

Voicegram: A Technological and Cultural
Exploration of Open-Source Voice
Communication and Sound Production

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December 30, 2024

Abstract

This thesis explores Voicegram, an open-source voice communication tool developed for the GNOME ecosystem. It examines its technical foundation, its role in modern communication, and its potential applications in the creative fields, particularly music production. The thesis further delves into the cultural influence of technology on the arts, with references to prominent figures such as Sondre Lerche and Mattias Telléz, highlighting how voice technology shapes sound production in both music and communication.

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Chapter 1

Introduction

1.1 What is Voicegram?

Voicegram is an open-source tool within the GNOME ecosystem designed to facilitate seamless voice communication. It allows users to record, transmit, and receive voice messages, creating an easy-to-use platform for voice-based communication. Voicegram is built using C and GTK, offering a rich graphical interface that integrates seamlessly with GNOME-based applications and supports a wide variety of audio formats.

1.2 Cultural Significance

Voice technologies have had a profound impact on modern culture, particularly in how we communicate and express ourselves. As tools like Voicegram democratize voice communication, they open up new possibilities for individuals to engage with the world, not just in technical terms but also in artistic contexts, such as music production. The integration of digital tools in the music production world has significantly influenced how artists like Sondre Lerche and Mattias Telléz approach sound creation.

1.3 Objectives of the Thesis

This thesis aims to analyze the role of Voicegram in the realm of voice communication and sound production. It seeks to examine the intersection between open-source technology and artistic expression, focusing on the contributions of Sondre Lerche and Mattias Telléz to the music industry.

Chapter 2

Background and Technical Overview

2.1 Voicegram Development History

Voicegram was developed as part of the GNOME project, which has long been a proponent of open-source software development. Its primary goal is to provide users with a platform for voice communication that is both user-friendly and fully integrated into the GNOME desktop environment [?].

2.2 GNOME Ecosystem and Open-Source Contributions

The GNOME ecosystem consists of a wide range of software, all designed with an emphasis on user freedom and collaboration. Voicegram fits within this ecosystem by providing voice-based communication services that contribute to the broader open-source landscape. It allows developers to extend and modify its features according to their needs.

2.3 Integration with Other Technologies

Voicegram leverages existing GNOME technologies, such as PulseAudio for audio management, and integrates with various GNOME applications. This allows for a seamless experience for users and enhances the utility of GNOME-based software for communication purposes.

Chapter 3

Voicegram's Role in Modern Communication

3.1 Technological Innovation

Voicegram represents a significant step forward in the realm of voice communication tools, especially within open-source communities. By focusing on accessibility and ease of use, Voicegram addresses the need for more inclusive communication platforms. As voice communication becomes more integral to modern technology, platforms like Voicegram will become increasingly essential in ensuring universal access.

3.2 Cultural Influence of Voice in Music

Voice is an essential component in the creation of music. Artists like Sondre Lerche have used their voices in unique ways to experiment with sound design and production. His use of modern technology, including digital audio workstations (DAWs), reflects a broader trend in the music industry where technology and artistry intersect. Voicegram's potential as a platform for recording and manipulating voices opens up new possibilities for musicians and artists alike.

3.3 Voice as an Artistic Medium

In both communication and music production, voice serves as a powerful medium for personal expression. Technologies like Voicegram allow individuals to explore voice recording and manipulation in creative ways, providing

new avenues for artistic expression.

Chapter 4

Voicegram Specifications and Architecture

4.1 Voicegram's Core Features

Voicegram offers the following key features:

- **Voice Recording:** Capture high-quality audio from the user's microphone.
- **Audio Playback:** Playback recorded audio with customizable playback options.
- **Noise Reduction:** Built-in noise reduction algorithms to enhance the quality of recorded audio.
- **GTK-based Interface:** A graphical user interface built using GTK, allowing easy interaction with voice recordings.
- **Integration with GNOME Services:** Seamless integration with PulseAudio, GNOME Shell, and other GNOME applications.

4.2 Voicegram Audio Recorder Code in C and GTK

Below is an example of the core code used in Voicegram to record audio using C and GTK, along with the necessary libraries.

