

# **SMART BOREWELL CHILD RESCUE AND WIRELESS MONITORING SYSTEM USING AI**

Submitted in partial fulfillment of the requirements for the award of  
Bachelor of Technology degree in Information Technology

by

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**DEPARTMENT OF INFORMATION TECHNOLOGY  
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## **SATHYABAMA**

**INSTITUTE OF SCIENCE AND TECHNOLOGY  
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC**

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**MARCH - 2021**



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**BONAFIDE CERTIFICATE**

This is to certify that this Project Report is the bonafide work of NANDHITHA BALA (REG NO: 37120051) PRASHANTHINI HARIKA.K (REG NO: 37120055) who have done the Project work as a team who carried out the project entitled “**SMART BOREWELL CHILD RESCUE AND WIRELESS MONITORING SYSTEM USING AI**” under my supervision from November 2020 to April 2021.

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## DECLARATION

We NANDHITHA BALA (REG NO: 37120051) and PRASHANTHINI HARIKA.K (REG NO: 37120055) hereby declare that the Project Report entitled “**SMART BOREWELL CHILD RESCUE AND WIRELESS MONITORING SYSTEM USING AI**” done by us under the guidance of **V.MARIA ANU M.E., Ph.D.**, is submitted in partial fulfillment of the requirements for the award of Bachelor of Technology degree in Information Technology

PLACE:

SIGNATURE OF THE CANDIDATE

## ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to **Board of Management of Sathyabama Institute of science and technology** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. T.Sasikala M.E., Ph.D, Dean**, School of Computing, **Dr.R.Subhashini M.E., Ph.D. , Head** of the Department of Information Technology for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **V.Maria Anu M.E., Ph.D.**, his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Information Technology** who were helpful in many ways for the completion of the project.

## **ABSTRACT**

India is an agriculture-based country, ranchers or farmers basically rely generally upon groundwater for their basic water framework requirements. Subsequent to the basic requirement yielding of the water, the bore wells would have generally left revealed. So that, most by far of kids coincidentally moves toward the well and falls into it, which is the main purpose for these distress disasters by and by. In recent years, many cases have been reported of children getting trapped in bore wells which take life of the children and are a nightmare for parents. There is a definite need for developing a security and rescue system for children to rescue from bore well. The current rescue systems are time taking, and are not at all accurate as involve manual help where there are many chances of human error. The bore well cases have taken many lives of innocent children while playing in that area. To overcome this problem, in this project a hardware module is designed using a raspberry pi as a processing module and a camera module. The facial emotion from the child is recognized by using emotional vggnet algorithm to check if the child is in distress and a music is played to keep the child calm. The child is asked questions through an audio output and is checked if it is conscious if it responds to the questions by using VGGISH algorithm. The temperature of the child is measured using thermal sensors to verify that the child is alive. A web application using reactJS is developed to display the status of the emotional state of the child. Thus, the project successfully provides an effective technological solution in rescuing the child.

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## LIST OF ABBREVIATION

|        |                                  |
|--------|----------------------------------|
| LIB    | LIBRARY                          |
| VVGish | algorithm                        |
| VVGnet | algorithm                        |
| API    | Application Programming Language |

# **CHAPTER 1**

## **INTRDUCTION**

### **1.1 GENERAL INTRODUCTION:**

Borewell accidents are common due to uncovered openings of borewell. It is very difficult and risky to rescue the trapped children. A small delay in the rescue can cost the child his or her life. Lifting the child out of the narrow hole of the borewell is not easy. The child who has suffered the trauma of the fall is confined to a smaller area where with the passage of time, the supply of oxygen reduces. Borewells are left unclosed after identifying that ground water is not abundant at the place. These bore wells in turn have started to take many innocent lives. There is no proper technique to rescue victims of such accidents. So used a morphological analysis, is a method for representing and exploring all the relationships in multidimensional problems. The word morphology means the study of shape and form and a way of creating new forms. The process was developed into a technique for generating solutions of design. In most cases reported a parallel hole is dug up and then a horizontal path is made to reach to the trapped object. Various cases are being encountered where people especially children are accidentally falling and trapped in the borewells. Taking them out safely is one of the most difficult challenges which involve risk and lot of human effort and time. Sometime the bore well is so deeper that a human cannot enter leaving the victim helpless to inside the bore well. There is no proper rescue technique to rescue victims of such accidents. When they make shift local arrangements do not work, army is called in for the rescue.

## 1.2 OBJECTIVE:

- The objective of the project is to provide an effective solution to lively monitor the emotional state of a child trapped in the borewell.
- To get responses from the child to check if it is conscious.
- To calm the trapped child using music playback.

## 1.3 EXISTING SYSTEM:

In recent years, many cases have been reported of children getting trapped in bore wells which take life of the children and are a nightmare for parents. There is a definite need for developing a security and rescue system for children to rescue from bore well. The current rescue systems are time taking, and are not at all accurate as involve manual help where there are many chances of human error. The bore well cases have taken many lives of innocent children while playing in that area. The process is very complicated and may be if someone is stuck a notification is also not received. In this paper, a new child rescue system is proposed, in which use of sensors and microcontrollers for rescue improves the efficiency of the system. Using surveillance camera, the child can be rescued by a hand gripper with utmost safety. This helps in the rescue of child from bore wells and also gives real time data of sensors and camera on phone and a LCD module of the system through communication with Zigbee.

### 1.3.1 DISADVANTAGES OF EXISTING SYSTEM:

- Does not provide an effective solution to lively monitor the emotional condition of the child.
- Does not provide a solution to effectively keep the child calm.
- The framework can be further being utilized to recuperate the exploited people.

## 1.4 PROPOSED SYSTEM:

India is an agriculture-based country, ranchers or farmers basically rely generally upon groundwater for their basic water framework requirements. Subsequent to the basic requirement yielding of the water, the bore wells would have generally left revealed. So that, most by far of kids coincidentally moves toward the well and falls into it, which is the main purpose for these distress disasters by and by. In recent years, many cases have been reported of children getting trapped in bore wells which take life of the children and are a nightmare for parents. There is a definite need for developing a security and rescue system for children to rescue from bore well. The current rescue systems are time taking, and are not at all accurate as involve manual help where there are many chances of human error. The bore well cases have taken many lives of innocent children while playing in that area. To overcome this problem, in this project a hardware module is designed using a raspberry pi as a processing module and a camera module. The facial emotion from the child is recognized by using emotional vggnet algorithm to check if the child is in distress and a music is played to keep the child calm. The child is asked questions through an audio output and is checked if it is conscious if it responds to the questions by using vggish algorithm. The temperature of the child is measured using thermal sensors to verify that the child is alive. A web application using reactJS is developed to display the status of the emotional state of the child. Thus, the project successfully provides an effective technological solution in rescuing the child.

### 1.4.1 ADVANTAGES:

- Provides an effective solution to lively monitor the child's emotional state of mind,
- A web application is developed to display the emotional condition of the child.
- The child's is kept calm by playing the music.

