AMBILIGHT MEDIA PLAYER

CENG 408

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WHAT IS AMBILIGHT MEDIA PLAYER?

- Ambilight Media Player is a media player,
- Unlike other media players, it can communicate with and manage smart bulbs,
- Ambilight Media Player offers the user a perfect realism while watching videos,
- Ambilight Media Player supports different video formats, (mpeg4, avi, mkv, mpeg etc.)
- It is cheaper than the examples in the market,
- Ambilight Media Player is easy to install and use. The software is user friendly,
- Ambilight Media Player is open source software,
- It can be developed as desired by the users.

RELATED WORKS

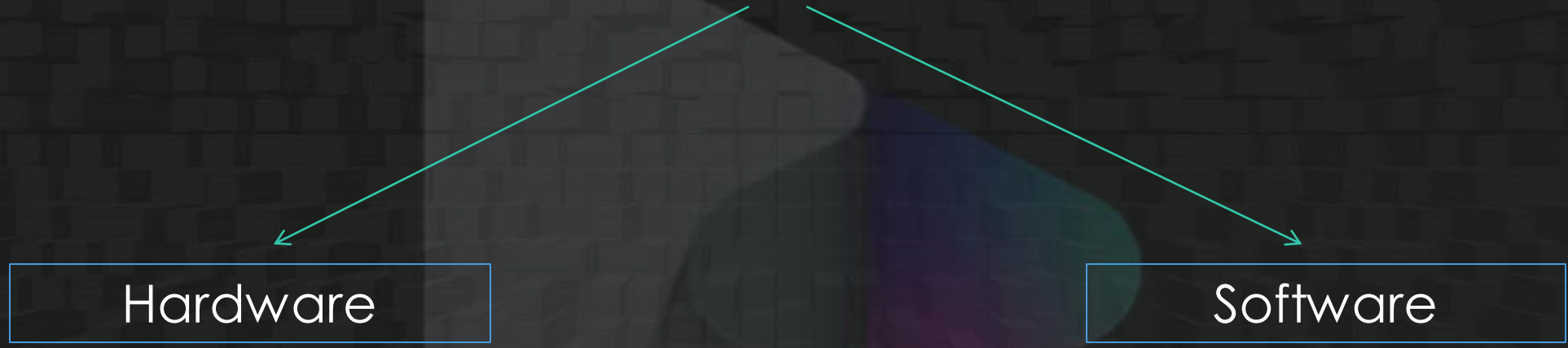
Philips Ambilight

Lightberry

Dreamscreen Backlight

PRODUCT PERSPECTIVE

There are two separate sections in our system



HARDWARE CONFIGURATION

A Computer
and
1 monitor that provides full HD quality screen display,

1x or 2x or 4x
Xiamoi Yeelight Smart Led Bulb 1 s YLDP13YL

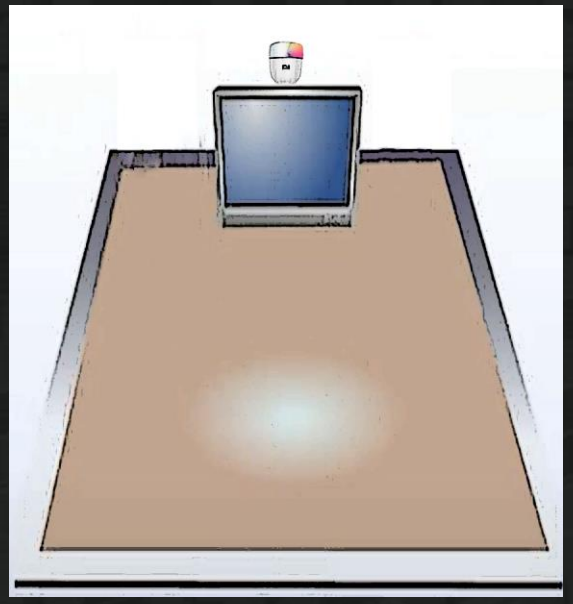
1x or 2x or 4x
E27 Bulb Holder

Hotspot providing
2.4Ghz network access

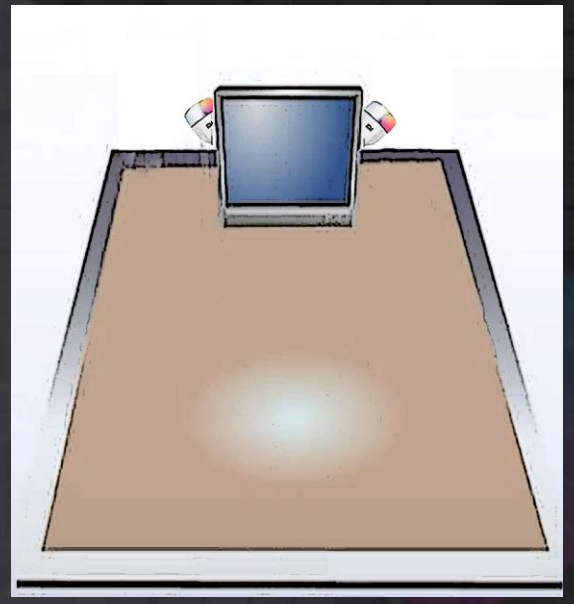
HARDWARE CONFIGURATION

- The user connects her/his computer to a high speed internet network,
- Ambilight Media Player developed using Xiamoi Yeelight Smart Led Bulbs, These bulbs have a capacity of 16 million colors. In addition, they can be managed over the network with 3rd party software,
- Ambilight Media Player can be used without bulb or with 1, 2, 4 bulbs,
- The user obtains the number of bulbs user prefers and places them behind her/his monitor or television at suitable angles.

