

GVPT Technical User Guide

Version 1.0.0

Hyunjin Cho¹

February 8, 2025

¹hcho9@uiowa.edu

Contents

1	Dow	nloadii	ng GVPT	3
	1.1	Execu	table (.exe) File	4
		1.1.1	Download	4
		1.1.2	Extract	5
		1.1.3	Run UlowaVoicePitchTrackingV2.exe	6
	1.2	C# Co	debase on Visual Studio	7
		1.2.1	Install Visual Studio	7
		1.2.2	Download and Run Visual Studio Solution (.sln) File	8
		1.2.3	Setup Build Configuration	9
		1.2.4	Run Through Visual Studio	9
		1.2.5	Distribute Modified Executable Files	10
2	GVF	PT Soft	ware User Interface	11
	2.1	Procto	or Console	11
		2.1.1	TTL Console	11
		2.1.2	Recording Control Panel	12
		2.1.3	Recording Parameters	13
		2.1.4	Experiment Parameters	14
		2.1.5	Task Control	15
	2.2	Subje	ct Screen	16
		2.2.1	Overview	16
		2.2.2	During Tasks	17
		2.2.3	Guidance Prompts - Dense Arrows	18
		2.2.4	Guidance Prompts - Sparse Arrows	18
3	Exp	eriment	t Setup	19
	3.1	The Si	implest Setup	19
	3.2	The Si	implest Use Case	20
	3.3	Playba	ack	21
	3.4	Rando	omizing Playback Delays	22
	3.5	Audio	Interfaces	23
	3.6	Real-t	ime Playback	24
4	Out	out File	S	25
	4.1	Outpu	It File Location	26
	4.2	Overv	iew	27
	4.3	Audio	file	28

7	Ack	nowledgement		36
6	Upd	late History		35
	5.4	Manual Audio Switch	 	34
	5.3	Automatic Audio Switch	 	34
	5.2	Audio Pre-Amp	 	34
	5.1	USB2TTL module	 	34
5	Peri	ipherals		34
	4.7	Target Pitch	 	33
	4.6	Pitch Target Contour	 	32
	4.5	Detected Pitch	 •	31
	4.4	Event Logs	 	29

1 Downloading GVPT

You can download and use GVPT in two ways:

- Download the compressed Windows executable files (.exe), which do not require installation.
- Download the C# codebase and run it through Visual Studio. Note: Visual Studio Code is a different IDE.

The download links can be found here on our GVPT webpage.

We welcome inquiries about GVPT, but we are unlikely to answer questions related to C# programming, Windows Presentation Foundation, or how to use Visual Studio.

1.1 Executable (.exe) File

1.1.1 Download

You can find the download link to the executable files on our webpage.



1.1.2 Extract

Right-click the downloaded zip file and choose "Extract All" (or use any compression software to decompress the files).



1.1.3 Run UlowaVoicePitchTrackingV2.exe

Double-click the UlowaVoicePitchTrackingV2.exe file, and the application will launch.

a Release	×	+					- 0 >	:
$\leftarrow \rightarrow \land \Box$	Q	> Downloads > Release > Relea	ise >			Search Release	٩	
🕀 New 🖌 🛛 🗘	Ĩ	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲	≣ View ~				📑 Details	
A Home		Name	Date modified	Туре	Size			
College		~ Today						
		🔁 Libs	10/18/2024 11:04 AM	File folder				
> Sin - University of Iowa		audioFiles	10/18/2024 11:04 AM	File folder				
	- 1	✓ Earlier this year						
🛄 Desktop	*	Infrastructure.dll	7/26/2024 10:53 AM	Application exten	7 KB			
🚽 Downloads	*	Infrastructure.pdb	7/26/2024 10:53 AM	Program Debug D	40 KB			1
Documents	*	UlowaVoicePitchTrackingV2.exe	7/26/2024 10:53 AM	Application	17 KB			
Pictures	*	UlowaVoicePitchTrackingV2.pdb	7/26/2024 10:53 AM	Program Debug D	60 KB			
Iowa Course Material		MoreLinq.dll	7/6/2024 11:42 AM	Application exten	318 KB			
		MoreLinq.pdb	7/6/2024 11:42 AM	Program Debug D	86 KB			
		MoreLing.xml	7/6/2024 11:42 AM	XML Source File	816 KB			
	- 1	UlowaVoicePitchTrackingV2.exe.config	6/16/2024 7:17 PM	Configuration Sou	1 KB			
> 🦲 iCloud Drive		ReactiveProperty.dll	2/27/2024 6:54 PM	Application exten	125 KB			
> 🜸 iCloud Photos		ReactiveProperty.xml	2/27/2024 6:54 PM	XML Source File	125 KB			
🗸 🛄 This PC		ReactiveProperty.Core.dll	2/27/2024 6:54 PM	Application exten	65 KB			
> 📔 Apple iPhone		ReactiveProperty.Core.xml	2/27/2024 6:54 PM	XML Source File	69 KB			
Local Disk (C:)		\sim A long time ago						
WD (D)		🖻 NLog.dll	10/15/2023 11:37 AM	Application exten	922 KB			
> 🛋 WD (D:)		NLog.xml	10/15/2023 11:37 AM	XML Source File	1,573 KB			
 Crucial (E:) 64 items 		🗈 MAudia Azia dii	0747002 2-40 DM	Application actors	DA ND			

