





D7.3 MARIO 2 Operational and User Manual

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D7.3

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Executive Summary (1 Page Max)

This is the MARIO 2 Operational and User Manual (Deliverable D7.3) for the MARIO system. It is targeted at the caregivers operating at the pilot sites.



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1. Introduction

The objective of this work is to document the use of the MARIO system both as a guide for users of the system and as an explanation of user-accessible functionality available. It is intended that readers of the manual should need little to no knowledge of the MARIO system in order for the document to be understandable.

The key outcome is the user manual itself, which is a self-contained document, albeit one that builds upon all the technical work carried out within the MARIO project.

1.1. Work Package 7 Objectives

Work package 7 focuses on the system level delivery of competent robots to the various validation sites and has three primary roles to fulfil:

- 1. The integration and test of the various subsystems to provide the validation sites with a robust first version of the robot system.
- 2. The ongoing support to the validation sites to assist with any operational problems and to fix problems with intended functionality.
- 3. To perform a system wide upgrade, based on the first round of validation sites, incorporating new or changed functionality as appropriate to support the final round of validation trials.

This document supports the second objective and specifically supports one of the objectives of Task 7.1, vis the production of a user manual for the pilot sites.

1.2. Purpose and Target Group of the Deliverable

The purpose of this document is to explain to the user accessible functionality of the MARIO system and how this is accessed through the MARIO Human-Robot interfaces.

The document is meant as a guide to the Pilot Site users as well as a general guide to the wider community on the functionality and user interface of the MARIO companion system.

1.3. Relations to other Activities in the Project

As this user manual documents the final version of the MARIO system, it encompasses nearly all of the technical work undertaken within Work Packages 2-7.

1.4. Document Outline

Section 2 provides an outline of the basics of starting up, shutting down, charging and moving the robot. Section 3 provides a detailed guide to configuring the MARIO robot and selecting preferences while Section 4 provides a detailed step by step guide to the use of the MARIO system. Finally, Appendix A provides technical data on the system together with information on changing the hand controller batteries.

1.5. About MARIO

MARIO addresses the difficult challenges of loneliness, isolation and dementia in older persons through innovative and multi-faceted inventions delivered by service robots. The



effects of these conditions are severe and life-limiting. They burden individuals and societal support systems. Human intervention is costly but the severity can be prevented and/or mitigated by simple changes in self-perception and brain stimulation mediated by robots.

From this unique combination, clear advances are made in the use of semantic data analytics, personal interaction, and unique applications tailored to better connect older persons to their care providers, community, own social circle and also to their personal interests. Each objective is developed with a focus on loneliness, isolation and dementia. The impact centres on deep progress toward EU scientific and market leadership in service robots and a user driven solution for this major societal challenge. The competitive advantage is the ability to treat tough challenges appropriately. In addition, a clear path has been developed on how to bring MARIO solutions to the end users through market deployment.



2. Overview



Figure 2-1: Overview of the MARIO Robot

Figure 2-1 shows the MARIO robot and its main features as described in Table 1.

Item	Description
1	Eyes screen
2	Kinect 2 (including camera and microphone)
3	Touch Screen
4	RFID Antenna
5	Emergency call button
6	Video camera
7	Navigation laser
8	Driving wheel
9	Castor wheel

Table 1: MARIO Features



2.1. Starting up the robot

To start MARIO you first need to access the control panel (shown in Figure 2-2) by removing the cover plate at the back. This is achieved by pressing on the side of the cover so that it rotates outward.



Figure 2-2: MARIO Control Panel

Table 2 lists all the control panel functions.

ltem	Description
1	Battery controller
2	ON/OFF button
3	Brake release button
4	Product information label
5	CAN socket
6	Charging socket
7	Battery switch

Table 2: MARIO Control Panel Functions



Table 3 lists the steps needed to power up the MARIO robot. Once this procedure is completed, the MARIO software must be started separately as described in section 3.1 below.

ltem	Description	
1	The brake release button must be released.	
2	Check that the battery cut switch is in the OFF position.	
3	Check the robot's battery level on the battery control panel.	Victor energy
4	Press on the ON/OFF button, a red LED will turn on.	CO CO F
	In Manual Mode:	1000
5	Take the Xbox controller in your hand and press the central button.	
	The central light of the controller turns for few seconds and will stop on the upper left dial.	
6	The eyes and touch screen turns on.	
7	The floor detectors and SOS buttons turn on as well.	

Table 3: MARIO Startup Sequence



2.2. Shutting down the robot

This should be done only after the MARIO PC has been properly shut down using the Windows shutdown procedure as you would do on any Windows 10 computer. This ensures that any changes to settings - for example screen timeouts - are safely saved to disk and available the next time the MARIO PC powers up. The LED of the ON/OFF button, the eyes and screen, the floor lasers, and the SOS button turn off.

Number	Description	
1	Press the ON/OFF button	AD 8 90
2	Put the battery cut switch on the OFF position (only when turning off the robot for long periods)	

Table 4: MARIO Shutdown Sequence



2.3. Charging the batteries

The batteries can either be charged using the charging cable or via the optional docking station.

The current practice is to manage battery levels manually by reading the battery level monitor and recharging via the charging cable when necessary. However, the intended behaviour is that the robot should warn automatically that recharge is needed when the battery level is at 40%, (but not interrupt its operation at that time), and when the batteries reach the 35% critical battery level the robot should either return to its docking station or the charging cable must be used (as the robot will interrupt its operation).

Note that these percentages are used to preserve battery life.

When the batteries are charged to about 70% the robot should have enough charge to function for approximately a day.

Also note that when the charging cable is inserted the cable must be turned to lock it into position (and likewise to release it).



2.3.1 The docking station

Figure 2-3: The Docking Station

The docking station is an optional feature. An example is shown in Figure 2-3.

The docking station can be used either:

- a) by the user manually driving the robot to the station using the hand controller, or
- b) when the robot drives itself to the docking station. This requires the robot to be working in Automatic mode.



2.3.2 The Charging Cable

The charging cable needs to be plugged into the control panel as shown in Figure 2-4:



Figure 2-4: Control Panel with charging cable in place

Note that the charging cable plug needs to be pushed into place and then turned right until it locks.





2.4. Driving the robot in manual mode

Two manual modes are available, one with the help of the Xbox hand controller provided with the robot. In this last mode, the speed of the robot is significantly slower for security reasons. The hand controller is used to:

- a) Enable the robot to start moving: see item 5, Table 3.
- b) To drive the robot.

To drive the robot the hand controller is operated as follows:



Figure 2-5: The MARIO Hand Controller

Action	Button
Power ON the hand controller	Xbox Button
Go forward	RT and green A button
Go Backward	LT and green A button
Turn Right	Right on left thumb stick and green A button
Turn Left	Left on left thumb stick and green A button

Table 5: MARIO Hand Controller functions

The controller switches itself off after it is not used for a small period.



2.5. Troubleshooting

The robot is not responding to the controller

- 1) Is the robot on?
- 2) Does the controller require new batteries?

The robot is not turning-on

- 1) Does it have enough battery power?
- 2) Is the battery cut switch turned on?

The robot won't move

- 1) Is it controllable by the controller? If not, does the controller need new batteries?
- 2) Is there an obstacle or a drop in its path?
- 3) Are the external sensors turned on?

The screen doesn't turn on

- 1) Is the robot on?
- 2) What is the intensity of luminosity?
- 3) Is the screen's power cord unplugged? Damaged?

