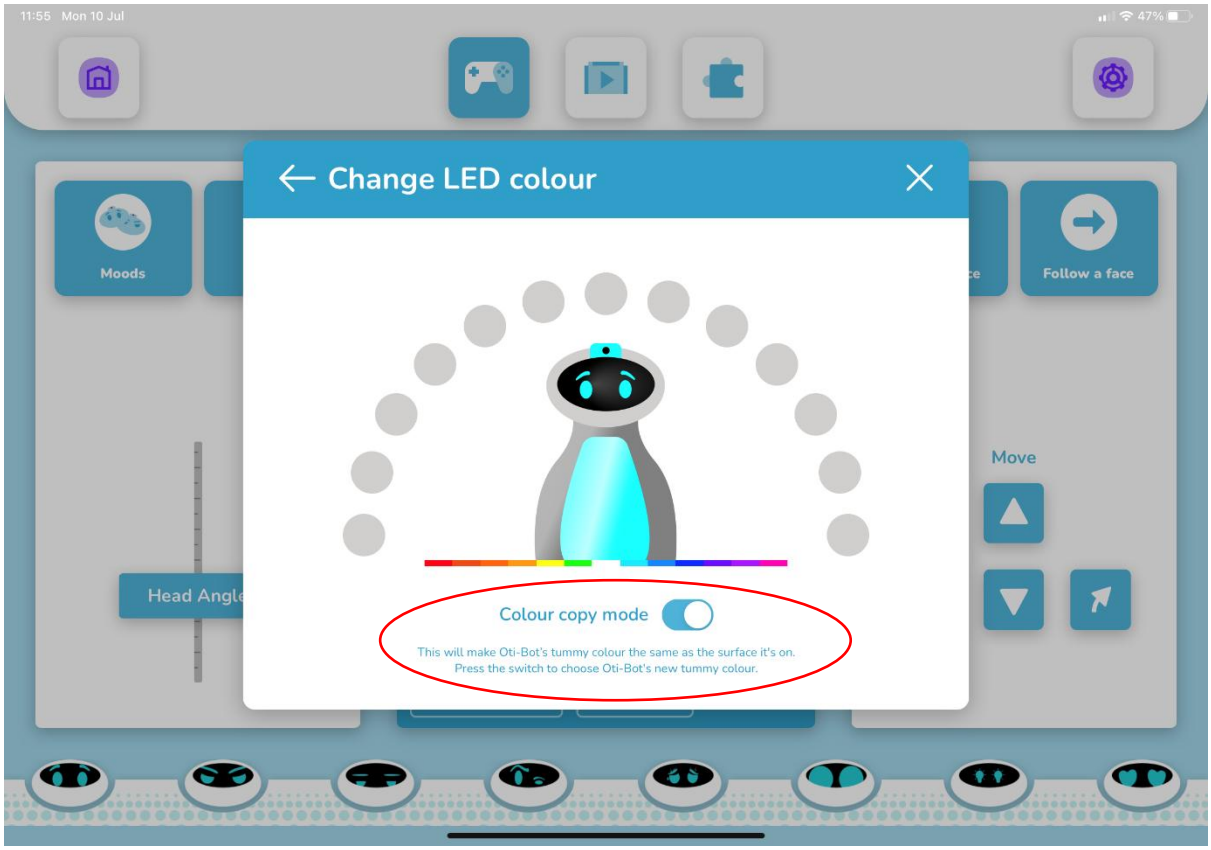
COLOUR SENSOR

Oti also has a colour sensor which sits underneath between the pen holder and the line follow sensor. This can be used to detect which colour Oti is currently travelling over. Oti-Bots colour sensor can be used in control and programming mode.

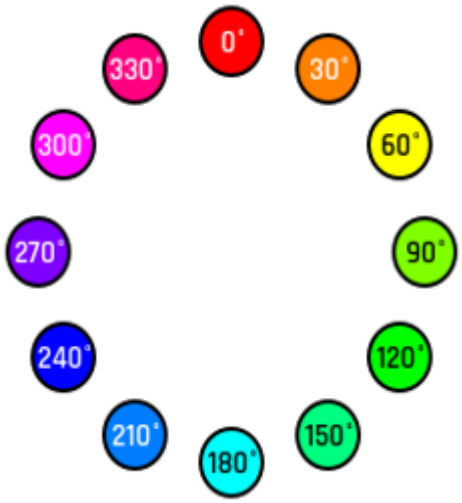
In control mode it is possible to turn Oti-bot into a chameleon and change the colour of his tummy and mohawk in line with the colour he is sat on.



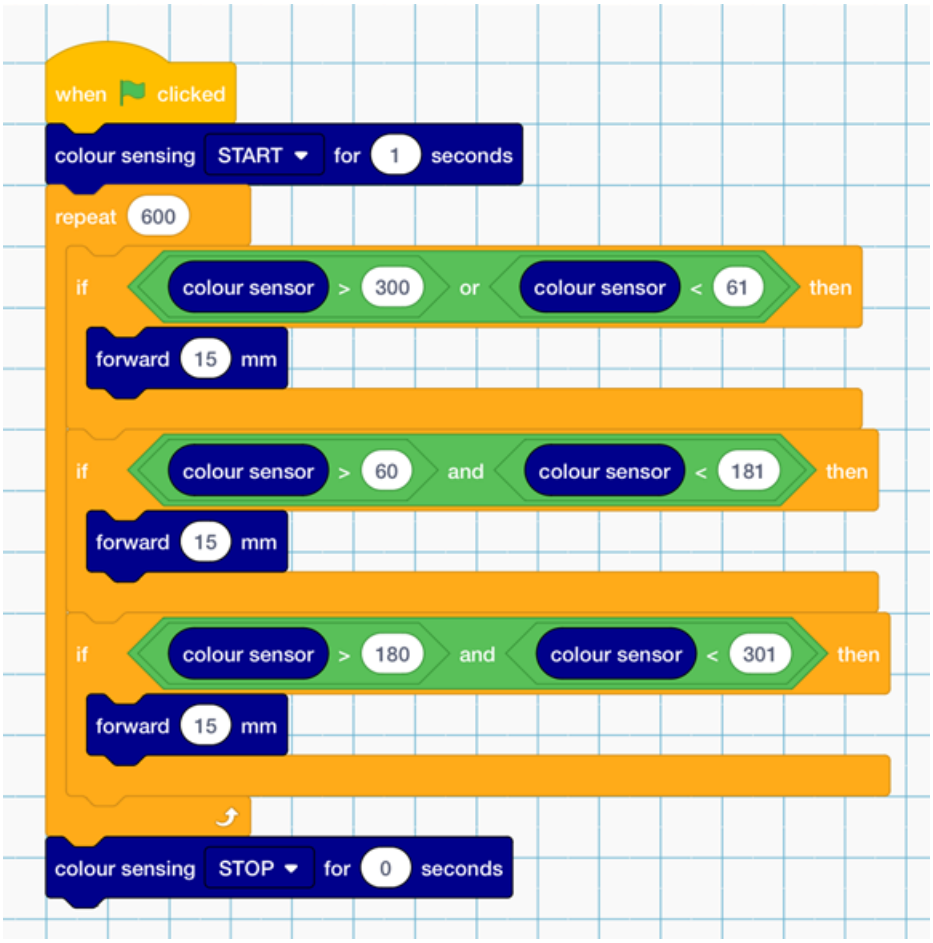




When using the colour sensor with Oti-Bot's blocks it is necessary to use a numeric value to calculate the sensed colour. This value is equal to its place on the colour wheel, and is broadly split into the values below:



Here is an example of how Oti may be programmed to move dependant on the colour he is sat on.



WHAT CAN I DO WITH THE CAMERA?

Oti-Bots camera can be used for a variety learning opportunities. Oti-Bot can take recordings which can be used for editing into digital artifacts at a later date, or he can livestream for an in class collaborative experience. Additionally Oti-Bot can be used to read QR codes in a variety of engaging ways, including through user programming and Teaching Assistant Mode.

READ A QR CARD ON STARTUP

When Oti-Bot is booted up he displays a QR code on his face ready to connect to a tablet. During this period, whilst he is not connected to a tablet device, he is also ready to accept a QR code from the set of cards included in his box.

Holding any of the QR codes to Oti-Bot's face during this period will result in him playing the action on the card.

The QR codes corresponding to the different emotions can be used in a variety of engaging ways, for example each student could choose an emotion to show Oti-Bot as they enter the class to say hello to him or the QR codes could be used on the bottom of worksheets to allow Oti-Bot to praise the student on their work.

Each Oti-Bot is supplied with a set of cards in his box, however should you need extra copies please find a digital version here:


OTI-BOT


OTI-BOT


OTI-BOT

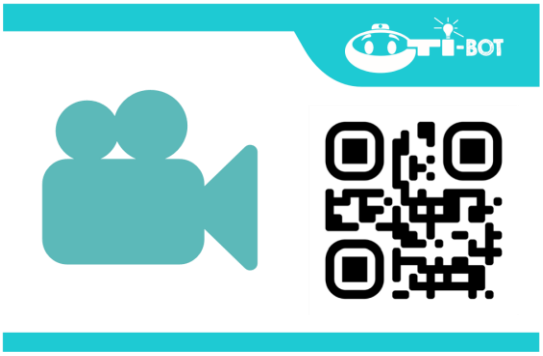

OTI-BOT


OTI-BOT


OTI-BOT

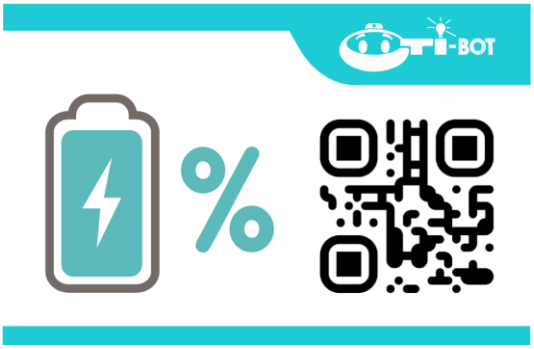

OTI-BOT

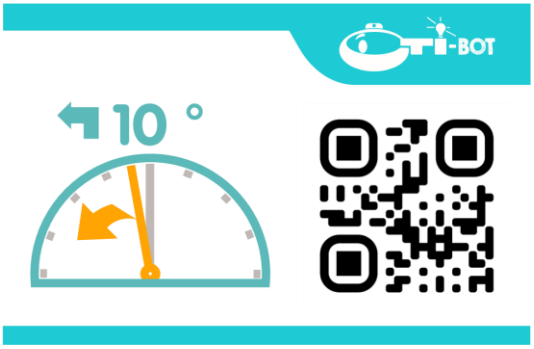

OTI-BOT

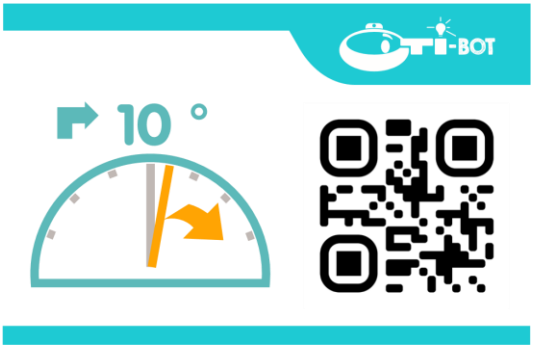

OTI-BOT


OTI-BOT


OTI-BOT


OTI-BOT

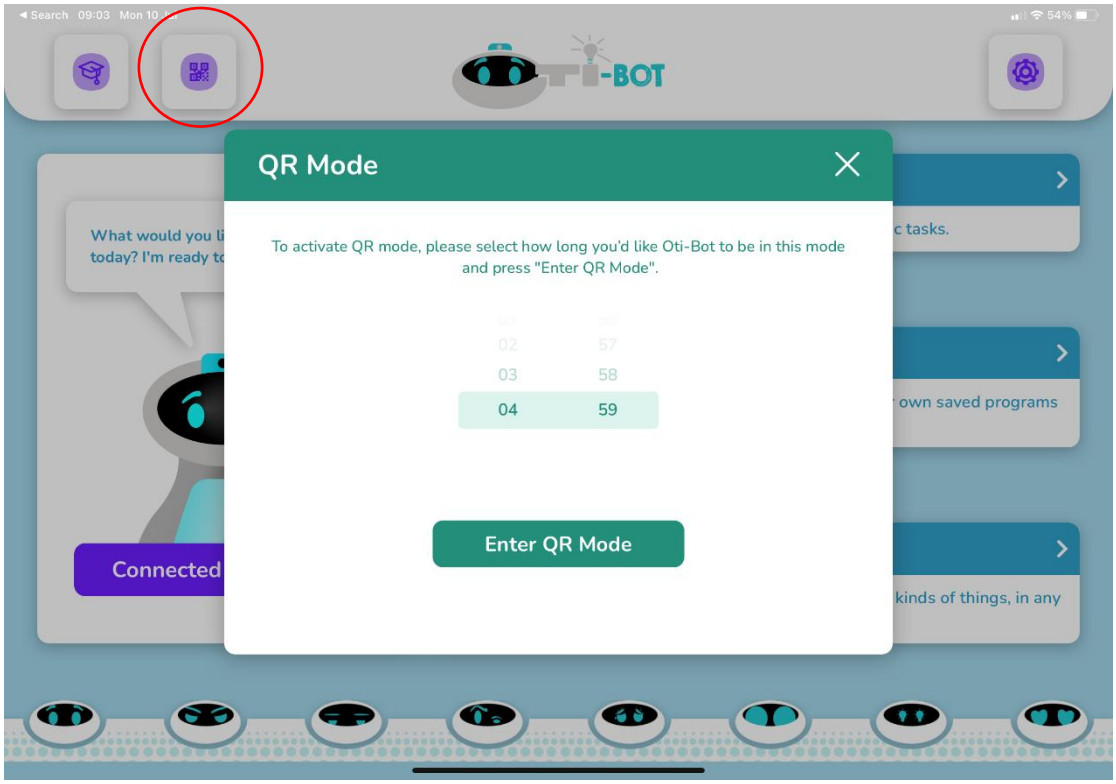

OTI-BOT
10 °


OTI-BOT
10 °

RE-ENTER QR CARD MODE WHEN CONNECTED

Should you wish to re-enter QR code mode when connected to the tablet you can do this from the settings menu. This will allow the user to be connected via a tablet device **and** read the QR code cards.

