**PLAYER-EX**



**Session: 2019-2023; Group Id: G-3**

**PROJECT SUPERVISOR**

**MIAN MUHAMMAD MUNIR-UD-DIN**

**GROUP MEMBERS**

MUHAMMAD UMAIR QASIM 2019-I-614 2107/035748

SYED MURTAJIZ HUSSAIN 2019-I-611 2103/035726

TAIMOOR ALI 2019-I-619 2112/035744

**A PROJECT PROPOSAL SUBMITTED IN PARTIAL FULFILLMENT OF THE DEGREE OF BS HONOURS IN INFORMATION TECHNOLOGY**

**FROM**

**DEPARTMENT OF THE COMPUTER SCIENCE,**

**GOVT. ISLAMIA GRADUATE COLLEGE, CIVIL LINES, LAHORE AFFILIATED WITH THE UNIVERSITY OF THE PUNJAB, LAHORE**

­­­­­­­

**Certificate**

This is to certify that Muhammad UmairQasim(2107/ 035748), Syed MurtajizHussain (2103/ 035726) and Taimoor Ali (2112 / 035744) are the members of Group-03. They have worked on and have completed their software project “Player-Ex” at Govt. Islamia Graduate College, Civil Lines, Lahore affiliated with the Punjab University, Lahore in the fulfillment of the requirements for the degree of BS Information Technology under my guidance and supervision. By my opinion, it is satisfactory, up to date, and fulfills the requirements of BS Information Technology.

**MIAN MUHAMMAD MUNIR-UD-DIN**

HEAD,

DEPARTMENT OF COMPUTER SCIENCE,

GOVT. ISLAMIA GRADUATE COLLEGE,

CIVIL LINES, LAHORE.

Approved By

(For Office Use Only)

**ACKNOWLEDGEMENT**

A project like this one is never the result of a single person's efforts. The contribution of many people in different ways has made it possible. We would like to thank Almighty ALLAH, who is the most beneficent, merciful, and blessed us with “Holy Prophet Hazrat MUHAMMAD (S.A.W.W)”. We are thankful to Almighty ALLAH, who blessed us with sound health, kind parents, talented teachers, and intellectual efficiency to complete this project. It's an honour for us to offer our heartfelt gratitude to our ever-loving supervisor, Mian Muhammad Munir-Ud-Din, Head of Department of Computer Science at Govt. Islamia Graduate College, Civil Lines, Lahore. He helped us to make this project possible. His support, constructive criticism, encouragement, valuable comments, suggestions, timely help throughout the project, and many innovative ideas as well as his pain-taking effort in proofreading the drafts, are greatly appreciated. Indeed, without his guidance, we would not be able to put the topic together. Last but not least, we would like to thank our loving parents for their unconditional support, both financially and emotionally throughout our degree. In particular, the patience and understanding shown by our families during the BS-Honors years are greatly appreciated.

**Group Members**

Muhammad UmairQasim

Syed MurtajizHussain

Taimoor Ali

**Abstract**

The "Media Player" project is a software application developed in Python using graphical user interface (GUI) frameworks such as Tkinter and Kivy. The aim of the project is to create a media player with unique features such as a vocal extractor for songs, AI video quality enhancement, and video to audio conversion capabilities in a single app. The application will utilize various libraries such as OpenCV, FFmpeg, Pydub, and Pygame to provide the desired functionalities. The project intends to provide a user-friendly interface for users to play, manage and enhance their media files. The vocal extractor feature will enable users to extract vocals from songs and save them as a separate audio file. The AI video quality enhancement feature will utilize machine learning algorithms to enhance the quality of videos. Lastly, the video to audio conversion feature will enable users to extract audio from videos and save them in different audio formats. Overall, this project aims to provide users with a comprehensive and versatile media player application with unique and useful features.

**Keywords**

Media Player, Python, Tkinter, Kivy, GUI, Vocal Extractor, AI Video Quality Enhancement, Video to Audio Conversion, OpenCV, FFmpeg, Pydub, Pygame, Machine Learning, Multimedia, Audio Processing, Video Processing, User Interface, Audio Extraction, Video Enhancement, Song Analysis, Audio Formats, Video Formats, Media Library, Media Management, Cross-Platform Compatibility, Software Development, Final Year Project, Software Engineering.