The robot's sound doesn't work

1) How loud is the sound turned up?

The robot is not responding to verbal commands

1) Ensure that the default microphone is configured correctly.

The robot isn't connecting to the internet

- 1) Is its Wi-Fi on? Check the Windows 10 Wi-Fi and proxy settings.
- 2) Does the Internet connection work?

The PCs aren't turning on

- 1) Is the robot on? Check the rear control panel.
- 2) Check the batteries are charged.



Please be aware that the robot cannot do the following:

- 1) Be used outside
- 2) Go up or down stairs
- 3) Open doors
- 4) Stop for obstacles which it cannot detect



2.6. Safety Rules



Figure 2-6: Safety Rules

2.7. Terms of use



Figure 2-7: Terms of Use



3. The MARIO Software

3.1. Starting the MARIO Software

Once the robot has been powered up (as described in the Overview above) the MARIO software needs to be started up.

The procedure for this is shown below.

- 1) Switch the robot on (as described in Section 2).
- 2) Once the startup has finished, the caregiver screen will appear as in Figure 3-1. This screen provides four options:
 - a. User Selection/Setup (in the **Open User Profile** Window (1)),
 - b. Patient Setup (via the **Patient** menu in the left-hand menu bar (2)),
 - c. MARIO Application setup, (via the **MARIO Apps** menu in the left-hand menu bar ③) and
 - d. Launching the Main MARIO application (via the green Launch MARIO! button at the bottom left (4)).



Figure 3-1: Patient Profile screen.

Note that Option d) is the "normal" default; the other options are only exceptionally entered when setting up or updating options for a patient.

3) A connection to the local Wi-Fi network needs to be established. Most of the time this will be automatic, but it is worth checking this by opening a web browser and accessing a favourite website. If there is a problem, use the Windows 10 control



panel to select the appropriate network and password. The details of this will vary (and may occur automatically).

Before it is possible to proceed further one of the users in the User Profile dialog box must be chosen (and confirmed via the **Open** button). This is used to tell the system which voice recognition profile to use when recognising and responding to voice commands.

Figure 3-2 shows the User Profile screen which appears after the User Profile has been selected.



Figure 3-2: User Profiles Screen after User Profile Confirmation

The remaining options are described further below.



3.2. Patient Setup

Figure 3-3 shows the screen when a Patient is chosen. The details for the selected patient can be entered or modified by clicking on the **View or Edit** link underneath the green **CURRENT USER** label. Note that the other patients all have a **Delete** link which can be used to remove their accounts. Also, a new patient can be created using the **Add new user** button.

Clicking on the **View or Edit** or **Add new user** link results in an edit screen as shown in Figure 3-3:

	s microphone is off; you can press its hotkey or click its icon to tu	ırn it on.		Profile	Tools	Vocabulary	Modes	Audio	Help	×
Patient Profile × ← → C ① localhost:8080	//mario/profile.xhtml								Q ★	:
TMARIO	Patient Profile						🛗 Wed 3	0 Aug 2017	7 @ 12:0	02
Aimee Teare	× Delete									Å
Patient							+ /	Add new us	ker	
 Mario Apps 	Personal details								×	
	Basic Information									
		User code	Automatically assigned by the system							
		First name *	enter patient first name							
		Last name	enter patient last name							
		Gender *	Select							
		Birth date	enter patient birth date							
	Reference Picture	Birth place	enter patient birthplace							
	+ Choose Photo	Hometown	enter patient home town							
		Current city	enter patient current city_							0
								✓ Sav	/e	-
Launch Mario!										1
💶 I 🚳 🥔 🚥 I	C 🐃 🖸 🙆 🔗 🔥					1 (B		al do H	12:02 P	101

Figure 3-3: User Profile Edit Screen.

Note that there are two compulsory fields (First name and Gender) which are marked with an asterisk as a reminder.

It is possible to associate an image with a user. This is selected using the **Choose Photo** button, as shown in Figure 3-4.



2	Open		×		
9 🐵 • 🛧 🎴 «	Applic ⊨ 60.0.3112.113 ⊨ ∽ Ċ	Search 60.0.3112.113	Q,		ୟ ★
Organize 🛪 New fo	older	880 -			🛗 Wed 30 Aug 2017 🔘 12:00
Downloads	Harric	Date modified	Туре		
📕 ownCloud	default_apps	8/30/2017 11:53 AM 8/30/2017 11:53 AM			
🖳 This PC	Locales	8/30/2017 11:53 AM 8/30/2017 11:53 AM	File folc		+ Add new user
崖 Desktop	🔒 swiftshader	8/30/2017 11:53 AM			
Documents Downloads	VisualElements WidevineCdm	8/30/2017 11:53 AM 8/30/2017 11:53 AM	File folc		×
Pictures Videos	60.0.3112.113.manifest chrome.dll chrome.dll.sig	8/23/2017 9:40 AM 8/23/2017 9:48 AM 8/23/2017 9:48 AM	MANIFI Applica SIG File	sutomatically assigned by the system	
Local Disk (C:)	chrome.exe sig	8/23/2017 9:48 AM 8/23/2017 9:40 AM	SIG File PAK File 🗸	enter patient first name	
90 (A. 1997) (A. 1997)	e name: Stellas Photo's	All Files	>	enter patient last name	
		Open 🔫 C	ancel	enter patient birth date	
	Reference Pict	ure	Birth place	enter patient birthplace	
	+ Choose Pho	to	Hometown	enter patient home town	
			Current city	enter patient current city	
Launch Mario!					✓ Save

Figure 3-4: User Choose Photo screen.

Once the various fields have been suitably edited, the changes are saved using the **Save** button.



Figure 3-5: User Profile after image selection



3.3. Patient Profile

Once a patient is setup there are additional options to associate the patient with members of a family and friends group and to add photos of life events. First the 'Patient' menu item is clicked (see menu item marked in red in Figure 3-6). This expands the menu bar on the left as shown in Figure 3-7:



Figure 3-6: Patient Profile Setup button



Figure 3-7: Patient Profile selection options

These options will be discussed in turn.



3.3.1 Family & Friends Setup

Figure 3-8 shows the screen after the 'Family and Friends' menu has been selected. The process for adding a new 'family and friend' member is shown below.



Figure 3-8: The screen after the 'Family and Friends' menu has been selected.

First, the 'Add new person' button is clicked. The result is shown in Figure 3-9:

P Family and Friends X				
+ + C 🛈 localhost:8080/ma	ario/family-and-friends.xl	tml:jsessionid=1obtict7ncakl1knwe2mkr5374		Q \$
TAMARIO	Family and	Friends		🛗 Wed 30 Aug 2017 Ø 12:1
60	Profile			ж
	Basic Information			
Alex Smith	First name *	enter first name		
Patient Profile	Last name	enter last name		
Family and Friends	Gender *	Select_		
III Life Events	Birth date	enter birth date		
Photos	Birth place	enter birthplace		
Mario Apps	Hometown	enter home town		Reference Picture
	Current city	enter current city		+ Choose
	Relationship with t	ne patient		
	This person *	Select a family or social relationship	÷	Alex Smith
	Contact Details			
· · · · · · · · · · · · · · · · · · ·		ou want that Mario allows the user to call this person using the MyChat applica	tion	
Launch Mario!		add phone number.	AND R	

Figure 3-9: Initial set screen for Family & Friends member.

Again, a number of fields are presented and two of these (First Name and Gender) are compulsory.