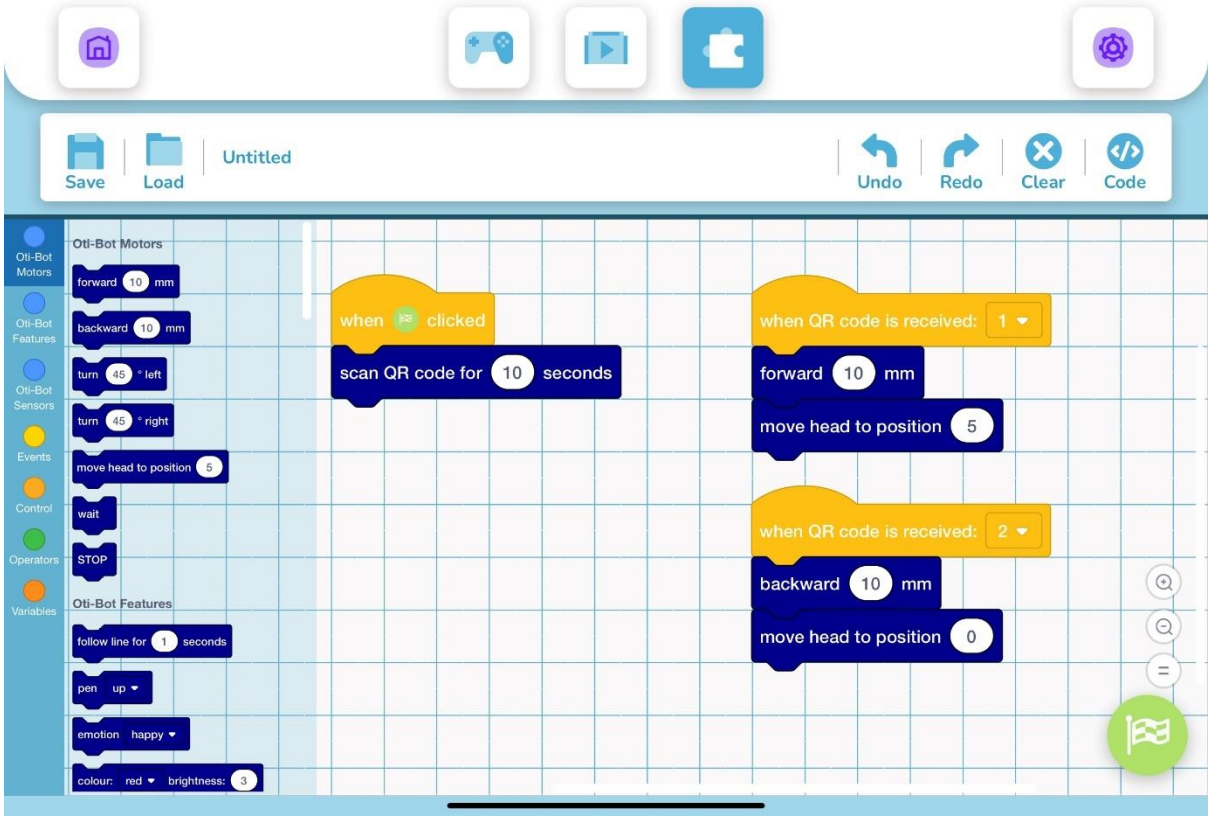
To do this select QR mode from the top left of the home screen and then select the duration of time you would like to remain in this mode:



READ A QR CARD IN PROGRAMMING

Additionally Oti-Bot can also read QR codes as part of the programming. This is a great way to introduce **sub-routines** to your class. To facilitate this please use the trigger QR codes found printed in Oti-Bot's box or additional copies here:

Below is an example of how the QR code listener can be activated for a specified amount of time and what will happen when Oti-Bot find either #1 or #2

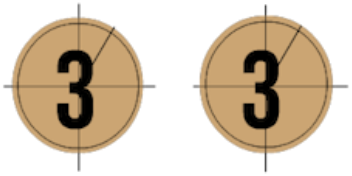


TAKE A PHOTO

Oti-Bot can take a photo in three different ways:

1. Using a QR trigger card
2. From the control screen
3. When programmed to do so

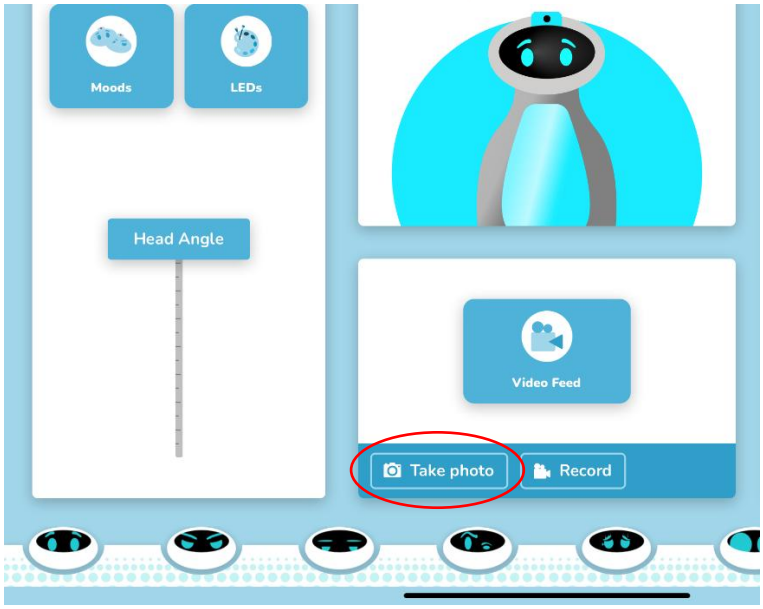
In all cases the user will be given a 3 second countdown timer which looks like this:



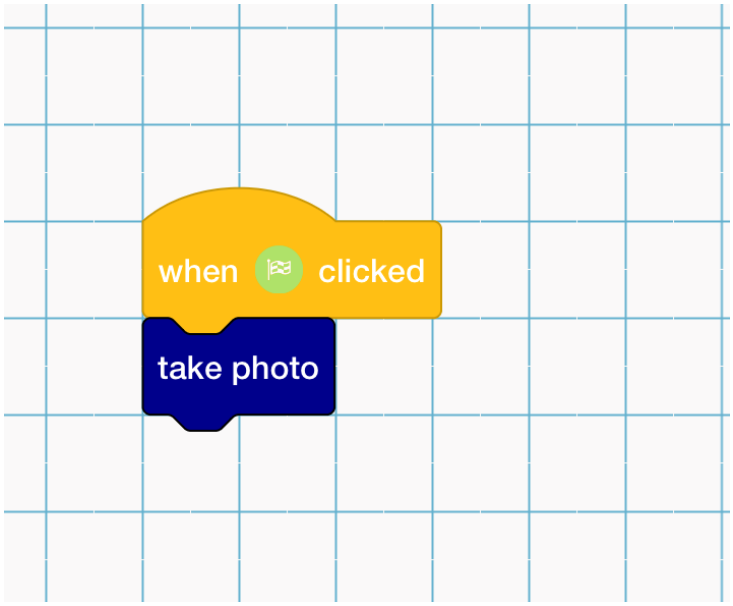
And in all cases the photo will be stored to Oti-Bot's internal memory.

Use the following trigger card when in QR mode to take a photo:

Use the following button in control mode:



Use the following block to take a photo when programming Oti-Bot:

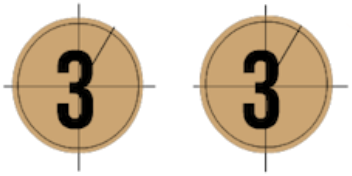


TAKE A VIDEO

Oti-Bot can record a video in three different ways:

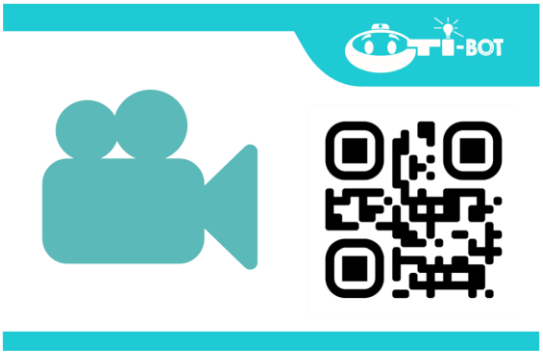
1. Using a QR trigger card
2. From the control screen
3. When programmed to do so

In all cases the user will be given a 3 second countdown timer which looks like this:

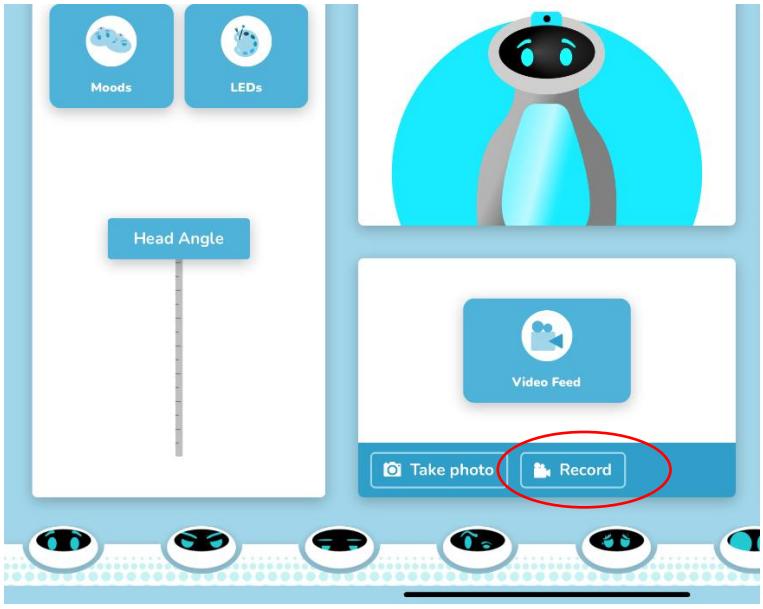


And in all cases the video will be stored to Oti-Bot's internal memory.

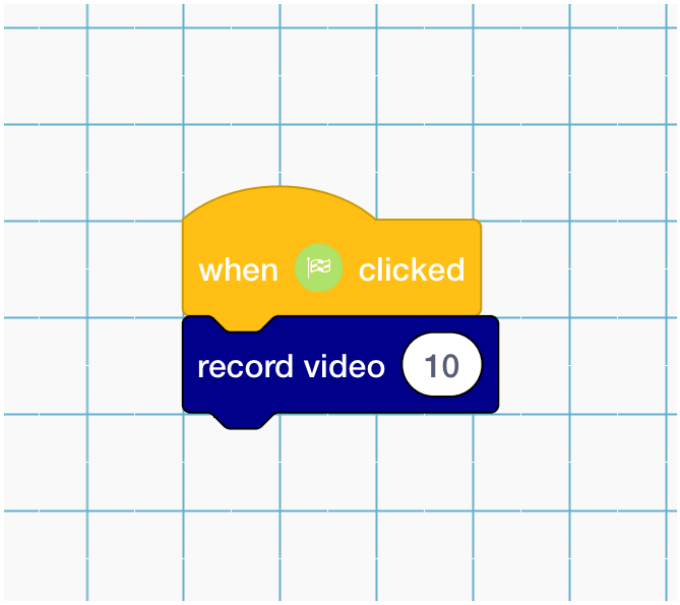
Use the following trigger card when in QR mode to record a 10 second video:



Use the following button in control mode:

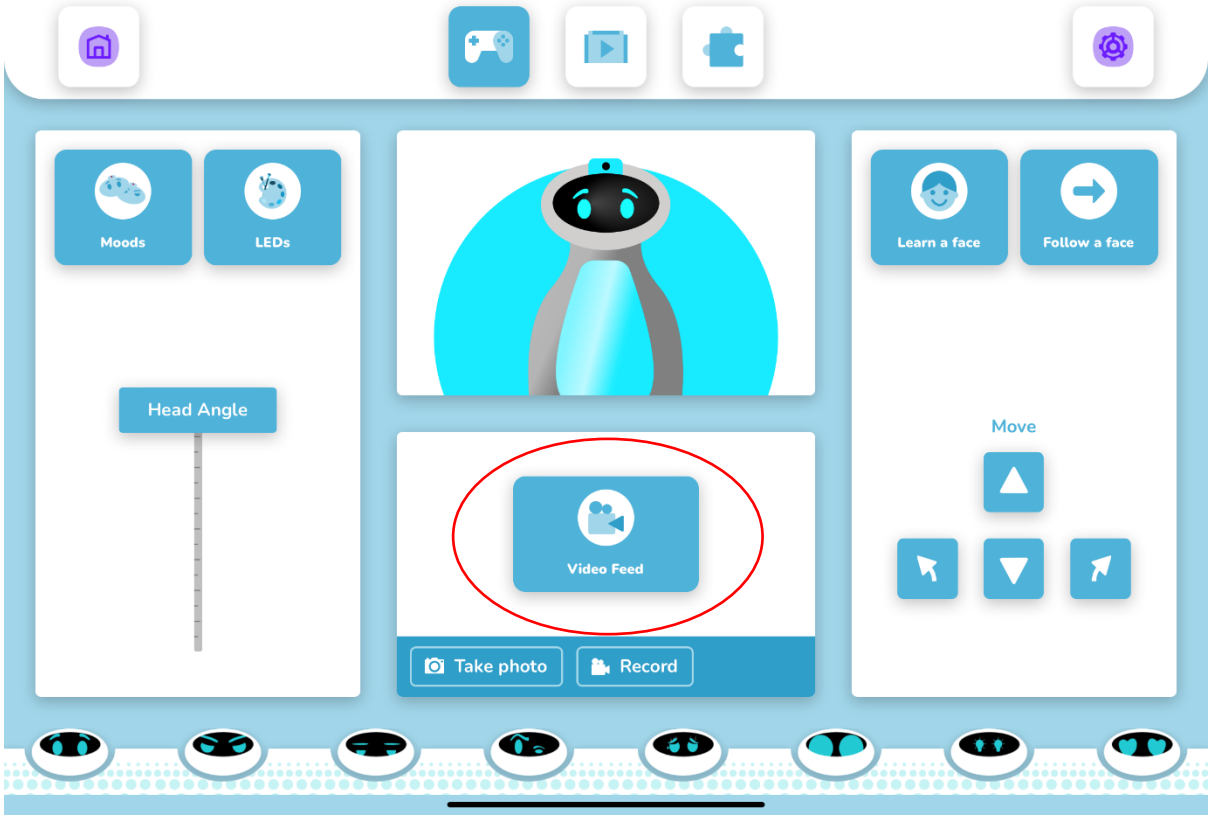


Use the following block to record a video when programming Oti-Bot, note the variable [10] can be changed to the desired length of your video:

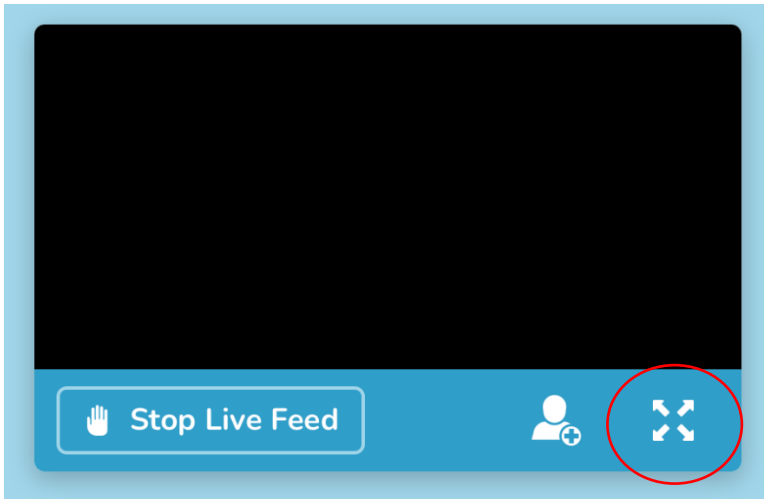


LIVESTREAM

Oti-Bot's ability to livestream offers collaborative and engaging opportunities in your classroom. To begin the livestream; connect to your Oti-Bot, navigate to the control screen and click "Video Feed" as shown here:

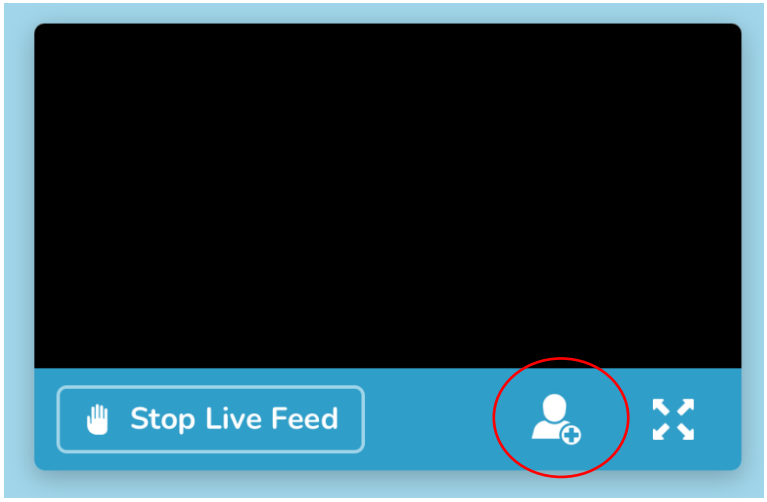


Once livestream is initiated you are able to make this a full screen viewing experience by clicking the expand button. When in full screen mode the user still has access to controls to move Oti-Bot's body and head position.

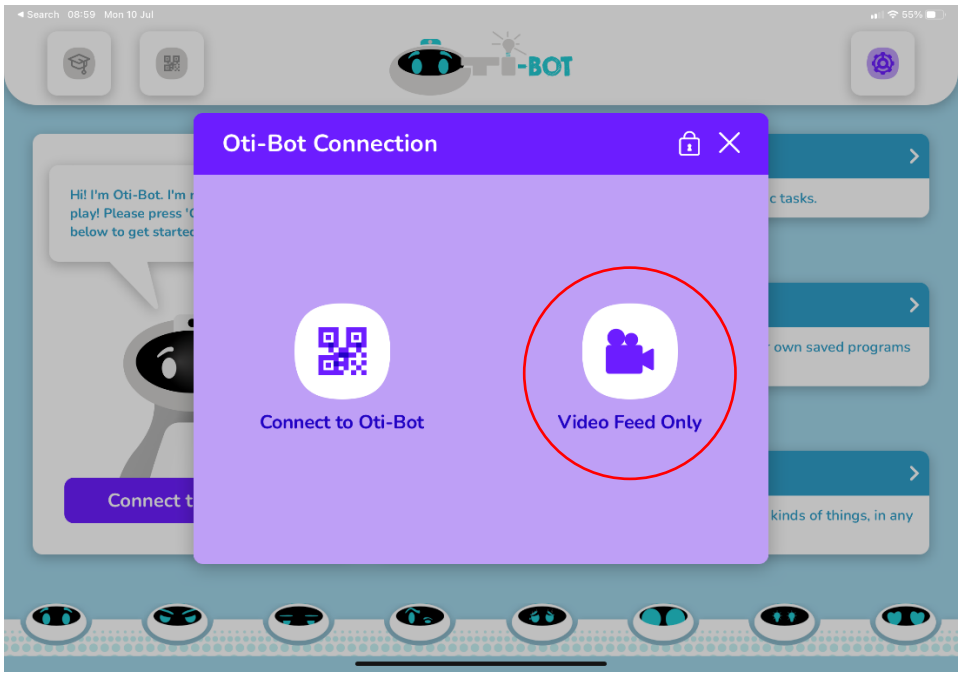


ADDING A SECOND VIEWER TO THE LIVESTREAM

Additionally you may add an additional viewer to the livestream by clicking here:



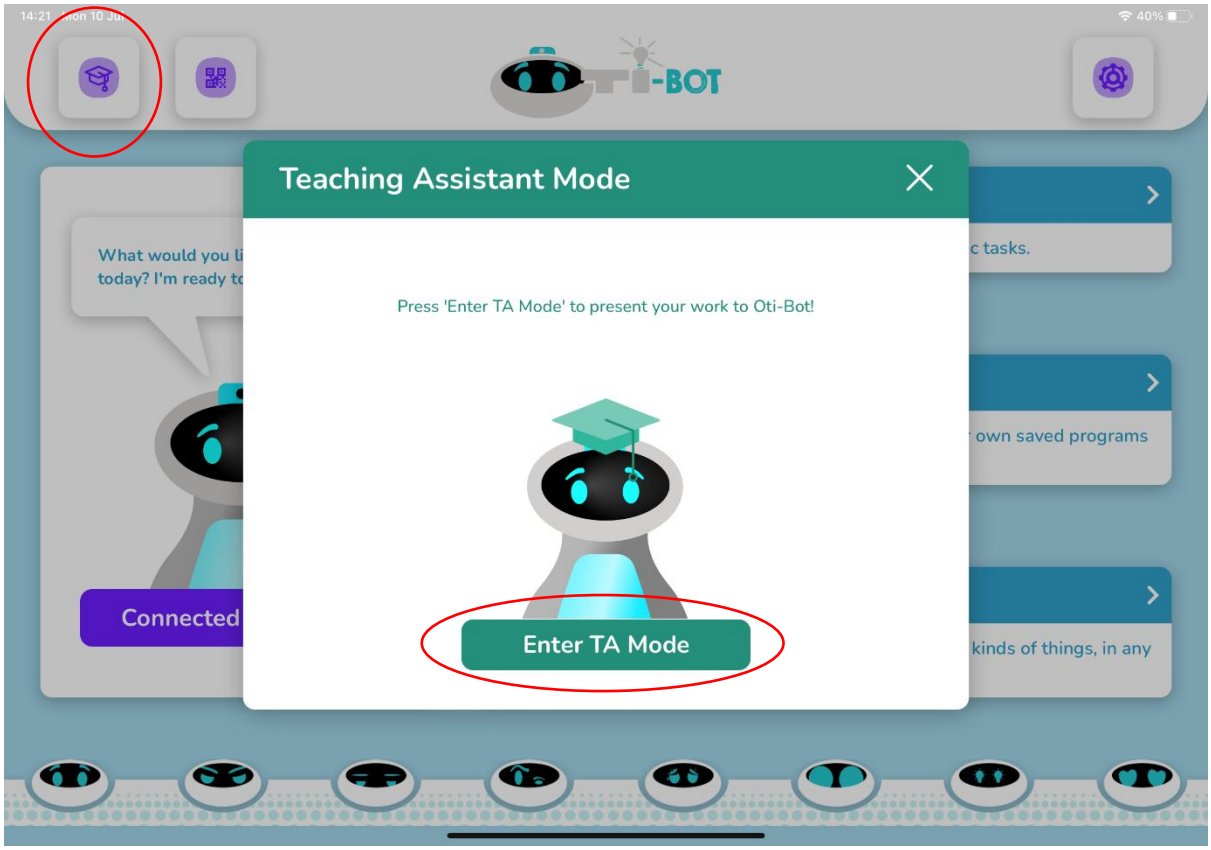
This will change Oti-bot's face to a QR code the second user can connect to. It is important that when connecting, the second viewer chooses to connect as **Video feed only.**



TEACHING ASSISTANT MODE

Oti is capable of helping out in your classroom as a means of capturing, storing and organising student work.

To enter TA mode click the Morter board hat icon on the home screen and then **Enter TA Mode**, this will initiate TA mode for 15 mins.

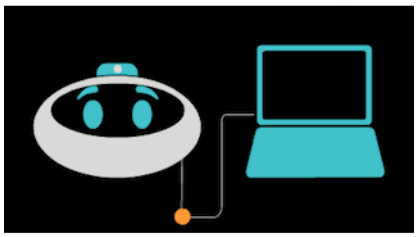


Oti-Bot can organise 99 different students work into the correct folder. To do this a student must be assigned a unique QR code from the Student QA code list.

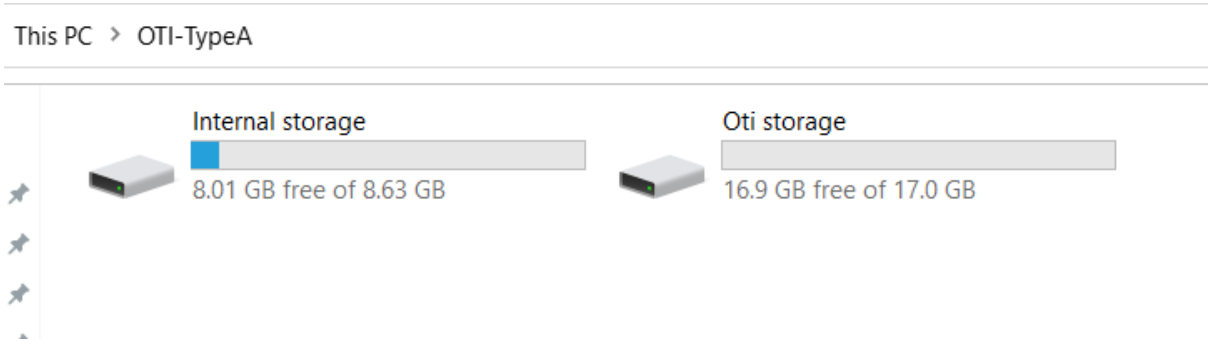
When Oti is presented with a unique QR code he can photograph the students work and save it into the unique folder, i.e. All work photographed with the Student 1 QR code will be saved into the student 1 folder. Oti-Bot will give a countdown and an opportunity for the student to correctly position their work in the frame by using his face as a screen.

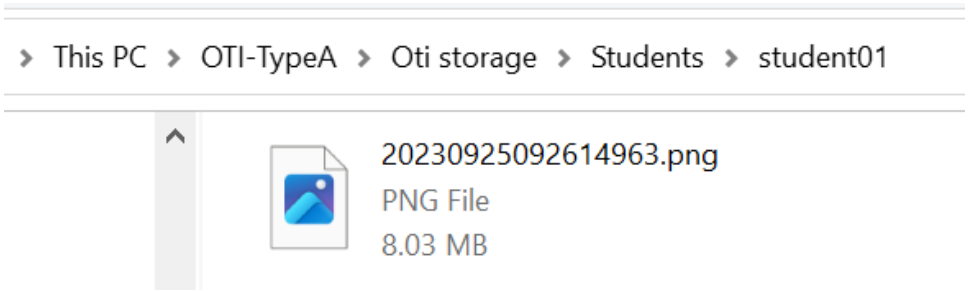
To access the files, plug Oti-Bot into a PC using his USB cable.

