AiBO+ User Guide

Version 3.1.2 – Move me!

(Last update: 2016-12-31)

Introduction

AiBO+ provides a new AIBOWare software (PMS stick) for Sony ERS-7 models and a client application under Windows, Mac OSX, iOS, Android and Ubuntu Linux. An AiBO+ compatible Skitter (thanks to DogsBody!) is bundled in the Windows installer and also available under Ubuntu Linux.

The AiBO+ software is free, but **there is NO any kind of warranty.** It is your responsibility to take the risk of the usage with your robot. Please never leave the robot alone while running AiBO+.

AiBO+ has the following skills at the moment:

- Game mode.
- Voice profiles (text-to-speech, Csaba, Marissa, Gillian).
- Basic postures: sit, stand, lie.
- Walking forward, backward.
- Turning left, right.
- Motion control from a mobile device.
- Turn the head towards a loud sound source.
- Petting makes happy.
- Poking makes angry.
- Holding in hands (pick-up mode) makes angry.
- Recognizing the floor surface while walking.
- Doing some exercises if getting bored.
- Turning over if the robot is upside down.
- Recognizing and avoiding a deepness (e.g stairs) while walking.
- Recognizing and avoiding a deepness (e.g lying on a sofa) while lying.
- Avoiding near obstacles.
- Sound event recognition.
- Adaptive walk speed.
- Adaptive LED brightness levels according to ambient illumination.
- Adaptive volume level control according to time and ambient illumination (configurable).
- Deafness support for the affected dogs.
- Showing the battery level.

Other features:

- AiBO+ Client application for Windows (XP or later), Ubuntu Linux (14.04/trusty), Android, iOS and macOS.
- Skitter integration: Motion editor for Windows (XP or later) and Ubuntu Linux (with wine).
- MemoryStick Settings application to manipulate the wireless settings on any PMS stick.

Installation

Windows: The latest bundled installer (AiBO+ Client, Skitter, MemoryStick Settings, AIBOWare Memory Stick image) can be downloaded from here.

macOS: The AiBO+ Client application can be downloaded from here. The 3rd party installation must be enabled in System Preferences/Security & Privacy/Allow apps downloaded from (change to Anywhere).

iOS: The AiBO+ Client application can be downloaded from App Store.

Android: The AiBO+ Client application can be downloaded from Google Play.

Ubuntu Linux: The whole software package (AiBO+ Client, Skitter, MemoryStick Settings, AIBOWare Memory Stick image) can be installed from this PPA by the following console commands:

```
sudo add-apt-repository ppa:csaba-kertesz/aiboplus
sudo apt-get update
sudo apt-get install aiboplus
```

The application, Skitter and the Memory Stick image will be reachable via the launcher under KDE/Gnome Shell and Gnome2. Just start to type “aibo” in the search field.

AiBO+ AIBOWare (Memory Stick image)

The Memory Stick image is the most important part of the AiBO+ components because this software is run inside the Sony ERS-7. *The AiBO+ AIBOWare is only compatible with Sony ERS-7.*

The AiBO+ stick is an AIBOWare and it must be installed on a PMS (Programmable Memory Stick). If you don't have a pink PMS, an ordinary Memory Stick can be turned into PMS with the StikZap application with a Sony Clié. For more details, please visit and read AiboPet web page carefully.

The image can be found:

- *Windows*: After executing the AiBO+ installer, a shortcut "AiBO+ Memory Stick (AIBOWare)" is under the Start Menu/AiBO+.
- *Ubuntu Linux*: After installing AiBO+, type "aibo" in the search field of KDE/GNOME Shell to get a shortcut "AiBO+ Memory Stick (AIBOWare)".
- The image can be downloaded separately from here.

After the AiBO+ AIBOWare is copied to a PMS, the wireless network can be configured for the AiBO+ Client with one of the following options:

- Edit the OPEN-R/SYSTEM/CONF/WLANDFLT.TXT file on the stick manually according to the Sony ERS-7 manuals and guides.
- Use the *MemoryStick Settings* application.

Number Game

The number game can be played with the robot if it is connected to an AiBO+ Client application via

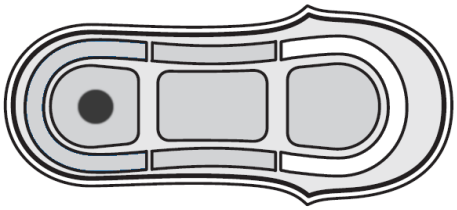
wireless network. A new game is started after pressing the crown button of AIBO for 3 seconds or selecting the “Play number game” button in Games view of the AiBO+ Client.