A menu item is provided to indicate the relationship of the new person to the patient as shown in Figure 3-10. Note that this field is compulsory.

6 5 Dragon's microphone is off; you can pre	s its hotkey or click its icon to turn it on. Profile Iools	<u>V</u> ocabul	ary <u>M</u> odes	<u>A</u> udio	Help	
	html;jsessionid=1obtict7ncakl1knwe2mkr5374			(2 1	2
Tamily and Examily and	Friends		🛗 Wed 3	0 Aug 2017	0	12:14
Last name	enter lost name					
Gender *	Select	٠				
* Patient Birth date	enter birth date					
Profile Birth place	enter birthplace		Refere	nce Picture		
	enter home town_			Choose		
Life Events Current city Photos	enter current city			.1100096		
Mario Apps Relationship with	the patient					
This person *	Select a family or social relationship		Alex Smith			
Contact Details	Select a family or social relationship is brother of is child of	Î				
Specify a phone number if	y is close friend of is colleague of					
Specify a Twitter name if y	is daughter of is engaged to is father of					Ę
✓ Twitter	add Twitter account name					
				✓ Sav		2:14 PM

Figure 3-11: Family & Friends Relationship menu

In addition the phone number and twitter accounts of the contact can also be entered (these fields are optional), see Figure 3-11. Note that compulsory fields need to be populated in order for the contact to appear in the Friends & Family application described in section 4.2.

Family and Friends X				
> C 🛈 localhost:808	0/mario/family-and-friends.xh	tml:jsessionid=1obtict7ncakl1knwe2mkr5374		Q \$
MARIO	🐸 Family and	Friends		🛗 Wed 30 Aug 2017 O 12:
65	Gender *	Select		
Alex Smith	Birth date	enter birth date		
Patient	Birth place	enter birthplace		Reference Picture
Profile	Hometown	enter home town_		+ Choose
Family and Friends	Current city	enter current city_		
Life Events				
Photos	Relationship with th	ne patient		
	Relationship with the This person *			Alex Smith
			,	* Alex Smith
	This person *			Alex Smith
	This person * Contact Details Specify a phone number if y	is brother of	,	AlexSmith
🕿 Photos Marío Apps	This person * Contact Details Specify a phone number if y Phone	is brother of		 Alex Smith
	This person * Contact Details Specify a phone number if yo & Phone Specify a Twitter name if yo	is brother of ou want that Mario allows the user to call this person using the MyChat application. add phone number	,	* Alex Smith

Figure 3-10: Family & Friends Phone number and Twitter account details.



3.3.2 Life Events Setup

The Life Events setup provides events data used by the Reminiscence application.

Figure 3-12 shows the screen when the Life events option is selected.

	s microphone is off; you can press its l	otkey or click its i	con to turn i	t on.			P	rofile I	ools 1	(ocabulary	Modes	Audio	Help	*
Life Events X												- 101		×
← → C O localhost8080	//mario/life-events.xhtml												ચ ☆	1
MARIO	👑 Life Events										🛍 Wed 3	0 Aug 2017	0 12	2:17
6	New Life Event													Î
Alex Smith	Define a new life event for Alex	Choose											-	
* Patient														
A Profile	Marriage													
Family and Friends	Got married to Maggie	on 03/07/1970 ii	Stockport	Car edit										P
📇 Life Events														
Photos														
 Mario Apps 	and front													
	Places s/he has live	1												
	A Lived in Manchester	edit												
	10-4N/082													
	COMPANY OF THE OWNER.													
														0
Launch Mariol	Visited Places													
🕂 🛞 🥥 🔤	🜔 📄 🕤 🔒	🐝 (6									- 1	aal 🔶 B	4G 12:17 8/30/	7 PM (2017

Figure 3-12: The screen after the 'Life Events' menu has been selected.

In order to add a new life event, the 'Choose' menu in the **New Life Event** window is selected. This results in a drop-down menu containing a number of event types, see Figure 3-13:

B Image: Constraint of the second secon	n's microphone is off; you can press its h	otkey or click its icon to turn it on.	Profile Iools y	(ocabulary Modes Audio Help ♥
← → C () localhost:808	80/mario/life-events.xhtml			ର 🕁 🗄
MARIO	👑 Life Events			🛗 Wed 30 Aug 2017 © 12:18
6	New Life Event			Í
AlexSmith	Define a new life event for Alex	Choose		
- Patient		Choose Job/Employment		
Profile Family and Friends Funds Protos Mario Apps	Marriage Got married to Maggie Discussion Places s/he has liver	Marriage Place she has lived Gota Pet School Attendance Travel/Visited Place		
Launch Marfol	Lived in Manchester Lived in Manchester Visited Places	2 mll		

Figure 3-13: Life Events screen with new event



Assume the 'Job/Employment' option is chosen. This results in a new form being shown as shown in Figure 3-14

B Image: Construction of the second sec	ie is off; you can press its h	otkey or click its icon to turn it on.	Profile	Tools	<u>V</u> ocabulary	Modes	Audio —	Help	*
← → C () localhost:8080/mario/life	e-events.xhtml							Q 🕁]:
MARIO HU	ife Events					🖺 Wed 3	0 Aug 2013	7 O 1	2:19
	Job/Employment								*
Alex Smith	ide details about this life e	vent.							
- Patient	Job position *	engineer, teacher, farmer, architect							
A Profile	Employer	company name, school name, institution name.							
Family and Friends	Where	insert city							
🛗 Life Events	With	select other people							
Photos	with	searce other people .							
 Mario Apps 	From								
	То								
	Photo Upload								
Uploa	ad photos for this life ever	it.							
	Choose + Upload	Cavor -							
									0
					🛩 Sav	e Event	Cano	:el	-
Launch Mariol									
🔣 🛞 🥥 🔤 🌍 🚺	🗑 📀 📋	¢, 6				II - 🐮	ad 🚯 B		19 PM 0/2017

Figure 3-14: Life Events new event job/employment

Note: the **Job position** field is compulsory.

Other event types, such as Marriage, Got a Pet, School attendance, etc. all produce similar forms appropriate to the types.

An image can be associated with the event using the Photo Upload button. This is a two-step procedure. First an image (previously uploaded to some chosen file location) is selected via a file menu as shown in Figure 3-15:

Open	×	
→ ↑ → « ownCloud → Photos	C Search Photos P	ବ
anize 👻 New folder	= • 1 0	🛗 Wed 30 Aug 2017 @
Favorites		
Desktop		
Downloads	a characteristic	
Recent plac		
ownCloud Paris.jpg San Francisco.	pg Squirrel.jpg	
This PC		
Desktop		iame
Documents		
Downloads		
Music		
Pictures		
Videos – Local Disk (🎽		
File name: Paris.jpg	✓ All Files ✓	
, unsiba		
	Open Cancel	
Upload photos for th	is life event.	
+ Choose 3	Ipload Cancel	
		Save Event Cancel
1 Launch Mariot		

Figure 3-15: Life Event Image selection.



Next, the chosen image is 'uploaded' to the event using the 'Upload' button, with the result shown in Figure 3-16. Alternatively, the image can be de-selected via the 'Cancel' button.