Oti-Bot will show the following face when he is correctly connected, if this does not display you may need to request access permission to use the USB on your school computer.



Once Oti is plugged into your computer you will be able to see two volumes:





Example Student Folder Location.

QR CODES – TA MODE STUDENT IDS 1 – 9

		
STUDENT01	**STUDENT02**	**STUDENT03**
		
STUDENT04	**STUDENT05**	**STUDENT06**
		
STUDENT07	**STUDENT08**	**STUDENT09**

GENERATING IDS FOR STUDENTS 10-99

It is possible to create 99 student IDs for Oti to recognise and record. Each ID will prompt Oti to take a photograph of the students work and store this in the unique student folder #1 -99.

To create additional QR codes, simply use an online code generator and set the code to create from text “student10”,”student11” etc.

HOW DO I UPDATE OTI?

Periodically it will be necessary to apply a Firmware update to your Robot, this may be to apply known bug fixes or to add new features to your robot. Should you purchase a new tummy for Oti you will be required to update both your robot and the app through the correct app store.

To check the software version your robot is running please scan the QR code below after boot up.

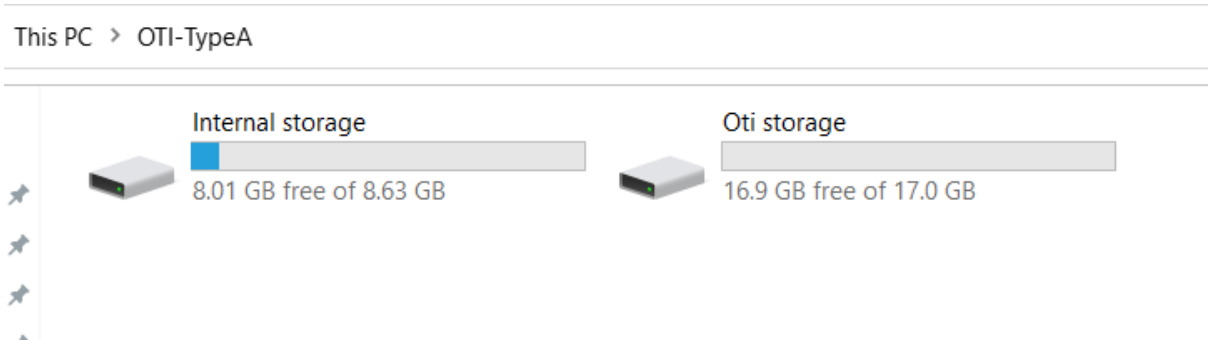
DOWNLOADING A NEW UPDATE

Please refer to the following link for information on downloading an update:

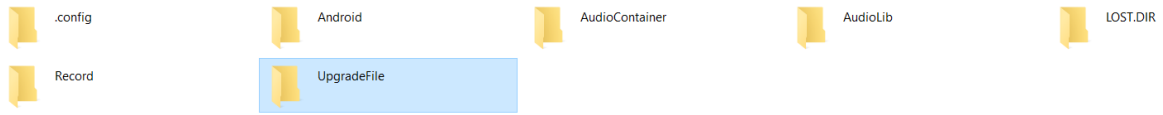
[Buy Oti-Bot | TTS (tts-group.co.uk)]

INSTALLING A NEW UPDATE

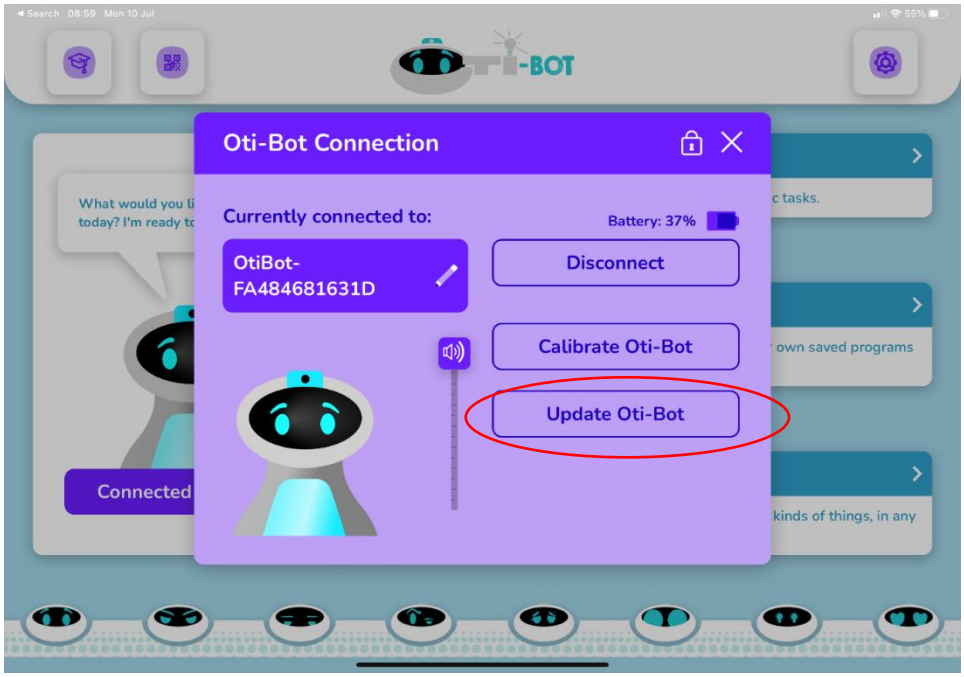
To Install a new update you need to plug Oti-Bot into a PC and navigate to **Oti Storage:**



Select the folder called UpgradeFile as shown here:



Within this folder drag and drop the upgrade files into the correct folder. It will be clear in the download whether you have been provided with an APK, an MCU or both.

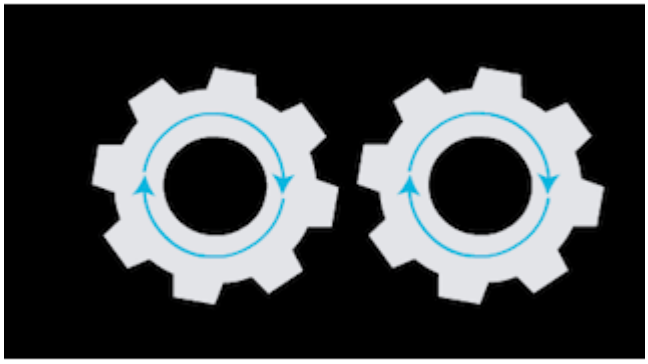


Once the files have been moved into the correct location disconnect Oti-Bot from your PC. Connect Oti-Bot to your tablet device and upon connection select the **Update Oti-Bot button**, the update will now run.

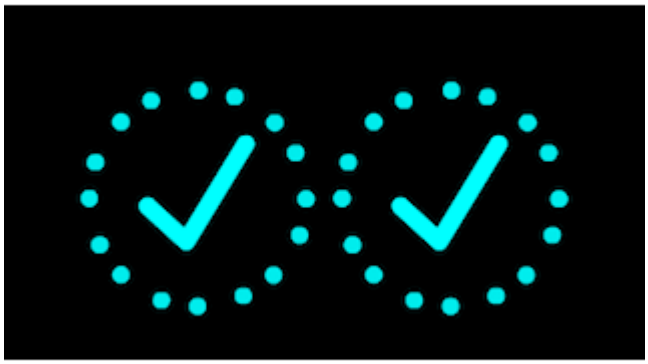
Alternatively you are able to show Oti the following QR code to the same effect. This will also initiate the update and may be more useful if you are updating many units at one time.

Oti-Bot will display the following faces during the upload process;

Update in Progress:



Update Successful:

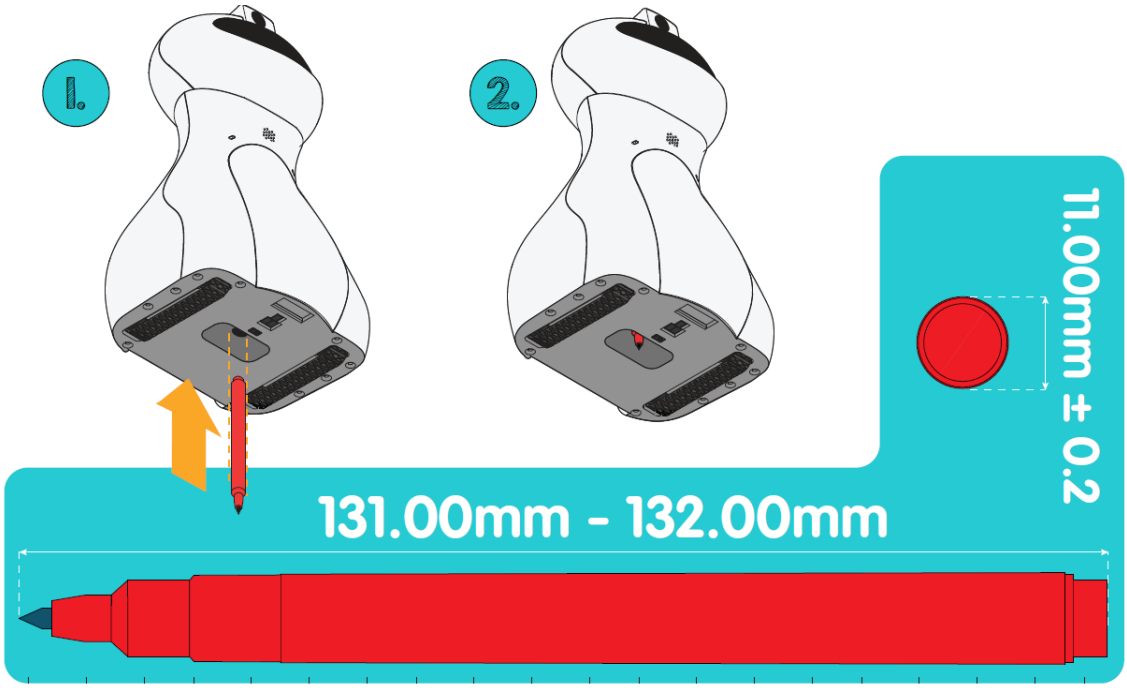


Update unsuccessful/update files not found:

HOW DO I DRAW WITH OTI?

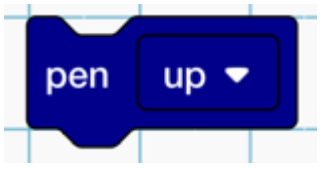
INSERT THE PEN

Oti-Bot has a pen mechanism which allows the pen to be lifted and lowered in his program. To inset the pen correctly please first remove the cap and then push the pen into the pen holder with the nib visible from the underside of Oti-Bot.



PEN UP, PEN DOWN

The Pen can be mechanically lifted and lowered using this block:



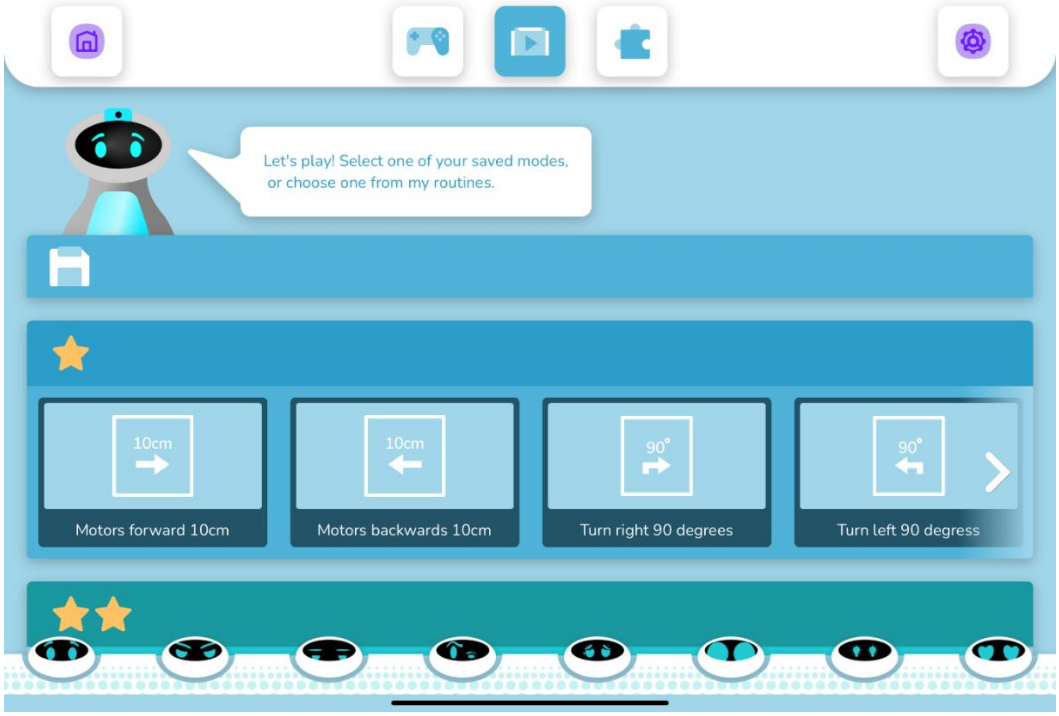
When the pen is up it will not make contact with the desk or paper and will not draw.

Please do not leave a pen in Oti-Bot for extended periods of non-use as it will dry the pen out. Please do not put the lid on the pen whilst held in Oti-Bot's pen holder. Never insert the pen with the lid on, always remove the lid first.

