Virtual Technology for Library Using VR Box

Ramya S[1], Gnanalaxmi S[2], Sargam P[3], Smitha T C[4], Madhusmitha, [5]

Final year B.E Students(UG), Department of Information Science & Engineering, The Oxford College of Engineering,

Bangalore, India[1,2,3,4]

Assistant Professor, Department of Information Science & Engineering, The Oxford College of Engineering,

Bangalore, India[5]

ABSTRACT: This paper describes the design and the development of hardware and software of a portable Virtual Reality Headset. The portability of the device is achieved using an Android smart phone. It is responsible for the execution of the main software and display of the rendered images on the screen. The Inertial Measurement Unit (IMU) present in the device tracks the user's head movements and communicates with Android smart phone. This technology focuses on developing a dedicated hardware platform for the Virtual Reality purposes. Throughout the design phase of the project, cost was kept minimal without compromising on the performance of the system.

KEY WORDS: VR, Virtual Reality, 3D, Online Book Reading, VR Library.

I. INTRODUCTION

VR library is a new type of library based on the new technology of digital, network-based, intelligent and the new concepts of management, which has gradually become the future library model. Generally, VR library has three characteristics: interconnectivity, efficiency, convenience, which is the product of the information age along with the technology of cloud computing, big data, Social Local Mobile (SoLoMo), wearable technology and virtual reality. In recent years, with the development of information technology, virtual reality (VR) technology has been applied in the military, entertainment, education, business and other fields. VR technology was proposed by Jaron Lanier, the founder of the VPL Company in United States in the 1980s, also known as virtual technology or artificial illusion. VR technology aims to improve the experience of human computer interaction by comprehensive computer graphics, artificial interaction, sensor and artificial intelligence technology. The users interact with the virtual world in a natural way in 3D virtual environment to achieve real visual, tactile, auditory and factory experience.We intend to use the VR technology to develop a virtual library system. The system realize the virtual library scene construction, virtual roaming and scene interaction and book retrieving by connected with the library management system to realize book location require and other functions.

II. PROBLEM STATEMENT

In designing any kind of learning environment, there are a number of issues one has to consider. In designing a learning environment based on new and relatively unexplored tools, such as virtual reality (VR), these issues become even more complex. These systems require a processor with a good computational power and a Graphic Processing Unit (GPU). Due to the above-mentioned constraints, the user cannot move around wearing the headset.

III. PROPOSED SYSTEM

We propose a virtual reality system in which the user will be having immersive experience for exercising in 3D world. Live streaming of the video could be done with the help of Android smart phone. The device will capture the images or videos from camera and place these images or videos in background to render in real-time. This will enable superimposing the real and virtual world images, thereby giving an entirely new viewing experience. This system creates a visual sensation to the user in the form of virtual or mixed reality. The rendered images are updated on the screen of the Head Mounted Display (HMD) according to the movement of the user.The architectural configuration procedure is concerned with building up a fundamental basic system for a framework. It includes recognizing the real parts of the framework and interchanges between these segments. The beginning configuration procedure of recognizing these subsystems and building up a structure for subsystem control and correspondence is called

construction modeling outline and the yield of this outline procedure is a portrayal of the product structural planning. The proposed architecture for this system is given below. It shows the way this system is designed and brief working of the system.

The step by step process how the Virtual box works is given

1. First the images and videos which need to be displayed are stored in the web app along with its information. The application can be used in any smartphones.
2. The app is connected to the monitor of the virtual box using a Bluetooth. The book selected by the user is transferred through the Bluetooth to be displayed in the virtual box.
3. There is a Android smart phone placed on the monitor. Once the Android smart phonereceives the instructions from the android based mobile app, those instructions are applied on the selected book and displayed in the virtual box.
4. The user can change the book using hand gestures without the help of the mobile app.
5. Based on the instructions given by the user the contents of books are modified using the python program in the Android smart phone and is displayed in the virtual box.
6. When the change button is pressed through hand gesture the instruction is given to the virtual box and the respective books are displayed.
7. The client side shows the user the respective scene roaming and the respective book the user clicks is displayed.
8. The server side stores the data about the user, model, scene and book details which acts as a database