1.2 C# Codebase on Visual Studio

1.2.1 Install Visual Studio

Download and install Visual Studio from the official Microsoft website. The Community version is free. (Compatible with Visual Studio 2022, 2019, or 2017.)

Ø (Nov 00/10) Marallitik × (00/1 caled tarreg (n Nov1 ×) House index in your by electric ×) # Nove (10/1 ×) # Nove (1		\$ ν – σ× σ±φά∛₫≣
Your AI coding partner for faster and smarter development Henry our efficiency, Life Capital and Young Backs 2000 by the grownest and refactor code, developments. University our efficiency and regarded and the state of the transmission of any encoded by the state of the transmission of the state of		
Meet the Visua	al Studio family	
Visual Studio 4 The Studio Visual Studio 4 The Studio Visual Studio Visual A Studio Visu	Construction Construction I and a Construction service of the	
Community 2022 Professional 2022 Enterprise 2022	Greenhaad Vasadi Studio Code v	feedback d

During installation, select the ".NET desktop development" workload to ensure you can run GVPT from the C# codebase.

/orkloads Individual components Language packs	Installation locations	
During Concerning ASP.NET Core, ASP.NET, HTML/JavaScript, and Containers including Docker supp	Adduct decomparison and creating resources using .NET and .NET Framework	Installation details Visual Studio core editor Python development
Python development Editing, debugging, interactive development and source control for Python.	Node, is development Build scalable network applications using Node, is, an asynchronous event-driven JavaScript runtime.	 NET Multi-platform App UI develop NET desktop development Desktop development with C++ Individual components
esktop & Mobile (5)		✓ Extensions
NET Multi-platform App UI development Build Android, JOS, Windows, and Mac apps from a single codebase using C# with. NET MAUL	NET desktop development Build WPF, Windows Forms, and console applications using C#, Visual Basic, and F# with .NET and .NET frame	XANU Styler for Visual Studio 2022 XANU Styler for Visual Studio 2022 Single-project MSIX Packaging Tools for VS 2
Desktop development with C++ V Build modern C++ apps for Windows using tools of your choice, including MSVC, Clang, CMake, or MSBuild.	Universal Windows Platform development Create applications for the Universal Windows Platform with C#, VB, or optionally C++.	
cation Program Files\Microsoft Visual Studio\2022\Community		Bemove out-of-support components
continuina, you agree to the license for the Visual Studio edition you selected	. We also offer the ability to download other software with Visual	Total space required
udio. This software is licensed separately, as set out in the <u>3rd Party Notices</u> or	in its accompanying license. By continuing, you also agree to those	Install while downloading

1.2.2 Download and Run Visual Studio Solution (.sln) File

You can download the C# codebase from our GVPT webpage.



After extracting the zip file, locate UlowaVoicePitchTrackingV2.sln. Doubleclick the solution file to open it in Visual Studio.