EXAMPLE ROUTINES

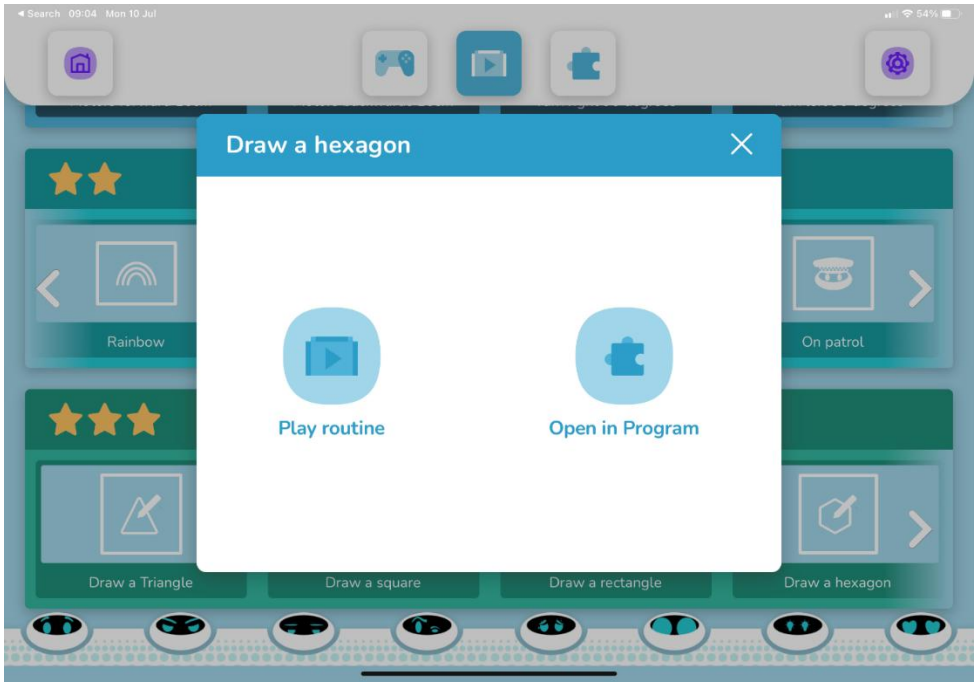
A wide variety of pre-programmed routines can be found in Oti-bot's Play Library. These are ranked in complexity from one star to three stars.

Additionally any saved student work will appear in the top row, in the order that it was saved.

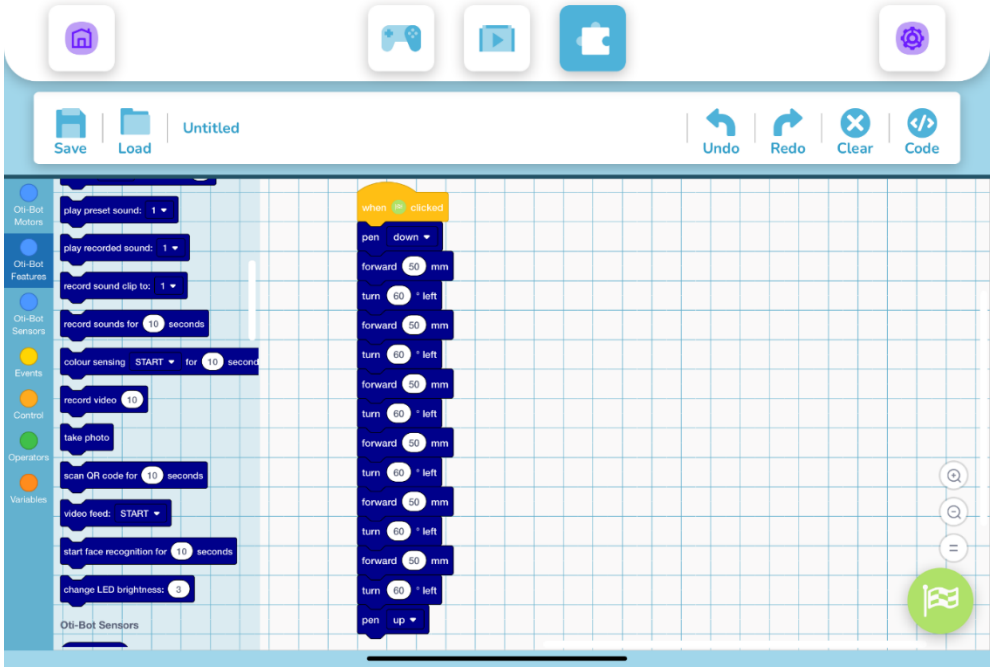


In the three star section are a number of pre-set shape drawing routines, as shown below:

For each pre-set program there are two options, you can play this directly or open the program to view in blocks:

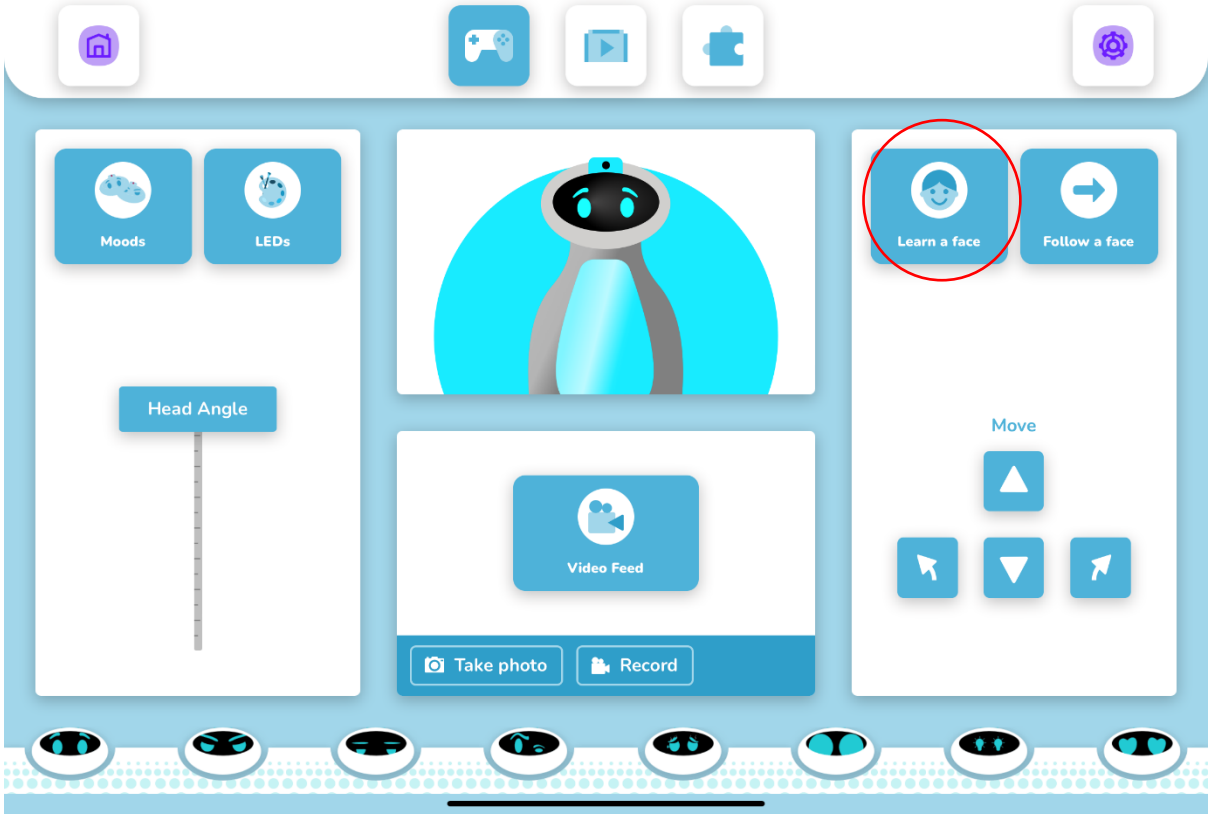


From here the user can either press the green flag to play or modify the program first.



HOW DO I USE MACHINE LEARNING TO TRAIN FACES WITH OTI?

Oti-Bot is capable of learning and recognising up to 40 faces.

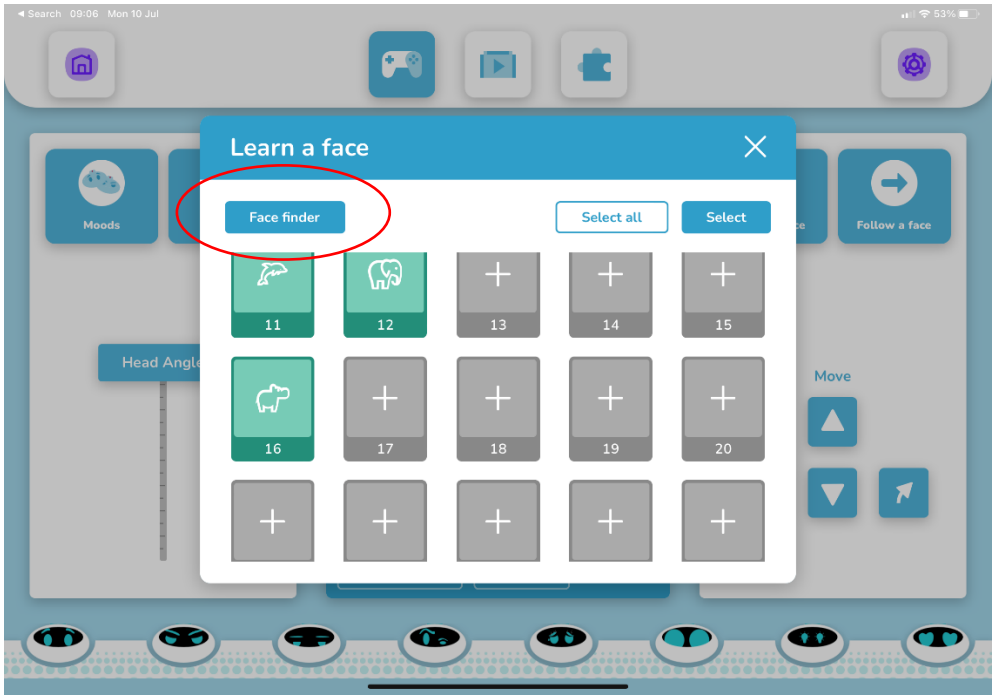


All of the training takes place in the “Learn a Face” module found here on the right hand side. There are spaces for 40 faces to be stored in 40 slots. Each slot will turn green once a face is stored there, otherwise it will be grey if it is empty. Once a face is trained the green slot will also display a number and an animal avatar. No name data is stored against the faces for security, the student must remember which slot they are saved in and/or their avatar. Alternatively they can use the face finder button if they forget these details, to determine which slot belongs to them.

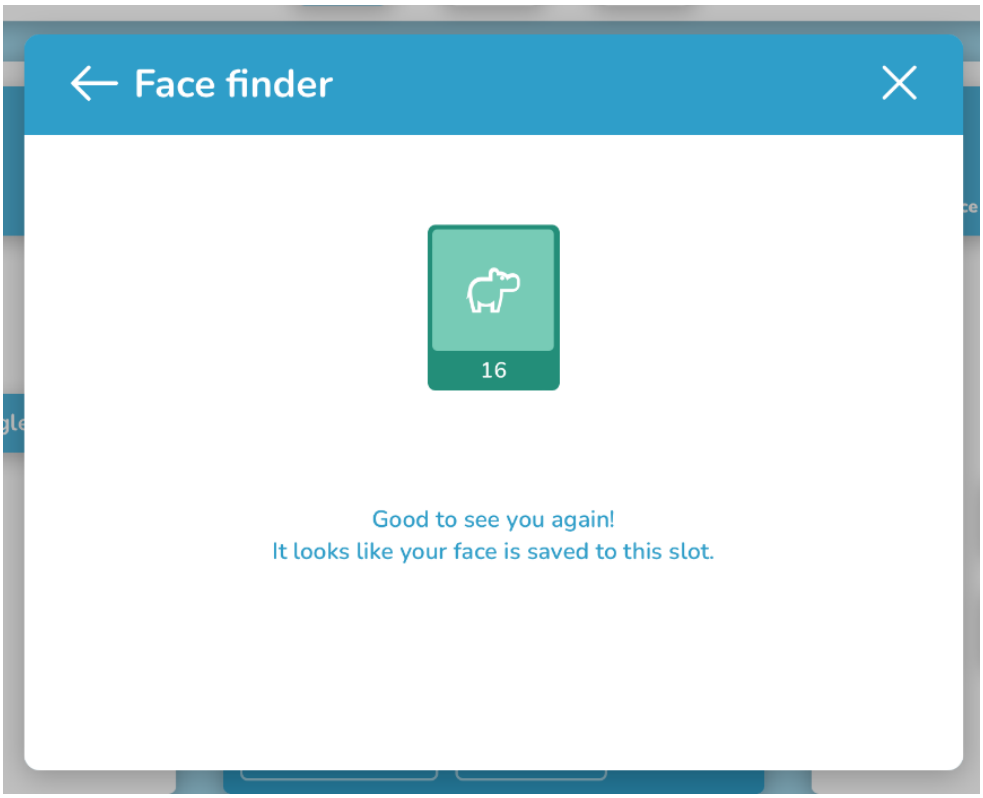
Face data is saved in the **app** not the **robot**. Therefore each different tablet device used with Oti-Bot can be used to store 40 unique faces. If one Oti-Bot is shared amongst multiple classes, but each class owns their own tablet, each class can be stored on the each class tablet.

HOW DO I SEE IF MY FACE IS ALREADY IN THE LIBRARY?

Here you can see that slots 11, 12 and 16 already have faces stored. Should you wish to remind yourself of which slot your face is stored into you can press the face finder button shown here:



Oti-Bot will open his camera, look directly at him keeping your face inside the red square on his display. If Oti-Bot recognises you he will let you know which face you are, if not he will tell you that he does not recognise you.



