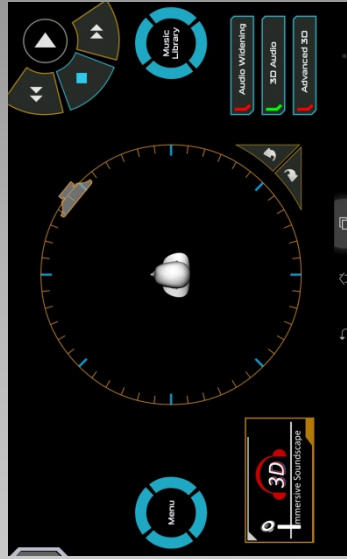




3D Audio App for Android Devices

Gan Woon Seng, Phyo Ko Ko



Download here: <http://tinyurl.com/kbog2gZ>



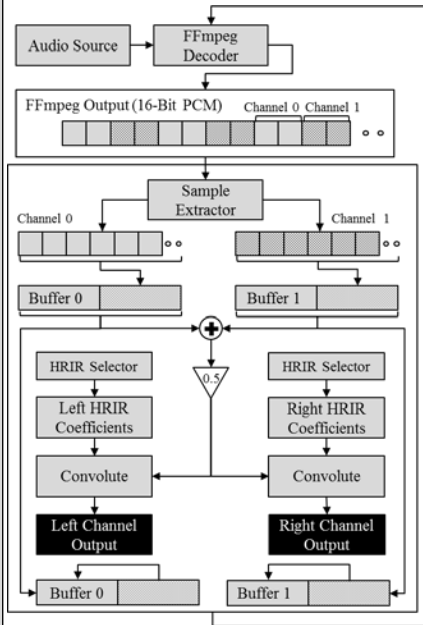
3D Audio App for Android Devices

Gan Woon Seng, Phyo Ko Ko

3D Audio App Overview

1. Real-time 3D Audio processing on Android Platform
2. Uses CIPIC HRTF database
3. Process up to 4 audio channels independently.
4. Provides intuitive UI for audio source placement and control.
5. Supports mp3 and wav file formats.

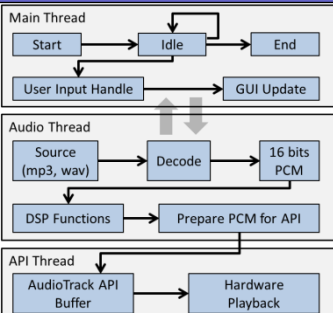
DSP Process Flow



Main Features

1. Real-time DSP on Android platform
2. Fully customized user interface and design.
3. Audio Widening (Externalization)
4. 3D Audio using HRTF filtering
5. Near Field 3D (audio depth)
6. Up to four channels simultaneous processing
7. Virtual Bass System integration

Java Process Flow



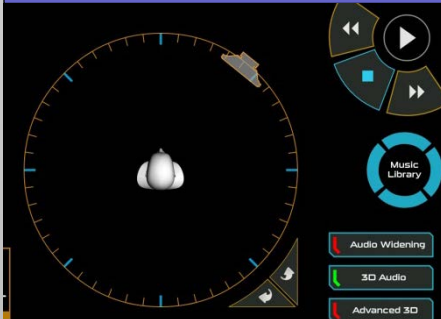
App Statistics

CURRENT / TOTAL INSTALLS	AVG. RATING / TOTAL #
1,048 / 15,676	★ 4.11 / 132
★★★★★	79
★★★★☆	22
★★★☆☆	14
★★☆☆☆	1
★☆☆☆☆	16

3D Audio App for Android Devices

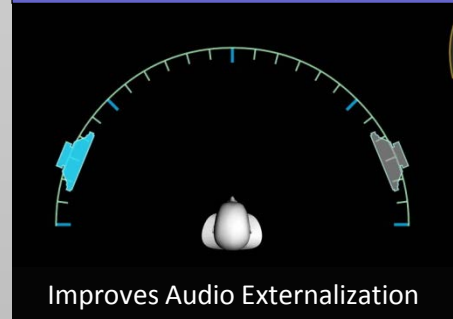
Gan Woon Seng, Phyo Ko Ko

Real-time 3D Audio, Azimuth Panning



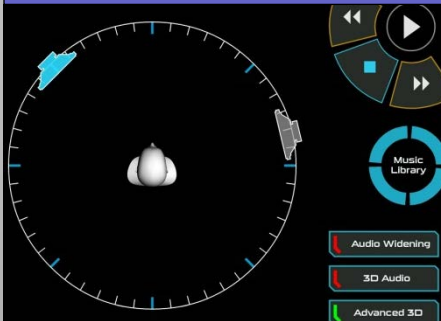
1. Allow panning in Azimuth with fixed 0° elevation and 1.4m distance
2. Azimuth switching and processing done in real-time.
3. HRTF resolution for Azimuth: 7.5°
4. User may touch within the circle to quickly change the audio source location.
5. Also features an auto-rotation function for both clockwise and anti-clockwise panning at fixed speed.

