ICARE BOT

Supporting people with
increased need of care
to master their daily
living at home

DHBW
Duale Hochschule
Baden-Württemberg
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UNIL | Université de Lausanne
IDHEAP

WHAT IS THE ICARE PROJECT ABOUT?

The project iCare, which is funded by the Internationale Bodenseehochschule (IBH), wants to make use of sensor-based systems to support people with special needs in living as independently and safely as possible, allowing them to remain longer in their familiar environment.

Providing care support to a rapidly ageing population with the same or even fewer resources has become one of the grand challenges of this century for many governments in developed countries. A matter of particular urgency is to increase the autonomy and social participation of people with increased need of care, since much evidence points into the direction that people residing self-determined in a homecare setting are much more independent and active as if they would be treated in long-term care facilities.

ICARE TRIES TO INCREASE AUTONOMY FOR PEOPLE WITH SPECIAL NEEDS & HELP THEIR FAMILIES

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THE ICARE BOT IS BASED ON A RASPBERRY PI COMPUTER EXTENDED BY OFF-THE-SHELF COMPONENTS
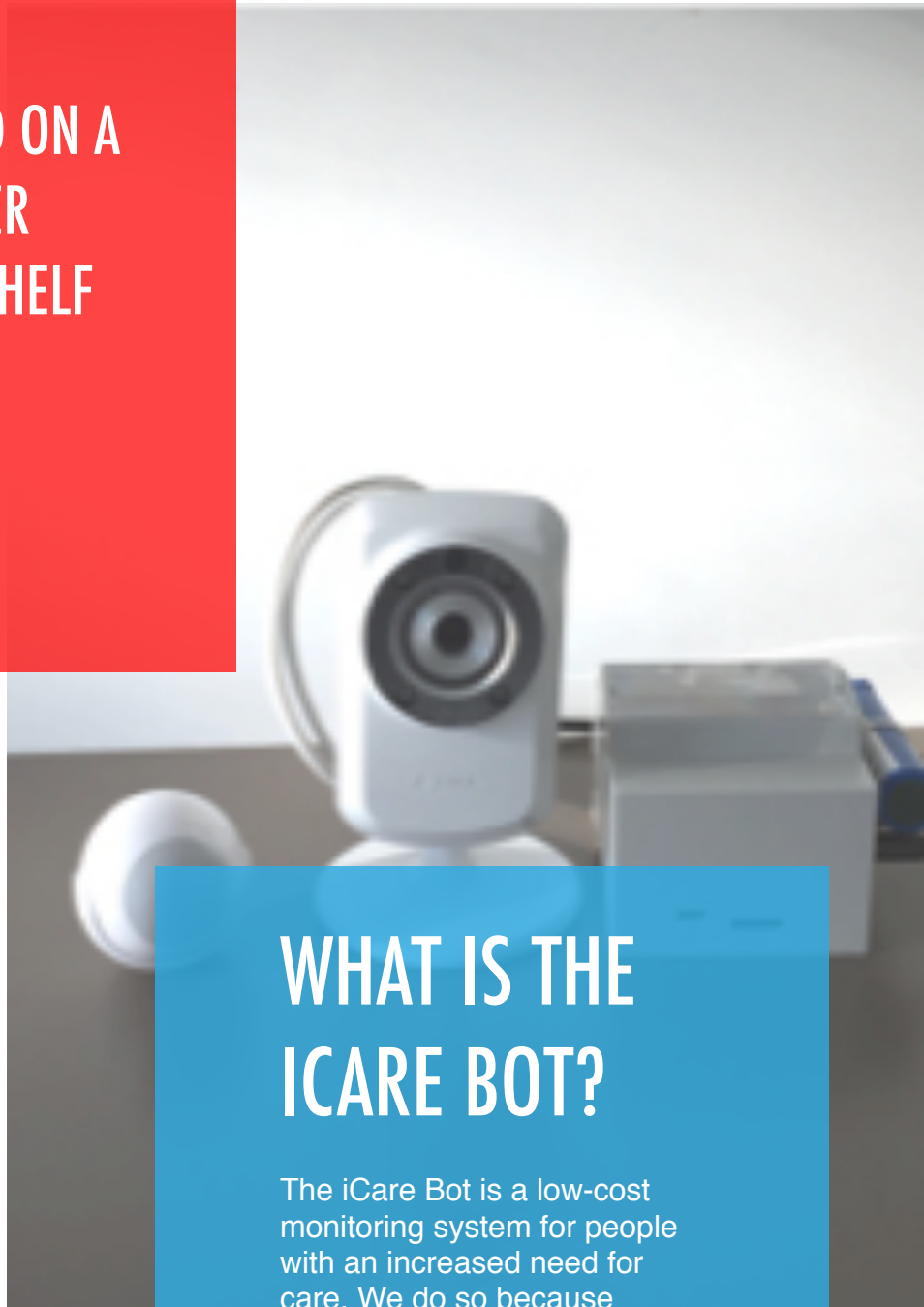
We have designed two versions of the iCare Bot, each of which can be easily extended with specific onboard accessories and any other standard, off-the-shelf component (e.g. web cams, motion sensors, navigation modules, displays etc.).
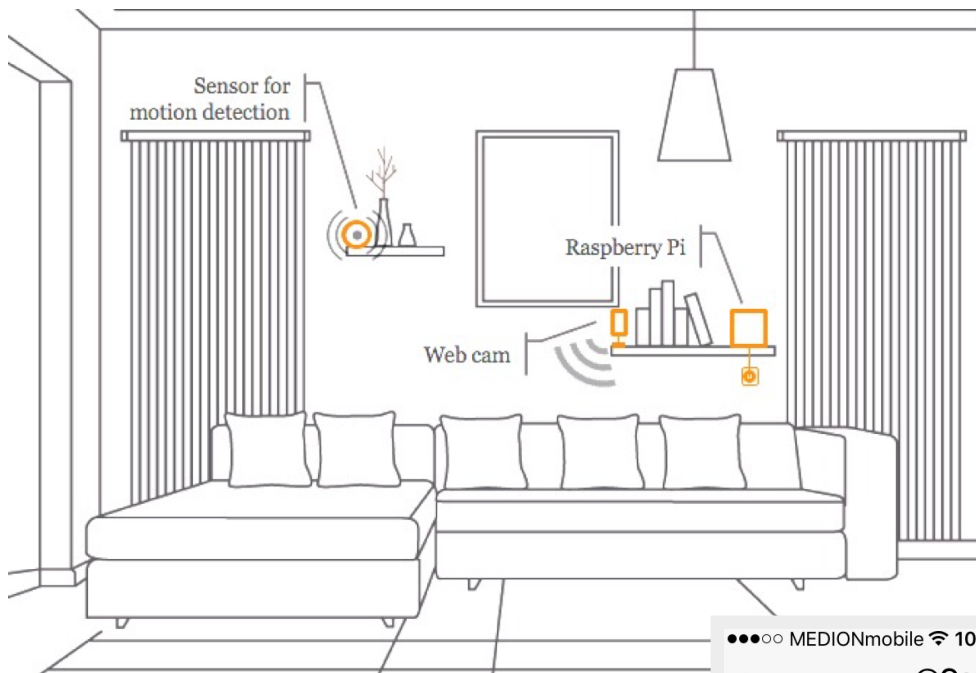
The first version is based on a Raspberry Pi 2 with an integrated motion detection sensor and camera.

