

ADAPTIVE
USE
MMUSICAL
INSTRUMENTS

A HOW-TO GUIDE

Deep Listening Institute, Ltd.

Photos by Jaclyn Heyen

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Introduction

Adaptive Use Musical Instruments (AUMI) software interface enables students who have very limited controlled (voluntary) movement or other types of impairments to independently engage in making music.

Led by musician, composer, and humanitarian Pauline Oliveros, the Adaptive Use Musical Instrument (AUMI) project has brought together the expertise of technicians at the Rensselaer Polytechnic Institute (RPI) and the community education initiatives of the Deep Listening Institute.

In collaboration with musician and occupational therapist Leaf Miller, the AUMI software interface was first used in drum workshops with children with disabilities at Abilities First, Inc., located in Poughkeepsie, New York. Since these initial workshops, the software interface has been made available as a free internet download and is now in use by therapists both nationally and internationally. The AUMI team is also collaborating with an international research project on Improvisation, Community, and social Practice (ICASP), centered at the University of Guelph, Canada. ICASP researchers are exploring improvisation as a model for social change.

The Adaptive Use Musical Instrument software interface enables the user to play music through move-

not on "hitting the right notes" or playing set pieces of music. Instead, the software uses music as a way for participants to express a range of affects, both by themselves and in response to, or in conversation with, others. While the AUMI interface can be used by anyone, the focus has been on working with children who have profound physical disabilities. In taking these participants as its starting point the projects attempts to make musical improvisation and collaboration accessible to the widest possible range of individuals. This approach also opens up the possibility of learning more about the relations between ability, the body, creativity and improvisation, from within a cultural context that does not always acknowledge or accept people with disabilities.

AUMI Researchers include:

Deep Listening Institute, Inc.

Staff and students of Abilities First, Inc.

Faculty and students

of Rensselaer Polytechnic Institute

Scholars and students of ICASP

from University of Guelph, Guelph Ontario

Staff and patients of Teleton in Santiago, Chile

Information Technology Department

at DeMontfort University, Leicester, UK

All those who download and use the AUMI interface,
currently 375 registered

Set up

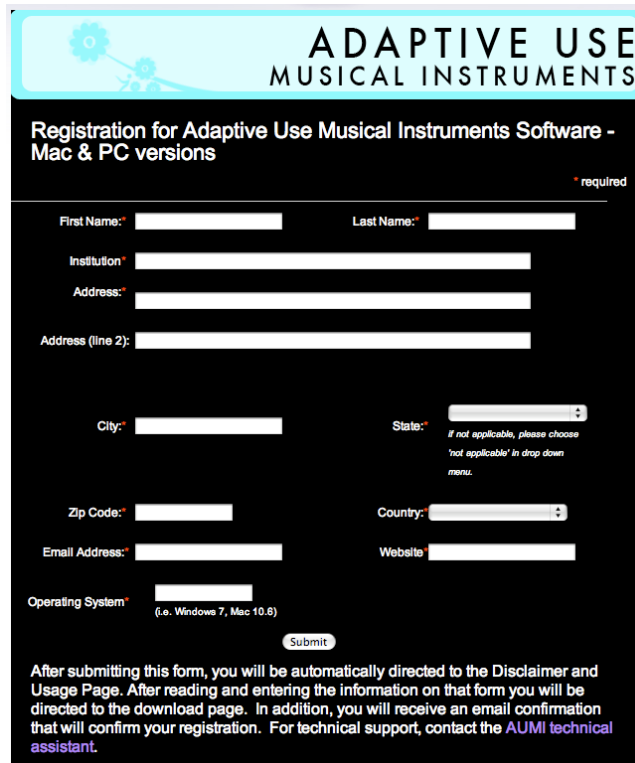
Directions for Mac 10.4+ (Tiger, Leopard, Snow Leopard) and PC (Windows XP, Vista, 7)

Download Instructions

Go to:

<http://deeplisting.org/site/content/aumidownload>

Fill out application:



The image shows a registration form titled "ADAPTIVE USE MUSICAL INSTRUMENTS" with the subtitle "Registration for Adaptive Use Musical Instruments Software - Mac & PC versions". The form is set against a dark background with white text and input fields. It includes fields for First Name, Last Name, Institution, Address, Address (line 2), City, State (a dropdown menu with a note: "If not applicable, please choose 'not applicable' in drop down menu."), Zip Code, Country (a dropdown menu), Email Address, Website, and Operating System (with a note: "(i.e. Windows 7, Mac 10.8)"). A "Submit" button is located below the Operating System field. At the bottom of the form, there is a paragraph of text explaining the registration process and providing contact information for technical support.