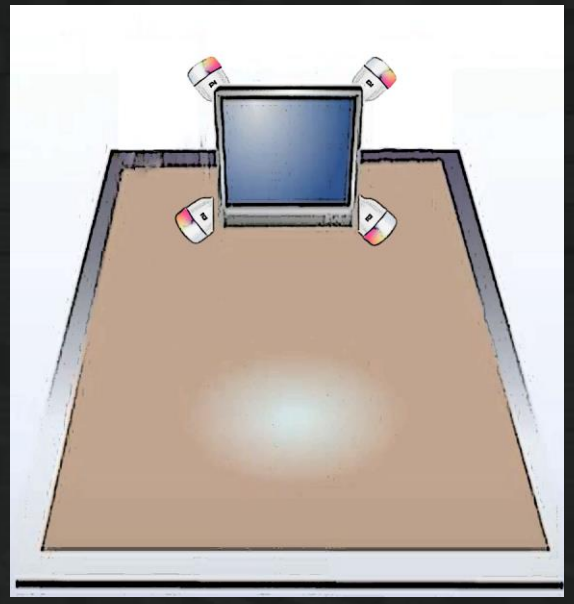
HARDWARE CONFIGURATION



One Led Bulb



Two Led Bulb



Four Led Bulb

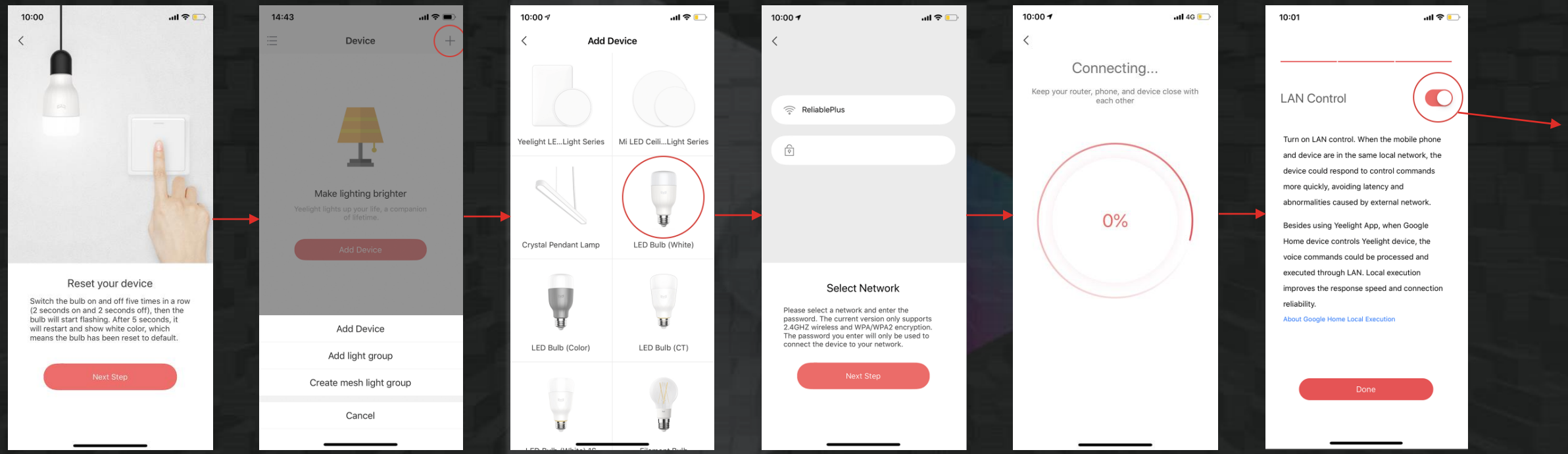
HARDWARE CONFIGURATION

- Xiamoi Yeelight Smart Led Bulbs need to be introduced to the existing network to manage,

- After the necessary connections of the bulbs are made, they are opened and closed five times with an interval of one second. Thus, the bulbs are reset,

- The bulbs are introduced to the existing network using the Yeelight app, which is then installed on the mobile phone or tablet.