Volume Control

The AiBO+ AIBOWare has two volume control logic. In normal mode, the volume is always on the maximum. In adaptive mode, it depends on the time and the ambient brightness:

- Full volume between 8:00-20:00.
- The dog is completely silent if the room is dark in the night time (20:00-8:00).
- The dog sets low volume in a room with some ambient brightness (e.g some lights are on) in the night time (20:00-8:00).

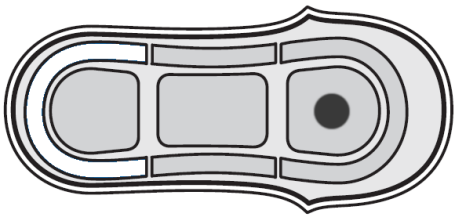
The volume control logic can be setup the *MemoryStick Settings* application or it can be toggled by pressing the fore touch button on the back:



- Press the fore button for 3 seconds when the robot is in idle and the volume logic will be toggled. The rear white LED blinks once for normal logic and twice for adaptive logic.

Sound Profiles

Three sound profiles are available on the robot: text-to-speech (TTS), Marissa and Gillian. The active profile can be setup the *MemoryStick Settings* application or it can be toggled by pressing the rear touch button on the back:



- Press the rear button for 3 seconds when the robot is in idle and the sound profile will be changed to the next. The fore white LED blinks once after each switching.

Deafness Support

When one of the microphones of a robot is dead, AIBO can’t discover the loud sound sources and this deafness support must be enabled in the settings file (WLANDFLT.TXT) on the memory stick.

General Usage

The following important things are good to know:

- When AIBO detects a deepness while lying, it will not change posture or walk for safety reasons. The dog makes the pessimistic assumption that it is placed on a chair or sofa. To bring out from this state, the dog should be picked up to change into pick-up mode and place it to the floor.
- When AIBO reaches the lying posture, all legs are switched off, until they are needed, for

safety reasons and sparing energy. In sitting posture, the hind legs are switched off.
- If the crown touch sensor is pressed for three seconds during the boot (white LED animation on the back), the robot switches to debug mode and becomes inactive until the AiBO+ debug application does not connect to the dog. *This mode should not be used by regular users, only a restart brings the robot back to normal mode.*

Attention! Do not leave the robot unattended while running the AiBO+ AIBOWare. Although the robot can avoid stairs and near objects in front, the current AI can not detect stuck legs (upcoming feature). Only emergency shutdown is active which is triggered by mechanical overload in the joints.

AiBO+ Client

The AiBO+ Client application can connect to a Sony ERS-7 dog running an AiBO+ AiBOWare. The same AiBO+ AIBOWare stick and AiBO+ Client applications should be used together. The application provides the following features:

- The robot dog is found on the wireless network automatically.
- The network, battery information, basic emotions, camera image are shown on the main screen.
- Motion control.
- Interaction with AIBO: floor surface recognition and game.
- AIBO camera images can be saved to the computer, phone or tablet.
- Data is collected to enhance the AI.

The application is available:

- *Windows*: After executing the AiBO+ installer, a shortcut "AiBO+ Client" is under the Start Menu/AiBO+.
- *Ubuntu Linux*: After installing AiBO+, type "aibo" in the search field of KDE/GNOME Shell to get a shortcut "AiBO+ Client".

Crowdsourcing

The AiBO+ Client gets the recognized floor surface data and game results from AIBO to upload in the AiBO+ Cloud. It is not possible to opt out, but the uploaded data are only some numbers. The uploaded data is not incorporated in the AI immediately, it is downloaded (and deleted from the Cloud) by the AiBO+ developer (me) for further analysis. The improved AI skills will appear in the upcoming AiBO+ releases. This kind of community based efforts are called crowdsourcing.