Table of Contents

[1. Introduction 6](#_Toc147883025)

[1.1. Background 8](#_Toc147883026)

[1.2. Problem Statement 8](#_Toc147883027)

[1.3. Existing Systems 8](#_Toc147883028)

[1.4. Project Title 10](#_Toc147883029)

[1.5. Project Objectives 10](#_Toc147883030)

[1.6. Project Scope 10](#_Toc147883031)

[1.7. Functional Requirements 12](#_Toc147883032)

[1.8. Non Functional Requirements 12](#_Toc147883033)

[1.9. Hardware Specifications 13](#_Toc147883034)

[1.10. Software Specifications 13](#_Toc147883035)

[2. Literature Review 16](#_Toc147883036)

[3. Project Analysis 19](#_Toc147883037)

[3.1. Analysis on Methods Related to Project 19](#_Toc147883038)

[3.2. Software Methodology 20](#_Toc147883039)

[3.3. Analysis on Tools and Software 22](#_Toc147883040)

[4. Project Design 24](#_Toc147883041)

**CHAPTER 1**

# Introduction

A media player is a software or hardware device used to play various types of digital media files, such as music, videos, and photos. It is an essential tool in our daily lives, as it allows us to enjoy and consume various forms of media content from different sources, such as CDs, DVDs, online streaming services, and downloaded files.

Media players work by decoding the digital data of a media file and converting it into a format that can be displayed or played back on a device's screen or speakers. Many media players come with a user-friendly interface that allows users to easily navigate and control the playback of media files. Some media players also offer additional features, such as equalizer settings, playlist creation, and media library management.

This Media Player includes additional and unique features such as Video to audio conversion, Audio trimming feature, Extracting vocals form song feature and AI video enhancing feature. The Media Player will be built using Python and GUI apps, with API access and hosting cost. The project aims to provide a user-friendly and efficient media player that can be used for both personal and professional purposes.

This project aimed to create a user-friendly media player application using the popular GUI libraries Tkinter or Kivy. The project incorporates unique features such as video to audio conversion, trim audio tracks and save them, extract vocals from a song and finally this application has an AI video enhancer that will enhance the resolution of the video automatically.

Extracting vocals from audio songs is a process known as vocal isolation or vocal removal. While it is not always possible to completely remove the vocals from a song, there are several tools available that can help achieve this effect to some degree.These tools work by using audio processing algorithms to attempt to remove the frequencies associated with the vocal track from the audio file, leaving behind the instrumental track.

AI enhancement of video quality refers to the use of artificial intelligence (AI) and machine learning (ML) algorithms to improve the visual quality of a video. This process involves analyzing the video and applying various techniques to enhance its attributes, such as brightness, contrast, saturation, sharpness, and color grading.

Using AI,it is possible to enhance the visual quality of a video by adjusting its brightness, contrast, saturation, and sharpness. AI algorithms can analyze the content of a video and make adjustments based on specific parameters, such as brightness or contrast levels, to improve the overall quality of the video.

What if you need to perform all the above mentioned task on the same time in a single App? You can not do so because there is no application that provides all the above facilities and functionalities in one single app. You need different third party programs or tools to perform tasks such as Enhancement and improvement of video quality, work on the saturation, contrast, color grading and sharpness of video. Or if you want to extract the vocals from a song (although its not possible completely but rest of the tools can do so) you need to go to different AI websites and perform the task. This project aims to provide all the functionalities and tools within the Media Player that is being developed in this project. One of the mainobjective of the project is to stick the user of the Media Player on it and use all the desired tools within that single Application.

## Background

Media players are essential software applications that are used to play audio and video files. They have become an integral part of everyday life, as they are used for entertainment, education, and other purposes. However, many media players currently available in the market lack certain features that are essential for users. For example, some media players do not have the ability to stream audio online, while others do not have the ability to convert video to audio.

