

Forprojektrapport

E18 E6BAC-01 Forberedelse til Bachelorprojekt

Designing Multichannel Audio- and Video-playback system:
Showman

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Chapter 1

Project Description

The following text is the project description pulled from the project catalog.

Development of multi-channel audio/video playback system for touring artists. This project will integrate both hardware- and software-design with emphasis on hardware design. Approx. 70-80 percent of modern Danish and international touring artists utilize audio backing tracks (prerecorded material played back on some chosen device) and video content projected on large screens as part of their performance.

However, there are a multitude of options ranging from iPod-playback to complex, customized systems operated by technical personnel.

Common for these systems is instability, making artists to purchase redundant backup-systems in order to deliver their audience a flawless and uninterrupted performance.

In a typical scenario, at least one laptop – often several laptops – with various audio- and/or videointerfaces, handles and runs the audio backing track and video-content in sync.

This project will integrate both audio- and video-handling in a single 19" rack-mounted device and provide the user with a user-friendly GUI (Graphical User Interface) while complying with international standards for audio and video and electronic devices.

For design and implementation of the device, a research is needed in:

- Circuit/hardware design
- D/A audio converters
- Standardized audio input/output formats
- Audio file formats
- Standardized video input/output formats
- Video file formats



- Time codes for synchronization
- User feedback for feasible GUI design

This project is already in the early stages of development as part of an apprenticeship in entrepreneurship (iværksætterpraktik) at Navitas Science and Innovation.

Current status on project:

- Requirements specification finished
- FURPS finished
- Market research ongoing

The project is requesting confidentiality as the device is in development intended for market release to prosumers in the music industry, thus an eventual project partner must sign a non-disclosure agreement.

Project partner profile: Electronic Engineering student or Information and Communication Technology student.

Chapter 2

Requirement Specification

Introduction

This chapter will describe the requirements needed for the multichannel audio/video playback system called Showman. This chapter contains an introductory overview of Showman in general that covers a System Description, System Overview and Usage Situation followed by Functional and Non-Functional Requirements. The chapter ends with a MoSCoW- and FURPS-analysis to organize a list of priorities needed to develop a functional prototype.

System Description

The purpose of Showman is to play back prerecorded audio- and video-material during a concert performance. Prerecorded audio- and video-playback material is colloquially called 'backing tracks'. The primary reason of backing track usage is to enhance a concert performance by play back additional material that artists on stage do not have the option or time to play themselves.

User (or artist) uploads synchronized audio files in 44.1 kHz 16-bit .WAV-format and video files in MPEG-4 format to Showman before using Showman during showtime. User creates, edits and organizes playlist with a software application Graphical User Interface (GUI) on laptop (PC or Mac). The content of the playlist is the backing track material that user produced beforehand. After playlist creation, user uploads the playlist via a USB-connection to Showman's internal memory.

Showman play back 8-tracks of audio along with video-content. The audio tracks can be connected directly into the XLR-inputs of a live sound mixer through Showman's XLR outputs, while the video-material can be connected to screens through Showman's HDMI-output. User starts each song in the playlist separately by pressing the 'Play'-button on Showman. The first song

on the playlist begins and playback stops automatically (auto-stop) after each ending of a song.