Privacy Aspects

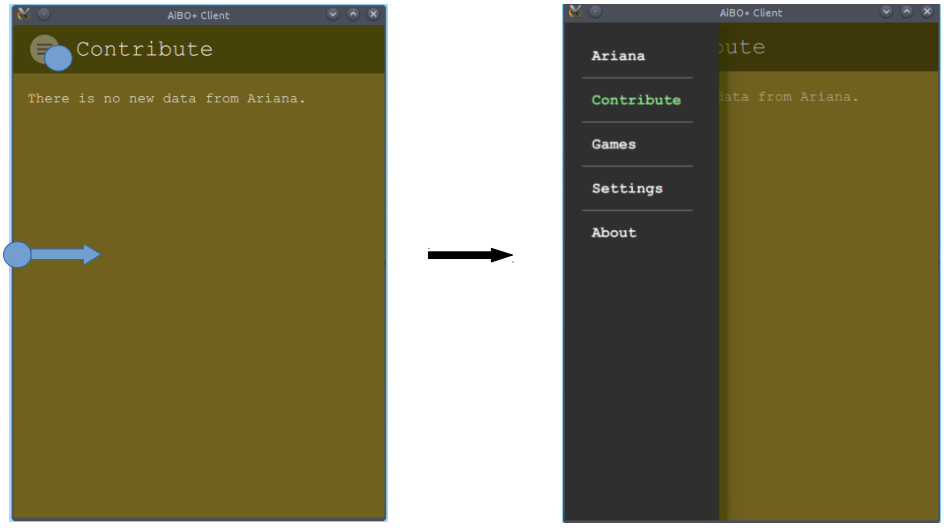
1. IP addresses, camera image or sound are NOT recorded and uploaded anywhere at this point.
2. The data, which is uploaded to the AiBO+ Cloud, does not contain any sensitive information except the configured user name and email address, but they are protected with RSA encryption. 3rd parties can not access them.
3. The wireless communication is not encrypted between the robot dog and the application. Please configure a wireless network with WEP encryption. Tip: for the best safety, you can configure a separate wireless network with 128 bit WEP encryption for your robot and connect this network to your regular wireless network with WPA/WPA2 encryption by

wireless distribution system (*WDS*) which is a built-in feature in the modern wireless routers.

General Usage

The graphical interface is easy to use with mouse on a PC or with finger on a portable device:

1. When the application is started the first time, the Settings screen is shown. A few settings must be configured to access other parts of the program. *Although fake user name and email address can be set, please don't do that because I will not be able to get in touch with you, for example, if surveys will be executed to vote for new features.*
2. The application uses the system tray on Windows and Ubuntu Linux. When the close button (x) is clicked, the program is not closed, but minimized to the system tray. The program can be closed by right clicking over the system tray icon and selecting Exit.
3. To switch between the application views, tap/click on the top/left icon, swipe your finger from the left edge of the screen to right or imitate the same with the mouse pointer on Windows/Linux. These gestures activate the sidebar menu.



4. It is intended to run one AiBO+ Client application on the local network and connect to one robot. It is NOT supported to:

    - Connect multiple AiBO+ Client applications from more devices to the same robot.
    - Connect to multiple robots from one AiBO+ Client.

Main View

The IP address of AIBO and its WLAN signal strength is shown in the Network section.

The Battery section contains the current battery level, energy consumption and an estimate about the remaining runtime. The user can check how much the battery capacity has been degraded from the factory capacity (2200 mAh). The "Battery capacity (current)" item shows the current battery capacity after the last full charge.

The camera image is updated about every second to get an impression what is seen by the camera on the ERS-7. By clicking on the Save button, the actual image can be saved to the pictures directory of the user.

The robot can be stopped by the Shutdown button.

Motion View

Command the robot to lie down, sit down or stand up. After clicking on “Start control”, walk functions can be controlled with arrow buttons or accelerometer control can be switched on optionally. Click on “Stop control” to let the dog back to autonomous mode.

Contribute View

When the robot starts to walk forward, it tries to recognize the underlying floor surface or carpet after 10 seconds. The guess is sent to the AiBO+ Client, an exclamation mark will blink over the top-left icon to go into this view and give feedback.

Games View

Select the “Play number game” button while the robot is connected to start a new game.

Settings View

A few settings can be configured and saved in this screen.