The second version, as shown at right hand side, is based on a Raspberry Pi 3 with a standalone web cam and one or several battery-operated wireless sensors with ultra-low power consumption.
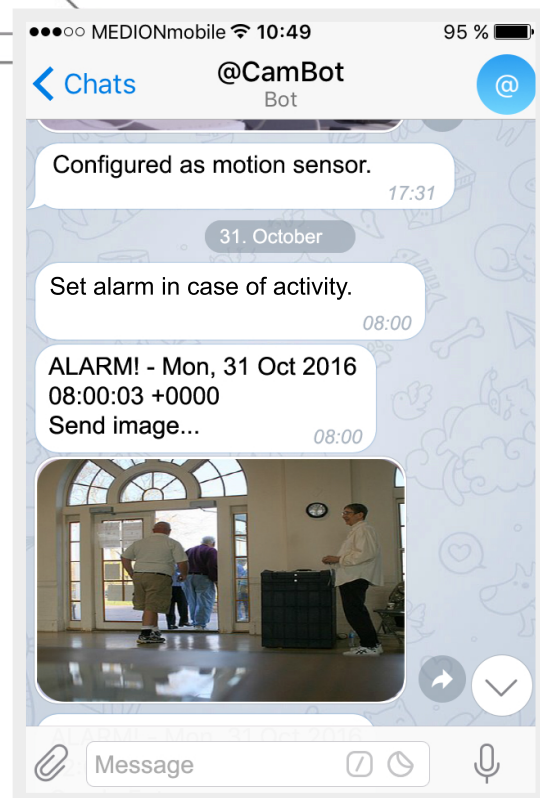
WHAT IS THE ICARE BOT?