Audio Widening



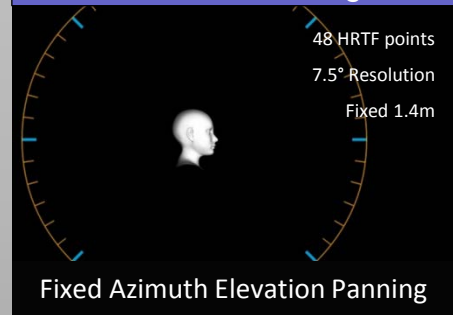
Improves Audio Externalization

Advanced 3D Audio, 4 Channel Processing



1. Allow panning of two separate audio sources independently.
2. HRTF Resolution: 7.5°
3. User may touch the speaker icons to place a new audio source location.
4. Process 4 audio channel simultaneously.
5. More immersive listening experience at the cost of higher processing power requirement.
6. Possible application: Virtual Conferencing, Virtual Concert

Elevation Panning



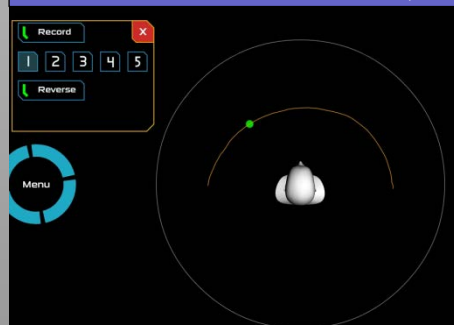
48 HRTF points
7.5° Resolution
Fixed 1.4m

Fixed Azimuth Elevation Panning

Technical Specifications

Supported Platform	Android
Supported OS Versions	4.0 and up
Minimum CPU requirement (Chipset)	Snapdragon 400 Nvidia Tegra 3 T30L Mediatek MT6589T Exynos 4210
Minimum RAM requirement	512 MB
App Size	6.84 MB
Audio Decoder	FFMPEG library
Supported formats	MP3, WAV
Supported Sampling rate	44100Hz
Frame Size	Stereo: 1152 (Mp3), 1024 (WAV)
HRTF Database	CIPIC HRTF Database
HRTF taps	200
Data type	double-precision 64-bit IEEE 754 floating point
HRTF sets (48 points/set)	Azimuth: 6 sets
	Elevation: 2 sets
	Near Field: 10 sets
Memory usage (HRTF)	6.75 KB
Azimuth HRTF Resolution	7.5°
Elevation HRTF Resolution	7.5°
Near Field depth	25cm, 50cm, 75 cm, 100cm, 125cm
Devices tested	Asus Transformer Pad TF300T
	Xiaomi Redmi
	Samsung Galaxy S2, S3, S4, S5
	Asus Padfone Infinity

Near Field 3D Audio, Azimuth panning with depth

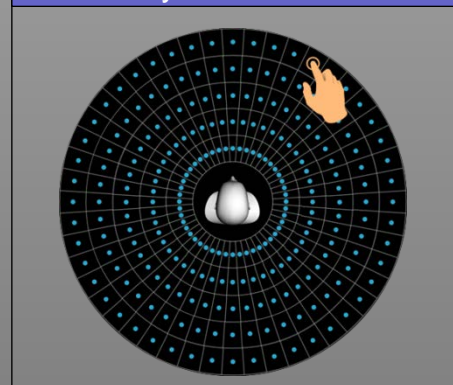


1. Allow panning in Azimuth with varying depth.
2. Enable recording of up to five user input paths.
3. Recorded path speed mirrors input movement speed
4. Real-time transition between HRTF points.
5. Allow path reversing.
6. Employs 240 individual HRTF points to achieve near field implementation.

3D Audio App Features

Real-time audio processing
Real-time filter swapping
Fully customized user interface and design
3D audio processing (HRTF)
Near Field 3D audio function (variable depth)
Near Field Path recording
Near Field Path reversing
Multi-channel 3D audio processing
Audio Widening function
Virtual Bass function (NLD)
3D audio in Elevation function
Auto-Rotate function
Selective 2D objects drawing on canvas
FFmpeg Audio Decoding

HRTF layout for Near Field



Contact Us

Gan Woon Seng EWSGAN@ntu.edu.sg
Phyo Ko Ko KKPHYO@ntu.edu.sg

School of Electrical and Electronic Engineering,
Block S2, S2-B4a-03, 50 Nanyang Avenue, Nanyang
Technological University. S639798.