UlowaVoicePitchTrackingV2	× +				-		×
\leftarrow \rightarrow \wedge C	🗋 > Desktop > UlowaPitchTrackir	ng > UlowaVoicePitchTr	ackingV2 >		Search UlowaVoicePitchTrackingVa	2	۹
⊕ New ~ 🔏 🖓	ື 🗐 🖻 🗊 🕄 Sort ∽	\equiv View \cdot				🕕 Det	tails
	Name	Date modified	Туре	Size			
🛄 Desktop 🌧	.vs	5/19/2024 9:57 PM	File folder				
↓ Downloads *	Infrastructure	6/19/2024 5:25 PM	File folder				
Documente 🌲	LoggingService	6/23/2024 4:46 PM	File folder				
Under the second	packages	7/17/2024 4:57 PM	File folder				
Pictures 📌	PatientViewModule	6/16/2024 7:17 PM	File folder				
📒 Iowa Course Material 🏾 📌	ProctorViewModule	9/11/2024 1:26 AM	File folder				
늘 IowaCourseWork 🏾 🖈	RecordingService	7/17/2024 4:57 PM	File folder				
	TTLService	9/11/2024 12:42 AM	File folder				
> 🦲 iCloud Drive	UlowaVoicePitchTrackingV2	9/11/2024 1:26 AM	File folder				
> 🜸 iCloud Photos	YinPitchDetectionService	9/11/2024 12:42 AM	File folder				
✓	🖓 UlowaVoicePitchTrackingV2.sIn	9/11/2024 12:42 AM	Visual Studio Solu	9 KB			
Annle iPhone							
> 🖴 Local Disk (C:)							
> - WD (D:)							
> — Crucial (E:)							
> = M.2_2 (S:)							
> 🐲 Network	1						
11 items						[

1.2.3 Setup Build Configuration

Once Visual Studio is open, change the build configuration to **x64**.



1.2.4 Run Through Visual Studio

To run the GVPT application, press **F5** for debug mode or **Ctrl + F5** for release mode. You can also use the play buttons at the top of the window (hover over them for descriptions of each button).



1.2.5 Distribute Modified Executable Files

To distribute a modified version of GVPT built in Visual Studio, navigate to the Solution Directory (where UlowaVoicePitchTrackingV2.sln is located), then go to:

(SolutionDirectory)/UIowaVoicePitchTrackingV2/bin/x64/(Debug or Release folder - depending on your build settings)



2 GVPT Software User Interface

GVPT launches with two windows: one for the proctor to set up the experiment and another for interacting with the subject. In this section, we cover how to work with each window and what files are generated for post-experiment data processing.

2.1 Proctor Console

2.1.1 TTL Console



The TTL Console is used to establish a TTL connection with another system (we use the NeuraLynx system to log our experiment as a backup). By using a USB2TTL8 Adapter, you can send a byte (from 1 to 255–0 is discarded by the adapter) from GVPT to the NeuraLynx system, timestamping the recording with a latency of under 1 millisecond.

The details about connecting the adapter are explained in the Peripherals section.

Send 127 button is provided for connection check.

2.1.2 Recording Control Panel



The Recording Panel contains the start and stop buttons for the experiment recording.

2.1.3 Recording Parameters

UIOWA VPT PROCTOR CO	NSOLE			×
TTL CONSOLE				TASK 1
TTL Socket	-	CONNECT	SEND 127	
RECORDING CONTROL PANEL		-		
				Task 1 Enabled 0
				TASK 2
STA	RT	ST	OP	
				Tack 2 Eaphied
RECORDING PARAMETERES				TASK 3
Sample Rate	48000 -	Pitch Detection Rate (Hz)	40Hz (25 ms) *	
Prompt Style	No Guidance	Dense Arrows	Sparse Arrows	
Task Interval Randomization		off		
Visuals		On		Task 3 Enabled Invert 0
EXPERIMENT PARAMETERS				TASK 4
Subject Number		0		
Number of trials		30		
Cents	1		400	
Plot Y Max			250	Task 4 Enabled 0
Plot Y Min			50	TASK 5
Save Plot Change		SAVE PLOT Y RANGE CHANGE		
Count Down	-1		3	
Grading Threshold	I		5	
Toggle Playback	OFF	Visuals Pitch	Target Pitch Contour	Task 5 Enabled Invert 0

The Recording Parameters box includes controls for:

- Audio Sampling Rate (44.2 kHz, 48 kHz, 88.4 kHz, 96 kHz)
- Pitch Detection Rate (40Hz—once every 25ms, or 20Hz—once every 50ms)
- Prompt Style—configures the level of "guidance arrows" to indicate pitch deviation from the target. Refer to 2.2.3.
- Task Interval Randomization—randomly delays tasks by an additional 4–9 seconds. If the Playback option is enabled, it also randomizes the post-playback interval. Without randomization, tasks typically last 13–15 seconds, but with randomization, they can last around 30 seconds per task. Refer to 3.4
- Visual Toggle—turns visual elements (target line, grading thresholds, and detected pitch points) on or off. Countdown is still provided.