ADAPTIVE USE
MUSICAL INSTRUMENTS

Registration for Adaptive Use Musical Instruments Software -
Mac & PC versions * required

First Name: Last Name:

Institution:

Address:

Address (line 2):

City: State:

If not applicable, please choose
'not applicable' in drop down
menu.

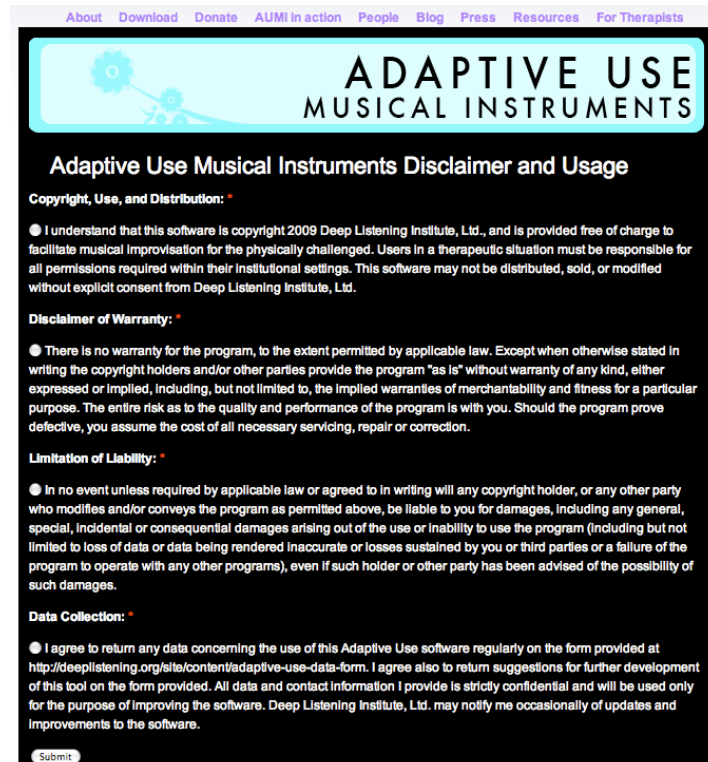
Zip Code: Country:

Email Address: Website:

Operating System:
(i.e. Windows 7, Mac 10.8)

After submitting this form, you will be automatically directed to the Disclaimer and Usage Page. After reading and entering the information on that form you will be directed to the download page. In addition, you will receive an email confirmation that will confirm your registration. For technical support, contact the [AUMI technical assistant](#).

Submit disclaimer form:



The image shows a screenshot of a web form titled "ADAPTIVE USE MUSICAL INSTRUMENTS". At the top, there is a navigation menu with links: About, Download, Donate, AUMI in action, People, Blog, Press, Resources, and For Therapists. Below the menu is a header with the text "ADAPTIVE USE MUSICAL INSTRUMENTS" and a small graphic of a person playing a guitar. The main content of the form is titled "Adaptive Use Musical Instruments Disclaimer and Usage" and contains four sections, each with a radio button for selection:

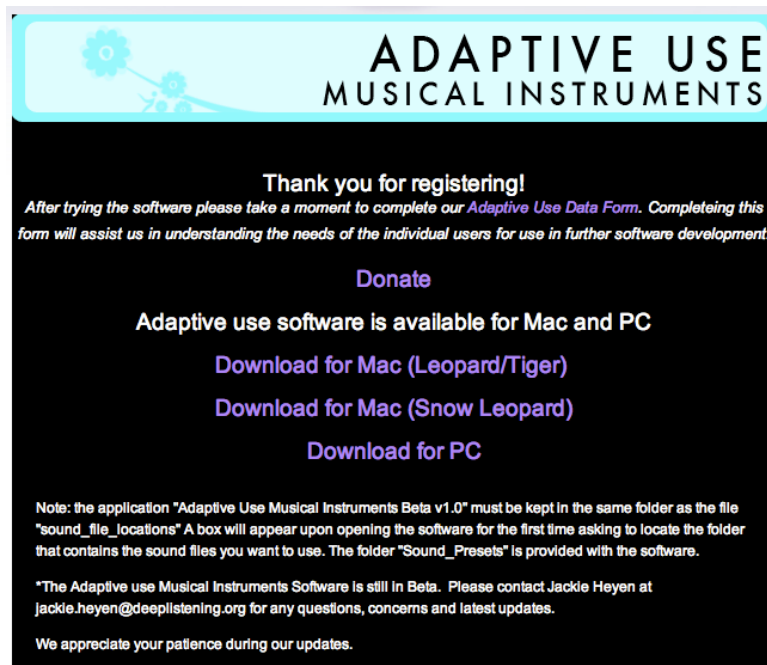
- Copyright, Use, and Distribution:**
 - I understand that this software is copyright 2009 Deep Listening Institute, Ltd., and is provided free of charge to facilitate musical improvisation for the physically challenged. Users in a therapeutic situation must be responsible for all permissions required within their institutional settings. This software may not be distributed, sold, or modified without explicit consent from Deep Listening Institute, Ltd.
- Disclaimer of Warranty:**
 - There is no warranty for the program, to the extent permitted by applicable law. Except when otherwise stated in writing the copyright holders and/or other parties provide the program "as is" without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The entire risk as to the quality and performance of the program is with you. Should the program prove defective, you assume the cost of all necessary servicing, repair or correction.
- Limitation of Liability:**
 - In no event unless required by applicable law or agreed to in writing will any copyright holder, or any other party who modifies and/or conveys the program as permitted above, be liable to you for damages, including any general, special, incidental or consequential damages arising out of the use or inability to use the program (including but not limited to loss of data or data being rendered inaccurate or losses sustained by you or third parties or a failure of the program to operate with any other programs), even if such holder or other party has been advised of the possibility of such damages.
- Data Collection:**
 - I agree to return any data concerning the use of this Adaptive Use software regularly on the form provided at <http://deeplistening.org/site/content/adaptive-use-data-form>. I agree also to return suggestions for further development of this tool on the form provided. All data and contact information I provide is strictly confidential and will be used only for the purpose of improving the software. Deep Listening Institute, Ltd. may notify me occasionally of updates and improvements to the software.

At the bottom of the form is a "Submit" button.

You will receive an email confirmation.

After you complete the sign up process you will be redirected to AUMI download page.

Download the file that corresponds to your operating system: Leopard/Tiger, Snow Leopard, PC.



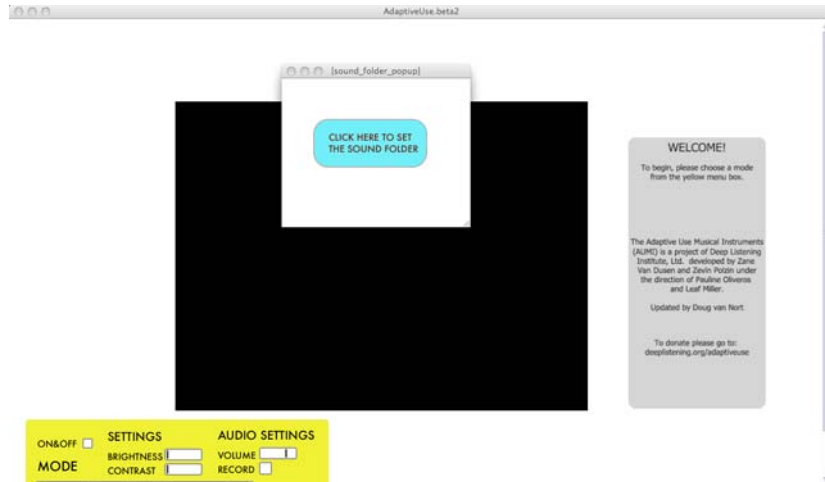
After downloading the Adaptive Use Musical Instruments Software you will have zip files with the application and a sound preset folder.

Unzip the file and you will have the application plus a sound preset folder.