🚯 🔜 🦳 🛞 💮 Dragon	's microphone is off; you can press its ho	tkey or click its icon to turn it on.	Profile	Iools ⊻ocabulary	Modes	Audio	Help	1
/ 🗋 Life Events 🛛 🗙						101 -		×
← → C ③ localhost:808	0/mario/life-events.xhtml					(२ क	
MARIO	👑 Life Events				🛗 Wed 30	0 Aug 2017	0	12:25
6	Employer	company name, school name, institution name,						*
Alex Smith	Where	insert city.						
- Patient	With	select other people						
Profile	From							
Family and Friends Life Events	Το							
Photos	Photo Upload							
 Mario Apps 	Upload photos for this life event	E,						
	+ Choose / Upload e	. Cancel						
	Paris jpg 223	4KB						
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🗶 Launch Mario!	Marriage							
Launch Marto:		n 03/07/1970 in Stockport 🛛 🖉 🚮 🔹						· ·
		F K					ari 12	25 PM

Figure 3-16: Life Event Image post upload to event.

Note that multiple images can be 'uploaded' to a given event.

After the image (or images) have been uploaded to the event, then either the 'Save Event' key can be pressed to proceed, or the 'Cancel' key can be used to undo the uploads.

Once the uploads are completed it is possible to associate members of the Friends & Family' group to the images. Figure 3-17 shows the screen provided for this:



Figure 3-17: Life Event - associating members of F&F to a photo.



To add a member of the Friends & Family to the photo, put the cursor in the 'Who appears in this photo' box and type the name. As you type the system will look for matches and provide a drop-down box from which you can select the required name. Note that it is only possible to add names from the Friends & Family list to the 'Who appears in this photo' field. Then start typing a second name if needed and so on (details of this process are shown in **Error! Reference source not found.** from the Photos setup section below). Once done, hit the 'Save Event' key to update the event and return to the setup screen as shown in Figure 3-12.

3.3.3 Photos Setup



The Photos setup provides the image data used by the Reminiscence application.

Figure 3-18: Photos setup screen 'Photo details' tab selected.

The screen starts by showing all the photos associated with the patient. It is possible to edit each photos detail and the people associated with it by using the two tabs ('Photo details' and 'People and Faces'). Figure 3-18 shows the 'Photo details' tab selected, and Figure 3-19 shows the 'People and Faces' tab selected.





Figure 3-19: Photos setup screen 'People and Faces' tab selected

To change the people associated with an image, place the cursor in the 'Who appears in this photo' field in the 'People and Faces' tab. A virtual keyboard will appear as in Figure 3-20:



Figure 3-20: Photos Setup - starting to enter a name

As soon as a keyboard character is entered, the system will search for matches from the Friends and Family list, and display a dropdown box. Figure 3-20 shows a name 'John Casey" that has appeared after a single 'j' character has been entered.



Clicking on the name will add it to the list, as shown in Figure 3-21:



Figure 3-21: Photos Setup - name added to list

A second name can be added using the same procedure, with the result as shown in Figure 3-22:



Figure 3-22: Photos Setup - second name added to list



When data entry is completed the keyboard can be dismissed either by tapping the in the

top-right corner or the button in the bottom-right corner.

After the keyboard is dismissed, the screen will revert to Figure 3-21. The **Save** button can then be used to save the changes.

That completes the setup.

3.4. MARIO Applications Setup

The application setup procedure starts by selecting the **MARIO Apps** menu item. Figure 3-23 shows the screen at this point.



Figure 3-23: MARIO Apps setup selection.

There are six MARIO applications which can be customised for each patient:

- a) My Music
- b) My Games
- c) My News
- d) My Family & Friends
- e) My Chat
- f) My Memories

These are discussed below.



3.4.1 My Music

6 🖪 🤇 Profile Iools Yocabulary Modes Audio Help ¥ ← → C () localhost:8080/mario Q 1 : MARIO My Music 🛗 Wed 30 Aug 2017 🗿 12:41 Music Select the genres that will be used by Mario for Alex Classical Italian A Profile × Not Selected Family and Friends Life Eve Select all App Settings Should Mario allow the user to select a specific genre when using the app? If no, Mario will skip the genre selection step and directly play music for the user. yes RE My N 🛩 Sa My Family and Friend My Chat Launch Ma o 🚞 🧿 🙆 🌾 🤇 GN_ 📖 - 📷 Jil 40 EN

Figure 3-24 shows the screen after the My Music menu item has been selected.

Figure 3-24: My Music setup screen.

This allows the music played in the MARIO application to be limited to specific genres by clicking on the Selected or Not Selected boxes to change them to the desired state. It is also possible to select all the genres by clicking on the Select all button. There is also a setting to allow the user to select genres within the MARIO application. In Figure 3-24 this setting is shown enabled. Clicking on the Yes button will change the setting to disabled, as shown in Figure 3-25:

App Settings	
Should Mario allow the user to select a specific genre when using the app? If no, Mario will skip the genre selection step and directly play music for the user.	no

Figure 3-25: Disabling genre selection within the Application.



When the option to select genres is disabled then the MARIO application will play the whole playlist (see section 4.3). The **Save** button is used to confirm the change, as shown in Figure 3-26:



Figure 3-26: Change confirmation screen.


3.4.2 My Games

Figure 3-27 and Figure 3-28 show the games setup screen accessed via the **My Games** menu option. This is used to select the games which the user will be allowed to play.



Figure 3-27: Game setup screen upper part

The games are selected or deselected by clicking on the **Selected** or **Not Selected** checkboxes until the desired selection is obtained. The **Save** button is used to confirm the changes. Note that a maximum of six games can be selected and if this list is exceeded then the system will show an error (as shown in Figure 3-28 at the top right) until six or less games are selected.



Figure 3-28: Game setup screen lower part



3.4.3 My News

Figure 3-29 and Figure 3-30 show the News setup screen accessed via the **My News** menu option.



Figure 3-29: My News setup screen upper part

	icrophone is off; you can press its ho	tkey or click its icon to turn it on.	Profile Tools Vocabulary	
My News X				
← → C 🛈 localhost:8080/m	nario/news.xhtml			옥 ☆ :
MARIO	🖽 My News			🛗 Wed 30 Aug 2017 🧿 12:48
6	Selected topics	sport		 Add topic
Alex Smith	Business ×			
- Patient				
A Profile				✓ Save
Family and Friends				
Life Events	RSS News Feeds			
Photos		be used by Mario to get news items for the user. The feed name will be present	ed by Mario to the user, in addition to any	topic you may have
★ Mario Apps	specified.			
Ja My Music	Feed name *	Feed URL *		
n My Games	e.g., BBC News	http://feed		+ Add feed
III My News				
My Family and Friends	Registered RSS News Feeds			
My Chat	Feed name	Feed URL		Action
	Manchester News	http://www.manchestereveningnews.co.uk/news/?service=rss		Remove Test
Caunch Mariol				✓ Save
🕂 🛞 🥥 🔤 🔇) 📋 🖸 🚺	ç 6		📖 - 🎠il () ENG 12:48 PM 8/30/2017

Figure 3-30: My News setup screen lower part



Topics available in the My News application can be set in the **Selected Topics** window. A new topic can be added by hitting the **Add Topic** button. This will place the cursor in the **Selected Topics** field and display a virtual keyboard as in Figure 3-31.



Figure 3-31: My News setup screen showing a new topic being selected

As soon as a keyboard character is entered, the system will search for matches from the topics list and display a dropdown box to show the matches. Figure 3-31 shows one topic 'Sport' available after a character 's' has been entered.

Further characters will narrow down the list. Clicking on the **Sport** menu item will add that to the selected topics list, as shown in Figure 3-32. The **Save** button is used to confirm the changes.