HARDWARE CONFIGURATION



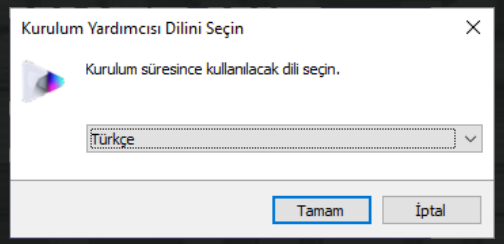
This is very important

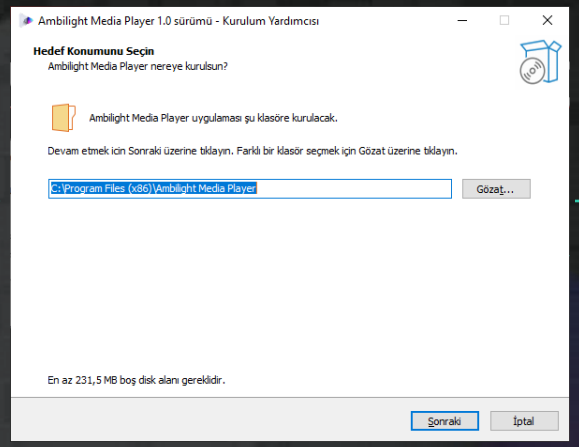
Picture source :https://en.yeelight.com/faq-2

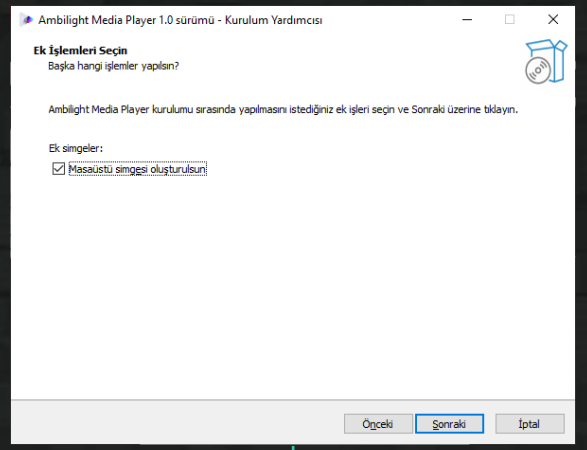
SOFTWARE CONFIGURATION

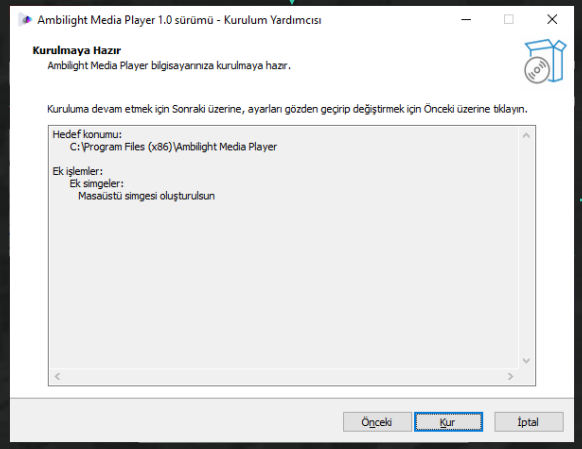
- Ambilight Media Player has an easy installation file,
- User can access the setup file and source codes at https://ambilightbp.wixsite.com/project ,
- After running the setup file, it completes the setup by following the instructions,
- The user can access the installation details at https://github.com/CankayaUniversity/ceng-407-408-2021-2022-Ambilight-Media-Player/blob/main/docs/amp_installguide.pdf .