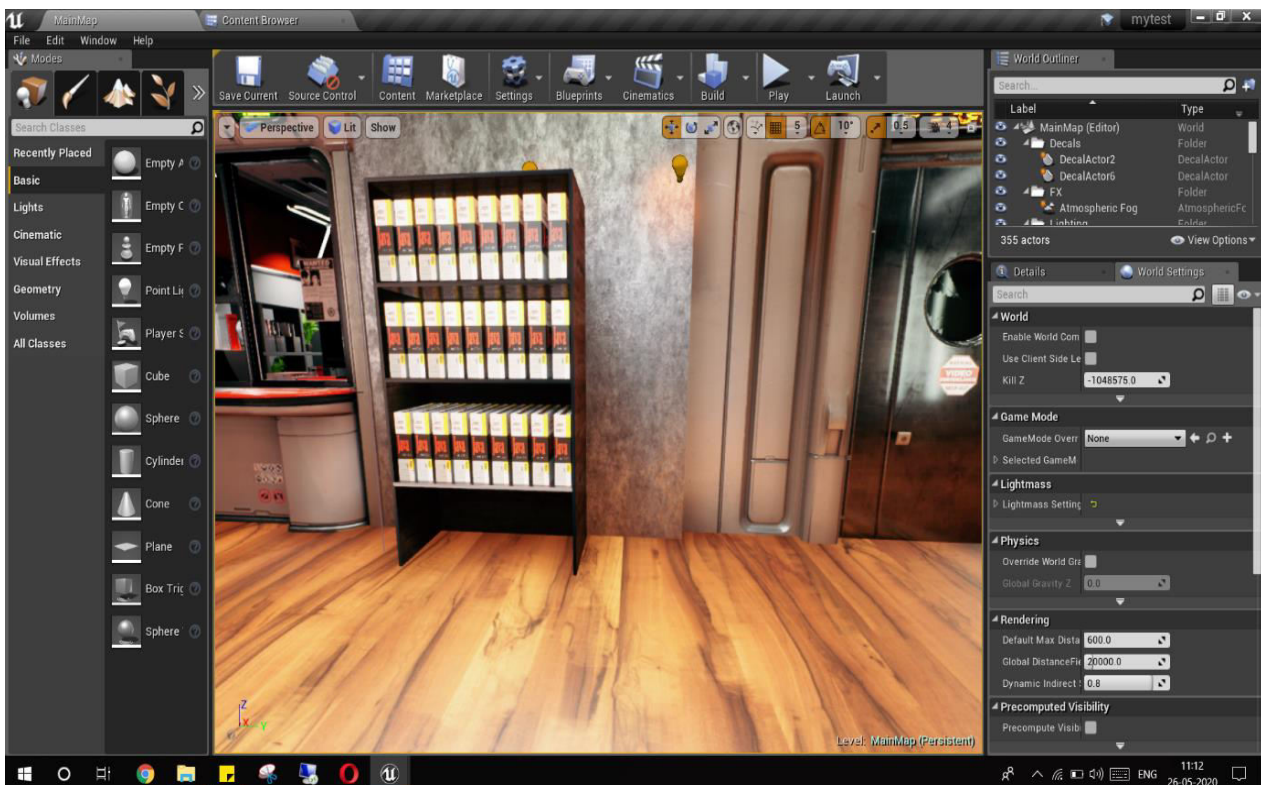## IV. IMPLEMENTATION, HARDWARE AND SOFTWARE