Also, it can be seen that RSS news feeds can also be added in a similar way by entering the feed name and URL data into the forms provided and confirming the change via the **Add feed** button. The feeds can be removed and tested via the **remove** and **test** links provided.



Figure 3-32: My News setup screen showing the 'Sports' topic added.



3.4.4 My Family & Friends

Figure 3-33 shows the My Family and Friends setup screen accessed via the **My Family and Friends** menu option.



Figure 3-33: My Family and Friends setup screen.

This screen is used to add hashtags used to retrieve tweets for the patient.



3.4.5 My Chat

Figure 3-34 shows the My Chat setup screen accessed via the My Chat menu option.

	: microphone is off; you can press its hotkey or click its icon to turn it on.	Profile	<u>I</u> ools	<u>V</u> ocabulary	Modes	Audio	Help	*
← → C ① localhost:8080	/mario/mychat.xhtml					-	Q \$:
MARIO	📞 My Chat				🛗 Wed 30) Aug 2017	7 @ 12	:54
6	App Settings							
Alex Smith	Should the My Chat app manage the interaction with the user in a simplified way? If YES, Mario will go back to the home screen after any call or attempt to call someone.						no	
• Patient	In r.c.s., mains will go back to the nome screen atter any call or attempt to call someone. If NO, Mario will allow the user to choose whether to make other calls after any call or attempt to call someone.							
Profile Family and Friends						*	Save	ſ
Life Events	People's Availabilities							
* Mario Apps	For each person that can be called (i.e., having a phone number defined as part of her profile), you can define time slots do to call those people during these time slots.	uring which t	they she	is not availat	e. Mario w	ion't allov	v the user	F.
,⊐ MyMusic ♣- MyGames	Anne Smith (daughter)							
E My News	Not available from * To *						_	
 My Family and Friends My Chat 					+	Add		
							_	6
						~	Save	
Launch Mario!								
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Figure 3-34: My Chat setup screen.

There are two settings for the MyChat application:

- App Settings: If this option is set MARIO will go back to the home screen after any call or attempt to call someone. If not set, MARIO will allow the user to choose whether to make another call after a call has finished or after an attempt to call someone. This option is set by toggling the yes/no switch provided.
- People's Availabilities: The application can limit the times that calls are allowed according to periods where the user is *not* allowed to call each person. This process is detailed below.

3.4.5.1 Setting up non-availability slots

All of the people from the Family & Friends list for the user (who are also setup to receive calls by having a phone number defined) will appear in the MyChat **People's Availabilities** form in Figure 3-35. It is possible to define periods where the user will **not** be allowed to call that person. Two form fields are provided: 1) The **Not Available from** and 2) the **To** field. Both fields must be completed.

Figure 3-35 shows the screen during the entry of a start time. On clicking the entry field a dropdown menu will appear which allows the start time to be entered by adjusting the Hour and Minute sliders as required. The end of the period is similarly entered into the 'To' box.

The availability period is confirmed by hitting the **Add** key. Figure 3-36 shows the screen at that point. Note that an entry can be removed using the **delete** link.



Note that multiple periods can defined for individual persons e.g. to prevent calls from 1am - 6am and 4pm - 6pm for example.

🚯 🄜 🦳 🧭 🛞 Dragon's i	microphone is off; you can press its hotkey or click its	s icon to turn it on.		Profile Tool	s <u>V</u> ocabulary	Modes Audio	<u>H</u> elp ¥
My Chat ×						- ISI	
← → C () localhost:8080/	mario/mychat.xhtml					e	2 ☆ :
MARIO	📞 My Chat					🛗 Wed 30 Aug 2017	O 12:57
6	App Settings						
Alex Smith	Should the My Chat app manage the interaction wi	ith the user in a simplified way?					
* Patient	If YES. Mario will go back to the home screen after If NO. Mario will allow the user to choose whether						no
Profile							
Family and Friends						· • •	Save
Life Events							
Photos	People's Availabilities						
 Mario Apps 	For each person that can be called (i.e., having	a phone number defined as par	t of her profile), you can define time slots du	ring which they	he is not availa	ble. Mario won't allow	the user
Ja My Music	to call those people during these time slots.						
the My Games	Anne Smith (daughter)						
El My News	Not available from *		To *				
My Family and Friends	09:30					+ Add	
My Chat	Only Time						
🛷 Launch Marioi	Time 09.30 Hour Minute					~	Save
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My Chat ×	's microphone is off; you can press its hotkey or click its icon to		Profile Tools Vocabi	ulary Modes Audio Help
→ C O localhost:8080	0/mario/mychat.xhtml			ର 🕁
MARIO	📞 My Chat			🛗 Wed 30 Aug 2017 🥝 12
6	App Settings			
Alex Smith	Should the My Chat app manage the interaction with the u	iser in a simplified way?		
Patient	If YES, Mario will go back to the home screen after any call If NO, Mario will allow the user to choose whether to make			no
Profile				
Family and Friends				🛩 Save
Life Events				
Photos	People's Availabilities			
fario Apps		ne number defined as part of her profile), you can define t	time slots during which they she is not a	vailable. Mario won't allow the
My Music	user to call those people during these time slots.			
• My Games	Anne Smith (daughter)			
I My News	Not available in these time slots:			
	From 09:30 To 12:00 Elete			
My Family and Friends	Not available from *	To *		
				Second
				+ Add
My Family and Friends My Chat				+ Add

Figure 3-36: MyChat Availability form with new entry



3.5. MyCalendar App

Currently, events, appointments and reminders are added by accessing a separate webpage. Note also that the MARIO application must be fully launched in order to update the calendar.

First, open a new webpage tab in Google Chrome at *http://localhost:3060/login*. This will result in a login page as shown in Figure 3-37. Be aware that the voice recognition system is active at this point, so it is recommended to work in a quiet room if possible:

6 🔀 🍯 🧹 (0)			ate and use void	the search of the search						Profile	Tools	Vocabulary	Modes	Audio	Help	¥
C My Chat ← → C ③ local	× \ 🗅 host:3060/log	Mario home gin	×	localhos	st:3060/login	×								- 14	. □ Q ☆	×] :
		ase loo	g in													
	Passw	_														_
																E I
																×
	q	2 W	^з е	⁴ r	⁵ t	⁶ у	7 u	a İ	9 0	°p		$\langle X \rangle$				
	а	S	d	f	g	h	j	k	I			Enter	a			
	¢	z	x	с	v	b	n	m	,	٠	?	• •	↑			
	&123	Ctrl	۲							<	>	• E	ENG			

Figure 3-37: Calendar editor login page

Next, the user then logs in with the required credentials (obtained from the MARIO system administrators) to obtain the case shown in Figure 3-38. Note that user names are case sensitive.



Events can now be added. To add an event, use the Manage Calendar button for the appropriate user. This will result in a screen as shown in Figure 3-38:

My Chat	X 🔨 🗋 Mario ho	me × / 🗅 localhost:3060	×		- 12	
C O loca	alhost:3060				Q	9 対
PWDs r	nanagemen	t page.				
	-					
Username	First Name	Last Name Gi		(Concerning of the second s		
Colgi	Lui	0	Manage Calendar	Life Info	Delete PWD	
repo	Alex	Smith	Manage Calendar	Life Info	Delete PWD	
mjxvJ	Aimee	Teare	Manage Calendar	Life Info	Delete PWD	
feISH	Alessandro		Manage Calendar	Life Info	Delete PWD	
LrbMw	Stella		Manage Calendar	Life Info	Delete PWD	
HvjSA	Yvonne		Manage Calendar	Life into	Delete PWD	
Aimee	Aimee	Teare	Manage Calendar	Life Info	Delete PWD	
Username						
First Name						
LastName						
Add PWD Ca	ncel					

Figure 3-38: Calendar events page

Note that the calendar page can show events in a single day, week or month using the day/week/month buttons shown above.