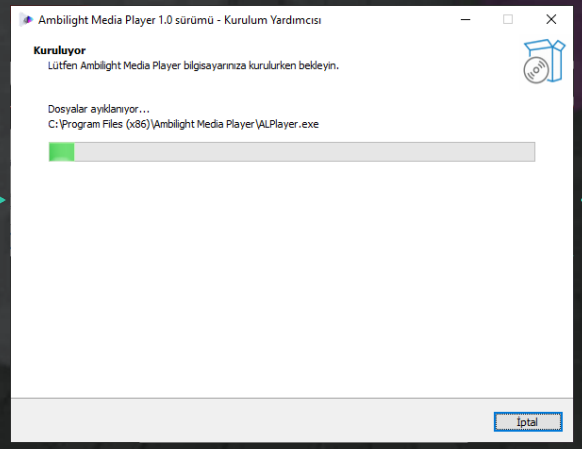
SOFTWARE CONFIGURATION

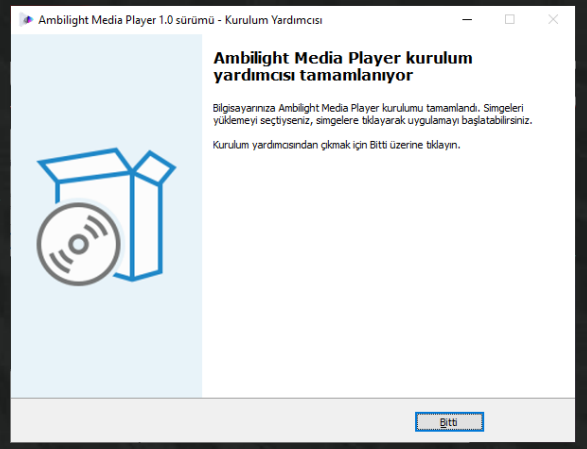






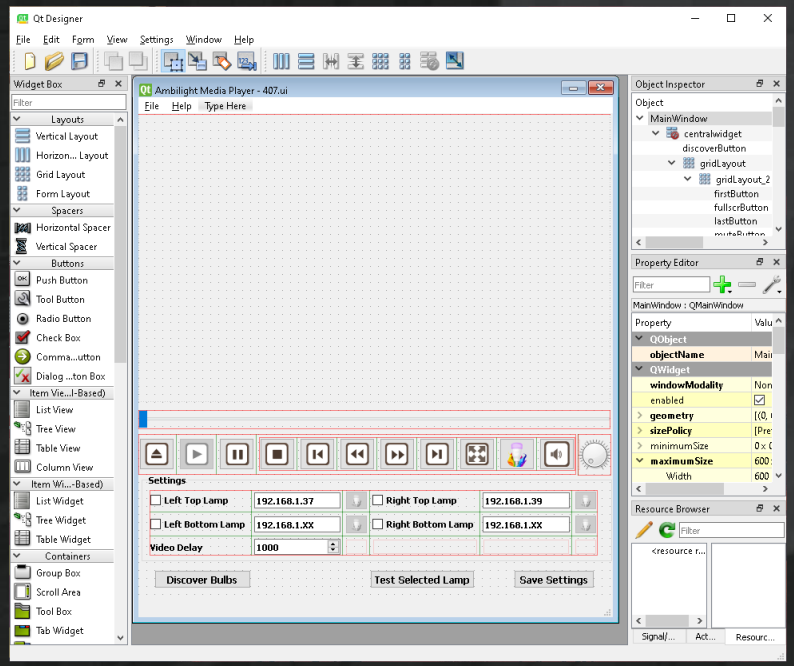




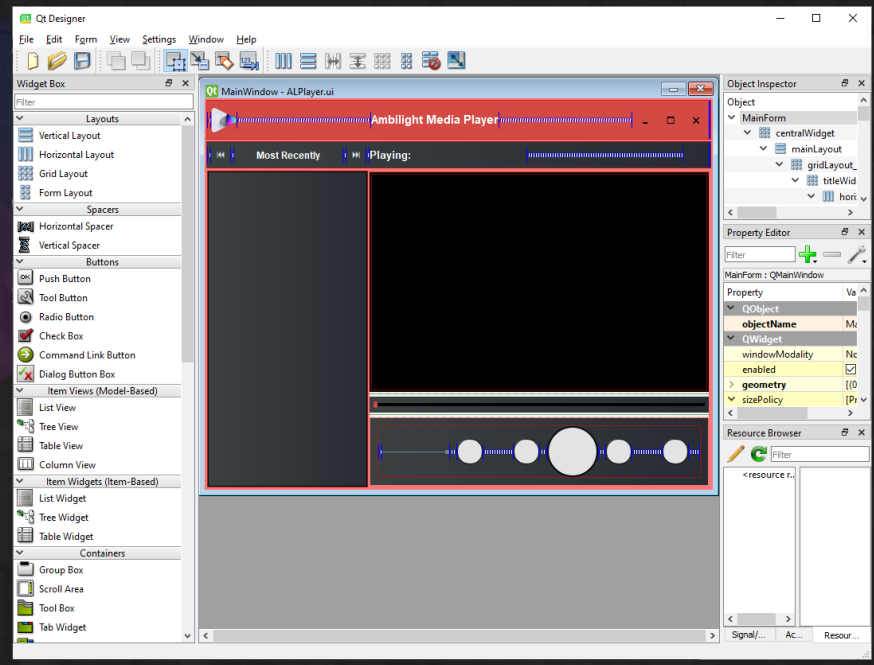


SOFTWARE CONFIGURATION / USER INTERFACE

- Ambilight Media Player has a user-friendly interface,
- The interface was developed with Qt Designer and integrated into the program.