HOW DO I ADD A FACE TO OTI'S RECOGNISED LIBRARY?

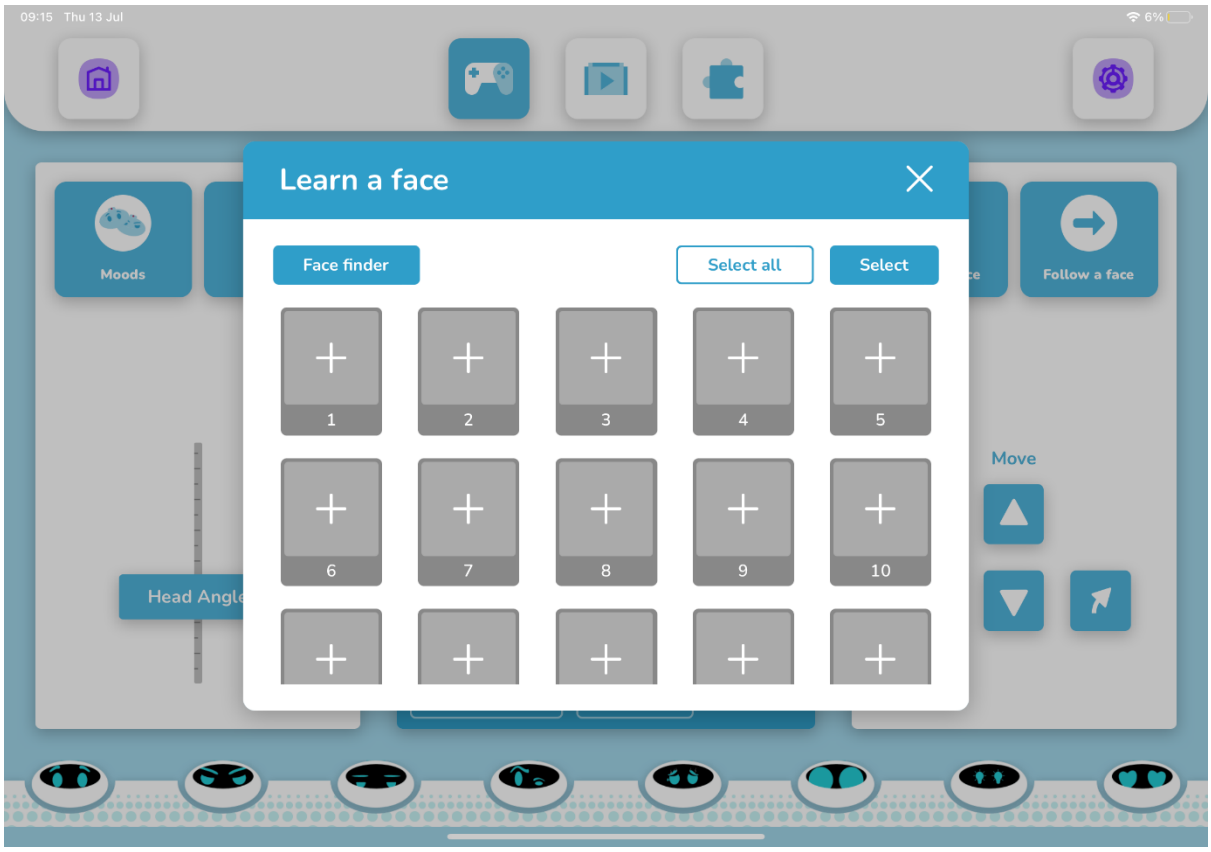
Prepare Oti-Bot before you begin, he will need to be able to see you clearly. Place him on a flat surface in front of you and if necessary adjust the angle of his head to face yours. Where possible avoid any bright lights behind you, do not sit with a window directly behind you.

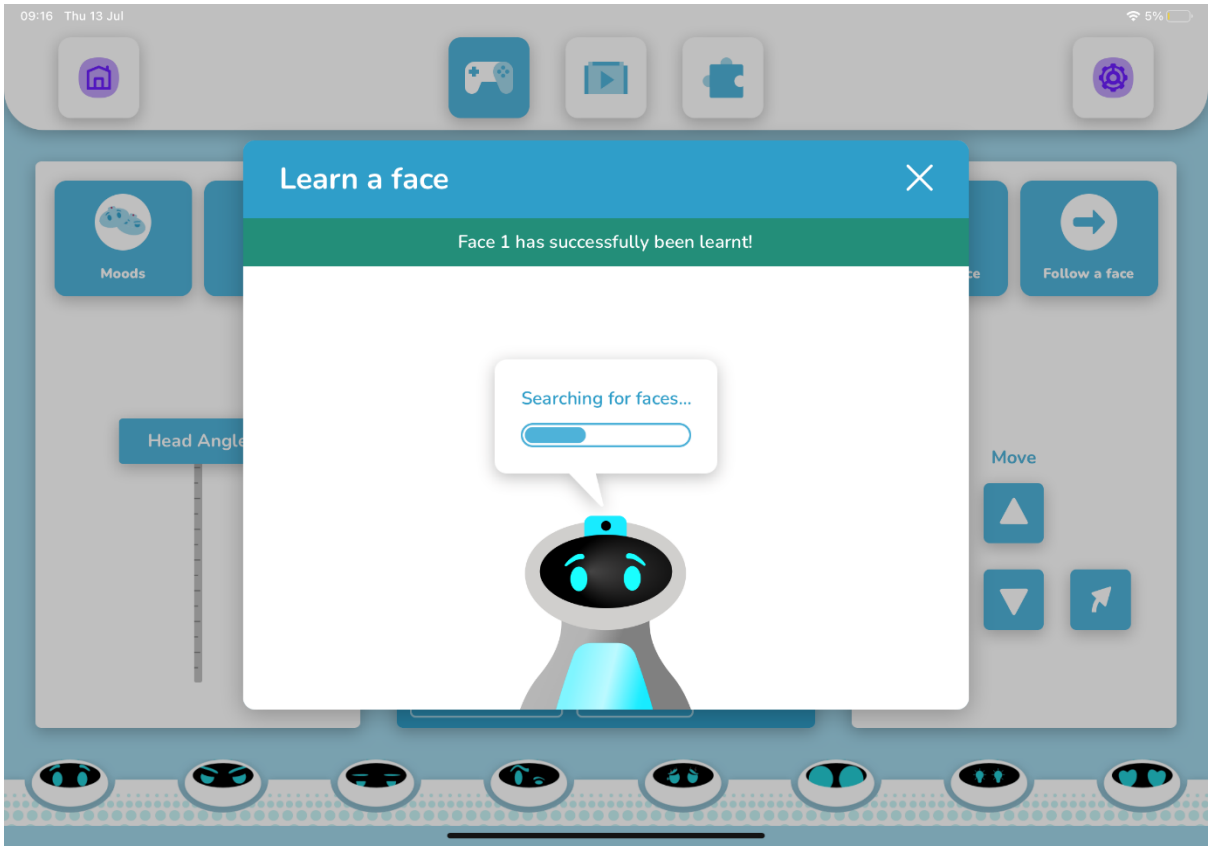
In the app click any empty slot to save a face to it. For this example I will click slot 1 – however you do not need to select them in a sequential order. When you select a slot Oti-Bot will open his camera to look at your face.

- Press Grey Slot-1.
- See Learn a New Face Dialog Box.
- Press Find Face.

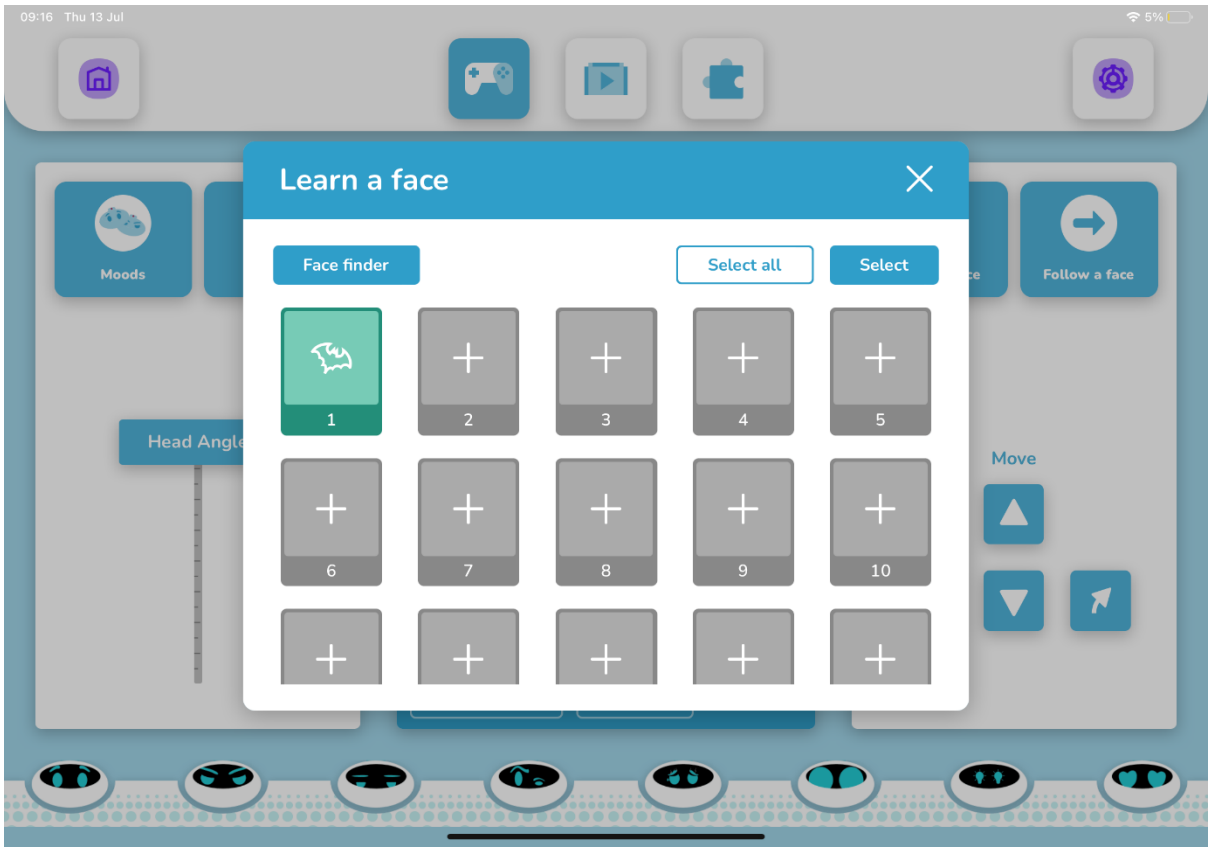
Oti-Bot will open his camera and wait for you to position your face in the red square on his display. Once Oti-Bot has a clear view of your face he will count down 3,2,1 and save your face. He only needs to do this once, then return to the app to complete the process.

- When learnt the Slot will turn green and reveal the avatar associated with that Slot.



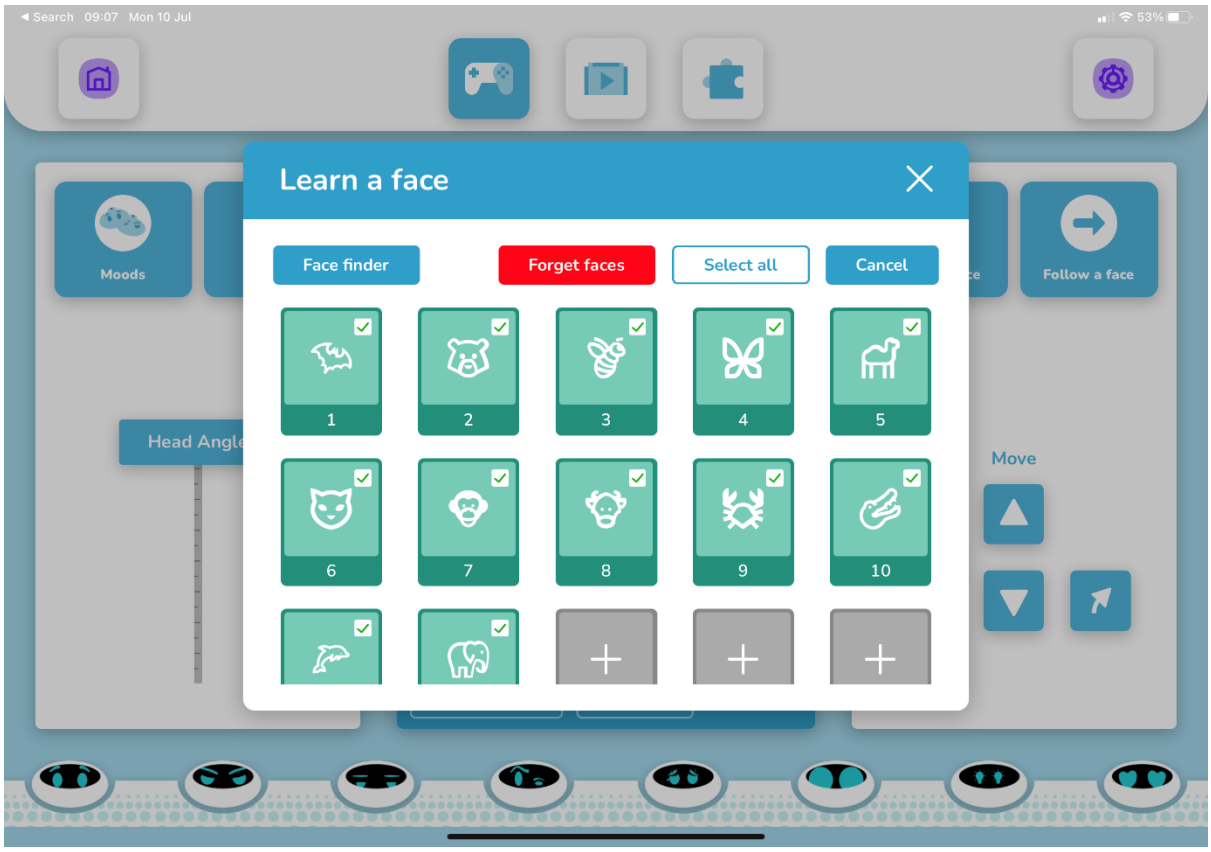


Oti-Bot's app will update to say "Face X has been successfully learnt!" The selected slot will then turn green and be assigned an avatar, as shown below:



HOW DO I DELETE A FACE FROM THE LIBRARY?