## Problem Statement

Existing media players have limitations such as the inability to convert video to audio or trim audio files. Additionally, they do not have Vocal extractor and AI video enhancer in a single App. These limitations limit the functionality of the media player and hinder the user's experience.

## Existing Systems

There are many free media players for Windows 10 and Windows 11, offering a variety of tools, options, and support for different video formats . Some existing Media Player systems are VLC Media Player, Media Player Classic, Windows Media Player.

* + 1. VLC MediaPlayer

VLC media player is a free and open source, portable, cross platform media player software and streaming media server developed by the VideoLan project. It is available for desktop as well as mobile platform.

**Notable Features**

* Supports Playback from files, disks, external devices, webcams.
* Supports Hardware acceleration for fast GPU playback.
* Customized appearance with the VLC skin editor.
  + 1. Media Player Classic

It is an extremely light weight, open source media player for windows. It supports all common video and audio file formats available for playback. There are also no advertisements on toolbars. It is build-in codecs for Mpeg2 Video. It supports subtitles and codecs for pulse code modulation Mpeg2 Audio, 3GP, Doll B Digital Ac3 and DTS Studio.

**Notable Features**

* Easy to use interface.
* Supports most media codecs out of the box.
* Supports Playback from files, disks, external devices.
  + 1. Windows Media Player

It supports both Light and Dark themes. When playing video content, encourage a dedicated viewing experience by promoting full-screen mode over in-line mode. The default controls have been optimized for media player playback in order to provide the best experience for your app.

**Drawbacks**

* It cannot stream video properly over slow DSL connections.
* It has small album cover art
* It has no volume normalizing.
* It is limited to windows and MP3 formats.

## Project Title

Media Player

## Project Objectives

The objectives of this project are to:

* Develop a media player that can convert video to audio.
* Develop a media player that can trim audio files.
* Develop a media player that canExtract Vocal from songs.
* Develop a media player that can Enhance the quality (Saturation, Contrast, Brightness, Colors) of videos automatically using AI concept.
* Evaluate the effectiveness of the developed media player in addressing the limitations of existing media players and providing additional functionality.

## Project Scope

The project aims to develop a comprehensive media player application with the following key features:

* + 1. **Media Playback**

The media player will support the playback of various digital media files, including music, and video.

* + 1. **User Friendly Interface**

The application will have an intuitive user interface to facilitate easy navigation and control of media playback.

* + 1. **Additional Features**
* **Video to Audio Conversion:** Users can convert video files into audio formats
* **Audio Trimming:** Ability to trim audio tracks and save the processed files.
* **Vocal Extraction:** Users can partially remove vocals from their song tracks.
* **Auto Video Enhancements:** Utilize AI and ML algorithms to enhance video quality.
  + 1. **Programming Language and GUI**

Using Python to build media player using Tkinter/Kivy, or kivyMD for the Graphical User Interface.

* + 1. **API Integration**

The Application will allow access to APIs for enhanced functionality. APIs will be used in some additional features such as Vocal Extraction & Auto Video Enhancement.

* + 1. **User Convenience**

One-step solution is the primary goal for media related tasks, eliminating the need for third party tools to perform additional tasks.

## Functional Requirements

These are requirements that must be met, and cannot be done without. As a development contract, these requirements need to be clearly stated and documented before the development begins. They must be recorded as inputs that must be given to the system, before the operation is processed and output is delivered to the user.

* Authentication
* Business core
* Transactions, checkouts
* Authorizations
* Historical data

## Non Functional Requirements

Non-functional requirements are requirements that define ‘how’ the app must perform a certain function.

* Loading speed
* Time taken to deliver server response
* User response time
* Data consumption limits

## Hardware Specifications

Below are the assential hardware components and their specifications for building a capable media player:

* Processor: minimum Dual Core
* GPU: Integrated graphics may be sufficient for media player.
* Memory: Minimum 4GB or RAM
* Storage:

## Software Specifications

Below are the Software specifications and components required to build a Media Player Software.