2.1.4 Experiment Parameters



The Experiment Parameters box controls variables for the voice pitch tasks:

- Subject Number—organizes the data into folders. Note: The subject number cannot be 0.
- Number of Trials-specifies how many times tasks will be repeated.
- Cents—adjusts pitch changes by default to 400 cents (4 semitones), which can be modified by 100-cent (1 semitone) increments using the slider.
- Plot Y Max-sets the maximum value on the Y-axis of the subject view.
- Plot Y Min—sets the minimum value on the Y-axis of the subject view.
 Changes to both sliders take effect only after the button below is clicked.
- Save Plot Changes—saves any adjustments to the Y-axis sliders.
- Countdown-default countdown is 3 seconds, adjustable based on prompt speed.
- Grading Threshold—sets the acceptable deviation from the target pitch.
- Playback—enables playback of the subject's previous voice pitch task. The proctor may choose to play the playback without the visuals or display the pitch target and subject pitch contour.

2.1.5 Task Control

UIOWA VPT PROCTOR CO	ONSOLE			_ = ×
TTL CONSOLE				TASK 1
TTL Socket	-	CONNECT	SEND 127	
RECORDING CONTROL PANEL				
				Task 1 Enabled 0
				TASK 2
ST/	ART	ST	ГОР	
				Task 2 Enabled
RECORDING PARAMETERES				TASK 3
Sample Rate	48000 -	Pitch Detection Rate (Hz)	40Hz (25 ms) •	
Prompt Style	No Guidance	Dense Arrows	Sparse Arrows	
Task Interval Randomization		Off		
Visuals		On		Task 3 Enabled Invert 0
EXPERIMENT PARAMETERS				TASK 4
Subject Number		0		
Number of trials		30		
Cents			400	
Plot Y Max			250	Task 4 Enabled 0
Plot Y Min			50	TASK 5
Save Plot Change		SAVE PLOT Y RANGE CHANGE		
Count Down	-1		3	
Grading Threshold	I		5	
Toggle Playback	OFF	Visuals Pite	h Target Pitch Contour	Task 5 Enabled Invert 0

GVPT provides five pitch tasks:

- Task 1 (Flat Task)—the subject must maintain a steady base pitch.
- Task 2 (Up Task)—the subject must raise the pitch by the specified amount (set in the Experiment Parameters) within 1 second.
- Task 3 (Down-U Task)—the subject must raise and lower the pitch in a "down-U" shape, with the peak matching the value set in the Experiment Parameters, within 1 second up and 1 second down. The proctor has the option to invert this task to an up U contour.
- Task 4 (Down Task)—the subject must lower the pitch by the specified amount within 1 second.
- Task 5 (Plateau Task)—the subject must raise the pitch within 1 second, hold steady for 0.5 seconds, and then lower it back to the base pitch within 1 second. The proctor has the option to invert this task to a down-up contour.

Tasks can be added or dropped based on the subject's performance by clicking the corresponding buttons. The bottom-right corner of the screen shows how many times each task has been prompted during the current recording session.

2.2 Subject Screen

2.2.1 Overview

The Subject's screen is designed to have the minimum distraction to suit its neuroscience research project origin and contains the only essential items that need to be presented to the subject.

- The Y axis is the pitch frequency
- The X axis represents time from 0 to 5.5 second which is the duration of the visual pitch tasks.

2.2.2 During Tasks



During tasks, the subject screen displays 3 items:



The red line is the voice pitch target that the subjects' should match, the blue lines represents the decision boundary for detected pitch points and the green squares represents the detected pitch of the subject.

2.2.3 Guidance Prompts - Dense Arrows



The 'Dense Arrow' guidance prompt will draw a red arrow from the pitch points that deviated from the grading boundary to the visual pitch target.



2.2.4 Guidance Prompts - Sparse Arrows

The 'Sparse Arrow' guidance prompt only draws a red arrow if the subject pitch point is when the target is moving.

3 Experiment Setup

3.1 The Simplest Setup

The simplest setup is to connect a headset with microphone to the experiment PC.