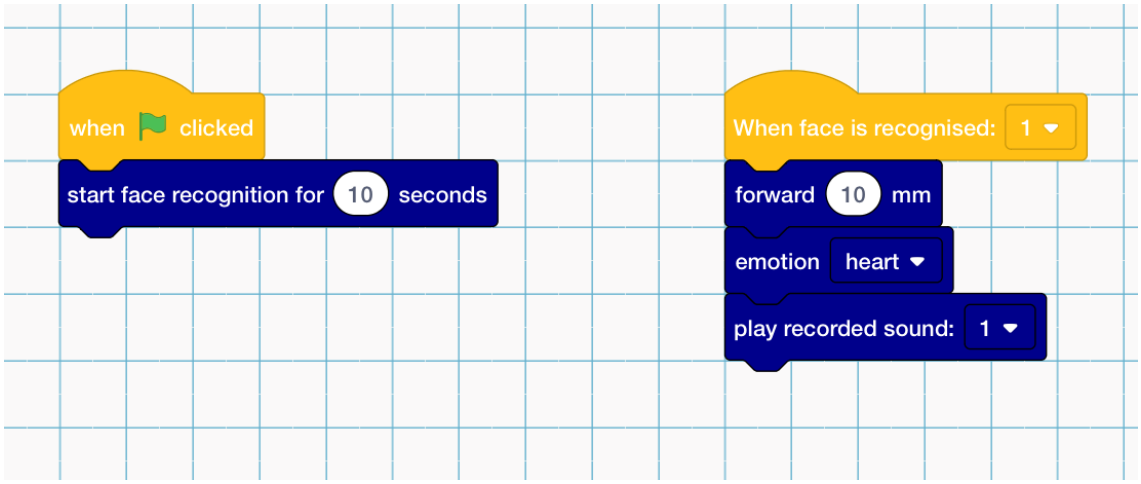
From time to time you may need to delete faces from the library, to do this use the forget faces button. Firstly click Select or Select All and make your selection by using the tick box in the top right hand corner of each. Then click Forget Faces to erase these from the library.



HOW DO I USE A TRAINED FACE IN A PROGRAM?

Once Oti has learnt a face it will be assigned a number in the face library. This number can then be used to recall the face in programming.

To use a trained face you need two subroutines. One that asks Oti-Bot to look for faces, and another that tells Oti-Bot what to do when it sees a face in the library.



Here you can see that both subroutines can run side by side.

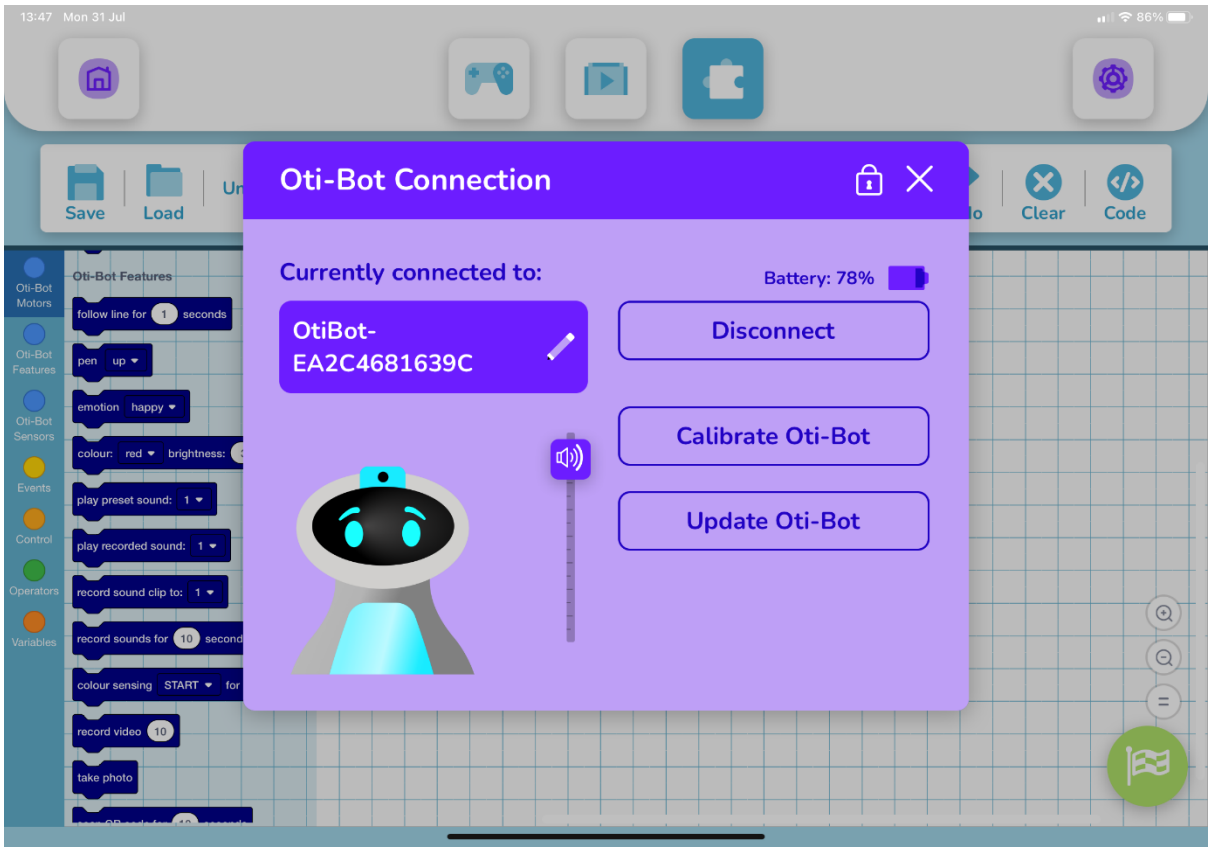
USING SOUNDS

HOW DO I MUTE OTI?

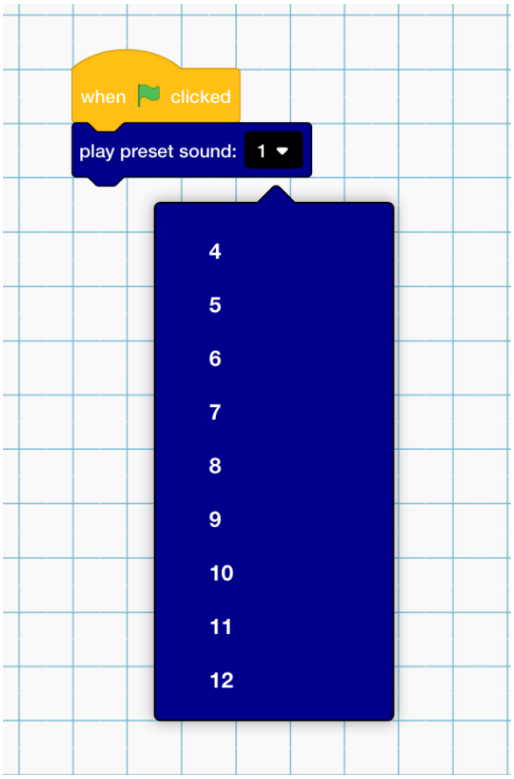
Oti-Bot has a physical mute switch next to his charging port. He can also be muted I the app by turning his volume to 0%.

HOW DO I CONTROL THE VOLUME?

Oti-Bot has a volume slider which can be used to turn down his volume in the app. This is accessed from the connection module. The connection module can be accessed by clicking the settings cog in the top right hand corner.



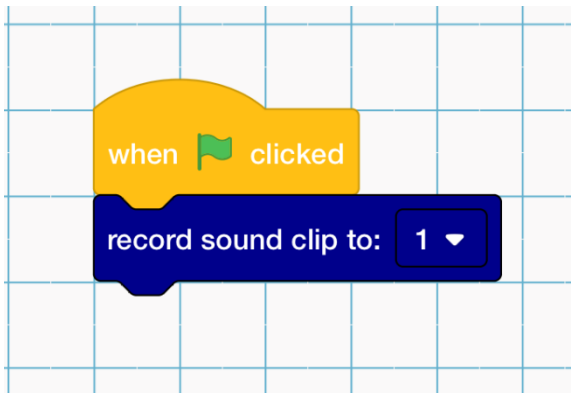
HOW DO I ASK OTI TO PLAY A PRESET LIBRARY SOUND?



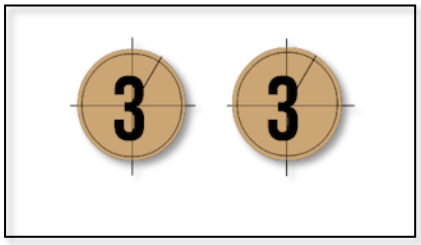
Oti-Bot has 20 preset library sounds. The full list can be found in Appendix B – Sound Library. Use this block to play the preset sound of your choosing.

HOW DO I RECORD A SOUND FOR OTI TO PLAY?

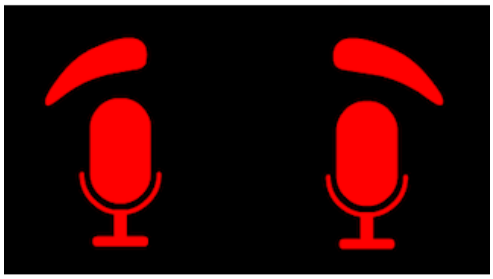
Oti-Bot has the ability to store up to 10 User Recorded sounds; referred to as Container Sounds. These are assigned a number 1 to 10. To record a sound create the following routine:



When you click the green flag Oti-Bot will prepare to record your audio clip. He will count down to prepare the user to begin, this will look like:



When Oti-Bot is recording his tummy will glow red and his eyes will display the following:



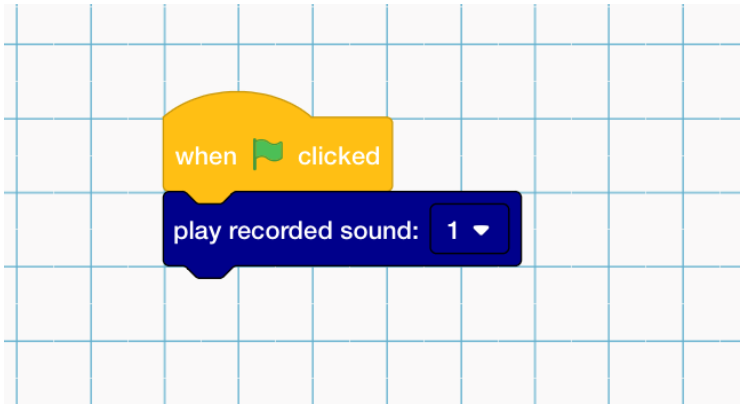
Each sound clip 1-10 is capable of storing up to 10 seconds of audio recording.

HOW DO I PROGRAM OTI TO PLAY A SOUND I HAVE PREVIOUSLY RECORDED?

Once a sound is stored into slot 1-10 it will remain there until it is deleted (by the user from the root folder on Oto-Bots storage) or recorded over.