The iCare Bot is a low-cost monitoring system for people with an increased need for care. We do so because existing monitoring solutions for this group of people are either expensive, extremely complex to handle by laypersons or not expandable to the needs of family members and caregivers.

Sensor for motion detection

Raspberry Pi

Web cam

●●●○○ MEDIONmobile 📶 10:49   95 % ▬

‹ Chats   **@CamBot**   @
              Bot

Configured as motion sensor.
                  17:31

31. October

Set alarm in case of activity.
                  08:00

ALARM! - Mon, 31 Oct 2016
08:00:03 +0000
Send image...
                  08:00

Message

In order to make use of the iCare Bot, you need to place the motion sensors and the camera to the place you want to monitor. The Raspberry Pi should be connected to the Internet, either using a LAN cable or a secure WiFi connection.

To receive notifications, you need to install the free instant messaging software *Telegram Messenger,* as shown at the right hand side, which runs on most common platforms including PC, Mac, Linux, iOS, Android, Windows Phone, and Ubuntu Touch.

HOW DOES THE ICARE BOT WORK?

The iCare Bot uses motion sensors that trigger alert messages on the *Telegram Messenger*. The sensors can be programmed according to specific needs or habits.

HOW TO GET AN ICARE BOT?

We want YOU to make one! With this guide we will describe you step-by-step which components to buy, how to assemble them, and how to install and configure the software for your purposes.

SHOPPING LIST

For the **CamBot** you will need:

1 x Raspberry PI (Modell 3B+)
1 x Raspberry Picam (or Picam Noir)
1 x Case for Raspberry PI with Picam
1 x MicroUSB power supply, (min. 2A)
1 x SD card (min. 16GB)

For the **ScanBot** you will need:

1 x Raspberry PI (Modell 3B+)
1 x Case for Raspberry PI
1 x MicroUSB power supply, (min. 2A)
1 x SD card (min. 16GB)
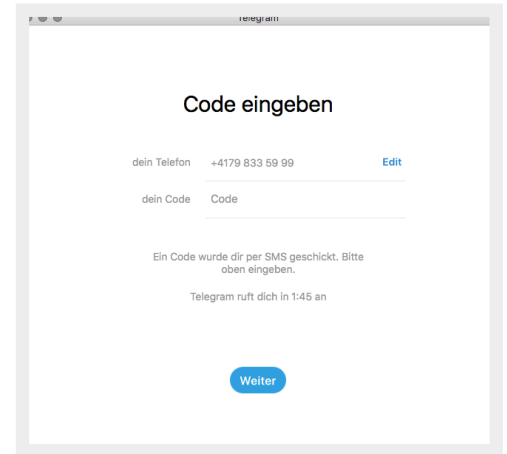n x Bluetooth 4.x Beacons
    (e.g. Gigaset Tag)

HOW TO INSTALL THE TELEGRAM MESSENGER AND SETTING UP A CHAT BOT - PART 1

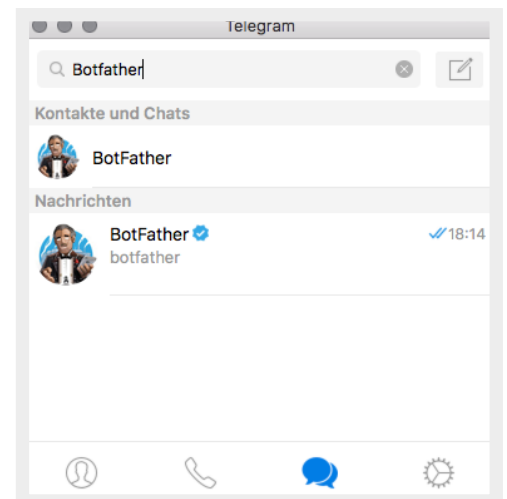## Installation of the Telegram Messenger

1. The *Telegram Messenger* is available for almost any current operating system. Visit the https://telegram.org/ website to see where to download the newest version for your type of device.

2. After you have downloaded and installed the app on your phone or desktop computer, you will see a screen similar asking you to click on the *Start Messaging* button.