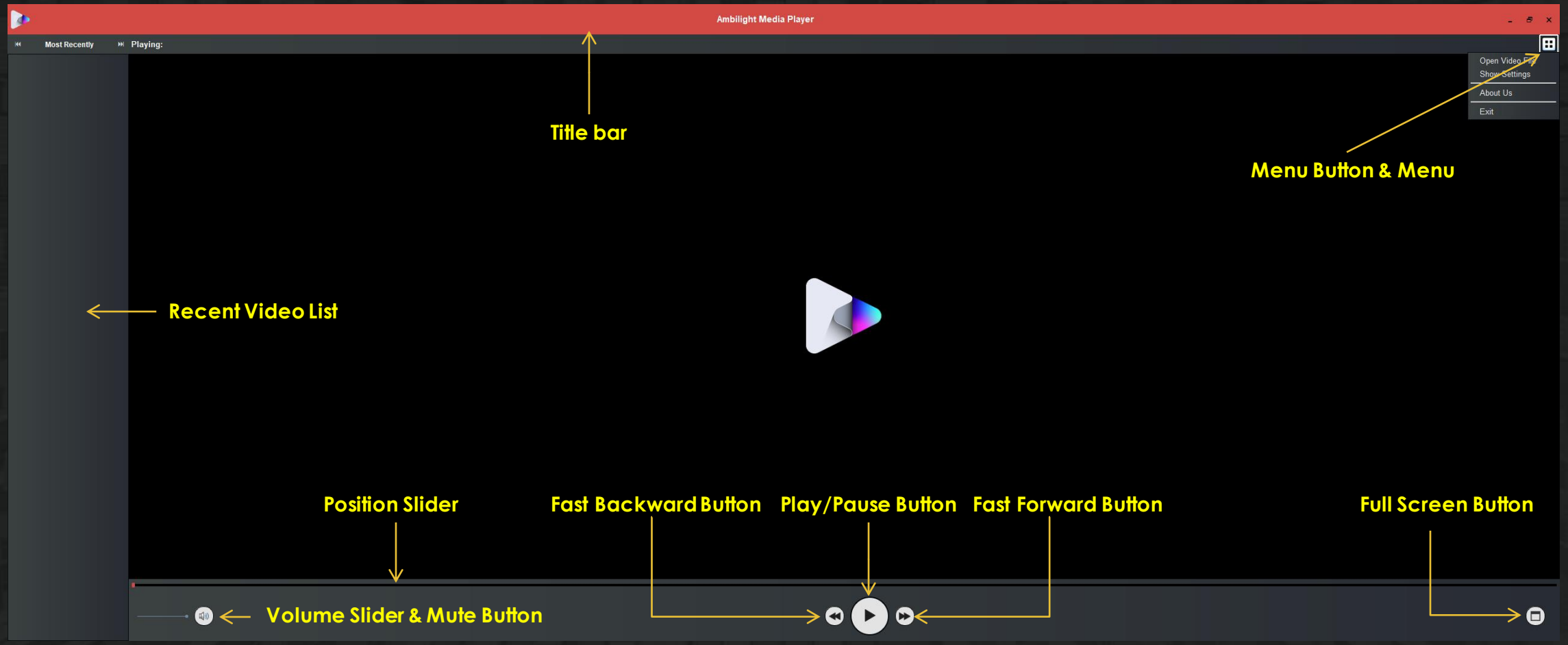


BEFORE



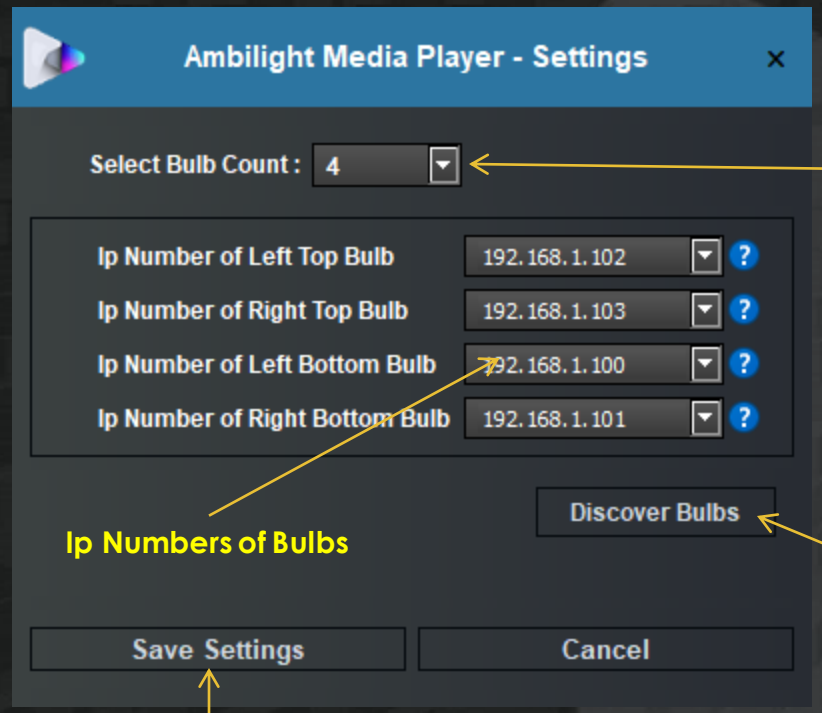
AFTER

SOFTWARE CONFIGURATION / USER INTERFACE



Users can find detailed information at https://github.com/CankayaUniversity/ceng-407-408-2021-2022-Ambilight-Media-Player/blob/main/docs/amp_usersmanual.pdf

SOFTWARE CONFIGURATION / USER INTERFACE



YeeLight Python library 0.7.10 is used for lamp control. There are functions such as discover_bulbs(), bulb(), turn_on(), turn_off(), set_brightness(), set_color_temp(), set_rgb() in this library.