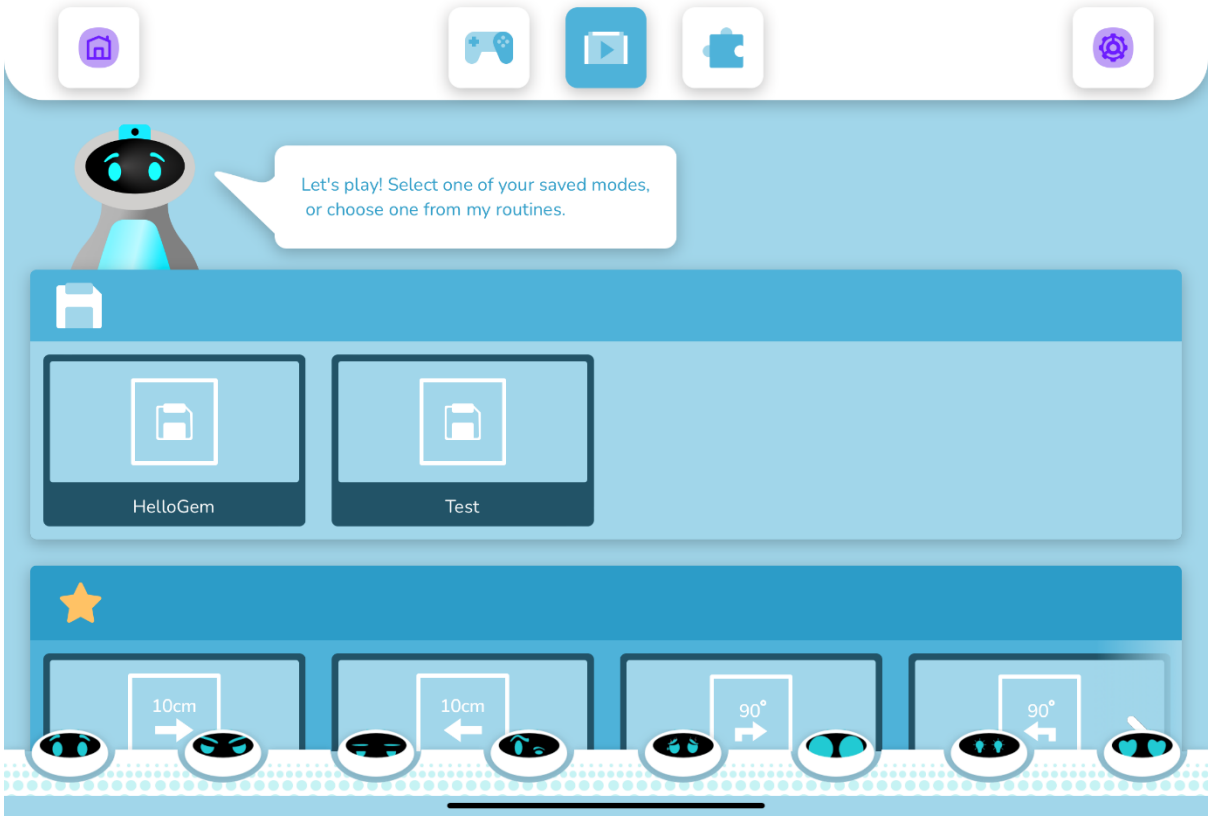
Container Sounds are stored in this folder:- This PC › OTI-TypeA › Oti storage › AudioContainer

To play the sound use the following block:

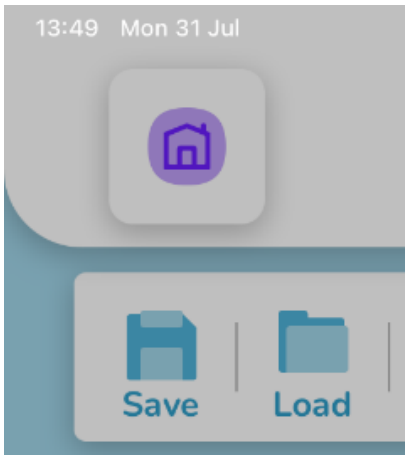


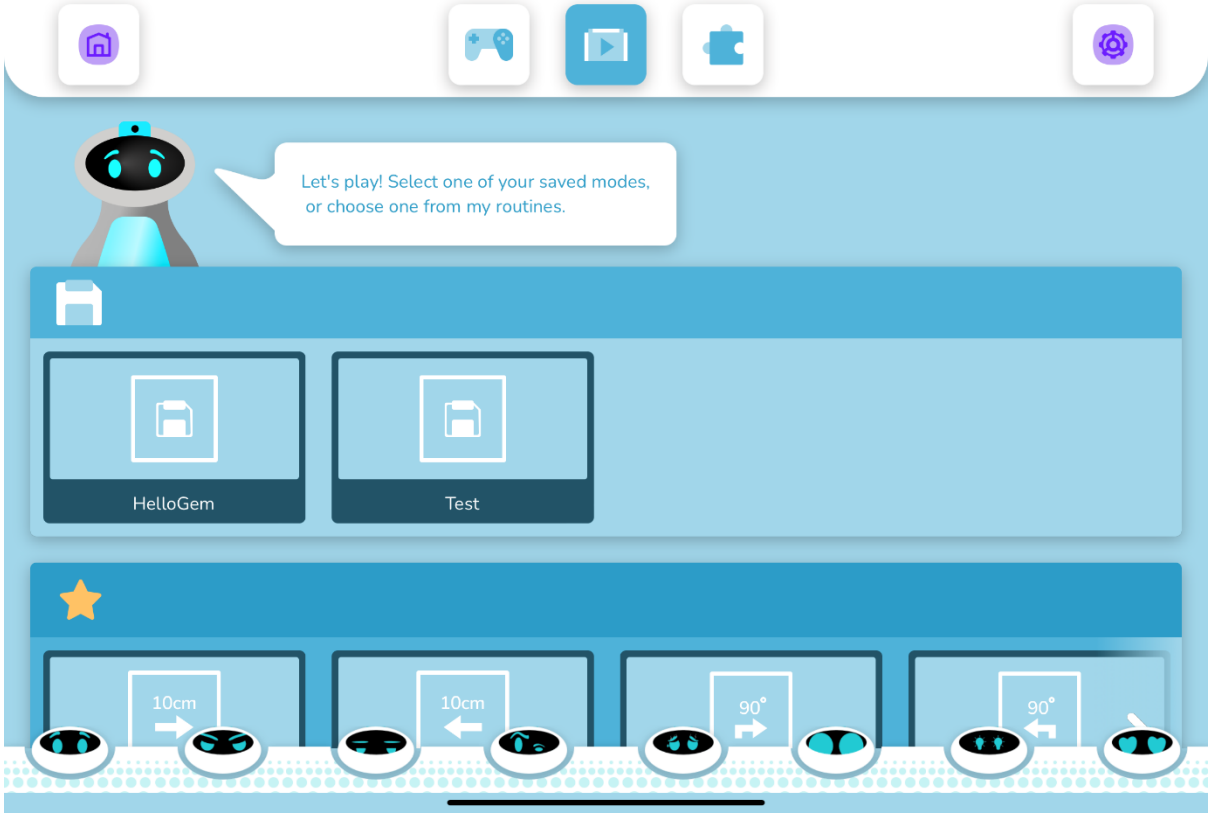
WHAT IS THE PLAY AREA?

The Play area contains a number of pre-set routines that students can load into Oti-Bots programming environment. The top row of the Play area will always contain the saved user programs in the order that they were saved.



HOW DO I SAVE AND RETRIEVE A PROGRAM?





APPENDIX A – VARIABLE DIRECTORY

PARAMETERS

VARIABLE PARAMETERS

Battery	0-100%
Motor Status.	Motor is Stopped / Moving.
Head Position	Range = 1 – 15; where 15 is head most raised.
LED brightness	Range = 1 – 3; where 3 = Brightest.
Touch Sensors	Head-Left; Head-Right; Back-Left; Back-Right.
Pen Position	Pen is Up / Down
Colour Sensor.	Range 0 – 359° (Reported as Colour Wheel).
Forklift Position (if device fitted).	Range = 1 – 3; where 3 = Highest.

CONTROL PARAMETERS

Travel Distance	0 – 9999 mm
Turn Angle	0 – 360°
Head Position	Range = 1 – 15; where 15 is head most raised.
Colour Options List.	Red; Light Orange; Dark Orange; Orange; Yellow; Green; White; Light Blue; Blue; Navy Blue; Violet; Purple; Pink.
Colour Brightness	1 – 3 where 3 = Brightest.
Colour Copy Mode	On / Off (Currently Control Panel Only).
Colour Sensing Control.	Start for 1 - 255s / Stop
Line Follow (secs).	1 – 255s.
Emotions List (12 Total)	{ Happy; Angry; Surprised; Hot; Cold; Sleepy; Confused; Thinking; Heart; Game Over; Unhappy; Sad }.
Record Sound (Time) Default = 10s	1 - 255s
Record Container Sound (fixed 10s)	Container Sounds 1 to 10
Play Recorded Container Sound.	Container Sounds 1 to 10
Play Preset Library Sound.	Library Sounds 1 to 20
Record Video (Time).	1 – 255s.
Take Photo.	Instant.
Scan QR Code (Time)	1 – 255s.
Colour Sense Start (Time).	1 – 255s.
Video Feed Control.	Video Start/Stop
Start Facial Recognition (Time).	1 – 255s.
When QR Code is received (Event)	1 – 9
When Face is Recognised (Event)	1 – 40

When I receive (Event)	New Message / message1
Forklift Position (if device fitted).	Range = 1 – 3; where 3 = Highest.
Oti Storage Capacity	17GB

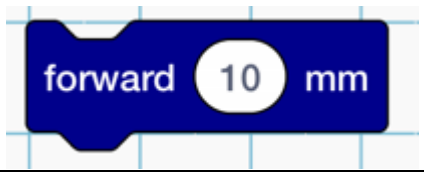
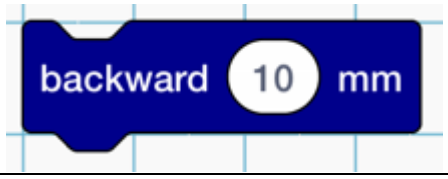
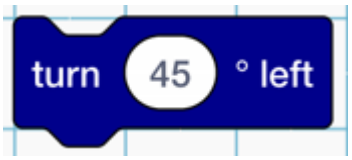
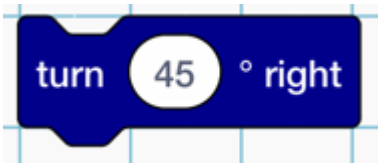
APPENDIX B – SOUND LIBRARY

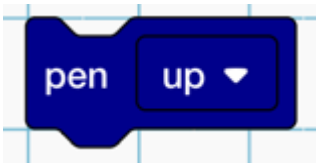
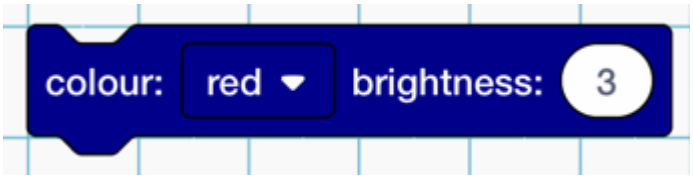
SOUNDS LIBRARY

Sound 1	Happy
Sound 2	Sizzle
Sound 3	Heartbeat
Sound 4	Unhappy
Sound 5	Crying
Sound 6	Surprised
Sound 7	Squeak
Sound 8	Game Over
Sound 9	Confused
Sound 10	Angry
Sound 11	Cold teeth chattering
Sound 12	Whizz
Sound 13	Bright twinkle
Sound 14	Beep
Sound 15	Quiet Beep
Sound 16	Losing power
Sound 17	Magic Forest
Sound 18	Power up and ready to go !
Sound 19	Wind chimes
Sound 20	Oti says nope !

APPENDIX C – BLOCKS LIBRARY

BLOCKS LIBRARY

Block	All blue Oti Blocks must be complimented with a Yellow event block at the start of the routine.	
Forward [x] mm		Enter the distance in millimetres you wish Oti to travel forward (the direction he is facing) in the white lozenge.
Backward [x] mm		Enter the distance in millimetres you wish Oti to travel backwards (away from the direction he is facing) in the white lozenge.
Turn [x] degrees left		Enter the amount of degrees you would like Oti to turn in the white lozenge. Oti will consider the way he is facing to be 0 degrees and will turn to the left. The minimum value is 0 and the maximum value is 360.
Turn [x] degrees right		Enter the amount of degrees you would like Oti to turn in the white lozenge. Oti will consider the way he is facing to be 0 degrees and will turn to the right. The minimum value is 0 and the maximum value is 360.
Move head to position [x]		Enter a value between 1 – 15. A value of 15 will move Oti's head in to the most raised position, looking up. A value of 0 will move Oti's head into the lowest position, looking down.
Wait		This waits for the motors and all other physical actions to stop before continuing.
STOP		Stops OTI Motion.

Follow line for [x] seconds		Minimum value is 1 and Maximum value is 255 seconds. Use this block to initiate the line follow sensor. The line must be drawn in black and be at least **8** mm in thickness. If Oti is located over a line he will begin to follow the line immediately for the duration of time specified. Otherwise Oti will move in a random pattern for the duration of the time specified in an attempt to find a line to follow.
Pen [x]		Use the drop down list to select up or down. This will cause the pen mechanism to lift and lower the pen – if inserted.
Emotion [x]		Use the drop down list to select an emotion. These can be trialled in the **control** section of the app. Emotions have differing play intervals and the animation will change the colour of Oti's mohawk and tummy, play a sound (if not muted) and a corresponding animation on Oti's face.
Colour [x] brightness [x]		Use this block to control the colour and brightness of Oti's tummy and mohawk. The minimum brightness is 1 and the maximum brightness is 3.
Play preset sound [x]		Use this block to play a preset sound. Please refer to the sounds library on page X for a description of all 20 sounds.
Record sound clip to [x]	 **Use this block if you wish to retrieve the sound clip as part of your programming**.	When recording your own sounds for Oti to store and play, you need to select a container to save your sound clip to. There are 10 containers available and the default length of the recording is ten seconds. Oti will give users a 3 second

		countdown on his face prior to recording. This recording can be accessed when Oti is connected via USB and in storage mode and will be saved in memory until it is overwritten
Record sounds for [x] seconds	 Use this block if you wish to retrieve the sound clip from Oti storage at a later date.	Use this block if you wish to record a longer clip and save it to Oti's storage. This cannot be recalled as part of a program but can be accessed from Oti when connected via USB. Minimum value is 1 and Maximum value is 255 seconds.
Play recorded sound [x]		Use this block to recall and play a sound previously recorded into a container 1-10.
Colour sensing [x] for [x] seconds		Use this block to enable Oti's colour sensor
Record Video		Use this block if you wish to record a video clip and save it to Oti's storage. This cannot be recalled as part of a program but can be accessed from Oti when connected via USB. Minimum value is 1 and Maximum value is 255 seconds.
Take photo		Use this block if you wish to take a photo and save it to Oti's storage. This cannot be recalled as part of a program but can be accessed from Oti when connected via USB.

Scan QR code for [x] seconds		Opens the camera to listen for a QR code in the selection of provided codes. Minimum value is 1 second, maximum value is 255 seconds.
Video feed [x]		To be used when paired with a second viewing device. Use the drop down option to start and stop the livestream from Oti's camera.
Start face recognition for [x] seconds		Use the input field to specify how long you would like Oti to scan for faces. Oti will open his camera and present love hearts and the correct number to any face he recognises.
Change LED Brightness		Changes the brightness of Oti's tummy and mohawk. Minimum value is 1, maximum value is 3.