## **CHAPTER 2**

### **LITERATURE SURVEY**

**TITLE :** Implementation of a Child Rescue System from Borewell using Zigbee for Long Range Applications

**AUTHORS:** Siddharth Singh, Manash Jyoti Baruah, Rahul Kumar Verma

**YEAR:**2020

In recent years, many cases have been reported of children getting trapped in bore wells which take life of the children and are a nightmare for parents. There is a definite need for developing a security and rescue system for children to rescue from bore well. The current rescue systems are time taking, and are not at all accurate as involve manual help where there are many chances of human error. The bore well cases have taken many lives of innocent children while playing in that area. The process is very complicated and may be if someone is stuck a notification is also not received. In this paper, a new child rescue system is proposed, in which use of sensors and microcontrollers for rescue improves the efficiency of the system. Using surveillance camera, the child can be rescued by a hand gripper with utmost safety. This helps in the rescue of child from bore wells and also gives real time data of sensors and camera on phone and a LCD module of the system through communication with Zigbee.

#### **Pros:**

The system helps in the rescue of child from bore wells and also gives real time data of sensors and camera on phone and a LCD module of the system through communication with Zigbee.

#### **Cons:**

The current rescue systems are time taking, and are not at all accurate as involve manual help where there are many chances of human error

**TITLE:** Arduino based Smart Borewell Ambulance Rescue System

**AUTHORS:** Tanveer Sultana, Basavarja Patil

**YEAR:** 2018

There is always a large demand of water across the globe especially in the developing countries like India. The ponds, lakes are not filled sufficiently due to lack of rain, so the humans started depending on ground water for their needs. To meet the demand of water, bore wells were dug. Every year many children's or animals become victims and fall in these bore well and they will get stuck for many hours because of lack of equipments for rescuing. In order to solve this issue, a design is proposed for developing adaptable diameter robot. The robot is equipped with arms which has spongy surface inside, Ultrasonic sensors for distance measurement to child, camera to get information about the status of child condition and a microphone and speakers to talk to child. A gas sensor is installed to sense for any harmful gases, a temperature sensor to calculate the temperature at that point. It has a special mechanism of releasing oxygen for the victim. For more safety, the child is provided by a base with metallic plate. The system proposed rescues the child without much injury.

**Pros:**

The HRRT has benefit, with RM on the TrueV unable to restore parity, and with the potential for image artifacts.

**Cons:**

The performance of HRRT is fairly poor compared to the other methods.

TITLE : A Novel Design of Robotic System for Rescue in Bore well Accidents.

AUTHORS : Nish Mohith Kurukuti, Mahesh Jinkala, Purushotham Tanjeri, Somasekhar Reddy Dantla and Mallikarjuna Korrapati

YEAR: 2016.

Many child deaths are reported in the past due to bore well accidents. During bore well accident an immediate rescue operation is required and it is quiet challenging to perform a rescue operation as the environment inside the bore well is highly unpredictable. Developing low cost robotic system and simple control will help rural people use it easily. In this paper, we propose a novel

design of rescue robot which would enlarge as per the diameter of bore well and attach to the bore-well by adjusting to the diameter while travelling up or down the bore-well. It would contain two artificial arms, which would help in holding the baby with the visual help offered by camera and also aid in the survival of the child. A prototype is made with help of 3D printing technology and tested with basic weights.

**Pros:**

The results demonstrated the advantage over the existing state-of-the-art real-time using a prototype with help of 3D printing technology and tested with basic weights.

**Cons:**

Is not an effective solution for saving the child from near death situation.

TITLE: An Approach Towards Rescue Robotics In Bore Well Environment.

AUTHORS : Manish Raj , Arpit Bansal ,AMakhal , P.Chakrabort and G.C.Nandi

YEAR :2017.

A technique for rescue task in bore well environment has been proposed. India is facing a distressed cruel situation where in the previous years a number of child deaths have been reported falling in the bore well. As the diameter of the bore well is quite narrow for any adult person and the lights goes dark inside it, the rescue task in those situations is a challenging task. Here we are proposing a robotic system which will attach a harness to the child using pneumatic arms for picking up. A teleconferencing system will also be attached to the robot for communicating with the child.

**Pros:**

Protects the child from near death situations

**Cons:**

The system is not very reliable.

TITLE :Measurement and Analysis of Local Pulse Transit Time for Emotion Recognition.

AUTHORS: N. Beckmann, R. Viga, A. Dogangün, and A. Grabmaier

YEAR: 2019.

The automatic detection and classification of emotions of individuals is investigated in the research field of affective computing. Various signal sources are used to derive data that are associated to emotional states. For data acquisition, one could distinguish between stationary and non-stationary systems. Stationary systems could analyse, for example, facial expressions or the speech of individuals through installed cameras and microphones in a room. Non-stationary systems could analyse physiological parameters through wearable sensor systems. However, due to smartphones and smartwatches camera- and microphone-based systems can also be non-stationary. In addition, physiological parameters can be acquired wireless from stationary systems. A method for local PTT measurement can be implemented using two photoplethysmography (PPG) sensors. However, this method is error-prone. In this paper, the physiological background that is presumably responsible for erroneous PPG-based PTT measurements is discussed. We present an algorithm that is capable to handle the derived physiological effects. The algorithm analyses and compares the two PPG-signals to adapt to time-varying physiological effects. By using this algorithm, calculating and analysing of the local PTT in the context of emotion recognition become possible. A study ( $n = 40$ ) to test the algorithm and investigate the usefulness of local PTT analysis for emotion recognition in combination with other physiological signals was conducted. PTT-based parameters, which were derived from the frequency domain of the signal, showed a statistically significant ( $p < 0.05$ ) difference between induced emotional states, if calculated by the developed algorithm. Our findings indicate that parameters derived by our method are significantly affected by emotional stimuli. We suggest

that this method can be used to advance emotion recognition investigations in real life as it can potentially be integrated into a single wearable device.

**Pros:** This method can be used to advance emotion recognition investigations in real life as it can potentially be integrated into a single wearable device.

**Cons:**

The system cannot distinguish between stationary and non-stationary system

## **CHAPTER 3**

### **AIM AND SCOPE OF THE MODEL**

#### **3.1 AIM :**

To rescue a child who is hell in the bore well using the advanced technology in the fastest manner so that the child remains alive instead of taking longer time to rescue meanwhile the child dies due to more amount of time consumed to do the operation. to avoid this is the main aim of our project.

#### **3.2 SCOPE OF THE PROJECT:**

- The facial emotion from the child is recognized using emotional vggnet algorithm to check if the child is in distress and a music is played to keep the child calm.
- The child is asked questions through an audio output and is checked if it is conscious if it responds to the questions by using vggish algorithm.
- The temperature of the child is measured using thermal sensors to verify that the child is alive. A web application using reactJS is developed to display the status of the emotional state of the child. Thus, the project successfully provides an effective technological solution in rescuing the child.

## **CHAPTER 4**

### **METHODOLOGY AND IMPLEMENTATION**

#### **4.1 SYSTEM REQUIREMENTS:**

##### **4.1.1 Software Requirements:**

Software requirements deals with defining resources requirements and prerequisites that needs to be installed on a computer to provide functioning of an application the minimal software requirements are as follows,

- Visual studio
- Python
- Arduino

##### **4.1.2 Hardware Requirements:**

The most common set of requirements defined by any operating system or software application is the physical computer resources, also known as hardware. The minimal hardware requirements are as follows.