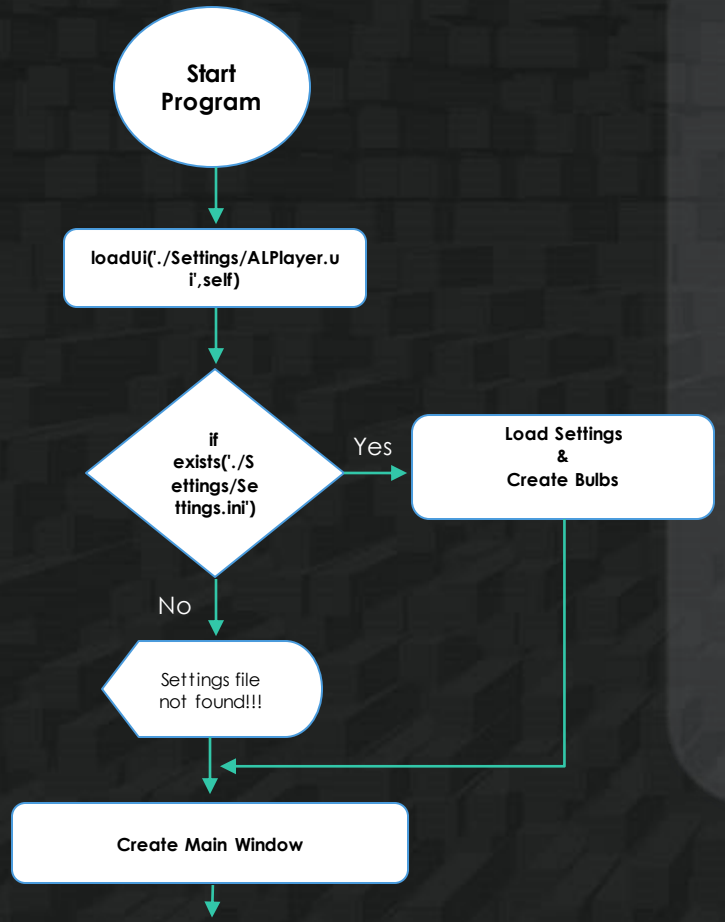
HOW DOES WORKS AMBILIGHT MEDIA PLAYER'S ALGORITHM?

PSEUDO CODE

```
Load use interface (.ui) file
If exists('./Settings/Settings.ini')
        Load Settings
        Create Bulbs
Create Main Window
Open Video File & Click Play
Create changeColorThared
```

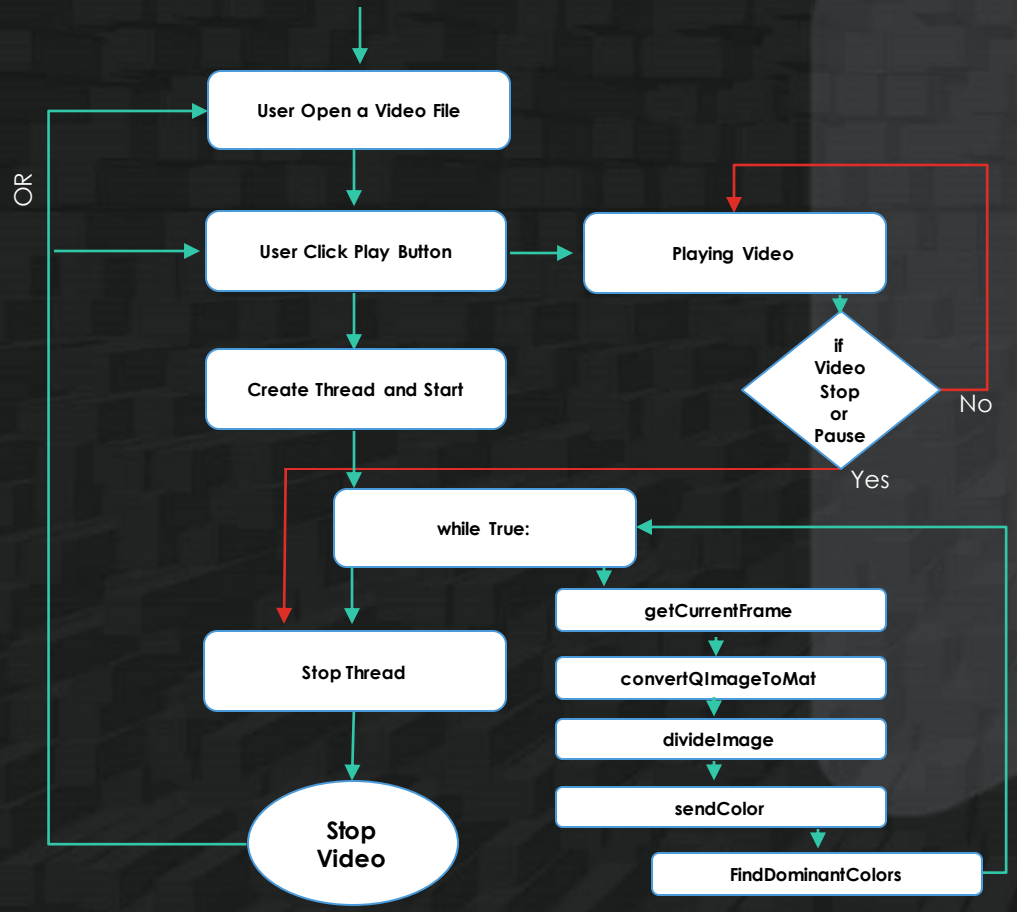
```
changeColorThared
        While True:
                getCurrentFrame()
                convertQImageToMat()
                divideImage()
                sendColor()
                        FindDominantColors()
```

HOW DOES WORKS AMBILIGHT MEDIA PLAYER'S ALGORITHM?