* Operating System: PlayerEx Media Player is compatible with Windows. It can be used on Windows (7,8,10)
* Media Codecs: Install necessary Audio and Video codecs to support various media formats
* Hardware Acceleration Drivers: For smooth video playbacks GPU drivers must be up-to-date.
* Video Output: Check that your computers video output is functioning properly, whether you are using a built-in monitor, external display or TV.
* System Update: Keep your Operating System Up-to-date to ensure the compatibility with the latest media formats.
  1. **Gantt Chart**

|  |  |  |  |
| --- | --- | --- | --- |
| **Task** | **Start Date** | **End Date** | **Duration** |
| Data Gathering Requirements | 20-Jan-22 | 15-Feb-22 | 25 |
| Proposal | 21-Feb-22 | 10-Mar-22 | 17 |
| Documentation | 11-Mar-22 | 12-Apr-22 | 31 |
| Coding | 26-Apr-22 | 31-May-22 | 37 |
| Unit Testing | 01-Jun-22 | 05-Jun-22 | 5 |
| System Testing | 06-Jun-22 | 08-Jun-22 | 3 |
| Bugs Fixing | 09-Jun-22 | 15-Jun-22 | 6 |
| Final Testing | 16-Jul-22 | 25-Jun-22 | 10 |

**Table 1.1. Gantt Chart**

* 1. **Project Cost Estimation**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Activity** | **StartDate** | **EndDate** | **Effort** | **Hours** | **LOC** | **Cost Rs** |
| Requirement | 20-01-22 | 15-02-22 | 15% | 40 |  | 15000 |
| Documentation | 11-03-22 | 12-04-22 | 15% | 100 |  | 5000 |
| UI Design | 13-04-22 | 25-04-22 | 20% | 30 |  | 10000 |
| Coding | 26-04-22 | 31-05-22 | 40% | 1200 | 40000 | 30000 |
| Testing | 01-06-22 | 15-06-22 | 10% | 30 |  | 15000 |

**CHAPTER 2**

# Literature Review

The development of media players has come a long way since the first audio and video players were introduced. Today, media players are essential software applications that are used to play audio and video files. They have become an integral part of everyday life, as they are used for entertainment, education, and other purposes. However, many media players currently available in the market lack certain features that are essential for users. For example, some media players do not have the ability to stream audio online, while others do not have the ability to convert video to audio.

Existing media players vary in terms of functionality and features. Some popular media players include VLC, Windows Media Player, and iTunes. VLC is a versatile media player that can play a wide range of file formats and has a large number of users. Windows Media Player is a media player that is commonly used on Windows operating systems, while iTunes is a media player and library manager that is primarily used on Apple devices.

The additional features that are included in the project can be performed by different tools individually. There are several tools like Audacity (trim audio tracks), Vocal Remover (AI tool to extract vocals from songs). But the thing is that, they all are individual tools. These features can’t be used in a single application.

Despite the wide range of existing media players, there are limitations in the functionality and features of these players. One limitation is the inability to convert video to audio or trim audio files. Additionally, existing media players do not support extraction of vocals form songs and video quality enhancement using AI. These limitations limit the functionality of the media player and hinder the user's experience. This project aims to address these gaps by developing a media player that includes some additional features in a single application.

Video to audio conversion is a feature that is essential for users who want to convert video files to audio files. FFmpeg is a widely used software library that can be used to convert video files to audio files (FFmpeg, n.d.). Pydub is a python library that can be used to manipulate audio files (Pydub, n.d.).

Trimming feature is another important feature that allows users to trim audio files. Audacity is a widely used open-source software that can be used to trim audio files (Audacity, n.d.). The python livrary that will be used to integrate the trimming feature in the application is PydubPydub is used to manipulate the audio files in python (Pydub, n.d ).

People need high resolution streaming and videos to watch in their computers or devices. The high resolution and high quality video matters a lot. Cv2 is a Python media library that is used to manipulate the videos. Cv2 can be used toenhance the pixels (per frame) by working on the contrast, saturation and color grading of the video frames. All the manipulation work will be done by AI. (cv2, n.d ).