- Power supply unit
- Raspberry pi
- Camera
- Microphone

#### **4.2 PACKAGES :**

##### **4.2.1 TENSORFLOW:**

Tensor flow is an open source library for numerical computation and large-scale machine learning. It bundles together a slew of machine learning and deep learning models and algorithms makes them useful by way of a common metaphor. It can be used across a range of tasks but has a particular focus on training and inference of deep neural networks. Tensor flow is a symbolic math library based on data flow and differentiable programming.

### 4.2.3 MATPLOT LIB:

Matplotlib is plotting library for the python programming language and its numerical mathematics extension numpy it provides an object oriented API for embedding plots into applications using general purpose GUI toolkit like Tkinter,wxpython,qtetc.pyplot function makes some changes for a created figures, creates a plotting area in figure, decorate the plots with labels. And its multi platform data visualization library built on numpy arrays.

### 4.3 ARCHITECTURE DIAGRAM:

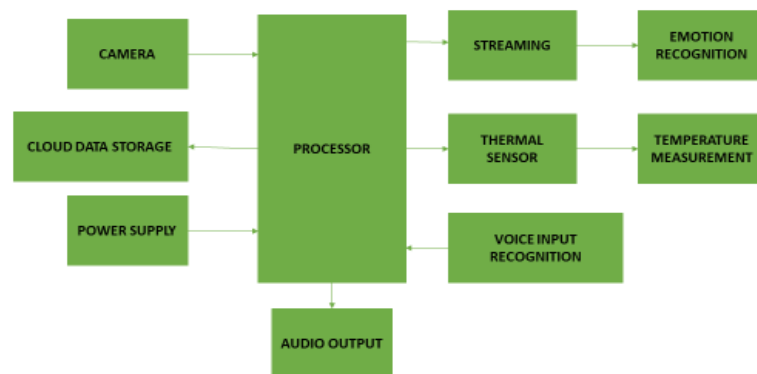


Figure 4.1 System Architecture

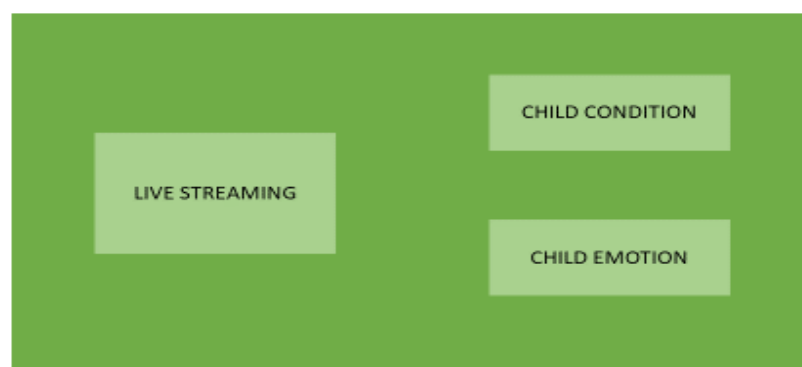


Figure 4.2 Web Application Architecture

In this project a hardware module is designed using a raspberry pi as a processing module and a camera module. The facial emotion from the child is recognized by using emotional vggnet algorithm to check if the child is in distress and a music is played to keep the child calm. So, initially the first step will be dataset collection where we will be collecting dataset such as face emotions images which are used to analysis the facial emotion recognition. After that, we will be splitting those datasets into different categories that is we will be splitting the dataset into training and testing dataset. In training datasets, we will be using the dataset for training the module whereas testing dataset is used to evaluate the model when it is been completely ready. So training dataset first undergoes the process called dataset augmentation, where the dataset is multiplied into many datasets then it will undergo the process called preprocessing, which is to make all sizes into single size. We train that datasets by extracting the features using a emotion vggnet deep learning architecture. It undergoes a process called optimization which will optimize the model and loss minimization which will reduce the noises generated during training. In the last it will be undergoing a process called model seriation which will be evaluated after generating model using the testing dataset and predict the facial emotion. The child is asked questions through an audio output and is checked if it is conscious if it responds to the questions by using vggish algorithm. The temperature of the child is measured using thermal sensors to verify that the child is alive. A web application using reactJS is developed to display the status of the emotional state of the child. Thus, the project successfully provides an effective technological solution in rescuing the child.

#### 4.4 IMPLEMENTATION:

- Processing module
- Streaming module

- Web dashboard development
- Audio recognition module
- Emotion recognition module

#### 4.4.1 Processing module

Raspberry Pi used for Maintenance and child condition monitoring and calming and it is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation. The organization behind the Raspberry Pi consists of two arms. The first two models were developed by the Raspberry Pi Foundation. The Raspberry Pi hardware has evolved through several versions that feature variations in memory capacity and peripheral-device support.

The Raspberry Pi device looks like a motherboard, with the mounted chips and ports exposed (something you'd expect to see only if you opened up your computer and looked at its internal boards), but it has all the components you need to connect input, output, and storage devices and start computing.

Raspberry Pi is a low-cost, basic computer that was originally intended to help spur interest in computing among school-aged children. The Raspberry Pi is contained on a single circuit board and features ports for:

- HDMI
- USB 2.0
- Composite video
- Analog audio
- Power
- Internet
- SD Card

The computer runs entirely on open-source software and gives students the ability to mix and match software according to the work they wish to do.

The Raspberry Pi debuted in February 2012. The group behind the computer's development - the Raspberry Pi Foundation - started the project to make computing fun for students, while also creating interest in how computers work at a basic level. Unlike using an encased computer from a manufacturer, the Raspberry Pi shows the essential guts behind the plastic. Even the software, by virtue of being open-source, offers an opportunity for students to explore the underlying code-if they wish.

The Raspberry Pi is believed to be an ideal learning tool, in that it is cheap to make, easy to replace and needs only a keyboard and a TV to run. These same strengths also make it an ideal product to jumpstart computing in the developing world. The quad-core Raspberry Pi 3 is both faster and more capable than its predecessor, the Raspberry Pi 2. For those interested in benchmarks, the Pi 3's CPU--the board's main processor--has roughly 50-60 percent better performance in 32-bit mode than that of the Pi 2, and is 10x faster than the original single-core Raspberry Pi



Figure 4.3 Processing Module

Compared to the original Pi, real-world applications will see a performance increase of between 2.5x--for single-threaded applications--and more than 20x--when video playback is accelerated by the chip's NEON engine. Unlike its predecessor, the new board is capable of playing 1080p MP4 video at 60 frames per second (with a bitrate of about 5400Kbps), boosting the Pi's media center credentials. That's not to say, however, that all video will playback this smoothly, with performance dependent on the source video, the player used and bitrate. The Pi 3 also supports wireless internet out of the box, with built-in Wi-Fi and Bluetooth. The latest board can also boot directly from a USB-attached hard drive or pen drive, as well as supporting booting from a network-attached file system, using PXE, which is useful for remotely updating a Pi and for sharing an operating system image between multiple machines.