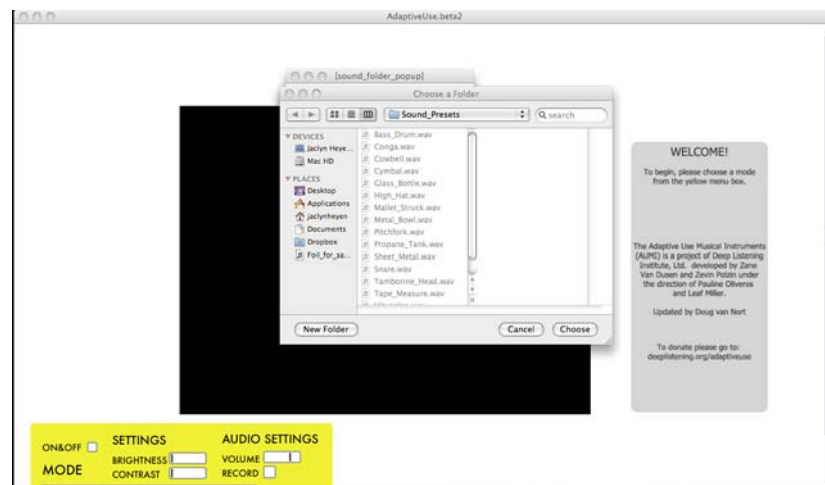
Open the application (by clicking on the brown circle with a 5 in the middle)

There is no installation process

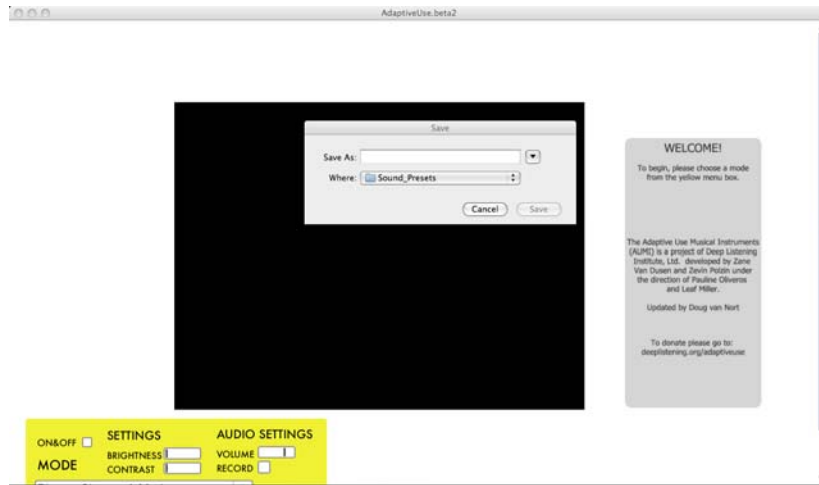
Click on the blue box “click here to set the sound folder”:



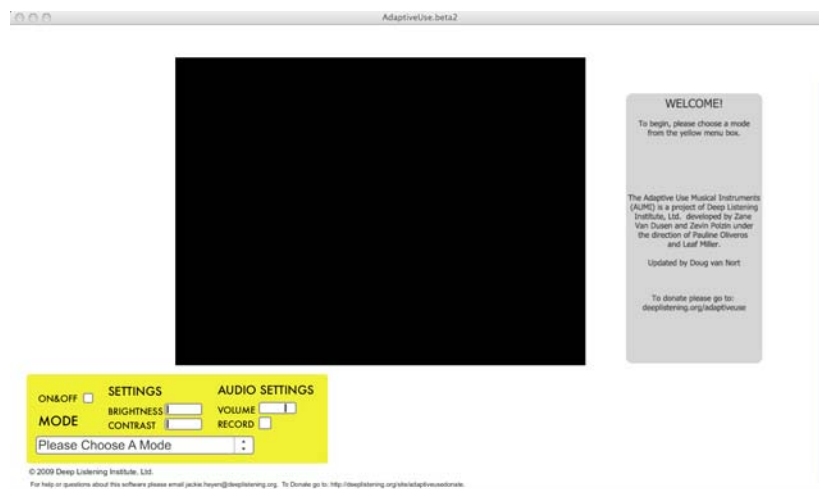
Select the sound preset folder that came with the download:



Cancel the 3 save windows that appear:



Welcome screen. Choose a mode:



In the yellow box:

Select the box next to ON&OFF

Choose a mode from the drop down menu
(the video will not appear until you choose a mode)

Hints

The computer needs to have a camera. It can be an internal camera or an external camera.

If using an external camera be sure the camera is plugged in and recognized by the computer before opening the application.