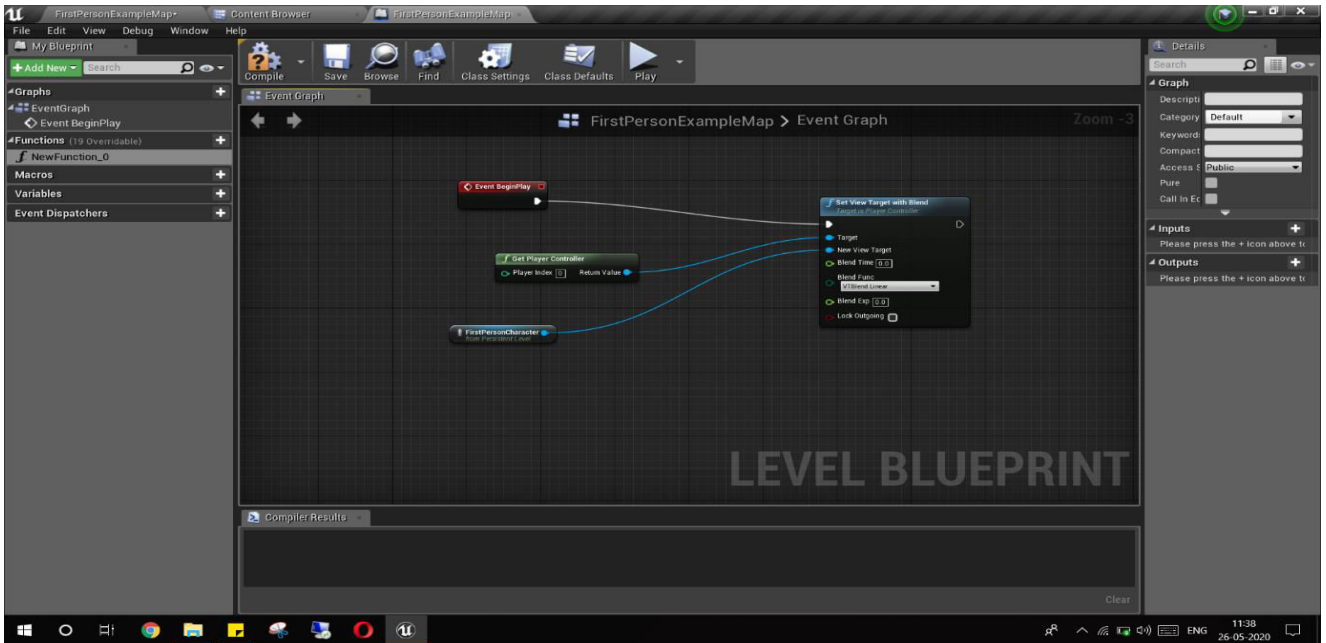
A. Implementation
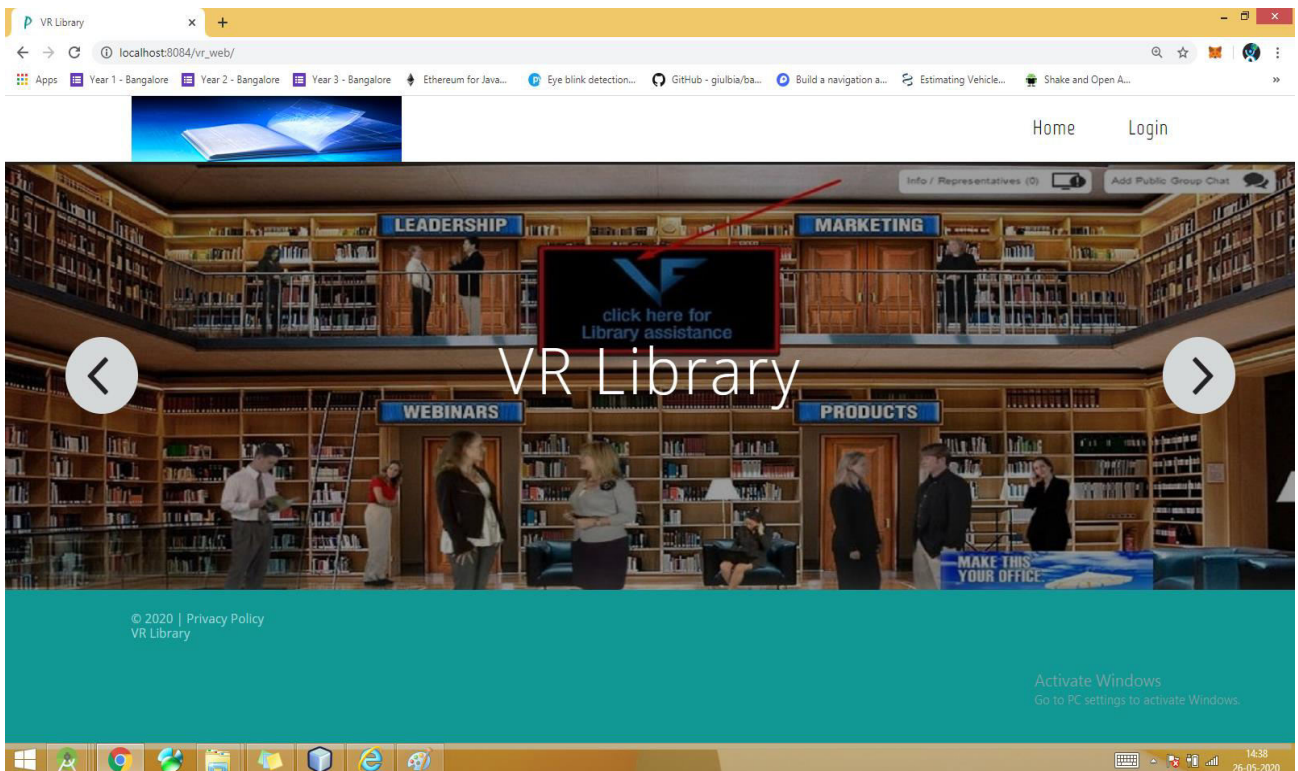