#### 4.4.2 Streaming module

An USB camera is a video camera that feeds or streams its image in real time to or through a computer to a computer network. When "captured" by the computer, the video stream may be saved, viewed or sent on to other networks travelling through systems such as the internet, and e-mailed as an attachment. When sent to a remote location, the video stream may be saved, viewed or on sent there. Unlike an IP camera (which connects using Ethernet or Wi-Fi), a webcam is generally connected by a USB cable, or similar cable, or built into computer hardware, such as laptops.

The term "USB" camera (a clipped compound) may also be used in its original sense of a video camera connected to the USB continuously for an indefinite time, rather than for a particular session, generally supplying a view for anyone who visits its web page over the Internet. Some of them, for example, those used as

online traffic cameras, are expensive, rugged professional video cameras.



Figure: 4.4 USB camera

#### 4.4.3 Web dashboard development:

ReactJS is JavaScript library used for building reusable UI components. According to React official documentation, following is the definition –

React is a library for building composable user interfaces. It encourages the creation of reusable UI components, which present data that changes over time. Lots of people use React as the V in MVC. React abstracts away the DOM from you, offering a simpler programming model and better performance. React can also render on the server using Node, and it can power native apps using React Native. React implements one-way reactive data flow, which reduces the boilerplate and is easier to reason about than traditional data binding.

#### 4.4.4 JSX

JSX stands for JavaScript XML. JSX allows us to write HTML in React. JSX makes it easier to write and add HTML in React.

It is faster than normal JavaScript as it performs optimizations while translating to regular JavaScript. It makes easier for us to create templates. Instead of separating the markup and logic in separated files,

React uses *components* for this purpose. We will learn about components in details in further articles.

## Components

Components are independent and reusable bits of code. They serve the same purpose as JavaScript functions, but work in isolation and returns HTML via a render function.

Components come in two types, Class components and Function components, in this tutorial we will concentrate on Class components.

## Unidirectional data flow and Flux

React implements one-way data flow which makes it easy to reason about your app. Flux is a pattern that helps keeping your data unidirectional.

## ADVANTAGES OF REACT JS

- Uses virtual DOM which is a JavaScript object. This will improve apps performance, since JavaScript virtual DOM is faster than the regular DOM.
- Can be used on client and server side as well as with other frameworks.

Component and data patterns improve readability, which helps to maintain larger app.

### 4.4.5 Audio recognition module:

VGGish network can better handle audio data, and RNN can better process time series data. VGGish is used to extract audio feature embeddings from audio recordings. VGGish is a variant of the VGG model [10], and it can be used to generate high abstraction level feature embeddings from audio recordings. In previous work [10], it is shown that a classification model can achieve better performance with VGGish

generated embeddings than raw audio features on an audio classification task. In our approach, we follow and use VGGish to generate audio feature embeddings from audio recordings. An input audio recording is first resampled to 16 kHz mono. Then, a log mel spectrogram tensor (96×64) is extracted from every one-second segment. VGGish takes the log mel spectrogram tensors as input. For one second of audio, it produces one embedding vector. To present the whole audio signal, we take the average of its one-second embedding vectors. We use the VGGish model that is pre-trained with YouTube-8M and published by Google

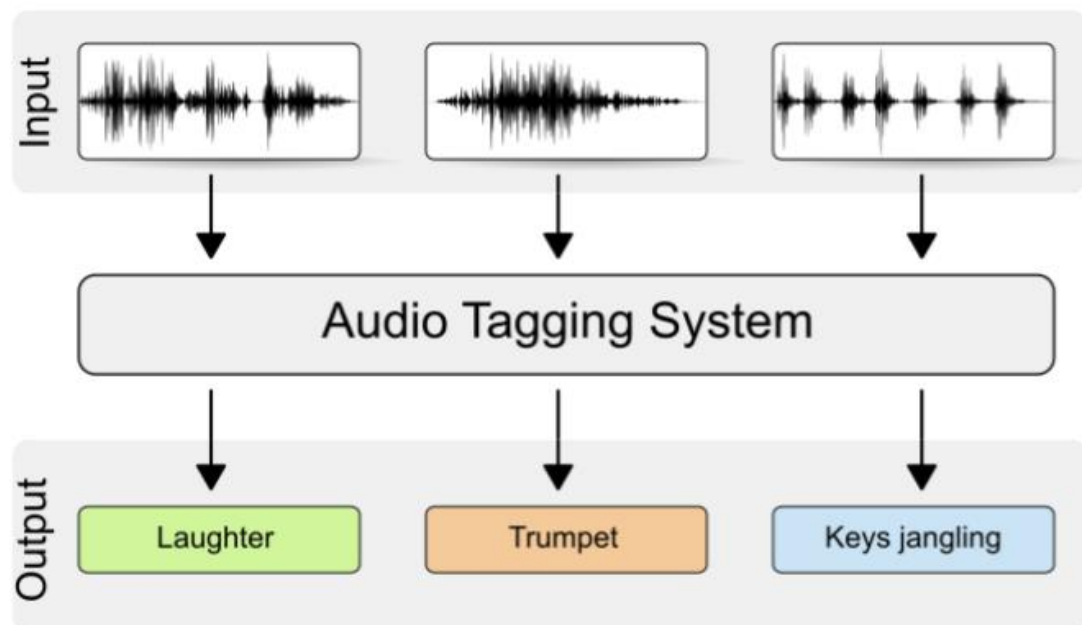


Figure 4.5: Architecture of VGGish

#### 4.4.8 Emotion recognition module:

In this project, emotional VGGNet algorithm is used to train the model.

The process of training a Deep Learning model involves providing a Deep Learning algorithm (that is, the learning algorithm) with training

data to learn from. The term Deep Learning model refers to the model that is created by the training process.

The training data must contain the correct answer, which is known as a target or target attribute. The learning algorithm finds patterns in the training data that map the input data attributes to the target (the answer that you want to predict), and it outputs a Deep Learning model that captures these patterns.

Using the Deep Learning model to get predictions on new data for which do not know the target. In this using Emotional VGGNet algorithm to implement the model and getting the prediction of the model.

Taking into the account, that the network needs to be small enough and fast enough to run in real-time on our CPU. Once the network is trained some code is written to load the serialized model from disk and apply it to a video stream to detect emotions in real-time. When studying emotion recognition, it's important to not focus on a single class label (as we sometimes do in other classification problems). Instead, it's much more advantageous for anyone to look at the probability of each emotion and characterize the distribution. The Kaggle Emotion and Facial Expression Recognition challenge training dataset consists of 28,709 images, each of which are 48\_48 grayscale images. The faces have been automatically aligned such that they are approximately the same size in each image. Given these images, the goal is to categorize the emotion expressed on each face into seven distinct classes: angry, disgust, fear, happy, sad, surprise, and neutral.

#### 4.4.7 TRAINING

To begin with, testing of the trained model, we can split our project into modules of implementation that is done. Dataset collection involves the process of collecting different emotional dataset

Various datasets were collected and one example among the collected dataset can be found below



Figure 4.6 Dataset Collected

After this the final implementation is done where the training process takes place and the results are obtained.