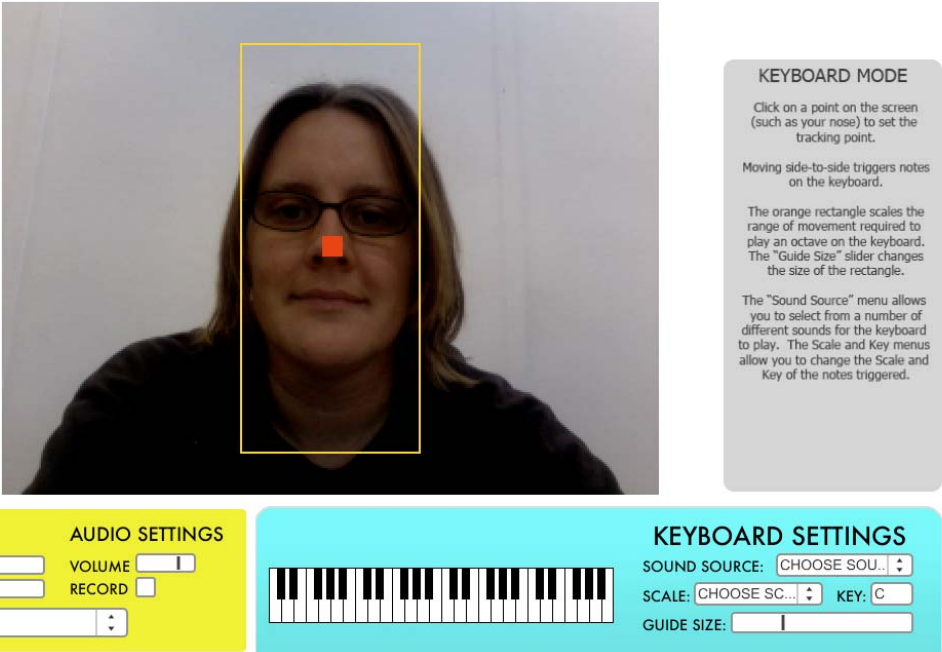
Any webcam or video camera with streaming ability can be used.

The Adaptive Use software is optimized by:

1. A contrasting background without patterns
2. A well-lit environment without reflections
3. Adjusting the height of the computer screen to accommodate the height of the student

Keyboard Mode

AdaptiveUse.beta2



KEYBOARD MODE

Click on a point on the screen (such as your nose) to set the tracking point.

Moving side-to-side triggers notes on the keyboard.

The orange rectangle scales the range of movement required to play an octave on the keyboard. The "Guide Size" slider changes the size of the rectangle.

The "Sound Source" menu allows you to select from a number of different sounds for the keyboard to play. The Scale and Key menus allow you to change the Scale and Key of the notes triggered.

KEYBOARD SETTINGS

SOUND SOURCE: CHOOSE SOU... ▾

SCALE: CHOOSE SC... ▾ KEY: C

GUIDE SIZE:

SETTINGS

ON&OFF BRIGHTNESS VOLUME

MODE CONTRAST RECORD

Keyboard Mode ▾

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Keyboard Mode

In the Yellow box:

Choose the Keyboard Mode from the Mode drop-down Menu

An orange box will appear in the video screen. The orange box is the active zone of the screen. Sound is only created in the orange box.

In the Blue box:

To adjust the size of the orange box move the slider next to Guide Size from left to right. Left being smaller and right being larger.

Choose from three scales in the drop down menu next to Scale

Choose a Key from the drop-down menu next to Key

Choose a sound from the drop-down menu next to Sound Source

When all of the settings are ready click a point to track on the video portion of the screen

A virtual red marker will appear.

Move the red virtual marker by moving the body part tracked from left to right to play through the scale

Hints

For the best results the red virtual marker needs to be able to reach both sides of the orange box.

Find a sound the user enjoys or relates to.

To track slight movement from the tongue or breath make the orange box very small.

Any point of the body can be tracked. For more mobile users step further away from the computer and move the virtual red marker with your hands.

Games can be played with the virtual red marker by having multiple people pass the red virtual marker to one another.

Quarter Screen Percussion

AdaptiveUse.beta2

QUARTER SCREEN PERCUSSION MODE

The screen is divided into 5 sections: four quarters and a square section in the center that can change in size.

The "Guide Size" slider changes the size of the center square.