Please make sure that the sound channels are properly selected and volume adjusted in the Windows Settings.

← Settings			- 0 ×
	System > Sound		
	Output		
Find a setting	Choose where to play sound Apps might have their own settings		Speakers 🗸
System			
8 Bluetooth & devices	Volume	c()) 50	•
 Network & internet Personalization 	Mono audio Combine left and right audio channels into one		Off ●
Apps	Input		
 Accounts Time & language 	Choose a device for speaking or recording Apps might have their own settings	Internal Digi	tal Microphone 🛛 🗡
 Gaming Accessibility 	Volume	Q 50	•——
Privacy & security	Advanced		
• Windows opulate	Troubleshoot common sound problems	Output device:	s Input devices
	All sound devices Turn devices on/off, troubleshoot, other options		>
	Volume mixer 		>
	More sound settings		2

Even with the simplest settings, you can conduct use cases: 3.2, 3.3 and 3.4



3.2 The Simplest Use Case

Software Subject

This figure represents the simplest use case of the GVPT, which prompts voice pitch tasks in a loop.

3.3 Playback



You can add playback after each task trial for the subject to assess their previous performance.



3.4 Randomizing Playback Delays

You can randomize the delay time(in red arrow) of the playback to spread the timing. This function is mostly used to offset each trials randomly to spread frequencies for EEG and fMRI analysis.

3.5 Audio Interfaces



You can add audio switches to further enhance the audio signals. Refer to peripheral section at 5.2.

3.6 Real-time Playback



You can add audio switches to offer real-time playback as the subject is mid-trial.

You can also split the Mic-in directly to the audio switch by using an audio splitter cable. This is where you can be very creative on how you setup the project hardware.

Refer to peripheral section:

- 5.3 Automatic Audio Switch
- 5.4 Manual Audio Switch

4 Output Files

Upon conclusion of the experiment, the software generates 5 output files.

- 4.3 Audio file for the entire experiment (in .wav)
- 4.4 Event logs w/ timestamps (in .csv)
- 4.5 Detected pitch (in .csv)
- 4.6 Pitch target contour (in .csv)
- 4.7 Target pitch (in .csv)

You can consume the csv logs with your preferred method - Excel, Pandas, Matlab, text editors, etc.

4.1 Output File Location



The output files will organize each subject ID into separate folders. You can access these files based on how you are launching GVPT:

- C# Codebase: (SolutionDirectory)/UIowaVoicePitchTrackingV2/ UIowaVoicePitchTrackingV2/bin/(Debug or Release - based on your build configuration)/AudioFiles/(SubjectID)
- Windows Executable(.exe): (ExecutableFileDirectory)/AudioFiles/(SubjectID)

4.2 Overview

= 999						-	×
⊕ New ~ 👗 🚺 🛅	🗐 🖻 🔟 🏷 Sort	∽ ≣ View ∽ …					
← → · ↑ 🎦 UlowaVoice	ePitchTrackingV2 > UlowaVoicePitchTrack	ngV2 > bin > x64 > Release > AudioFile	s > 999	~ C	, Search 999		
> 🛨 Quick access	Name	Date modified	Туре	Size			
	• 1.wav	10/21/2024 2:58 PM	WAV File	672 KB			
Cloud Drive	1-events.csv	10/21/2024 2:58 PM	Comma Separated V	1 KB			
> 🔹 iCloud Photos	1-pitch.csv	10/21/2024 2:58 PM	Comma Separated V	4 KB			
> 📥 OneDrive	1-TargetContour.csv	10/21/2024 2:58 PM	Comma Separated V	7 KB			
> 📮 This PC	1-TargetPitch.csv	10/21/2024 2:58 PM	Comma Separated V	1 KB			
> Salarak							
5 items							≣□

The output files will have incremental file numbers starting at 1.

4.3 Audio file

999						- 0	×
🕀 New - 👗 🔲	🛅 🗐 🖻 🗊 🏷 Sort -	≡ view - ···					
÷ → ~ ↑ 🎦 - Uk	owaVoicePitchTrackingV2 > UlowaVoicePitchTracking	gV2 > bin > x64 > Release > AudioFil	ies > 999	~ C	P Search 999		
Quick access	Name	Date modified	Туре	Size			
	• 1.wav	10/21/2024 2:58 PM	WAV File	672 KB			
 ICloud Drive 	1-events.csv	10/21/2024 2:58 PM	Comma Separated V	1 KB			
solution in the second	l-pitch.csv	10/21/2024 2:58 PM	Comma Separated V	4 KB			
 OneDrive 	1-TargetContour.csv	10/21/2024 2:58 PM	Comma Separated V	7 KB			
💻 This PC	1-TargetPitch.csv	10/21/2024 2:58 PM	Comma Separated V	1 KB			
Network							
-							
items							≡

The audio file output contains every sound that the microphone picked-up during the experiment at proctor selected sampling rate.