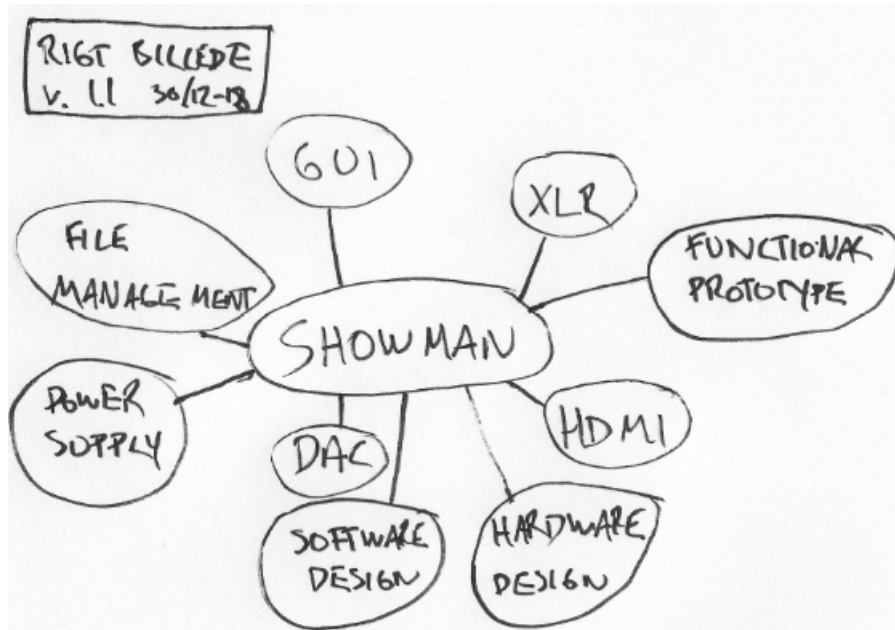


Figure 2.1 – Content of Showman as a rich picture.

Usage Situation

Showman's intended users are artists that utilize backing tracks at concert performances to enhance/augment their performance. Preconditions are essential to Showman, as user must have up to 4 stereo or 8 mono .WAV-files and a MPEG4-videofile available for each song that has backing tracks. The artist need to have produced the backing tracks beforehand.

As Showman's intended usage conditions are tough touring conditions and periodic hard handling, Showman's user interface is a 2U 19" rack mounted device with a LCD screen for user monitoring and panel buttons for navigation.

When the user have the necessary files available, the user assembles the playlist in the software application GUI and assigns the audio outputs. The GUI uploads the playlist project into specific folders in Showman's internal 500 GB flash memory.

When user need to start playback of a song, all user need to do is press 'Play' on the user panel. An auto-stop function after the end of each song in

the project is embedded in Showman.

Actor-Context Diagram

The figure below is an overview of actors that interact with Showman:

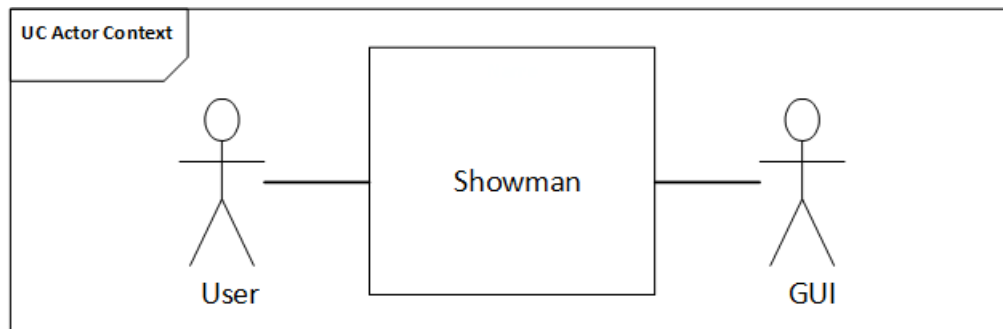


Figure 2.2 – Actor-Context diagram of Showman.

User

User is the primary actor. User creates the playlist and uploads the playlist to Showman. User operates Showman. User's interaction with Showman is outlined in detail in the specification for the individual Use Cases.

GUI

The Graphical User Interface (GUI) is the secondary actor. The GUI is the software application that handles the file management and playlist creation that is uploaded to Showman's interaction with Showman is outlined in detail in the specification for the individual Use Cases.

Use-Case Diagram

Functional Requirements

Non-Functional Requirements

MoSCoW

FURPS+

Chapter 3

Project Plan

(Udkast til) projektplan, herunder beskrivelser af hvilke eksperimenter, teknologier mm, der forventes udarbejdet i løbet af afgangsprojektet.

Chapter 4

Project Research

Undersøgelse af tilsvarende projekter og relevant litteratur.

Chapter 5

Project Expectations

Evt. aftale om forventet arbejdssted og tid.

Chapter 6

Conclusion

Konklusion på det indledende arbejde med forprojektet.

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