Figure 3-38 shows the display set to show a month, with the current day highlighted in yellow. Other days can be highlighted by tapping the appropriate entry on the screen.

To add an event, tap on the desired entry in the diary display. An editing panel and keyboard will be shown as in Figure 3-39:

My Chat	×\D	Mario home	×	localhost	3060/calendar	×							
- → C 🛈 loca	lhost:3060/cal	lendar/?id=59	99d5fd988b23	37044c721921									Q \$
Day Week Mont	h					Augus	t 2017						Today < >
Monday		Tuesday		Wednesday		Thursd	isy	,	iday		Saturday		Sunday
			01		02		03			04		05	
	07		10:00 - 10:05	New event						1		12	1
	14		Т	tle New event						\$		19	1
	21		Descript	on								25	
													j.
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The event can be given a title and a description as shown in the MARIO application. The time of the event, whether it repeats, and the time of any associated alarms can also be set as shown in Figure 3-40:

The Save and Cancel buttons can be used to confirm the even or discard it. After this the screen returns to the state shown in Figure 3-38.



Figure 3-40: Calendar event time editing

To complete the event editing process, exit the webpage using the browser 'close tab' function. That completes the setup process.



4. The MARIO Application

To start the MARIO Application, the 'Launch MARIO!' button is pressed.

Figure 4-1 shows the screen after MARIO application starts:



Figure 4-1: MARIO Home/Start Screen

There are four parts to this screen:

- 1) The **Start** Button. This is always shown and is used to return the user to the Home screen shown in Figure 4-1 above.
- 2) The Speaker button. This is used to mute or unmute the speaker.
- 3) The Microphone status icon/button. This performs two functions:
 - a) Firstly, it displays when the MARIO system is listening for voice commands (when it

appears thus: $\mathbf{\Psi}$) and when the system is not listening for voice commands

(when it appears thus: 2000). For example when MARIO is speaking itself - as shown in Figure 4-1 - the system will ignore any speech input it receives. While the MARIO Application is running it continually listens for commands as well as responding to button presses.

- b) This button can also be clicked to disable the microphone (but only for a short period).
- 4) The Applications buttons. There are three of these:
 - a) The **See what is happening around you** button. This is used to read the news or to open the user's calendar (events can only be viewed but not changed or added to by the patient).
 - b) The **Or connect with family and friends** button. This is used to connect to the contacts in the Friends and Family group including MyChat.
 - c) The **Or do you want to play something** button. This is used to listen to music, play a game, or show a slideshow of photographs associated with the user.



The Applications are discussed in more detail below.



4.1. The 'See What is Happening' Application

B Image: Construction of the second sec	press its hotkey or click its icon to turn it on.	Profile	<u>I</u> ools <u>V</u> ocabulary <u>M</u> od	es <u>A</u> udio <u>H</u> elp ¥
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希 Start	🗲 Back	(Ç	2
Would you like t	o?			
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		¥ (3	
Read the I	news?	Or see what's	on for toda	iy?
	6 🗞 6			Image: Second state 1:04 PM Image: Second state 8/30/2017

Figure 4-2: MARIO See What is Happening Application Screen

Figure 4-2 shows the screen after the **See What is Happening** application is activated:

There are two options which can be selected here: **Read the News?** and **Or see what's on for today?** Which shows the calendar appointments or events that the patient has. A '**Back**' button has been provided; this shows on all the **See What is Happening** screens, and serves to allow the user to navigate around the application without having to return to the Home Screen and reselect the **See What is Happening** application.



Figure 4-3 shows the screen after the **Read the news** button is pressed, or the user has given a verbal command (such as "Read the news, please MARIO") to MARIO. Note that MARIO responds verbally to confirm receipt of the command.

🚳 🚯 🌕 🧭 🔕 Normal mode: You can dictate and use voice commands	<u>P</u> rofile	<u>T</u> ools <u>V</u> o	ocabulary	Modes	Audio	Help
My Chat × Mario apps × ✓ X X Δ X Δ X Δ Δ X Δ Δ					- 19	□ <mark>→</mark>
🗥 Start	4)			Ŷ		
What would you like to do?						
NEWS Read all headlines?	Select a to	pic of	new	s?		
💷 🕲 🧧 🔤 🌍 🍓 🌜 🤇				- 😼	.al († 8	NG 1:07 PN 8/30/20

Figure 4-3: MARIO Read the news Screen



🚯 🚯 🍊 🐰 🏟 🔿 Normal mode: You can dictate a	and use voice commands		Profile	Tools	<u>V</u> ocabulary	Modes	Audio	Hel
My Chat X / Mario apps	×						- 121	- 0
	can press its hotkey or click its icon to turn it on.		Profile	Tools	Vocabulary	Modes	Audio	Help
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← → C () localhost:3030/showheadlines							0	2 \$
🖀 Start	🗲 Back	40				Ź		
News headlines								
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Houston reals as Storm H	arvey moves on to Louisiana							
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Published 2 hours ago. The rain finally stops in H Published 2 hours ago. The storm that has killed Texas.	ouston. at least 11 people is causing	catastrophic floo	dingi	n pa	rts of l	Louis	siana	ar
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Published 2 hours ago. The rain finally stops in H Published 2 hours ago. The storm that has killed Texas.	ouston. at least 11 people is causing	catastrophic floo	ding i	n pa		Louis		

Figure 4-4 shows the screen after the Read all Headlines option is activated. At this point

Figure 4-4: MARIO Read all Headlines Screen

MARIO is verbally reading through all the headlines and cannot respond to verbal commands - hence the microphone icon shows as

Figure 4-5 shows the screen after an item in Figure 4-4 is selected. Note again that MARIO is reading the text aloud to the user:



Figure 4-5: MARIO News item selected



Figure 4-6 shows the screen after the **Select a topic of news** option is activated in Figure 4-3. In this case two options are available: **Business** and **Manchester News**:

🚯 🚯 🌀 🖗 🔕 Normal mode: You can dictate and		<u>P</u> rofile	<u>T</u> ools <u>V</u> ocabulary <u>M</u> ode	es <u>A</u> udio <u>H</u> elp ¥
My Chat ★ ▲ Mario apps ← → C ① localhost:3030/showoptions	×			Q & :
😭 Start	🗲 Back	4)	Ų	
Which topic wo	uld you like to rea	ad about?		
NEW	5	NE	MS	
Busine	ess?	Manchest	er News?	
🕂 🛞 🥼 🔤 🧕 🚞	6			No 1:11 PM ■ ENG 8/30/2017

Figure 4-6: MARIO Select a topic of news Screen

B Image: Construction of the second sec	can press its hotkey or click its icon to turn it on.	Profile	e <u>T</u> ools ⊻ocabu	ulary <u>M</u> odes <u>A</u> udio <u>H</u> elp ♥
← → C () localhost:3030/showheadlines	×			
🖀 Start	🗲 Back	1		Ź
News headlines	;			
MBA: Mortgage Applicat	ions Decrease in Latest W	eekly Survey.		
Wednesday: GDP, ADP Er Published 14 Insurs age.	mployment.			
The Impact of Harvey on Published 18 hours ago	Unemployment Claims.			
				9
	See more head	llines		
🕂 🛞 🧳 🔤 💽 👸	6			- 🎠 🗤 🔶 ENG 1:12 PM 8/30/2017

Figure 4-7: MARIO Business News item selected

Figure 4-7 shows the screen after the **Business** option is activated:



The see what's on for today button (see Figure 4-2) produces the screen shown in Figure 4-8:

The patient can choose to look at the current day's diary, or look ahead to upcoming events. Figure 4-9 shows the screen when the **Upcoming events** button is pressed. Note that the **Today's diary** button will produce a screen with exactly the same format, as will an event alert:

🖀 Start	I	
What would you like me to remind you about?		
Today's diary	Upcoming events	

Figure 4-8: The What's on for today screen.