4.4 Event Logs

999						-		×
🔁 New - 🔏 🔲 🛅	E) 🖻 🗓 🛝 Sort - 🗮 Vie	w ~						
← → · ↑ 🎦 · UlowaVoio	ePitchTrackingV2 > UlowaVoicePitchTrackingV2 > bin >	x64 > Release > AudioFiles	> 999	~ C	. P Search 999			
> 🛨 Quick access	Name	Date modified	Туре	Size				
 Claud Drive 	• 1.wav	10/21/2024 2:58 PM	WAV File	672 KB				
 Cloud Drive 	1-events.csv	10/21/2024 2:58 PM	Comma Separated V	1 KB				
ICloud Photos	1-pitch.csv	10/21/2024 2:58 PM	Comma Separated V	4 KB				
> 📥 OneDrive	1-TargetContour.csv	10/21/2024 2:58 PM	Comma Separated V	7 KB				
> 📮 This PC	1-TargetPitch.csv	10/21/2024 2:58 PM	Comma Separated V	1 KB				
> 🙀 Network								
								_
5 items							1	

The event logs are formatted with elapsed time(with respect to the time the record button was pressed), and the following events:

- · Task Started when the 'Go queue' was displayed
- Task X when the base pitch was established and target pitch contour was displayed
- 500ms timestamps for every tasks, there are timestamps in every 500ms to assist alignment with other logs
- Task Finished is when each task was terminated.

F10 ~	$ X \sim f_X \sim [$																						~
A	В	С	D	E	F	G	н	1	1	K	L	м	N	0	Р	Q	R	S	Т	U	v	W	Х
1 Ellpsed Time	Events																						
2 0	Recording Started																						
3 2944.028	Task Started																						
4 3944.7962	Task 2 - Up																						
5 4459.0973	500ms timestamps																						
6 4959.4619	500ms timestamps																						
7 5460.2036	500ms timestamps																						
8 5945.6906	Task Finished																						
9 11957.9347	Task Started																						
10 12958.2148	Task 1 - Flat																						
11 13461.947	500ms timestamps																						
12 13962.814	500ms timestamps																						
13 14463.8891	500ms timestamps																						
14 14958.4066	Task Finished																						
15 20961.2956	Task Started																						
16 21962.2027	Task 5 - Up and down Plateau																						
17 22466.0192	500ms timestamps																						
18 22966.548	500ms timestamps																						
19 23466.9886	500ms timestamps																						
20 23967.4965	500ms timestamps																						
21 24468.2225	500ms timestamps																						
22 24968.5468	500ms timestamps																						
23 25461.7675	Task Finished																						
24 31473.0834	Task Started																						
25 32473.6027	Task 4 - Down																						
26 32977.4709	500ms timestamps																						
2/ 334/7.6081	500ms timestamps																						
20 33970.1700	South State and																						
29 34473.0027	Task Philshed																						
30 40467.3224	Task Started																						
31 41407.7311	Task 3 - Down 0																						
32 42492.0172	500ms timestamps																						
34 42904 8699	500ms timestamps																						
25 42405 5445	500ms timestamps																						
36 43995 8275	500ms timestamps																						
37 44488.7255	Task Finished																						
38 47488 8202	Playback Started																						
39 57523.4708	Task Started																						
40																							
41																							
42																							
$\langle \rangle$	2-events +																				_		