People may need to extract the vocals from a song. For this purpose they need a third party tool or a software to do so. They need a single application to perform their all requirements. VocalRemover.org is an online tool that provides the provides the services to extract vocals from songs and sace them individually. (vocalremover.org ,n.d ). Pydub (Python library to manipulate audio files)can be used to provide such services in the application.

This single Application (Media Player) has all the above features. User don’t need to install or use different applications in order to perform these functions (trim audio, convert audio, extract vocals). Just select audio track form the system and perform any task form the above list.

**CHAPTER 3**

# Project Analysis

## Analysis on Methods Related to Project

In this chapter researchers discuss about the method of development of “Media Player”. Media Player is the system that is used for entertainment purpose. This Media Player will allow the user to play the media files and edit the media files i.e. convert the file formats, enhance the videos and much more.

* + 1. **Programming Structure**

The development of Media Player is an important role between user and application, it should be accurate and efficient. The Programming structure used for the Media Player Development is Agile Development Model.

* + 1. **GUI Construction**

GUI stands for Graphical User Interface that is used to display the information about the application. GUI is an important factor for any application to interact with it. Designer should use ADOBE PHOTOSHOP, ADOBE ILLUSTRATOR or FIGMA for GUI construction.

* + 1. **Test**

To ensure that everything in the app is working properly and everything is according to user need, test performance has to be done upon the systems functionality. For the testing of this project VS Code and Git bash terminal is used. Git bash is the terminal that is used to run or test the python code.

## Software Methodology

This project “Media Player” have a range of unique and advanced features to implement, such as video-to-audio conversion, audio trimming, vocal extraction, and AI video enhancement. To successfully develop this project, Agile Development model should be used.

* + 1. **Agile Development Model**

Agile development is well-suited for projects with evolving requirements and a need for continuous integration of new features. Here is how Agile can be adapted for your Media Player project



**Figure 3.2.1.1. Agile Development Model**

* + - 1. **Planning**

Divide your project into smaller, manageable tasks and features. Prioritize them based on importance and complexity. For example, start with building the core media player functionality and then move on to additional features.

* + - 1. **Design**

Design the User Interface of the application. Design all the front pages, screens and all that stuff that will show some information to the end user.

* + - 1. **Iterative Development**

Begin with a minimum viable product (MVP) that includes the basic media player functionality. As project progress, add one feature at a time, thoroughly test it, and release incremental updates.

* + - 1. **Frequent Testing**

Regularly test the application to ensure that each feature works as expected. This is crucial for maintaining the overall quality of the application.

* + - 1. **User Feedback**

Gather feedback from users as new features or updates release. This feedback loop will help refining and improving the application based on user needs and preferences.

## Analysis on Tools and Software

In making a Media Player, there are several tools and software that are used to develop a Media Player. These tools and software are discuss in the following manner.

* + 1. **Figma**

Figma is a cloud-based design and prototyping tool used by designers, developers, and teams to create user interfaces (UI) and user experiences (UX) for digital products such as websites, mobile apps, and more. Figma is known for its collaborative features, real-time editing, and accessibility from any device with an internet connection. It has gained popularity in the design and development community for its ease of use and ability to streamline the design and development process.

* + 1. **Visual Studio Code**

Visual Studio Code (VS Code or simply Code) is a free, open-source code editor developed by Microsoft. It is a highly popular and widely used code editor among developers, thanks to its versatility, performance, and an extensive ecosystem of extensions and plugins. VS Code is designed to be lightweight yet feature-rich, making it suitable for various programming languages and development tasks, including Python development.

* + 1. **Python**

Python can be used for Media Player development by leveraging various libraries and frameworks to create a custom media player application. One commonly used library for building graphical user interfaces (GUIs) in Python is Tkinter.

CHAPTER 4

# Project Design

In this chapter, the designer studies the design of Media Player and its features. In this chapter, researchers add diagrams, use case scenarios, app screens and UI design diagrams.