😭 Start	🗲 Back	∎.	Ŷ
Coming soon			
Charlotte is visiting in a d	day.		
Alert Status: Enabled - 🗘			
John the Gardener in 2 d	ays.		
Alert Status: Enabled - Q			

Figure 4-9: Upcoming Events screen

An event can be expanded to show more detail. For example, Figure 4-10 shows the screen when the '**Charlotte is visiting in a day**' button is pressed:



😭 Start	🗲 Back	4)	Ź
Charlotte is vis	iting		
^{m in a day} Your daughter Charl cake	otte is coming round	for a cup of tea and a	a chat, she will bring
 I will notify you about this event! 			E.

Figure 4-10: Event Details screen

Note also that the back button can be used to return to the **Upcoming events** screen, and the Start button returns to the home screen (Figure 4-1).

4.2. The Family and Friends Application

Figure 4-11 shows the screen after the **or Connect with Family and Friends** option is activated (from Figure 4-1):



Figure 4-11: MARIO Family and Friends Screen



4.2.1 The 'See What Family and friends are up to' screen

Figure 4-12 shows the **See What Family and friends are up to** screen (in this example, only one Family and Friends member has been setup):



Figure 4-12: MARIO See What Family and friends are up to Screen

Figure 4-13 shows a sample screen where news from a specific person has been selected:

	ecan press its hotkey or click its icon to turn it on.	Profile	Iools Yocabulary Modes Audio Help 💝
← → C () localhost:3030/showheadlines			@.☆.:
🖀 Start	🗲 Back	4)	2
News about yo	ur family and frie	nds	
Great little thing we pick	ed up as part of the @EUEra	asmusPlus funded Silver I	Learners Project
@Mario_Kompai MarioS testing again for @EU_eH Published 7 days ages	ays Had a fantastic day yest lealth funded project.	erday in Stockport with t	the @alzheimerssoc
RT @EIP_AHA: Let's map PROGRESSIVE event on Published 7 days ago.	together ICT standards pro 19.10.17! AHA .	omoting Active and Healt	thy Ageing! Join
			9
	See more head	lines	
= 💿 🥼 🔤 🧕	6		📟 • 🐧 .al 🍫 ENG 🕺 150 PM

Figure 4-13: MARIO Family and friends news screen for a selected person



4.2.2 The 'Or call your family' screen

Figure 4-14 shows the screen after the **or call your family** option is activated. In this case, one option only is available, however more options can be shown if multiple Family and Friends contacts are setup:



Figure 4-14: MARIO or Call your family item selected

MARIO can all any of the people displayed here. A call can be made either by tapping the Icon for Anne, or by giving the verbal command "call Anne". Figure 4-15 shows the screen during the call.



Figure 4-15: MARIO Call in progress

Note: during the call MARIO is not listening and therefore is unable to respond to verbal commands. To terminate the call the **Hang up** button must be pressed.



Figure 4-16 shows the screen after the call has been terminated (provided the settings for the Chat application allow a follow-on call to be made without reverting to the home page first, see Figure 3-34):



Figure 4-16: MARIO screen after a call has been terminated

Note also that if the patient has already called someone then a reminder is presented to say 'you called xxx 5 minutes ago' with another yes/no option.



4.3. The Play Application

Figure 4-17 shows the screen which appears when the **or do you want to play something** option in the applications screen (Figure 4-1) is activated:



Figure 4-17: MARIO Play screen

The Listen to music option produces the screen shown in Figure 4-18:



Figure 4-18: MARIO Listen to Music screen



The user can either tell MARIO to start playing music immediately, or move to a further selection screen. The Play Music button (or equivalent verbal command, e.g. '*MARIO, play some music*') will tell MARIO to immediately start playing music from the music library as shown in Figure 4-19. Note that when playing music MARIO stops listening so it will not respond to verbal commands - the next commands will need to be performed by touching the buttons on the screen:

The user can select a genre of music to be played by activating the Select music option in Figure



Figure 4-19: MARIO Play Music screen

4-18, provided this option is enabled in the patient setup (See Figure 3-25). MARIO will then display the preset genres setup for the user as shown in Figure 4-20:



Figure 4-20: MARIO Music Genre Selection screen



The user can then select the desired genre (either by tapping the appropriate icon on the screen, or by verbal command) and the music will start playing as shown in Figure 4-19.

The user can also select a game to play by activating the **Or play a game** option in the Play screen (Figure 4-17). Figure 4-21 shows the game selection screen:



Figure 4-21: MARIO Game Selection screen

The user can select a game and start playing. Note that the **See more choices** button will bring up another page of games. The details of the games are not discussed further in this guide.

The user can use the **Or look at some photos** option in the Play screen which is the My Memories application (Figure 4-17). When this option is selected MARIO first shows a confirmation screen as in Figure 4-22:



Figure 4-22: MARIO Look at Photos screen





MARIO then starts a slideshow of the photos, as shown in Figure 4-23.

Figure 4-23: MARIO photo slideshow screen

While displaying this screen, MARIO asks the patient some questions about the photo which they can respond to. When ready for the next photo the patient touches the **Next Photo** button.

When the slideshow has shown all the images, the screen shown in Figure 4-24 is shown:

Great!		
We have seen all the pictures together! Do you	want to see them	again?
	YES!	NO!

Figure 4-24: End of slideshow

The **No!** button in the **End of slideshow** screen returns control to the MARIO **Play** screen (Figure 4-17).



4.4. The Comprehensive Geriatric Assessment (CGA) Application

The CGA Application can be configured by accessing the corresponding item in the "MARIO Apps" section of the caregiver screen (see Figure 4-25).

MARIO	& Comprehensive Geriatric Assessment	🋗 Wed 20 Sep 2017 🧿 15:18
E	Clinical Tests and Questionnaires	
John May	Select the clinical tests and questionnaires that will be used by the CGA app when interacting with the user.	
▶ Patient	Cohabitation Status	
 Mario Apps 	Medication Use	
🞜 My Music	Activities of Daily Living (ADL)	
🔒 My Games	Instumental Activities of Daily Living (IADL) Short Portable Mental Status Questionnaire (SPMSQ)	
I My News	Mini Nutritional Assessment (MNA)	
🛗 My Calendar		✓ Save
My Family and Friends		▼ Jave
S My Chat	Additional Information	
& CGA	Provide the following additional information that is used by the CGA app for the clinical questionnaires.	
▶ Reports		
	Short Portable Mental Status Questionnaire (SPMSQ)	
	Enter one or more strings representing the possible ways the user may refer to the place where the CGA is performed.	
	St. Brendans × Nursing Home ×	
	Enter one or more strings representing the possible ways the user may refer to the name of the current Pope.	
	Francis * Pope Francis * Jorge Mario Bergoglio *	
Launch Mario!	Enter one or more strings representing the possible ways the user may refer to the name of the previous Pope.	