The below image shows the dataset collected for every emotion:

|    | Standard | Standard                                                                                                                           |
|----|----------|------------------------------------------------------------------------------------------------------------------------------------|
| 1  | emotion  | pixels                                                                                                                             |
| 2  | 0        | 70 80 82 72 58 58 60 63 54 58 60 48 89 115 121 119 115 110 98 91 84 84 90 99 110 126 143 153 158 171 169 172 169 165 129 110 113 1 |
| 3  | 0        | 151 150 147 155 148 133 111 140 170 174 182 154 153 164 173 178 185 185 189 187 186 193 194 185 183 186 180 173 166 161 147 133 1  |
| 4  | 2        | 231 212 156 164 174 138 161 173 182 200 106 38 39 74 138 161 164 179 190 201 210 216 220 224 222 218 216 213 217 220 220 218 217 2 |
| 5  | 4        | 24 32 36 30 32 23 19 20 30 41 21 22 32 34 21 19 43 52 13 26 40 59 65 12 20 63 99 98 98 111 75 62 41 73 118 140 192 186 187 188 196 |
| 6  | 6        | 4 0 0 0 0 0 0 0 0 0 0 3 15 23 28 48 50 50 84 115 127 137 142 151 156 155 149 153 152 157 160 162 159 145 121 83 58 48 38 21 17 7   |
| 7  | 2        | 55 55 55 55 55 54 60 68 54 85 151 163 170 179 181 185 188 188 191 196 189 194 198 197 195 194 190 193 195 184 175 172 161 159 158  |
| 8  | 4        | 20 17 19 21 25 38 42 42 46 54 56 62 63 66 82 108 118 130 139 134 132 126 113 97 126 148 157 161 155 154 154 164 189 204 194 168 1  |
| 9  | 3        | 77 78 79 79 78 75 60 55 47 48 58 73 77 79 57 50 37 44 56 70 80 82 87 91 86 80 73 66 54 57 68 69 68 68 49 46 75 71 69 70 70 72 72 1 |
| 10 | 3        | 85 84 90 121 181 182 133 153 153 169 177 189 195 199 205 207 209 216 221 225 221 220 218 222 223 217 220 217 211 196 188 173 170 1 |
| 11 | 2        | 255 254 255 254 254 179 122 107 95 124 149 150 169 178 179 179 181 181 184 190 191 191 193 190 190 195 194 192 193 196 193 192 188 |
| 12 | 0        | 30 24 21 23 25 25 49 67 84 103 120 125 130 139 140 139 148 171 178 175 176 174 180 180 178 178 182 185 183 186 186 178 180 172 175 |
| 13 | 6        | 39 75 78 58 58 45 49 48 103 156 81 45 41 38 49 56 60 49 32 31 28 52 83 81 78 75 62 31 18 19 19 20 17 20 16 15 12 10 11 10 23 36 65 |

Figure 4.7 Dataset representation

The below image shows the dataset format of the dataset collection:

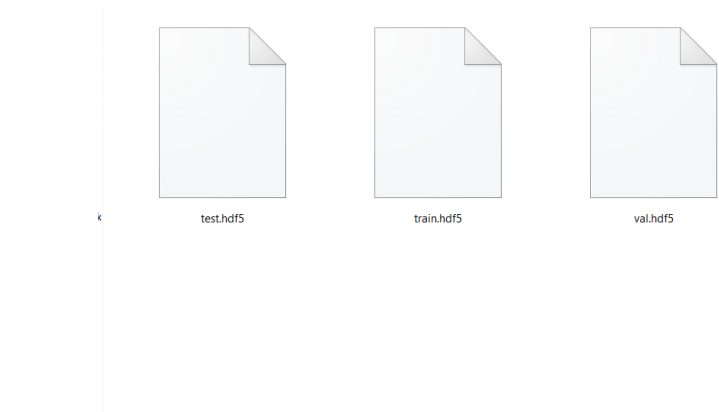


Figure 4.8 Dataset format

## CHAPTER 5

### RESULT AND FUTURE WORK

#### 5.1 RESULT ANALYSIS:

The below image shows the facial emotion recognition in flow:

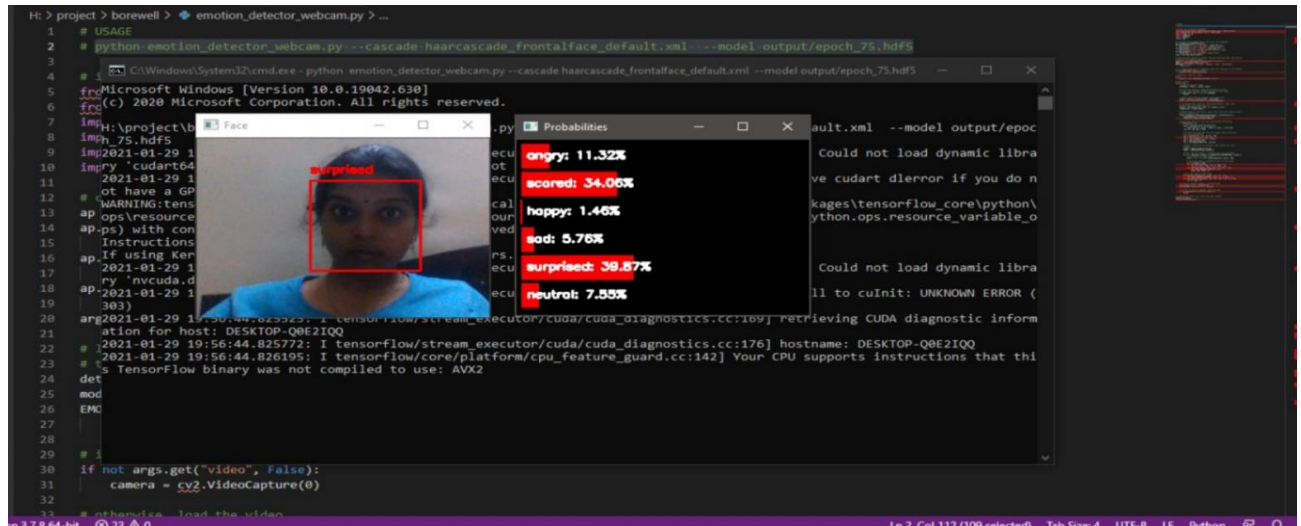


Figure 5.1.1 Face Emotion recognition

The below image shows the initiation of audio recognition:

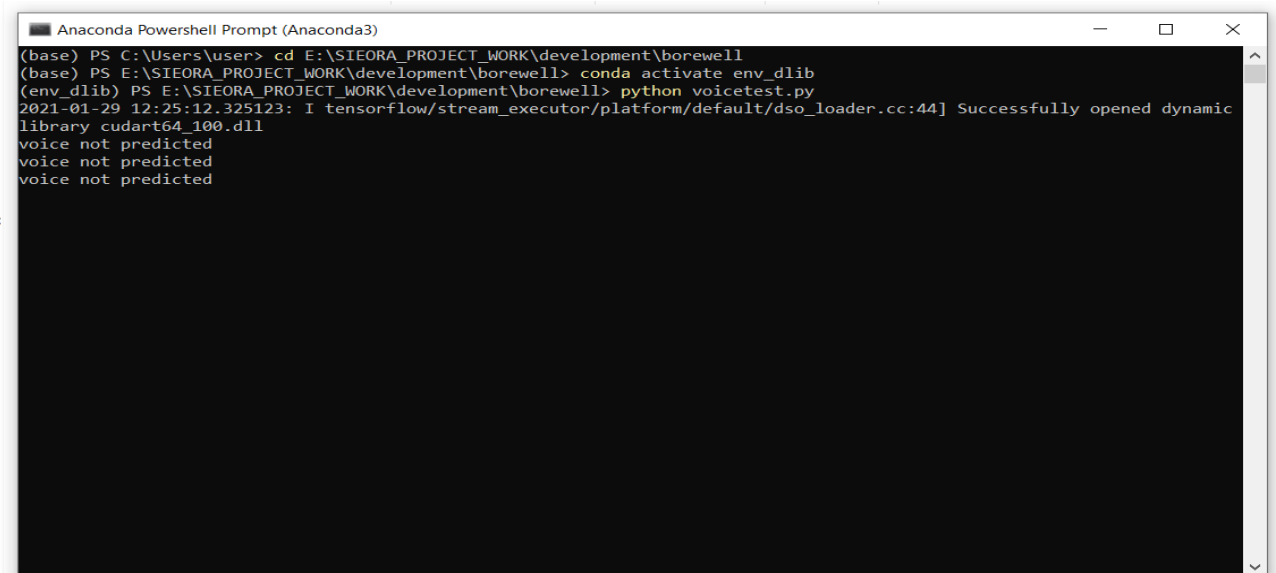


Figure 5.1.2 Audio recognition

The below image shows the effective prediction of audio:

```
Anaconda Powershell Prompt (Anaconda3)
(base) PS C:\Users\user> cd E:\SIEORA_PROJECT_WORK\development\borewell
(base) PS E:\SIEORA_PROJECT_WORK\development\borewell> conda activate env_dlib
(env_dlib) PS E:\SIEORA_PROJECT_WORK\development\borewell> python voicetest.py
2021-01-29 12:26:32.775539: I tensorflow/stream_executor/platform/default/dso_loader.cc:44] Successfully opened dynamic
library cudart64_100.dll
voice not predicted
voice predicted
(env_dlib) PS E:\SIEORA_PROJECT_WORK\development\borewell> _
```

Figure 5.1.3 Audio prediction

A web application using react JS is developed to facilitate in effectively intimating the child's status. The below image shows the login page of the web application:

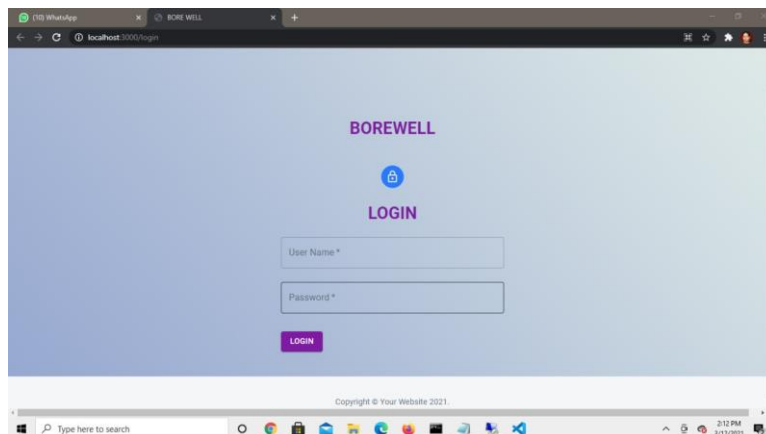


Figure 5.1.4 Login page

On successful login on the child web application page, the use temperature reading is routed to the homepage. The below image shows the child application home page on successful login:

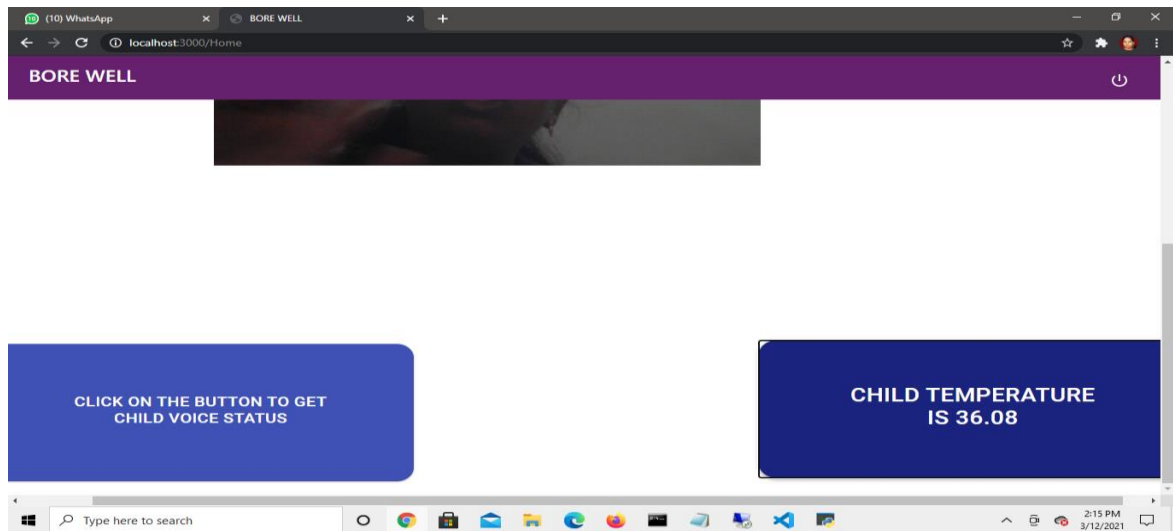


Figure 5.1.5 Home page

In the home page the child's voice recognition is intimated through the web application as shown in the image below:

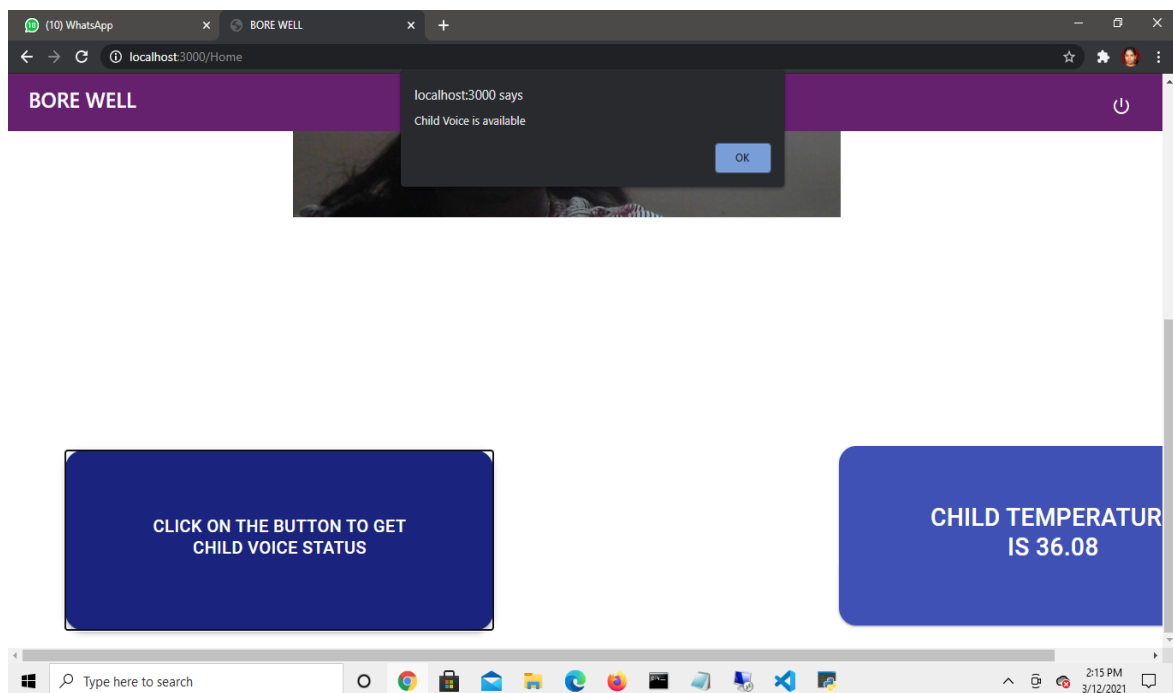


Figure 5.1.6 Voice recognition intimation and temperature of child.

The child's emotion is detected and live streaming of the child can be viewed through the web application as shown in the image below:

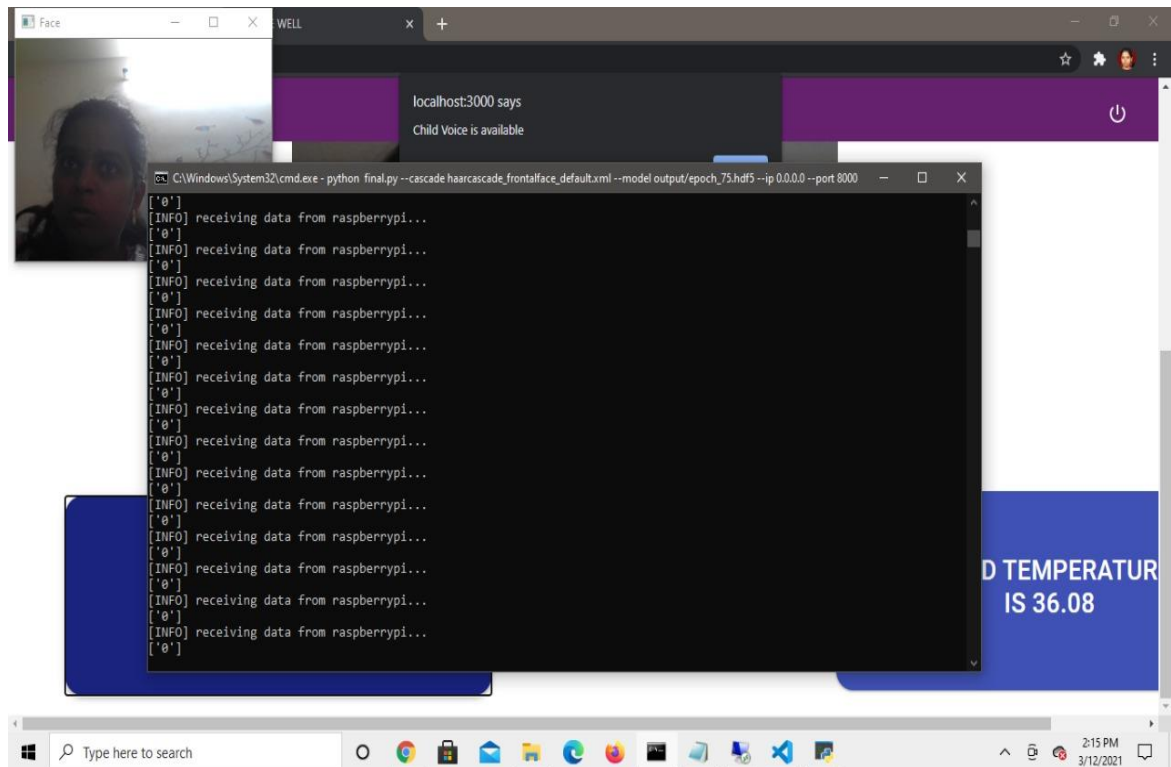


Figure 5.1.7 Live streaming of the child emotion

Thus, from the above results and discussions it is clear the child rescue project has been successfully implemented with web application development.

## 5.2 FUTURE WORK:

In the coming future, we review the application of the child rescue technology in dire situations where a child falls into a borewell, this project can be scaled to effectively help rescue the child. Thus, this project has an efficient scope in coming future where this idea can be converted to computerized production in a cheap way

## CHAPTER 6

### CONCLUSION

#### 6.1.SUMMARY:

This project is successfully implemented for developing a system for rescuing and monitoring a child when fallen in to a borewell which can automatically recognize the child facial and voice emotions using the currently prevailing deep learning approach. This also help in child's life like live streaming the face using cameras and sending the data to a web application for effective monitoring and rescuing. So, reduces the chances of losing a child to falling from a borewell.

#### 6.2.APPENDIX:

##### 6.2.1 SAMPLE CODE

```
import React, { useState, useEffect } from 'react';
import Avatar from '@material-ui/core/Avatar';
import Button from '@material-ui/core/Button';
import CssBaseline from '@material-ui/core/CssBaseline';
import TextField from '@material-ui/core/TextField';
import FormControlLabel from '@material-ui/core/FormControlLabel';
import Checkbox from '@material-ui/core/Checkbox';
import Link from '@material-ui/core/Link';
import Grid from '@material-ui/core/Grid';
import Box from '@material-ui/core/Box';
import LockOutlinedIcon from '@material-ui/icons/LockOutlined';
import Typography from '@material-ui/core/Typography';
import { makeStyles } from '@material-ui/core/styles';
import Container from '@material-ui/core/Container';
import { Redirect } from 'react-router-dom'

function Copyright() {
  return (
```

```

<Typography variant="body2" color="textSecondary" align="center">
  {'Copyright © '}
  <Link color="inherit" href="https://material-ui.com/">

```

Your Website

```

  </Link>{' '}
  {new Date().getFullYear()}
  {'.'}
</Typography>
);
}

```

```

const useStyles = makeStyles((theme) => ({
  paper: {
    // marginTop: theme.spacing(8),
    display: 'flex',
    flexDirection: 'column',
    alignItems: 'center',

  },
  avatar: {
    margin: theme.spacing(1),
    backgroundColor: theme.palette.secondary.main,
    marginTop: "10%"

  },
  form: {
    width: '100%', // Fix IE 11 issue.
    // marginTop: theme.spacing(1),

  },
  submit: {
    margin: theme.spacing(3, 0, 2),