Click on a point on the screen (such as your nose) to set the tracking point.

Each section can be assigned a sound that will be triggered when the tracking point enters the section. The center square is silent.

ON&OFF **SETTINGS** **AUDIO SETTINGS**

MODE BRIGHTNESS VOLUME
CONTRAST RECORD

Quarter Screen Percussion

QUARTER SCREEN PERCUSSION (CLICK HERE TO CHANGE SOUND FOLDER)

GUIDE SIZE:

DIVISION 1	DIVISION 2	DIVISION 3	DIVISION 4
Bass_Dru...	Conga.wav	Cowbell.wa	Cymbal.wav

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Quarter Screen Percussion

In the Yellow box:

Choose Quarter Screen Percussion from the Mode drop-down menu

Five boxes will appear. The box in the middle of the screen and four boxes along the outside corners of the screen.

The middle box is a silent zone. No sound is created within or moving into the middle box.

The outer boxes create sound. Sound is only created when moving into the outer box. Once in the box no sound will be created.

In the Blue box:

Choose a sound in the drop-down menu under each Division.

The Guide Size refers to the size of the middle box.

Moving the bar to the left the middle box will become smaller and to the right the middle box will become larger

When all of the settings are ready click a point to track on the video portion of the screen.

A virtual red marker will appear.

Move the red virtual marker across the lines to create sounds.

Sound will only be created when crossing into one of the outer boxes. The sound will not repeat when within the same box.

Hints


If there are no sounds in the drop-down menu click next to Quarter Screen Percussion in the blue box where it says (click here to choose sound folder) Then choose the sound preset folder that came with the download.

If the participant moves up and down but no left to right this mode is the best option. Place the camera so the participant is on one half of the screen. Click on the point with the up and down movement. The participant will then play between two boxes instead of all four.

To remove the middle silent-box completely for beginners move the guide size slider all the way to the left.

Relative Movement Percussion

AdaptiveUse.beta2



RELATIVE MOVEMENT PERCUSSION MODE

Sounds are triggered based on the averaged direction of movement on the screen.

The speed and distance of your movement can be used to control the pitch and volume of the sound playback.

The Sensitivity slider controls how much movement is required to trigger a sound. Moving the slider to the right increases the sensitivity, moving the slider to the left decreases it.

Sounds can be assigned to four directions: up, down, left, and right.

ON&OFF SETTINGS AUDIO SETTINGS

MODE BRIGHTNESS VOLUME

CONTRAST RECORD

Relative Movement Percussion

RELATIVE MOVEMENT PERCUSSION (CLICK HERE TO CHANGE SOUND FOLDER)

MOVEMENT SENSITIVITY:

LEFT	UP	DOWN	RIGHT
Cymbal.wav	Bass_Dru...	Cowbell.wa	Conga.wav

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Relative Movement Percussion

In the Yellow box:

Choose Relative Movement Percussion from the Mode drop down menu.

In the Blue box:

Choose a sound for left, right, up and down.

The Movement Sensitivity refers to how much movement is needed to create a sound. Move the slider to the right for more sensitive and to the left for less sensitive.

There is no red dot virtual marker for the Relative Movement Percussion Mode.

Once the sounds and sensitivity are set you are ready to play.

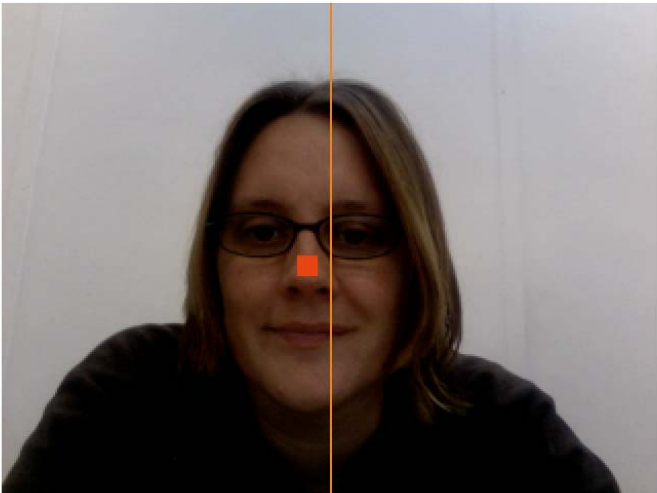
Hints

If there are no sounds in the drop down menu click next to Relative Movement Percussion in the blue box where it says (click here to choose sound folder) then choose the sound preset folder that came with the download.