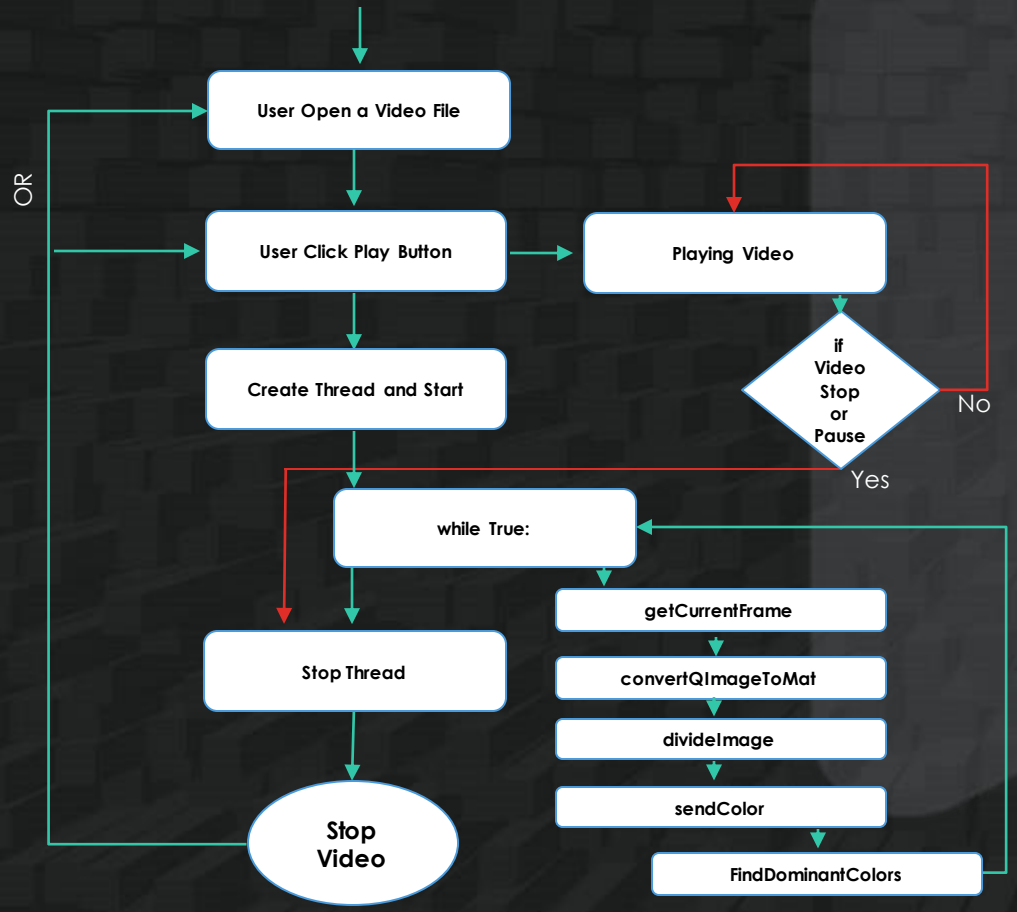
- When Ambilight Media Player is run, it loads the ALPlayer.ui file prepared for the main window and located in the Settings folder,
- Then the basic variables to be used in the program are defined,
- The existence of the Settings.ini file in the Settings folder is checked,
- If Settings.ini exists, the bulbs are created using the saved settings,
- If the bulb creation is successful, the AMLStatus variable is set to True,
- Then the main window of Ambilight Media Player is prepared.

HOW DOES WORKS AMBILIGHT MEDIA PLAYER'S ALGORITHM?