```

```
},  
));
```

```
export default function SignIn(props) {  
  const classes = useStyles();  
  const [username, setUsername] = useState("");  
  const [password, setPassword] = useState("");
```

```
  const usernamehandleChange = event => {
```

```
    console.log (event.target.value)
```

```
    setUsername(event.target.value)
```

```
  }
```

```
  const passwordhandleChange = event => {
```

```
    console.log (event.target.value)
```

```
    setPassword(event.target.value)
```

```
  }
```

```
  function login(){
```

```
    if (username == "") {
```

```
      alert("Please enter Username ")
```

```
    }
```

```
    else if (password == "") {
```

```
      alert("Please enter Password ")
```

```
    }
```

```

else if (username == "bore" && password == "bore") {

    props.history.push('./Home');

}

else {

    alert("Entered Username and Password is incorrect")
}

}

var bg=require('./borewell.png')

return (

    <div className='background-image' style ={ {    backgroundImage:
`url(${bg})`,
    backgroundPosition: 'center',
    backgroundSize: 'cover',
    backgroundRepeat: 'no-repeat',
    width: '100vw',
    height: '100vh' ,
    bottom:20 } }>
    <Container component="main" maxWidth="xs">
        <CssBaseline />
        <div className={classes.paper} >

```

```

<h1 style={{textAlign:'center'
,fontSize:30,fontWeight:'bold',color:'#7f1aa3',marginTop:"50%"}}>BOREWELL
</h1>
  <Avatar className={classes.avatar}>
    <LockOutlinedIcon />
  </Avatar>

```

```

<h1 style={{textAlign:'center'
,fontSize:30,fontWeight:'bold',color:'#7f1aa3',marginTop:"5%"}}> LOGIN
</h1>

```

```

<form className={classes.form} noValidate>
  <TextField
    variant="outlined"
    margin="normal"
    required
    fullWidth
    id="Username"
    label="User Name"
    name="Username"
    autoFocus
    value={username}
    // type="number"
    onChange={usernamehandleChange}
    // onInput={(e) => {
      //
      e.target.value = Math.max(0,
parseFloat(e.target.value)).toString().slice(0, 10)
    // }}
  />

```

```

<TextField
  variant="outlined"

```

```

        margin="normal"
        required
        fullWidth
        name="password"
        label="Password"
        type="password"
        id="password"
        autoComplete="current-password"
        value={password}
        onChange={passwordhandleChange}

    />

    <Button
    variant="contained"
    className={classes.submit}
    onClick={() => { login() }}

    style={{backgroundColor:'#7f1aa3',color:'white'}}
    >
        LOGIN
    </Button>

</form>
</div>
<Box mt={8}>
    <Copyright />
</Box>
</Container>
</div>
);
}
import React, { useState, useEffect } from 'react';

```

```

import Avatar from '@material-ui/core/Avatar';
import Button from '@material-ui/core/Button';
import CssBaseline from '@material-ui/core/CssBaseline';
import TextField from '@material-ui/core/TextField';
import FormControlLabel from '@material-ui/core/FormControlLabel';
import Checkbox from '@material-ui/core/Checkbox';
import Link from '@material-ui/core/Link';
import Grid from '@material-ui/core/Grid';
import Box from '@material-ui/core/Box';
import LockOutlinedIcon from '@material-ui/icons/LockOutlined';
import Typography from '@material-ui/core/Typography';
import { makeStyles } from '@material-ui/core/styles';
import Container from '@material-ui/core/Container';
import { Redirect } from 'react-router-dom'

function Copyright() {
  return (
    <Typography variant="body2" color="textSecondary" align="center">
      {'Copyright © '}
      <Link color="inherit" href="https://material-ui.com/">
        Your Website
      </Link>{' '}
      {new Date().getFullYear()}
      {'.'}
    </Typography>
  );
}

```

```

const useStyles = makeStyles((theme) => ({
  paper: {
    // marginTop: theme.spacing(8),
    display: 'flex',
    flexDirection: 'column',
    alignItems: 'center',

```

```

    },
    avatar: {
      margin: theme.spacing(1),
      backgroundColor: theme.palette.secondary.main,
      marginTop: "10%"

    },
    form: {
      width: '100%', // Fix IE 11 issue.
      // marginTop: theme.spacing(1),

    },
    submit: {
      margin: theme.spacing(3, 0, 2),
    },
  }));

```

```

export default function SignIn(props) {
  const classes = useStyles();
  const [username, setUsername] = useState("");
  const [password, setPassword] = useState("");

  const usernamehandleChange = event => {

    console.log (event.target.value)

    setUsername(event.target.value)

  }

  const passwordhandleChange = event => {

    console.log (event.target.value)

```

```

    setpassword(event.target.value)

}

function login(){

    if (username == "") {
        alert("Please enter Username ")
    }
    else if (password == "") {
        alert("Please enter Password ")
    }

    else if (username == "bore" && password == "bore") {

        props.history.push('./Home');

    }

    else {

        alert("Entered Username and Password is incorrect")
    }

}

var bg=require('./borewell.png')

```

```

return (

  <div className='background-image' style ={ { backgroundImage:
`url(${bg})`,
  backgroundPosition: 'center',
  backgroundSize: 'cover',
  backgroundRepeat: 'no-repeat',
  width: '100vw',
  height: '100vh' ,
  bottom:20 } }>
  <Container component="main" maxWidth="xs">
    <CssBaseline />
    <div className={classes.paper} >

      <h1 style={{textAlign:'center'
,fontSize:30,fontWeight:'bold',color:'#7f1aa3',marginTop:"50%"}}>BOREWELL
    </h1>
    <Avatar className={classes.avatar}>
      <LockOutlinedIcon />
    </Avatar>

    <h1 style={{textAlign:'center'
,fontSize:30,fontWeight:'bold',color:'#7f1aa3',marginTop:"5%"}}> LOGIN
    </h1>
    <form className={classes.form} noValidate>
      <TextField
        variant="outlined"
        margin="normal"
        required
        fullWidth
        id="Username"
        label="User Name"

```

```

        name="Username"
        autoFocus
        value={username}
        // type="number"
        onChange={usernamehandleChange}
        // onInput={(e) => {
            //
                e.target.value = Math.max(0,
parseFloat(e.target.value)).toString().slice(0, 10)
            // }}
    />

```

```

<TextField
    variant="outlined"
    margin="normal"
    required
    fullWidth
    name="password"
    label="Password"
    type="password"
    id="password"
    autoComplete="current-password"
    value={password}
    onChange={passwordhandleChange}

/>

```

```

<Button
    variant="contained"
    className={classes.submit}
    onClick={() => { login() }}

```

```
        style={{backgroundColor:'#7f1aa3',color:'white'}}
      >
        LOGIN
      </Button>

    </form>
  </div>
  <Box mt={8}>
    <Copyright />
  </Box>
</Container>
</div>
);
}
```

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Sincerely,



**Dr. K. Geetha,**

JCT College of Engineering and Technology, Coimbatore, India.

## REFERENCE

- [1] Context Based Emotion Recognition using EMOTIC Dataset, Ronak Kosti, Jose M. Alvarez, Adria Recasens, Agata Lapedriza [2019, Vol No: 0162-8828 ]
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