Fig: Library Design Page

Fig: Blueprint Design Page

Home Page:

Fig: Home Page

Login page:
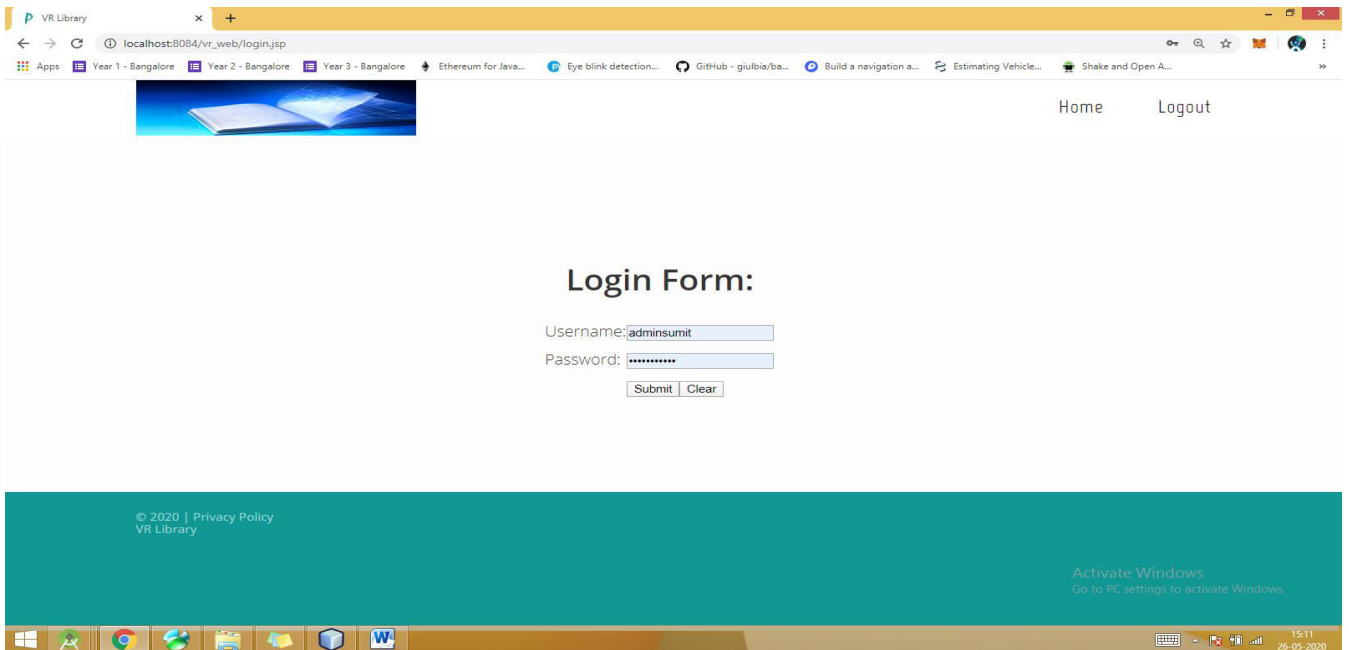
Fig: Login page

Admin Home Page:
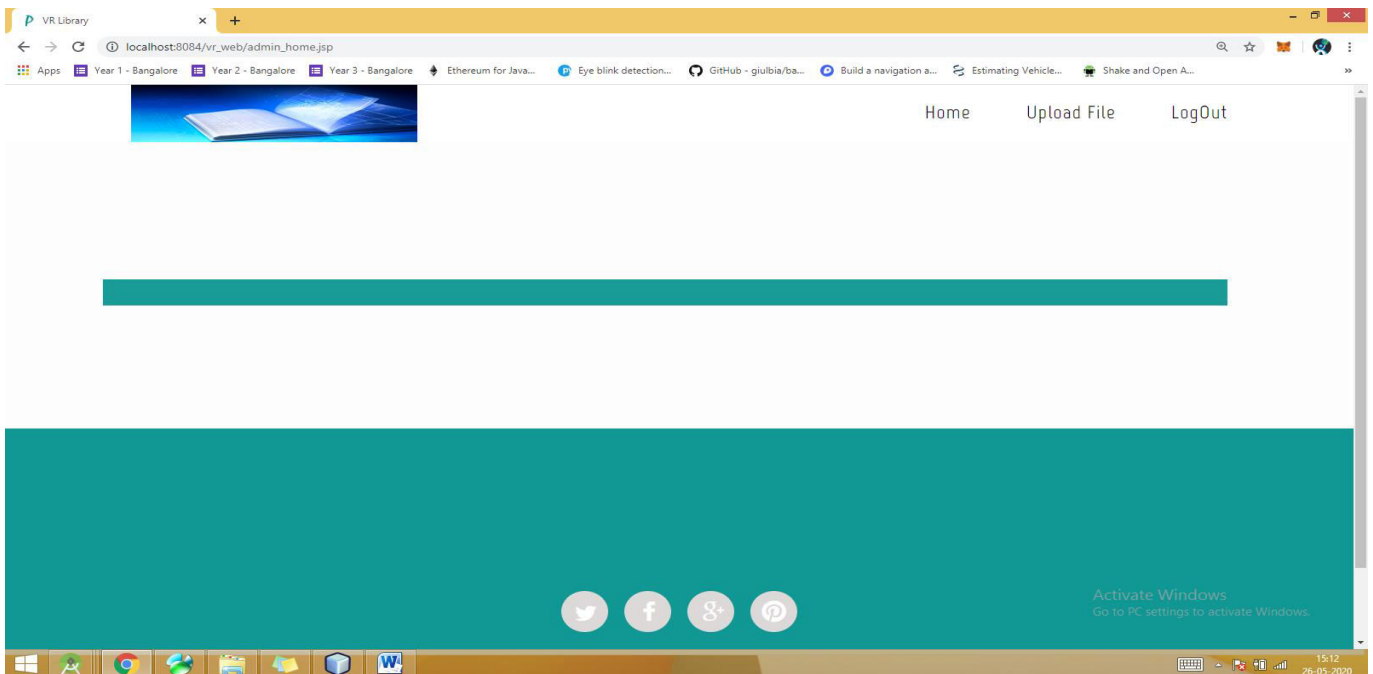
Fig: Admin Home Page

Upload E-Book Page:
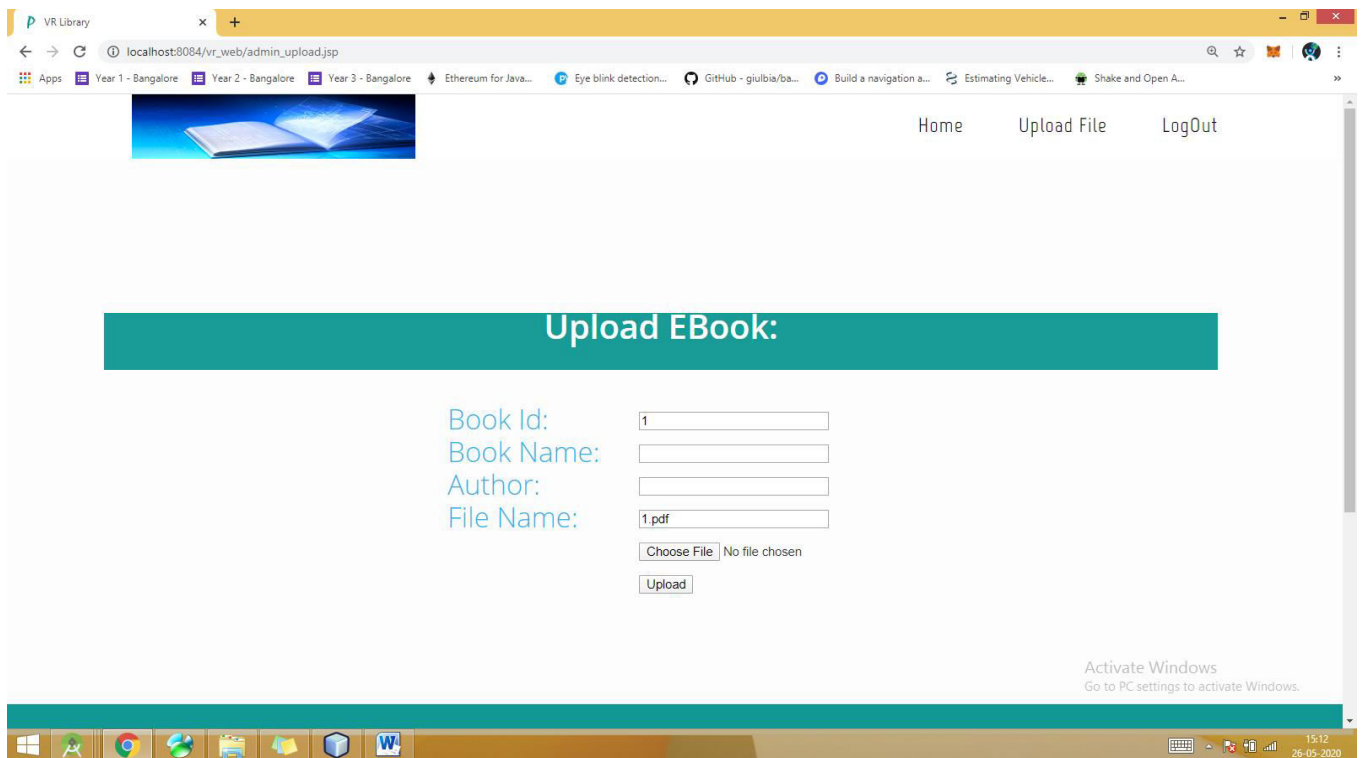
Fig: Upload E-Book

B. Hardware requirements

System	:	Intel i5 3 GHZ
Memory	:	8GB.
Hard Disk	:	250 GB SSD
GPU	:	NvidiaGforce GTX1050Ti

Arduino, Node MCU
ADXL
Android Phone
Power supply

C.Software requirements

Operating System	:	Windows 10.
Language	:	Java, Python, C
Tool	:	Unreal Engine 4, Netbeans IDE

V. RESULT ANALYSIS

The result of the project mainly focuses on providing the user with virtual experience of the library. The hardware result which will focus on how the device is running displaying the book selected, if the goal is being achieved properly. And the