CMPT 365 Assignment #2 Report

By Maoshun Shang (301280479)

Chang Liu (301294110)

Instructor: Mark Drew

Computing Science Department, Faculty of Applied Science

Simon Fraser University

Introduction:

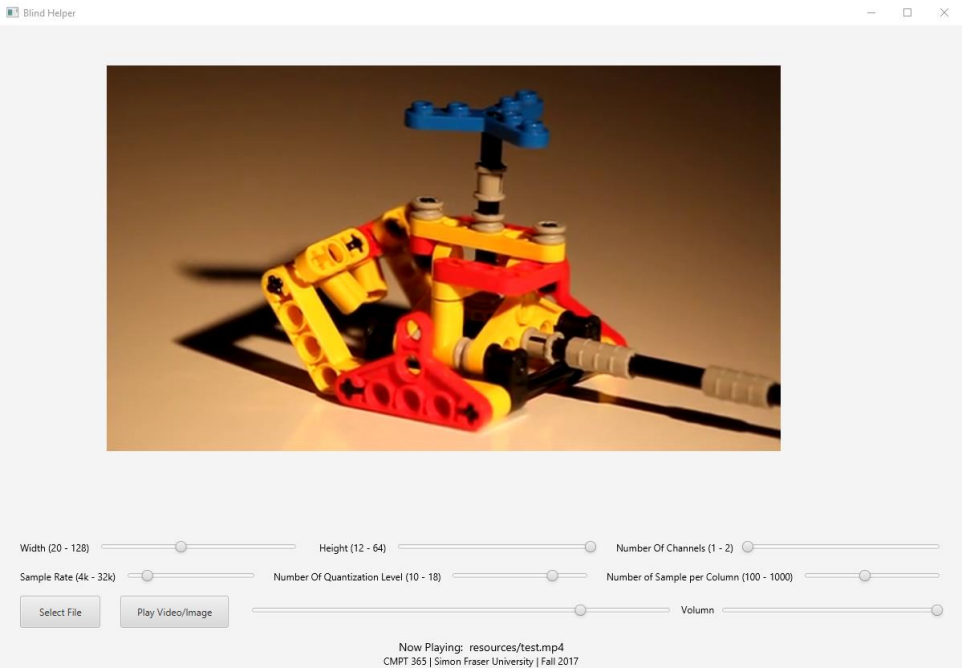
We apply basic fundamentals for multimedia manipulation to implement OpenCV libraries in order to construct a video-based program. The process of converting multimedia data is required for conveying ideas of pictures or videos to the blind. In this assignment, many libraries regarding graphics and media, such as OpenCV, and JavaFX, are used to construct and develop the Blind Helper program.

- In this assignment, OpenCV has functioned important roles to manipulate multimedia data. The OpenCV also contains FFMPEG, so that program enables to process both image and video stream.

```
import org.opencv.core.Mat;
import org.opencv.core.Size;
import org.opencv.imgcodecs.Imgcodecs;
import org.opencv.imgproc.Imgproc;
import org.opencv.videoio.VideoCapture;
import org.opencv.videoio.Videoio;
```

- JavaFX is the software platform, which contains many graphics and media functional kits, so that the application can be developed consistently. In this assignment, JavaFX has helped to create many interactive components, so that GUI can be described in XML. In that case, we can just use Scene Builder to construct the program.

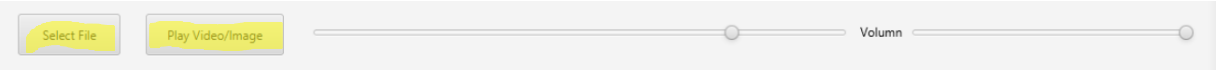
```
import javafx.scene.Scene;
import javafx.scene.control.Button;
import javafx.scene.control.Slider;
import javafx.scene.control.TextField;
import javafx.scene.image.Image;
import javafx.scene.image.ImageView;
import javafx.scene.input.MouseEvent;
import javafx.scene.media.Media;
import javafx.scene.media.MediaPlayer;
import javafx.scene.text.Text;
import javafx.stage.FileChooser;
```



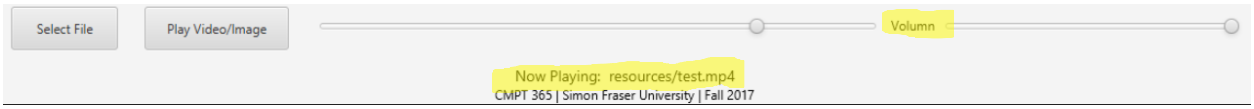
(Global View)

Features we implemented:

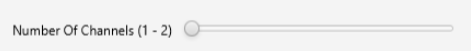
In this assignment, almost ***basic requirements*** have been implemented completely. The "Open" button functions well for both images or videos. The user can select any format of file regarding either images or videos after the "**Select File" button** was clicked. The program is designed to read a picture and convert data to audio sound, it still can fluently play videos. The **"Play Video/Image"** sound has also been added to the frames. Thus, we finished all the basic requirements.



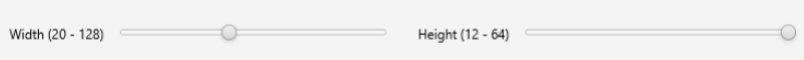
For the ***optional requirements***, many features have been implemented completely. GUI, after modified, allows users can adjust to expected size with the sliders adjusts accordingly. **The progress bar, texts**, and all the buttons are all adjustable according to the alteration of the window size. Besides, we also implement the **volume** controller, which the sound can be adjusted to a user-appropriate level.



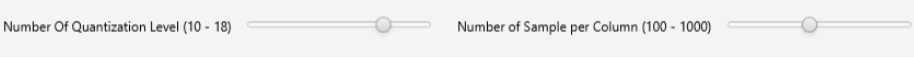
Moreover, **sample rate** has also been implemented in order to adjust the frequency of capturing the pictures from a video. In that case, the sample rate controller has been added to Scene Builder, which associates with sample rate functioning. The **number of channels** indicates a particular instrument related to a play sound message.



The quantities of **width** and **height** are also adjustable. The **title** at the bottom is capable of altering as the change of files and showing the name of the file that is currently playing.



Furthermore, the **number of quantization level** slider and the **number of sample per column** slider have been created for adjusting the range and domain of digitalization.



Conclusion:

To conclude, constructing the blind helper program requires many fundamentals of coding, and knowledge of multimedia manipulation. Some developer kits, such as OpenCV, JavaFX, help us to construct the functionalities based on the skeleton program. In this assignment, many features for blind helper have been designated to manipulate multimedia audio and video. We implemented the buttons to give program commands to select, interact with the program. Controllers have played the role of adjusting the quantities, which enable to meet the requirements of users. Therefore, we have learned the multimedia mechanisms of relevance between graphics and digital sound through this assignment.