About View

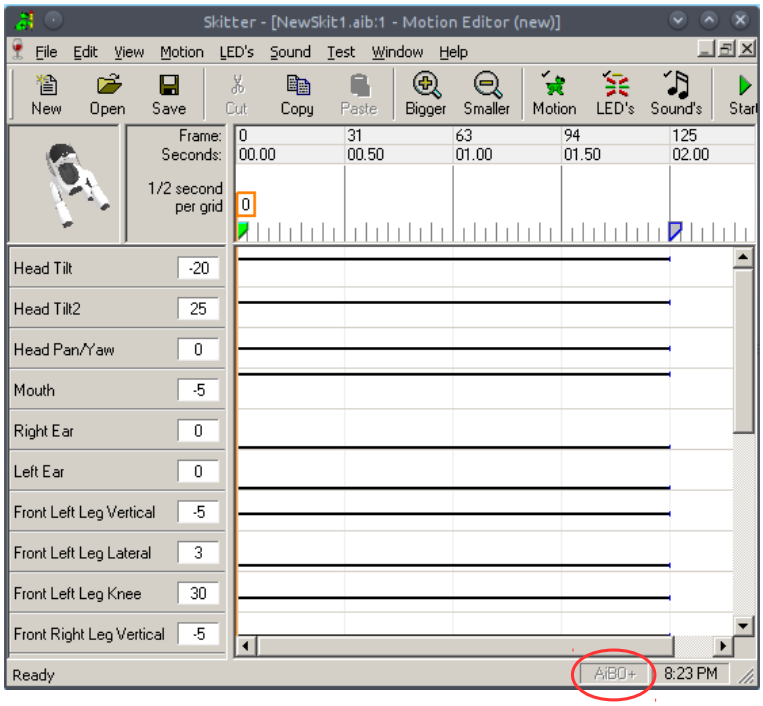
This screen contains basic information about the application and how to send feedback.

Skitter

The Skitter application (version 3.55), bundled with AiBO+, can connect to a Sony ERS-7 with AiBO+ AIBOWare. The IP address of the robot is detected automatically and the “AiBO+” text becomes black.

The following features are supported in AiBO+ from Skitter:

- LED animations: The ERS-7 face LEDs have much more levels than Skitter provides. To overcome this limitation, the AiBO+ software on ERS-7 interpolates the LED levels to exploit the whole range and show more fluid animations. An other feature of the face LEDs of ERS-7 is the two separate modes and all face LEDs can operate only in one common mode at once, but Skitter has no built-in support to warn the user. More information can be found here: http://aiboplus.sf.net/docs/Aibofaces.pdf.
- Motions: Three starting poses are supported: sleep, sit and stand and other poses can be added on request. Before playing back a motion, the AiBO+ AIBOWare verifies that the starting pose is supported and abyss is not detected before the dog. If the robot is not in the starting pose at the moment, the dog changed to the desired starting pose. For example, if a new motion with starting sleep pose is sent to the robot while it walks, the walk sequence will be stopped and the standing posture will be transitioned to the sleep pose before the actual playback starts.



- Sounds: Wav files can be played back on the ERS-7, but the maximal duration is 10 seconds in wireless testing mode. MIDI support can be added later on request.

Skitter documentation can be found here: http://www.dogsbodynet.com/skitter.html

MemoryStick Settings

The wireless settings of a Memory Stick can be modified by this application. The Memory Stick must be attached to the computer with a reader and the MemoryStick Settings can find it by clicking on the Autodetect button. If the program does not find the WLANFLT.TXT file, it can be selected by clicking on the Select button.

AiBO+ Extensions

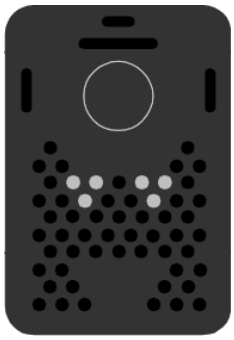
AiBO+ specific configuration values are on the bottom of the graphical interface:

- Sound profile name
- Volume control (adaptive, normal)
- Deafness support

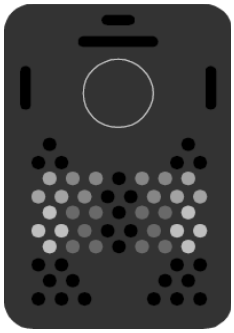
AIBO modifies these values during runtime if the user change them.

Face LEDs

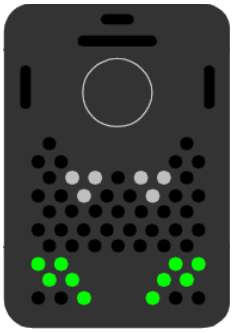
Some LED expressions are defined for AiBO+ and they are sometimes similar to AIBO Mind to make easier the learn the new concepts. The face LED expressions are not shown with full brightness all the time, it is aligned to the ambient illumination.



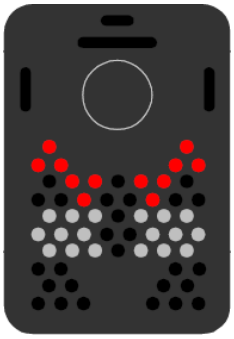
- If these LEDs are on, the robot is awaken.
- If these LEDs blink, the robot went to sleep mode.