software result which will focus on storing the books and graphical view of library required to be displayed along with its information to be displayed in the VR box.

Fig: VR BOX

VI. CONCLUSION

The key motivation for developing this product was to design and develop a dedicated hardware and software for VR purposes to make portability possible. Available devices use either the phone's processor and display or Personal Computers' hardware. The next version of the device will be developed with better display to address the problem of aliasing. Even the casing design for the device will be optimized for shape and mass. We also plan to incorporate cameras in the device to make AR possible. The device will capture the images from camera and place these images in background to render in real-time. This will enable superimposing the real and virtual world images, thereby giving an entirely new viewing experience.

REFERENCES

[1] K. S. Hale and K. M. Stanney, Handbook on Virtual Environments, 2nd edition, CRC Press, 2015.
[2] Steaven M. Lavelle, Virtual Reality URL: http://msl.cs.uiuc.edu/vr/, 2015.
[3] https://www.oculus.com/en-us/, 2015.
[4]http://www.htcvive.com/us/,2015.
[5]https://www.playstation.com/enin/explore/ps4/features/playstation-vr/,2015.
[6] https://www.visusvr.com/, 2015.
[7] William R. Bussone, Linear and Angular Head Accelerations in Daily Life, URL : http://scholar.lib.vt.edu/theses/available/etd-08182005- 222028/unrestricted/thesis.pdf, 2005.
[8] InvenSense, "MPU-6000 and MPU-6050 Product Specification Revision 3.4", URL : http://store.invensense.com/datasheets/invensense/MPU6050_DataSheet_V3%204.pdf, 2013.
[9] Arduino, "Arduino Uno", URL: https://www.arduino.cc/en/Main/ArduinoBoardUno, 2015.