Figure 4-25 The CGA Application

The "Clinical Tests and Questionnaires" section of the configuration page allows the clinician to select the clinical tests and questionnaires that will be used by the CGA app when interacting with the user; by default all tests/questionnaires are selected (see Annex 1 of Deliverable 4.3 – "MARIO Robot CGA Module" for a description of the clinical tests and questionnaires).

If the "Short Portable Mental Status Questionnaire (SPMSQ)" is selected as part of the CGA tests, there is additional information may be defined in order to allow MARIO to interpret the user's answers and check the correctness of the replies, so as to assign a score according to the questionnaire's assessment logic. The SPMSQ assessment test includes questions that relate to user- and location-specific information; this holds in particular for the following questions: "What is the name of this place?", "Who is the current Pope/President?", "Who was the previous Pope/President?", "How old are you?", "What is your date of birth?", "What is your home address?", "What was your mother's maiden name?".

The "Additional Information" section of the CGA configuration page (again Figure 4-25) allows defining the possible ways the user may refer to the place where the CGA is performed, as well as the possible ways the user may refer to the name of the current/previous Pope and President. Those names should reflect what the caregiver considers as correct/acceptable answers to the corresponding questions.

Concerning the user-specific questions, the following information should be defined as part of the user profile (see Figure 4-26):



MARIO	🐣 Patient Profi	ile		🛗 Thu 21 Sep 2017 📀 00:19
6				+ Add new user
John May	Personal details			×
- Patient	Basic Information			
🛔 Profile	p	User code	Automatically assigned by the system	
Family and Friends		First name *	John	
🛄 Life Events	126	Last name	May	
Photos		Gender *	Male	
 Mario Apps 		Birth date	16/06/1945	
Reports		Birth place	enter patient birthplace	
		_		
	+ Choose Photo	Hometown	enter patient home town	
		Current city	enter patient current city	
	Additional Information	on		
	Home address	50 Oxford Street, Birmingham, Engl	and	
🦿 Launch Mario!				✓ Save

Figure 4-26 Basic CGA Information

- the user's birth date
- the user's home address

In addition, a specific profile should be defined for the user's mother under the "Family and Friends" section, where the lady's maiden name is explicitly defined (see screenshot Figure 4-27).

MARIO	* Family and Friends			🏥 Tue 19 Sep 2017 O 13:59
	Profile			×
	Basic Information	1		
John May	First name *	Diana		
+ Patient	Last name	Smith		
Profile Family and Friends	Gender *	Female	÷	1221
👑 Life Events	Maiden name	Page		1 to 10
Photos	Birth date	enter birth date		Amerik
 Mario Apps 	Birth place	enter birthplace		12 Start
▶ Reports	Hometown	enter home town		+ Choose
	Current city	enter current city		
	Relationship with	the patient		
	This person *	is mother of		John May
	Contact Details			
	Specify a phone number i	f you want that Mario allows the user to call this person using the MyChat application.		
🧳 Launch Mario!	🕻 Phone	add phone number		

Figure 4-27 Profile for Patients mother



The CGA App is not directly accessible to the user in the MARIO user interface. The application is typically vocally triggered by the caregiver, who asks MARIO to make an assessment of the user/patient.

The assessment questions are shown on screen and depending on the type of question the user/patient can answer vocally or, in the case of closed-ended questions, through the touchscreen by selecting one of the available options (see screenshots Figure 4-28 and Figure 4-29).



Figure 4-28 Sample CGA assessment question (1)



Figure 4-29 Sample CGA Assessment (2)



CGA sessions are available to the caregiver by accessing the corresponding item in the "Reports" section of the menu (see Figure 4-30). The "CGA Sessions" page provides an overview of the recorded sessions, with the starting/ending date and time and their duration. The caregiver can then access the details of each session using the corresponding button. This leads to a page (see Figure 4-31) where the details of the interaction are reported, including the questions posed by MARIO and user's answers, with the corresponding interpretation or score.

MARIO	CGA Sessions		🛗 Mon 30 Oct 2017 O 13:34
John May	Sessions and Results CGA Session - Monday 11 September 2017		
 Patient Mario Apps 		🛗 Ended: 11/09/2017 🕐 At: 11:03	Duration: 13 minutes
Reports GA Sessions General Settings	CGA Session - Thursday 31 August 2017 Started: 31/08/2017 O At: 15:25 Details	🛗 Ended: 31/08/2017 💿 At: 15:35	Duration: 10 minutes
			Export sessions
🖌 Launch Mario!			

Figure 4-30 CGA Reports

As shown in Figure 4-30, the caregiver also has the possibility to export the CGA session for a given user by pressing the "Export Sessions" button. All recorded sessions for the user are exported to an Excel file, whose specific path and location on the robot are shown to the user in a confirmation dialog when the export process finishes. The resulting Excel file includes a sheet where the different sessions are summarised and, for each CGA session, a dedicated sheet where the details of the session are reported.



MARIO	CGA Sessions		🎬 Thu 21	Sep 2017 O 00:17
E	CGA Session - Monday 11 Sept	ember 2017		
John May	m Started: 11/09/2017 O At: 10:50	m Ended: 11/09/2017 @ At: 11:03	Duration: 13 minutes	
Patient	Question			
 Mario Apps 	How many drugs do you take?			
* Reports	Answer			Ø 10:51:21
CGA Sessions	Two drugs every day			
	Interpretation or score: 2			
	i			
	Question What is the date today?			
	Answer It's the 4th of September 2017			Ø 10:52:17
	Interpretation or score: 1			
	Question What day of the week is it today?			
	Answer It's Tuesday			◎ 10:53:12
🛷 Launch Mario!	Interpretation or score: 0			

Figure 4-31 CGA Session



4.5. Controlling MARIO's Motion Subsystem and Approach Behaviour



Figure 4-32 Motion Subsystem Settings

Figure 4-32 shows the setup screen accessed via the General Settings > Robot menu option. The screen allows enabling or disabling the ability of MARIO to approach the user. When this feature is enabled via the corresponding input switch (as shown in the Figure), the robot will be able to autonomously move and approach a user. Although this setting is not user-specific and can be enabled/disabled dynamically while MARIO is operating, it is recommended to enable/disable this capability as part of the overall setup performed before activating the robot for a specific user.



Appendix A Technical Data

Designation	Specification
Span	450mm
Height	1330 mm
Weight	45 Kg
Torso Rotation	180°
On-board Energy	960 Wh
Autonomy	4h
Slope	8%
Maximum Speed	1 ms ⁻¹ in manual mode, 0.5ms ⁻¹ in automatic mode
Clearance	20mm
Security	Anti-collision laser, Emergency stops, Bumper
Communication	Wi-Fi, 4G Key

Table 6 MARIO Technical Data



Appendix B Changing the hand controller battery

Batteries are installed or changed as follows:

- 1) Open the compartment underneath the controller.
- 2) Insert two AA batteries in the allocated compartment, making sure that the positive and negative polarities are properly in placed.
- 3) Replace the battery compartment in the controller.



Figure B-33: Opening the Hand Controller battery compartment



Figure B-34: Replacing the Hand Controller batteries