For more mobile users step away from the computer and it can track movement of the entire body. Or use an external video camera to track larger movements.

Split Screen Percussion

AdaptiveUse.beta2



SPLIT SCREEN PERCUSSION MODE

The screen is divided into vertical sections. The "Number of Divisions" controls the number of sections the screen is divided into. Up to 8 sections can be created.

Click on a point on the screen (such as your nose) to set the tracking point.

Each section can be assigned a sound that will be triggered when the tracking point enters the section.

ON&OFF **SETTINGS** **AUDIO SETTINGS**

MODE BRIGHTNESS VOLUME
CONTRAST RECORD

Split Screen Percussion

SPLIT SCREEN PERCUSSION (CLICK HERE TO CHANGE SOUND FOLDER)

NUMBER OF DIVISIONS: 2

DIVISION 1 DIVISION 2
Bass_Dru... Conga.wav

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Split Screen Percussion

In the Yellow box:

Choose Split Screen Percussion from the Mode dropdown menu.

A line will appear in the middle of the screen

In the Blue box:

Choose the number of divisions by moving the Number of Divisions slider to the right for more divisions and left for less divisions.

Up to eight divisions are possible.

Choose a sound for each division.

When all of the settings are ready click a point to track on the video portion of the screen.

A virtual red marker will appear.

Move the red virtual marker across the lines to create sounds.

A sound is only created when crossing the line. The sound will not repeat when within the same section.

Hints

If there are no sounds in the drop-down menu click next to Split Screen Percussion in the blue box where it says (click here to choose sound folder) then choose the sound preset folder that came with the download.

Any point of the body may be tracked. For more mobile users step further away from the computer and move the virtual red marker with your hands.

Games can be played with the virtual red marker by having multiple people pass the red virtual marker to one another.

Key Points to Using the AUMI Software

- 1) **Start with Good Positioning:** The posture of the user is of utmost importance for improved interaction with her/his environment. When a child in a wheelchair is well positioned, the ability to access the software is enhanced, encouraging good head and trunk control. Also, the height and position of the computer screen needs to be adjusted to the user to encourage proper posture and visual attention.
- 2) **Track one consistent movement:** This may be a voluntary movement of the head or an involuntary movement, such as chest movement while breathing.
- 3) **Be patient and respect processing time:** Children with disabilities often process information slowly.
- 4) **Individualize Parameters:** Each mode has adjustments e.g. guide size, sounds, sensitivity, for greatest effectiveness, self-expression and ease of use.
- 5) **Use a Team approach:** The team includes students, parents, teachers, therapists, musicians, programmers and tech support.
- 6) **Experiment:** The software interface is a musical instrument and requires familiarity and technique, just like any other musical instrument.
- 7) **Experience world drumming:** World drumming traditions and styles readily lend themselves to playing music in community and collaboration. The drum circle is a community-based art form that encourages participation of all.
- 8) **Be an improviser:** Improvisation creates a welcoming musical environment. There are no "right" and "wrong" notes.

Therapeutic Outcomes

Increased motivation and attention

Improved multi-sensory processing of auditory, visual and vestibular information

Improved head control and mid-line orientation

Improved dynamic movement control and expansion of movement repertoire

Increased awareness of cause and effect

Increased independence

Active participation in a group

Enhanced interactions with others, i.e. peers, family members, school staff

Musical Implications

Promotes accessibility of musical expression for all people, regardless of level of physical ability

Builds new inclusive musical communities and musical collaborations

User-friendly music technology is now available and it is a free software download

Links

For more information go to:
www.deeplisting.org/adaptiveuse

For questions or technical issues contact Jackie Heyen
at: jackie.heyen@deeplisting.org

Donations to the Adaptive Use Musical Instruments
Project are accepted at:
www.deeplisting.org/site/adaptiveusedonate

Join us on FaceBook for up to date information at:
www.facebook.com/AdaptiveUse

AUMI Video Tutorial Link:
www.youtube.com/watch?v=UN193PfgzdU

To give feedback on the AUMI software interface:
www.deeplisting.org/adaptiveuse

To submit data of your use of the AUMI software
interface go to:
www.deeplisting.org/site/content/adaptive-use-data-form