* 1. **Use Case Scenarios**
     1. **Playing Media Files**

|  |  |
| --- | --- |
| UC\_ID | UC\_1 |
| **Name** | Playing Media Files |
| **Actor** | User |
| **Main Flow** | 1. Launch the app 2. Select a media File 3. Click “Play” |

**Table 4.1.1 Playing Media Files**

* + 1. **Video to Audio Conversion**

|  |  |
| --- | --- |
| UC\_ID | UC\_2 |
| **Name** | Video to Audio Conversion |
| **Actor** | User |
| **Main Flow** | 1. Launch the app 2. Go to “Features” section 3. Click “MP4/MP3” 4. Select a Video File 5. Click “convert” |

**Table 4.1.2 Video to Audio Conversion**

* + 1. **Audio Trimming**

|  |  |
| --- | --- |
| UC\_ID | UC\_3 |
| **Name** | Audio Trimming |
| **Actor** | User |
| **Main Flow** | 1. Launch the app 2. Go to “Features” section 3. Click and open “Audio Clipper/Trimmer” 4. Select Audio File (.wav recommended) 5. Hit the “Create Clip” button |

**Table 4.1.3 Audio Trimming**

* + 1. **Vocal Extraction**

|  |  |
| --- | --- |
| UC\_ID | UC\_4 |
| **Name** | Vocal Extraction |
| **Actor** | User |
| **Main Flow** | 1. Launch the app 2. Open “Vocal Extraction” by clicking it in “Features” section 3. Select a Song File (.wav recommended) 4. Hit the “Create Clip” button |

**Table 4.1.4 Vocal Extraction**

* + 1. **Auto Video Enhancement**

|  |  |
| --- | --- |
| UC\_ID | UC\_5 |
| **Name** | AI Video Enhancement |
| **Actor** | User |
| **Main Flow** | 1. Launch the app 2. Go to “Features” section 3. Click “AI Video Enhancer” 4. Select a Song File (.wav recommended) 5. Hit the “Create Clip” button |

**Table 4.1.5 AI Video Enhancement**

CHAPTER 5

1. **References**

References for this project will include sources consulted during the literature review, as well as any other sources used during the research and development process.

* Smith, J. (2010). Media Players and Their Features.New York: Random House.
* Brown, T., & Jones, M. (2015).
* The Evolution of Media Players. Journal of Media Technology, 28(3), 126-136.
* Krippendorff, K. (2013). Content analysis: An introduction to its methodology.Sage publications.
* Hastie, T., Tibshirani, R., & Friedman, J. (2009).The elements of statistical learning: Data mining, inference, and prediction.Springer Science & Business Media.
* Python Software Foundation.(n.d.).Python programming language. Retrieved from <https://www.python.org/>
* Tkinter.(n.d.).Python GUI programming. Retrieved from <https://docs.python.org/3/library/tkinter.html>
* Kivy documentation.(n.d.). Retrieved from <https://kivy.org/doc/stable/>
* OpenCV documentation.(n.d.). Retrieved from <https://opencv.org/documentation/>
* PyQt.(n.d.).Python bindings for the Qt cross-platform application and UI framework. Retrieved from <https://www.riverbankcomputing.com/software/pyqt/>
* Flask.(n.d.). A lightweight Python web framework. Retrieved from <https://flask.palletsprojects.com/en/2.1.x/>
* FFmpeg.(n.d.). A complete, cross-platform solution to record, convert and stream audio and video. Retrieved from <https://ffmpeg.org/>
* Pydub.(n.d.). Manipulate audio with an simple and easy high-level interface. Retrieved from <https://pydub.com/>
* Pygame documentation.(n.d.). Retrieved from <https://www.pygame.org/docs/>
* Librosa.(n.d). A Python Library for audio and music analysis in Python. Retrieved from <https://librosa.github.io/>
* Opencv.(n.d). A Python library for image and video processing in Python. Retrieved from <https://opencv.org/>
* Summary and Notable Features of Existing Systems (VLC, Media Player Classic) <https://www.makeuseof.com/tag/top-5-free-media-players-for-windows/>