3. Next, you will be asked to enter your mobile phone number and country code.
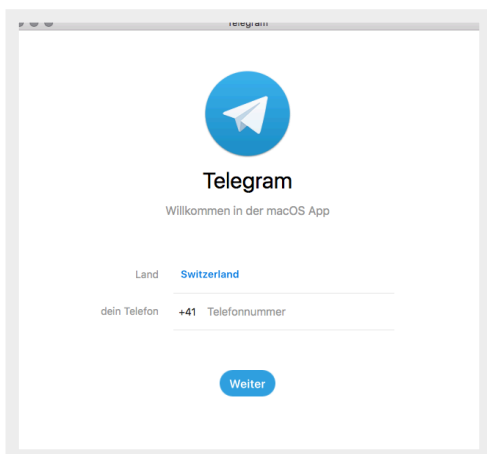
4. You will receive an SMS notification to the mobile phone number you entered previously. Type in the code and proceed.

5. Next, enter the settings menu and add a username (you can use characters a-z, 0-9 and underline; a minimum of 5 characters is required). It is recommended to add a username so that others who don't know your mobile phone find you.

6. To receive messages from the iCare Bot, we need to create a bot in Telegram. Type `BotFather` in the search box first.
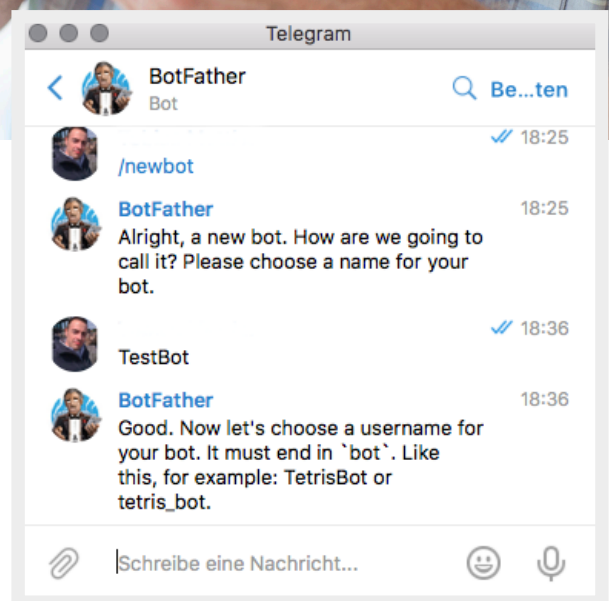
HOW TO INSTALL THE TELEGRAM MESSENGER AND SETTING UP A CHAT BOT - PART 2

Creating a new chat bot

1. Well, let's send BotFather a message. Type `/newbot` to create a new chatbot. The BotFather will ask you for a name and username, then generate an authorization token for your new bot. The *name* of your bot is displayed in contact details. The *username* is a short name, to be used in mentions. Usernames are 5-32 characters long and are case insensitive, but may only include Latin characters, numbers, and underscores. Your bot's username must end in 'bot', such ‚icareBot'.

2. The BotFather will send you a token, i.e. a string such as `110201543:AAHdqTcvCH1vGWJxfSeofSAs0K5PALDsaw.` Write down the token number or copy it to your clipboard. You will need this token later on.

   For further help related to the setup of a chat bot in Telegram, please consult the following website:

   https://core.telegram.org/bots#6-botfather

Telegram

BotFather
Bot

⟲ Be…ten

✓✓ 18:25

/newbot

BotFather   18:25
Alright, a new bot. How are we going to call it? Please choose a name for your bot.

✓✓ 18:36

TestBot

BotFather   18:36
Good. Now let's choose a username for your bot. It must end in `bot`. Like this, for example: TetrisBot or tetris_bot.
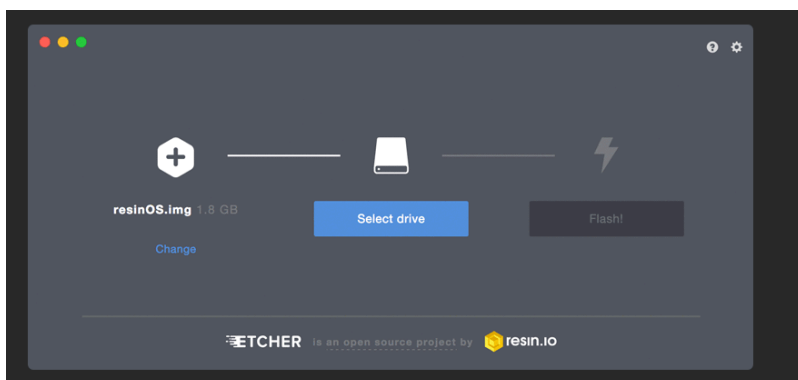
Schreibe eine Nachricht…

HOW TO INSTALL THE ICARE BOT OPERATING SYSTEM - PART 1

The iCare Bot operating system is freely available on our website. Please check for newer versions of our software image on a regular basis.