4.5 Detected Pitch

999						-	×
🕀 New - 🏑 💭	🛅 🗐 🖻 🗊 🛝 Sort -	≡ View - ····					
\leftarrow \rightarrow \checkmark \uparrow \blacksquare - Ulowa	VoicePitchTrackingV2 > UlowaVoicePitchTrackingV	√2 > bin > x64 > Release > AudioFile	s > 999	~ 0	, P Search 999		
> 🛨 Ouick access	Name	Date modified	Туре	Size			
	• 1.wav	10/21/2024 2:58 PM	WAV File	672 KB			
 Cloud Drive 	1-events.csv	10/21/2024 2:58 PM	Comma Separated V	1 KB			
Sicloud Photos	1-pitch.csv	10/21/2024 2:58 PM	Comma Separated V	4 KB			
> 🔷 OneDrive	1-TargetContour.csv	10/21/2024 2:58 PM	Comma Separated V	7 KB			
> 📮 This PC	1-TargetPitch.csv	10/21/2024 2:58 PM	Comma Separated V	1 KB			
> 🗽 Network							
5 items							

The detected pitch log contain every pitch detection and its timestamps.

• Voice pitch detection is vulnerable to noise. -1 is returned as a default if pitch detection failed at that timestamp.

A	1	• : 🗙	$\checkmark f_x \sim$	Ellpsed	Time												
	А	В	С	D	E	F	G	Н	1	J	K	L	М	N	0	Р	Q
244	12179.64	129.9101															
245	12229.69	127.221															
246	12280.22	125.3912															
247	12329.98	124.3109															
248	12379.57	125.2043															
249	12429.15	125.5153															
250	12479.6	125.5364															
251	12529.16	125.0017															
252	12579.71	122.1717															
253	12630.43	124.3176															
254	12679.53	124.3317															
255	12729.61	124.2652															
256	12780.24	123.2653															
257	12830.11	124.8829															
258	12879.67	125.5729															
259	12929.75	125.6687															
260	12980.27	126.0543															
261	13029.23	126.1994															
262	13080.31	125.9114															
263	13128.91	126.5306															
264	13180.17	126.9419															
265	13230.14	124.0965															
266	13279.52	125.3978															
267	13330.19	126.6743															
268	13379.83	125.613															
269	13429.72	124.9197															
270	13479.47	125.6425															
271	13530.57	126.3751															
272	13579.6	126.4828															
273	13629.02	126.8609															
274	13679.42	125.1166															
275	13729.49	124.8569															
276	13780.04	124.6921															
277	13830.09	126.6282															
278	13879.52	125.854															
279	13929.28	124.8725															
	< >	2-pit	ch	+													

4.6 Pitch Target Contour

939						-		×							
④ New ~ →	⊙ New - 🐰 🚺 🔂 😢 🗊 🚯 Sart - ≡ View														
$\leftrightarrow \rightarrow \rightarrow \uparrow$	 UlowaVoicePitchTrackingV2 > L 	lowaVoicePitchTrackingV2 $>$ bin $>$ x64 $>$ R	elease > AudioFiles > 99	9	~ C	,P Search 999									
> 📩 Quick access	Name	Oate m	odified Typ	e S	ize										
	 1.way 	10/21/2	024 2.58 PM WA	V File	672 KB										
> iCloud Drive	1-events.csv	10/21/2	024 2.58 PM Con	nma Separated V	1 KB										
> 🙁 iCloud Photos	1-pitch.csv	10/21/2	024 2:58 PM Con	nma Separated V	4 KB										
> 📥 OneDrive	1-TargetConts	ur.csv 10/21/2	024 2:58 PM Con	nma Separated V	7 KB										
N This M	1-TargetPitch.	sv 10/21/2	024 2.58 PM Con	nma Separated V	1 KB										
/ Ginsec															
> 🦆 Network															
5 items															

The target contour log contain the pitch target contour that was displayed to the user.