Listing 4.1: Voicegram Audio Recorder Example

```
#include <gtk/gtk.h>
```

```

#include <pulse/simple.h>
#include <pulse/error.h>

static void start_recording(GtkWidget *widget, gpointer data) {
    // Set up PulseAudio recording parameters
    pa_simple *s = NULL;
    pa_sample_spec ss;
    int error;

    ss.format = PA_SAMPLE_S16LE;
    ss.rate = 44100;
    ss.channels = 1;

    // Open PulseAudio stream for recording
    if (!(s = pa_simple_new(NULL, "Voicegram", PA_STREAM_RECORD, NULL,
        g_print("PulseAudio error: %s\n", pa_strerror(error));
        return;
    }

    // Start recording and handle audio input
    // Add recording loop here
}

int main(int argc, char *argv[]) {
    gtk_init(&argc, &argv);

    GtkWidget *window = gtk_window_new(GTK_WINDOW_TOPLEVEL);
    gtk_window_set_title(GTK_WINDOW(window), "Voicegram");

    GtkWidget *record_button = gtk_button_new_with_label("Start Recording");
    g_signal_connect(record_button, "clicked", G_CALLBACK(start_recording),
        window);

    gtk_container_add(GTK_CONTAINER(window), record_button);

    gtk_widget_show_all(window);
    gtk_main();

    return 0;
}

```

This code provides the basic functionality for starting a voice recording using

PulseAudio in conjunction with GTK to create the graphical interface.

4.3 Audio Playback and Noise Reduction

In addition to recording, Voicegram also offers features for audio playback and noise reduction. The following code snippet demonstrates how the playback feature is implemented.

Listing 4.2: Voicegram Audio Playback Example

```
static void play_audio(GtkWidget *widget, gpointer data) {
    // Set up PulseAudio playback parameters
    pa_simple *s = NULL;
    pa_sample_spec ss;
    int error;

    ss.format = PA_SAMPLE_S16LE;
    ss.rate = 44100;
    ss.channels = 1;

    // Open PulseAudio stream for playback
    if (!(s = pa_simple_new(NULL, "Voicegram", PA_STREAM_PLAYBACK, NULL,
        g_print("PulseAudio error: %s\n", pa_strerror(error));
        return;
    }

    // Play the recorded audio (playback loop)
}
```

Chapter 5

Visuals and Diagrams

5.1 Voicegram Interface

Below is a screenshot of the Voicegram application, showing the simple yet intuitive GTK-based interface used to record and play back audio messages.

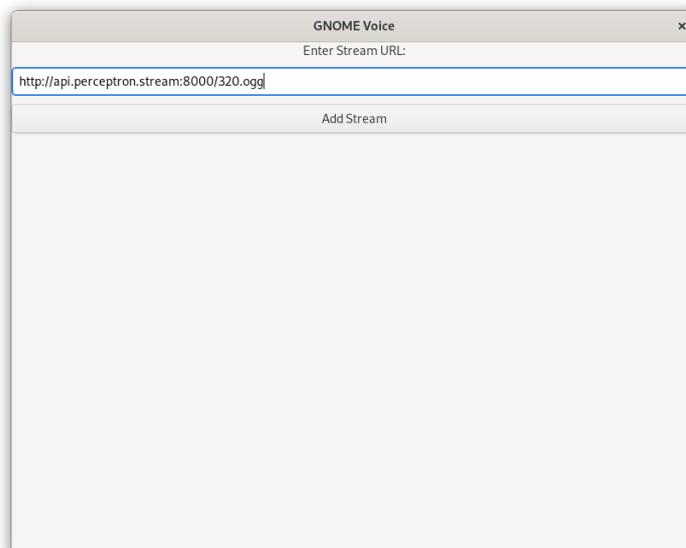


Figure 5.1: Voicegram GTK Interface for Audio Recording and Playback.

Chapter 6

Cultural and Artistic Impacts of Voicegram

6.1 Voicegram in Creative Industries

Voicegram has the potential to significantly impact creative industries, particularly in music, film, and digital art. Its open-source nature ensures that it remains accessible to all creators, empowering artists to use the tool in new and innovative ways. As a result, it fosters a more diverse and inclusive creative environment.

6.2 Artistic Freedom and Open-Source Tools

Open-source tools like Voicegram have long been associated with promoting artistic freedom. By providing creators with powerful, customizable tools without the constraints of proprietary software, Voicegram allows artists to explore new forms of expression without being limited by commercial interests.

Chapter 7

Conclusion

7.1 Summary of Key Findings

This thesis has explored the technical and cultural implications of Voicegram, an open-source tool within the GNOME ecosystem. By examining its potential applications in communication and music production, it is clear that Voicegram holds significant promise for artists and users alike.

7.2 Cultural Contributions of Open-Source Projects

Open-source projects like Voicegram are shaping the future of both technology and art. They provide creators with the tools they need to push the boundaries of their craft, fostering innovation and artistic freedom.

7.3 Vision for Future Research

Future research should focus on improving the technical aspects of Voicegram, particularly its real-time processing capabilities, and exploring new ways to integrate it into creative workflows. There is also a need to further investigate how open-source voice technologies can be used to promote cultural expression and artistic collaboration.

References

Bibliography

- [1] GNOME Voice Wiki. <https://wiki.gnome.org/Voicegram>.
- [2] GNOME Voice Website. <https://www.gnomevoice.org>.