Download and mount the iCare Bot image

1. Open your web browser and access the following website: http://wp.unil.ch/icare/downloads/?lang=en

2. Download the image file (usually a file ending with a *.gz* extension). Since the image file is rather large, the download will take a certain amount of time.

3. Once you have dowloaded the file from the website, you need to write the image to your SD card. Hence, insert your SD onto the computer

4. If you do not have previous experience with mounting images, the easiest way to do so is a tool named *Etcher*. You can download this tool on: https://etcher.io

   Once you have dowloaded and installed *Etcher* you simply select the location where you stored the image file and select the SD card and hit the *Flash!* button.

5. Once done, remove the SD from your computer and insert into your switch off Raspberry Pi.

6. Connect the Raspberry Pi to the Internet using a LAN cable and then to the power supply. Wait a couple of minutes for the system to boot.

resinOS.img 1.8 GB

Select drive

Flash!

Change

ETCHER is an open source project by resin.io
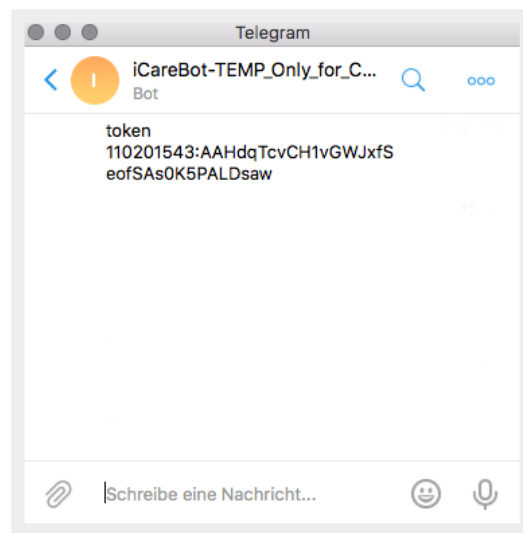
where the image file is stored.

HOW TO INSTALL THE ICARE BOT OPERATING SYSTEM - PART 2

The iCare Bot operating system is freely available on our website. Please check for newer versions of our software image on a regular basis.

Connect the iCare Bot with Telegram

1. Open your web browser and access the following website: http://t.me/icare_temp_configuration_bot

   A message will appear asking you if *Telegram* is allowed to open this website. Klick yes to proceed.

2. In the *Telegram Messenger* type `token` together with the number you received earlier by the BotFather, e.g.

   ```
   token 110201543:AAHdqTcvCH1
   vGWJxfSeofSAs0K5PALDsaw
   ```
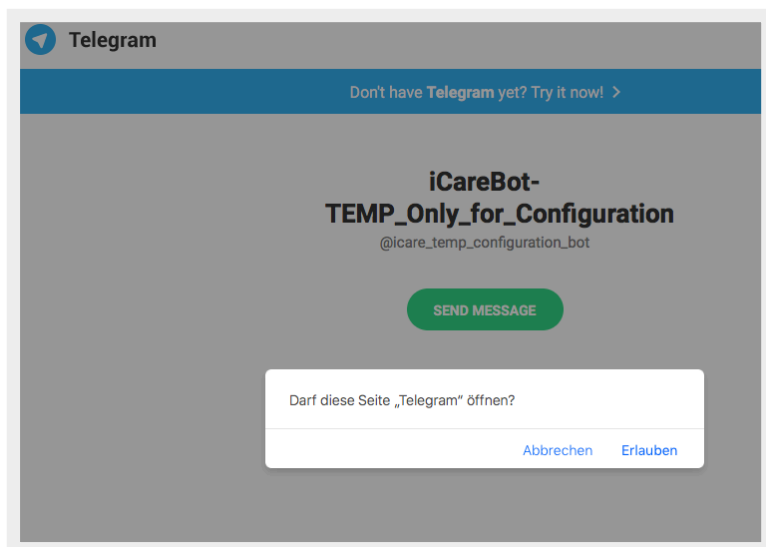
   Watch out that you enter the token correctly (the token is case-sensitive).