Q4		i X V	$f_{\rm f} \sim$																										
	A	8	с	D	E	E.	0	н	1.1		ĸ	L	м	N	0	P	Q	8	8	т	U	v	w	x	Y	z	AA	AB	
1 1	iskNumber	Target Co	ntour																										
2	-1	-4	-1	-4	-1	-4	-1	- 4	-1	-4	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-4	-1	-1	-1	-4	-1	
\$ 3	125.6686783	125,6687	125.6686783	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	125.6687	12
4	122.6241234	122.634	122.6243234	122.624	122.624	122.624	122.624	122.624	122.624	122.624	122.624	122.624	122.624	122,624	122.624	122.624	122.624	122.624	122.624	122,624	122.624	122,624	122.624	122,624	122.624	122.624	122.624	122.624	-1
5 1	2.35585317	62.35381	62.35381317	62,35381	62.35381	62,35381	62.35381	62,35381	62.35381	62.35381	62.35381	62,35381	62.35381	62.35381	62.35381	62,35381	62.35381	62.35381	62.35381	62,35381	62.35381	62,35381	62.35381	62.35381	62.35381	62,35381	62.35381	62.35381	62
6	123.1256547	123.1296	123.1255547	123.1295	123,1256	123.1295	123,1256	123.1295	123,1256	123.1295	123,1256	123.1295	123,1256	123.1295	123.1256	123.1295	123,1256	123.1296	123,1256	123.1296	123,1256	123.1296	123,1256	123.1296	123.1256	123.1296	123,1256	123.1296	12
1	128.1296547	123,1296	123.1296547	123.1295	123,1296	123.1295	123,1296	123.1295	123.1256	123.1295	123.1256	123.1295	123.1256	123.1295	123.1256	123 1295	123.1256	123 1296	123,1256	123.1295	123.1296	123.1296	123,1256	123.1296	123.1296	123 1296	128,1256	123.1296	12
0																													-1
																													-1
11																													-
12																													
33																													
54																													
35																													
35																													
17																													
\$8																													
39																													
20																													_
21																													
22																													_
23																													_
24																													-
20																													-
20																													-
20																													
22																													-
33																													-
31																													-
22																													-
33																													-
34																													
35																													-
36																													
		2-Targe	tContour	+													1	1.00											

4.7 Target Pitch

<mark>=</mark> 999								-		×					
🕙 New - 🐰	⊙ New - 🐰 🕕 🗈 😢 🐨 14-Sont - ≡ View														
$\leftarrow \rightarrow - \uparrow$	- UlowaVoicePi	tchTrackingV2 > UlowaVoice	ePitchTrackingV2 > bin >	x64 > Release > AudioF	ilas > 999	~ C	,P Search 999								
> 📩 Quick access		Name		Date modified	Туре										
		 1.way 		10/21/2024 2:58 PM	WAV File	672 KB									
> iCloud Drive		1-events.csv		10/21/2024 2:58 PM	Comma Separated V	1 KB									
> 🗶 iCloud Photos		1-pitch.csv		10/21/2024 2:58 PM	Comma Separated V	4 KB									
> CneDrive		l 1-TargetContour.csv		10/21/2024 2:58 PM	Comma Separated V	7 KB									
> 📮 This PC	[1-TargetPitch.csv		10/21/2024 2:58 PM	Comma Separated V	1 KB									
> Tankark															
-															
5 items										= -					

The target pitch log contains the base pitch of each task, and pitch moved up & down as the proctor configured experiment setup from the base pitch.

C)32 ~	$X \sim f_{X}$													
	A	В	С	D	E	F	G	н	1	J	К	L	м	N	0
1	Ellpsed Time	BasePitch	PitchUp	PitchDown											
2	3944.7962	0	0	0											
3	12958.2148	-1	-1.2599	-0.7937											
4	21962.2027	125.6687	158.3326	99.7433											
5	32473.6027	122.624	154.4966	97.3268											
6	41487.7511	62.3538	78.5609	49.4903											
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
1/															
18															
19															
20															
21															
22															
23															
24															
23	< >	2-Target	Pitch	+							:	•		-	

5 Peripherals

5.1 USB2TTL module

The adapter typically occupies the COM3 port, but if COM3 is unavailable, it may occupy another port (such as COM4, COM7, or COM8). If you cannot connect via COM3, check the Windows Device Manager under "Ports" to identify which port the adapter is using.

5.2 Audio Pre-Amp

We currently use Scarlett Solo 3rd gen to connect all the devices together.

5.3 Automatic Audio Switch

If you want an automatic audio switch for real-time playback (during task). We recommend using Bobwire's RCA1.

This device will switch audio source automatically based on how you configure its primary & secondary source and switching threshold. If you need more information about the automatic switch, please contact Bob at **bobwireaudio@gmail.com**

5.4 Manual Audio Switch

If you prefer to switch audio sources manually, we recommend using a stereo audio switch. This is one model that we used for other projects - Amazon link, but you may use any analog audio switch that fits your purpose and cabling needs.

6 Update History

Version 1.0.0 - Initial release

7 Acknowledgement

The GVPT software is relying on many projects. Special thanks to:

- MahApps.Metro
- MoreLINQ
- NAudio
- NLog
- OxyPlot
- Prism Library
- ReactiveProperty