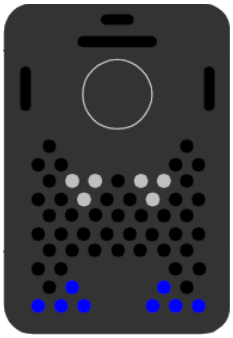
- These LEDs are lit up when AIBO is suprised.



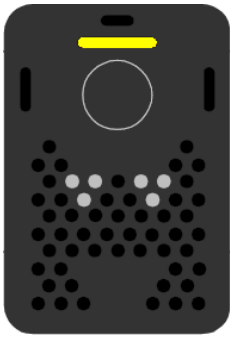
- The green LEDs flash when AIBO is happy. (E.g when the robot is petted.)



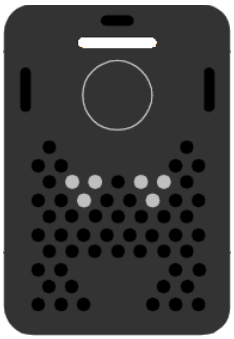
- The red LEDs flash when AIBO is angry because of pick-up mode, being poked or some inactive legs are moved by a human.



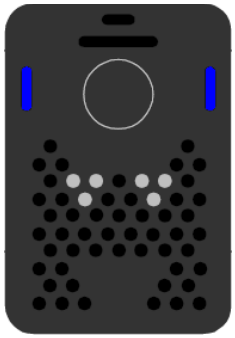
- AIBO is sad by some reason when the blue LEDs flash.



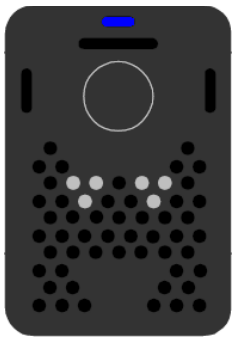
- The yellow LED blinks when the dog is happy because of the stroked crown.



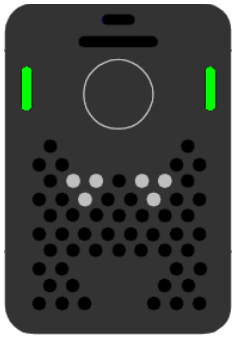
- The white LED over the crown is switched on if the dog pauses to perform a longer task.



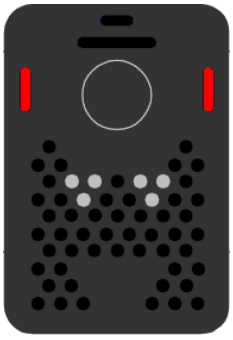
- When these blue ear LEDs blink twice during the boot then WLAN connection is not available.
- When these blue ear LEDs blink once, an AiBO+ Client connects to the dog.



- This LED flashes if a bigger data packet is sent to a PC or other portable device.



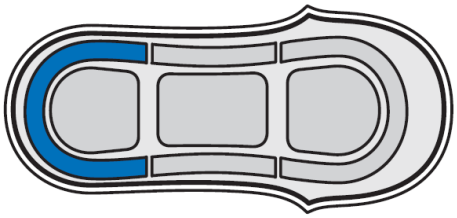
- The green ear LEDs blink in pick-up mode.



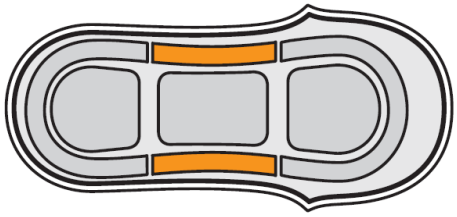
- The red ear LEDs switch on in game mode.

Back LEDs

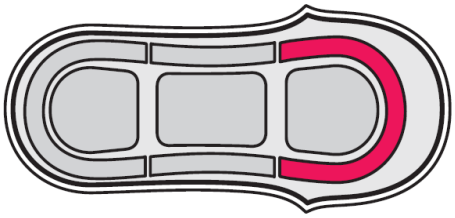
The back LEDs align their general brightness level to the ambient illumination, similar to the face LEDs.



- When the blue LED illuminates, the battery level is high.



- When the blue LED fades out and the orange LED fades in, the battery still holds a moderate power level.



- When the red LED is on, the battery does not have much energy left. The red LED blinks if the battery level drops below 10%.