3. Remove the iCare Bot from the power supply so that it can reboot.

4. In the *Telegram Messenger* start a new chat with the chat bot you created earlier.

   You can test if the connection between the iCare Bot and *Telegram* works by typing the command `hi.` In case everything was entered correctly you should receive a message like *„Hi, I am yourChatBotName, your bot from the iCare research project.“*

   With this ready, we can proceed to adding a WiFi connection. This will allow you to place your iCare Bot wherever you like at home.

HOW TO ADD A WIFI CONNECTION USING TELEGRAM

The iCare Bot needs an Internet connection. Unless you do not connect the bot to your local network, it won't work. You can either connect the bot directly via LAN cable or via WiFi connection. We show you how to do the latter now.

Connect to a secured network (recommended)

1. Once the iCare Bot is connected to *Telegram* it is quite easy to add a WiFi connection.

   Open the chat within *Telegram Messenger* and simply type `wifi key` followed by the name of your wireless home network and your password, e.g.

   `wifi key Your_network_name Your_wifi_password`

2. In order that the modifications become effective, you need to reboot the iCare Bot by typing `reboot`.

   Note: If you want to really check if the WiFi connection works properly, shut down the iCare Bot by typing `off`. Unplug the iCare Bot from the power supply and LAN cable. Wait a couple of minutes and plug the iCare Bot without the LAN cable to the power supply.

3. Type `ip` to check your network connection.

   Note: There is also the possibility to connect to WPA-EAP secured networks using the *Telegram Messenger* for configuration. Please consult our help by typing the command `info`.

   Otherwise, there is also the possibility to manually add a WiFi connection using a terminal prompt, as will be explained on the next page of this manual.

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HOW TO ADD A WIFI CONNECTION USING TERMINAL

The iCare Bot needs an Internet connection. Unless you do not connect the bot to your local network, it won't work. You can either connect the bot directly via LAN cable or via WiFi connection. We show you how to do the latter now.

Connect to a secured network (recommended)

1. Connect your iCare Bot to a keyboard using a USB cable and to a display using a standard HDMI cable.

2. Open the Wifi configuration file by typing in the following:

```
sudo nano /etc/wpa_supplicant/
wpa_supplicant.conf
```

3. Go to the bottom of the file and add the following:

```
network={
    ssid=„Your_network_name"
    psk="Your_wifi_password"
}
```

Note that, the WiFi configuration file requires the red values (your actual network name and password) to be quoted, otherwise the bot will not connect to your network.

4. Save the file by pressing Ctrl+X, then Y, then finally press Enter.

Connect to an unsecured network (not recommended)

If the network you use at home does not use a password, the entry for the network will need the following entry instead:

```
network={
    ssid=„Your_network_name"
    key_mgmt=NONE
}
```

Connect to a hidden network

If you are using a hidden network, an extra option is needed:

```
network={
    ssid="yourHiddenSSID"
    scan_ssid=1
    psk="Your_wifi_password"
}
```

You can verify whether the iCare Bot has successfully connected typing

```
ifconfig wlan0
```

If the inet addr field has an address beside it, the iCare bot has connected to the network. If not, check if your password and SSID are correct.

For further help, please consult the following website:

https://www.raspberrypi.org/documentation/configuration/wireless/wireless-cli.md

FIRST STEPS WITH THE ICARE BOT

Excellent! The initial configuration activities should be over now. Let's test if everything functions properly. First, check if the iCare Bot is connected to a power source and has a working Internet connection. Position the iCare Bot in a way that the camera looks into the direction you want to monitor.

Testing the connection to your iCare Bot

1. In the *Telegram Messenger* type `foto`. If everything is setup properly, you should have received a notification with an image on Telegram. If you would have typed in `hi`, the iCare Bot will return a text message instead.
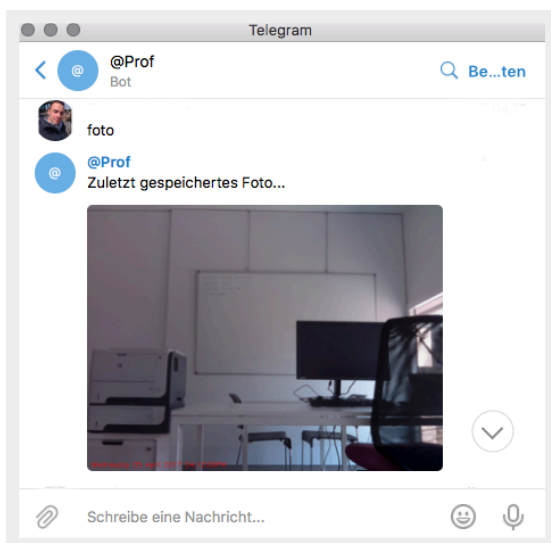
Basic commands of the iCare Bot