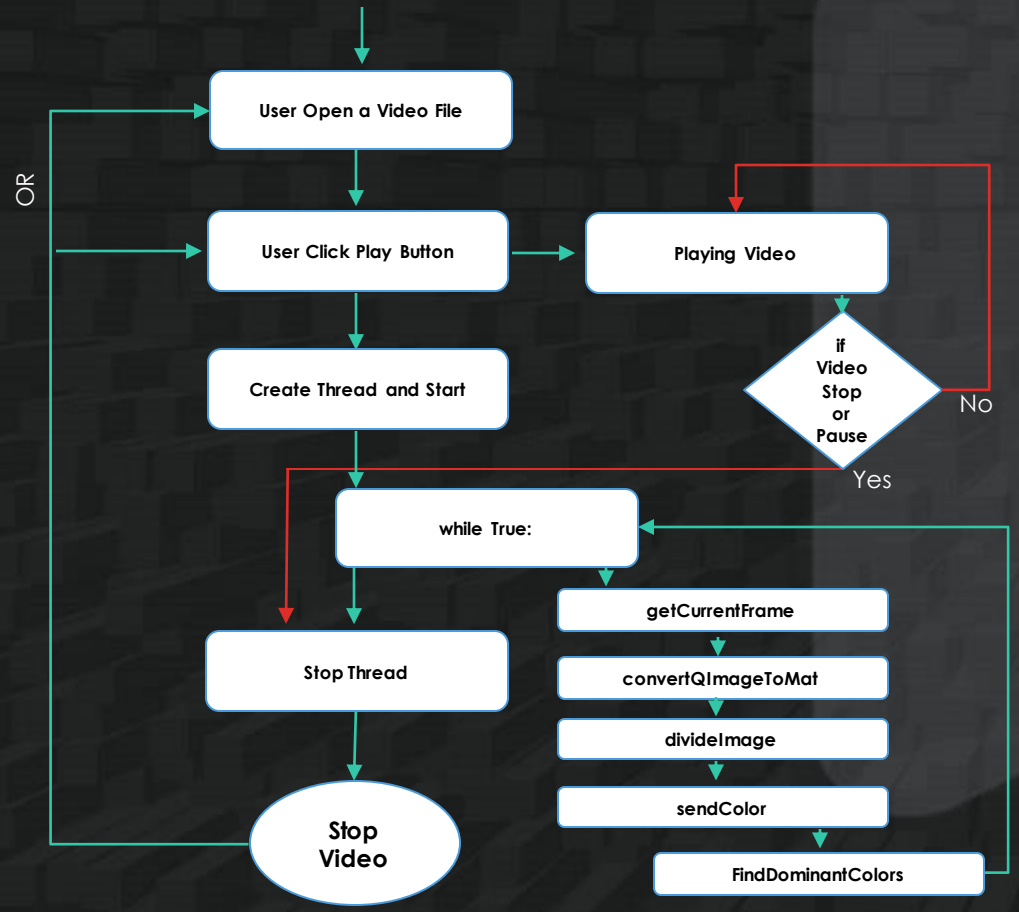
- The user opens a video file and clicks the play button,
- The video starts playing,
- A Thread named changeColorThared is created for screen capture and color sending operations,
- The created thread is looped endlessly, it can be terminated according to the video status,
- The current frame is captured continuously in the loop...

HOW DOES WORKS AMBILIGHT MEDIA PLAYER'S ALGORITHM?



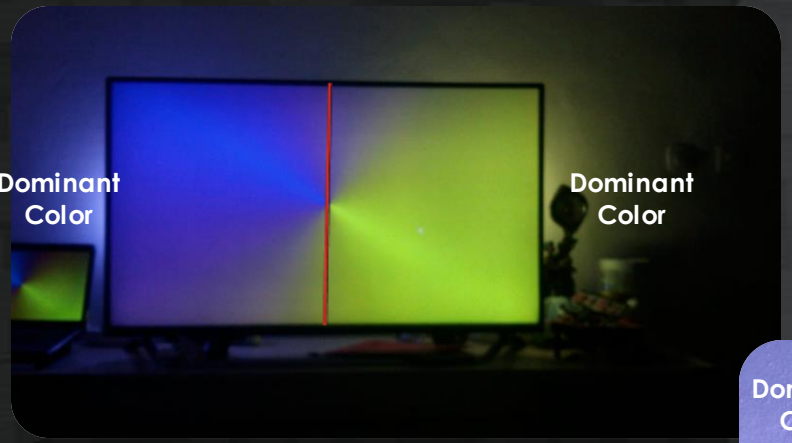
- The captured frame is converted to a mathematical matrix with the convertQImageToMat function,
- The resulting matrix is sent to the divideImage function, divided into parts according to the number of lamps(1 or 2 or 4) and an image list is created,
- The image list is sent to the sendColor function...

HOW DOES WORKS AMBILIGHT MEDIA PLAYER'S ALGORITHM?



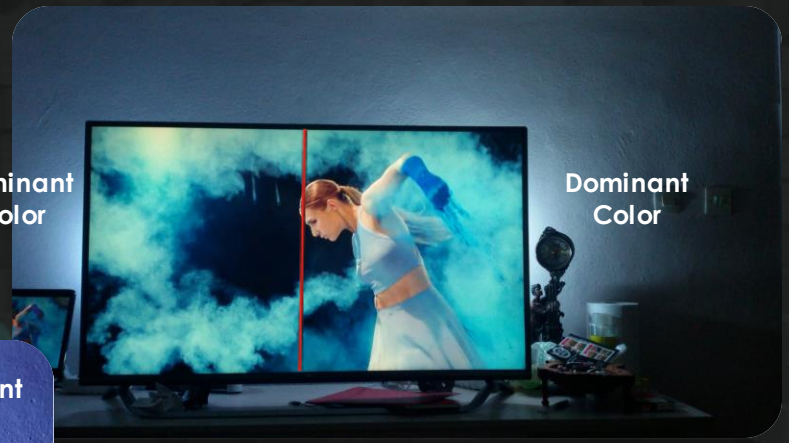
- The image list coming to SendColor function is sent to FindDominantColors function in order,
- The FindDominantColors function uses the K-Means algorithm to find the most dominant color in the picture and the brightness of this color,
- The number of clustering was determined as 5 when using the K-Means algorithm. Thus, 5 different color clusters were determined. The most dominant of these colors and the one with a brightness ratio greater than 35% was preferred.
- The detected color code and brightness value are sent to the lamps by the SendColor function.

SAMPLE SCREENSHOTS



Two Bulbs Example

Four Bulbs Example



Two Bulbs Example

AMBILIGHT MEDIA PLAYER

THANK YOU FOR LISTENING