2. Ok, let's check what other commands are available to interact with the iCare Bot. A useful command is the help command. Type in `info` and your will obtain a list of all implemented functions of the iCare Bot.
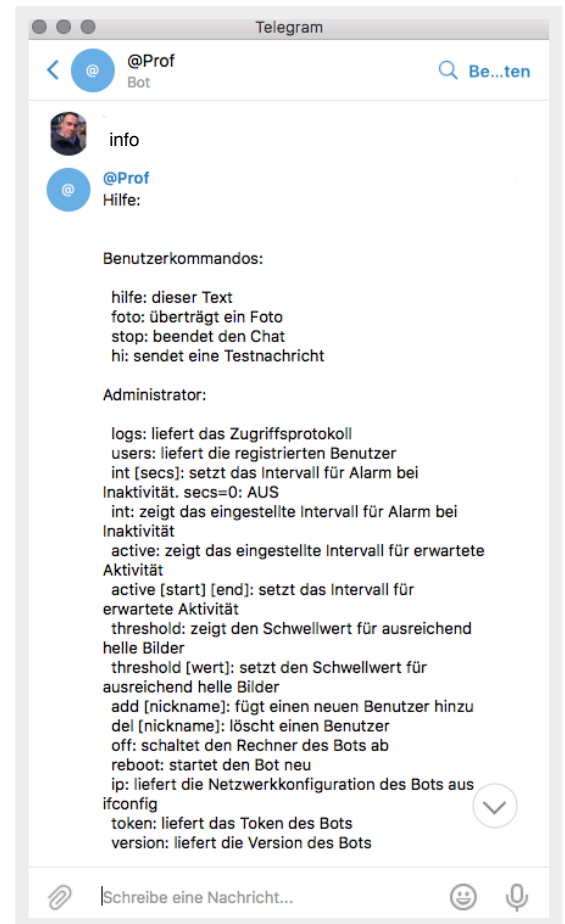
3. Since there is no power on/off button, type `off` to shut down the iCare Bot. If you encounter problems and would like to restart the bot, then type `reboot`.

4. To check the currently installed software version of the iCare Bot type `version`.

5. To verify which IP number was assigned to the iCare Bot, type `ip`.

6. Finally, if you are using several bots in parallel and would like to check which token is assigned to the bot you are currently chatting with, then type `token` to receive the token number of the bot.

HOW TO DEFINE YOUR CARE SETTING AND ADDING FAMILY MEMBERS

The idea of the iCare Bot is to keep your care setting, such as family members, informed. As you will see, it is very easy to add and remove people from the list of notification recipients.

Adding people to your care setting

• To add a person that should receive notifications from your iCare Bot you need to know his or her *Telegram* username. Accordingly, this person requires to have installed *Telegram* on a device. Once you have this information, simply type `user add` followed by the `username` of the person.

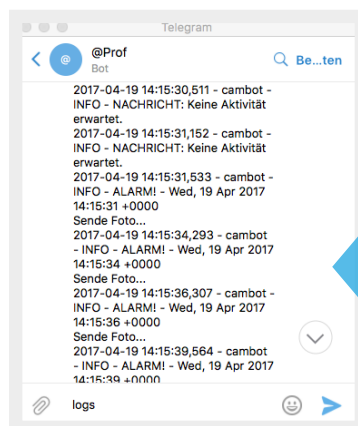## Removing people from you care setting

• You don't want that a specific person receives notifications from your iCare Bot anymore. No problem! Simply type `user del` followed by the `username` of the person.

Checking recent history of notifications

• If you want to see a brief history of what your iCare Bot was doing lately, then type `logs`. You will receive valuable information about any encountered errors as well as listing of notifications which were sent to your care setting.

Who should receive notifications?

• Well, this depends on how much trust do you have in certain individuals and institutions. We cannot tell you who should be part of your care setting. We only tell you how to setup such an environment.

Checking who is receiving notifications

• If you don't know who is receiving notifications from your iCare Bot, then just type `users`. You will receive a list of all people who are currently subscribed to your iCare Bot.

Telegram

@Prof Bot

2017-04-19 14:15:30,511 - cambot - INFO - NACHRICHT: Keine Aktivität erwartet.
2017-04-19 14:15:31,152 - cambot - INFO - NACHRICHT: Keine Aktivität erwartet.
2017-04-19 14:15:31,533 - cambot - INFO - ALARM! - Wed, 19 Apr 2017 14:15:31 +0000
Sende Foto...
2017-04-19 14:15:34,293 - cambot - INFO - ALARM! - Wed, 19 Apr 2017 14:15:34 +0000
Sende Foto...
2017-04-19 14:15:36,307 - cambot - INFO - ALARM! - Wed, 19 Apr 2017 14:15:36 +0000
Sende Foto...
2017-04-19 14:15:39,564 - cambot - INFO - ALARM! - Wed, 19 Apr 2017 14:15:39 +0000

logs

HOW TO SETUP WHEN TO TRIGGER A NOTIFICATION

With the version 1.0 of the iCare Bot we provide two modes for triggering notifications. We will explain now how you can configure your iCare Bot so that you only receive notifications when needed.

Getting a notification in case of unusual activity

- Suppose you are a sleepwalker and you want your care setting to be notified when there is movement during the night (e.g. between 23:00 and 06:00). Hence, the time frame you are normally active is between 06:00 and 23:00 or in other words, we can expect some movement during the day, while wandering at night is rather unusual. To tell your iCare Bot to trigger an alarm when you are doing nocturnal walks, type into the Telegram Messenger `active 06:00 23:00`.
From now on, the iCare Bot will send a notification to your care setting when you wander at night.
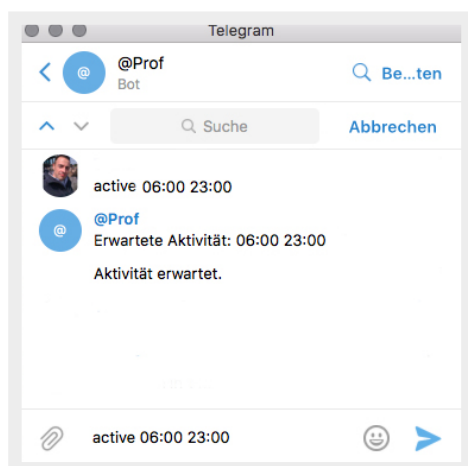
Getting a notification in case of inactivity

- Suppose you want to trigger an alarm when there is no movement during half a day (…it is not good to sleep so long 😀). Type `period 432000` and you will receive a notification in case there was no movement in the past 12 hours. You can change the interval of inactivity by changing the number after `period` (we set the time in seconds; one hour = 3600 seconds; therefore 12 hours = 432000 seconds).

- Type `period off` if you want to disable notifications in case of inactivity.
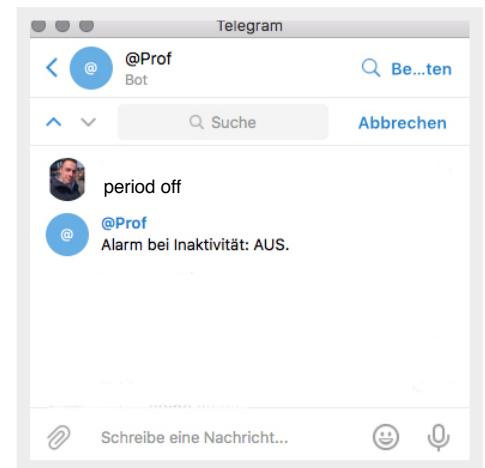
Checking current notification settings

- To see the current settings related to notifications in case of activity, type `active`. You will get a message from the iCare Bot indicating the time frame when activity is expected (this means that you won't receive alert messages then).

- To see the current settings related to notifications in case of inactivity, type `period`. You will get a message from the iCare Bot indicating the interval after which the bot will trigger a message when no movement is detected.

- There are more options you can modify. Simply type `info` for getting an overview of commands available with your iCare Bot.

TROUBLESHOOTING

We don't take any responsibilities or liability to any harm the iCare Bot could cause. However, in case you encounter technical issues related to the building and setup of the bot, please send us an e-mail at judt@dhbw-ravensburg.de or tobias.mettler@unil.ch

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ICARE BOT

Supporting people with increased need of care to master their daily living at home

Visit our websites
www.unil.ch/icare I www.ravensburg.dhbw.de/icare

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