EDUCATIONAL WEBSITE FOR LEARNING SIGN LANGUAGE

Abd-Elrahman Hesham Sharawy 89587, Barakat Ramadan 89634
Alaa Ahmed Mohamed 89670, Sara Sayed Hussein 89635

89587@must.edu.eg *89634@must.edu.eg*
89635@must.edu.eg *89670@must.edu.eg*

ABSTRACT

For those who are Deaf and Mute, or those who lack the ability to hear and communicate, sign language is crucial. It becomes crucial for people to comprehend their language because it is the sole means of communication for these individuals.

The approach or algorithm for an application that would aid in the recognition of the various signs known as sign language is proposed in this research. The photos, which are loaded at runtime, are of the right and left hands' palm sides.

The approach was created with a single user in mind. Real-time photographs will be taken in the beginning, saved in a directory, and on the most current image, feature extraction will be done to determine which sign the user has articulated using an algorithm. The outputs for the following may be seen in the sections below.

The comparisons will be done in arrears, and then the result will be created in accordance through matching keypoints from the input picture to the image recorded for a given letter already in the directory or the database. Each alphabet in sign language is represented by one of the 26 signs, and the suggested algorithm correctly identified 95% of them

KEYWORDS: Sign Language; Feature Extraction; Keypoint Matching; Sign/Gesture.

1. INTRODUCTION

Today, it is absolutely crucial to create a conversation or engagement with Deaf and Mute individuals. These folks communicate by using signs or hand gestures. Basically, gestures are bodily actions that a person does to express important information. One of the most effective ways for humans to communicate is through gestures. In fact, gesture is so ingrained in human communication that many individuals still do it when talking on the phone. There are many signals that represent complicated meanings, making it difficult for those who don't understand the language to identify them.

Finding a sign language interpreter who is knowledgeable and skilled becomes challenging everywhere and at all times, yet human-computer interface systems may be implemented anyplace.

The idea for creating such a useful application arose from the knowledge that it would be crucial for helping people in a socially responsible manner, as well as how it would assist raise social consciousness. When deaf individuals use sign language to communicate with hearing people and with each other as well, they demonstrate the incredible power of human eyesight to recognise gestures. In this essay, we tackle one of the social problems that this group of people has in interacting with regular people on a long-term basis.

In order to improve the applications and elevate them to the highest levels, research on hand gesture recognition, pattern recognition, and image processing has also been carried out by supposedly countries. Sign language is classified according to regions like Indian, American, Chinese, Arabic, and so on.

2. METHODOLOGY

Easily available online data, immense improvement of theory and algorithms in recent times have influenced and enhanced the computation power in solving real world problems. A bunch of machine learning techniques are available now to make our job easier. K Nearest Neighbor (KNN), Decision Tree, Gradient Boosting Methodologies (GBM), Random Forest, Support Vector Machine (SVM) are some of the popular techniques that have emerged in the recent past. It may happen that multiple methods (machine learning as well as traditional methods) are applicable to a particular problem in hand and the researcher or the analyst may be confused to find a good reason for choosing one method over another. This paper aims to help you make intelligent decisions about where KNN is most suitable for your particular problem and how you can apply it.

3. RESULT

KNN uses proximity to make classifications or predictions about the grouping of an individual data point. While it can be used for either regression or classification problems, it is typically used as a classification algorithm, working off the assumption that similar points can be found near one another. Figure 1.3(a),(c),(e),(g) represents the input gesture images for Alphabets such as “A”, “B”, “Y”, “J” and Figure 1.3 (b),(d),(f),(h) shows the corresponding output for input gesture image which are given below.

3.1. SOME NUMBERS AND ALPHABET

Figure 1.2 (a)

Figure 1.2 (b)

Figure 1.2 (c)

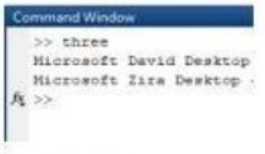

Figure 1.2 (d)

Figure 1.2 (e)

Figure 1.2 (f)

Figure 1.2 (g)

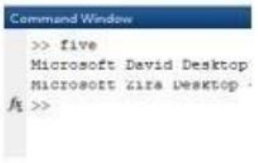

Figure 1.2 (h)

Figure 1.2 (a),(c),(e),(h) are input images
Figure 1.2 (b),(d),(f),(h) are the corresponding outputs

Figure 1.3 (a)

Figure 1.3 (b)

Figure 1.3 (c)

Figure 1.3 (d)

Figure 1.3 (e)

Figure 1.3 (f)

Figure 1.3 (g)

Figure 1.3 (h)

Figure 1.3 (a),(c),(e),(g) are the input images
Figure 1.3 (b),(d),(f),(h) are the corresponding outputs

4. CONCLUSION

In the suggested model, an effort has been made to create a system that can identify the alphabetic and numeric signs. To create a feature vector database, several picture features have been extracted. Convolutional neural networks are utilised to categorise the various sign-language words and subsequently to recognise them. When the accuracy of the suggested approach for sign language of various languages was examined, it was discovered to be greater than 95% for the majority of the signwords.

```php
<?php

include '../components/connect.php';

if(isset($_POST['submit'])){

   $email = $_POST['email'];
   $email = filter_var($email, FILTER_SANITIZE_STRING);
   $pass = sha1($_POST['pass']);
   $pass = filter_var($pass, FILTER_SANITIZE_STRING);

   $select_tutor = $conn->prepare("SELECT * FROM `tutors` WHERE email = ? AND password = ? LIMIT 1");
   $select_tutor->execute([$email, $pass]);
   $row = $select_tutor->fetch(PDO::FETCH_ASSOC);

   if($select_tutor->rowCount() > 0){
     setcookie('tutor_id', $row['id'], time() + 60*60*24*30, '/');
     header('location:dashboard.php');
   }else{
      $message[] = 'incorrect email or password!';
   }

}

?>

<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta http-equiv="X-UA-Compatible" content="IE=edge">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>Login</title>

   <!-- font awesome cdn link  -->
   <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.2.0/css/all.min.css">

   <!-- custom css file link  -->
   <link rel="stylesheet" href="../css/admin_style.css">

</head>
<body style="padding-left: 0;">
```

Figure 2.1 (a): Implement of Login Page

```php
<?php
if(isset($message)){
   foreach($message as $message){
      echo '
      <div class="message form">
         <span>'.$message.'</span>
         <i class="fas fa-times" onclick="this.parentElement.remove();"></i>
      </div>
      ';
   }
}
?>

<!-- register section starts  -->

<section class="form-container">

   <form action="" method="post" enctype="multipart/form-data" class="login">
      <h3>welcome back!</h3>
      <p>your email <span>*</span></p>
      <input type="email" name="email" placeholder="enter your email" maxlength="20" required class="box">
      <p>your password <span>*</span></p>
      <input type="password" name="pass" placeholder="enter your password" maxlength="20" required class="box">
      <p class="link">don't have an account? <a href="register.php">register new</a></p>
      <input type="submit" name="submit" value="login now" class="btn">
   </form>

</section>

<!-- registe section ends -->
```

Figure 2.1 (b): Implement of Login Page

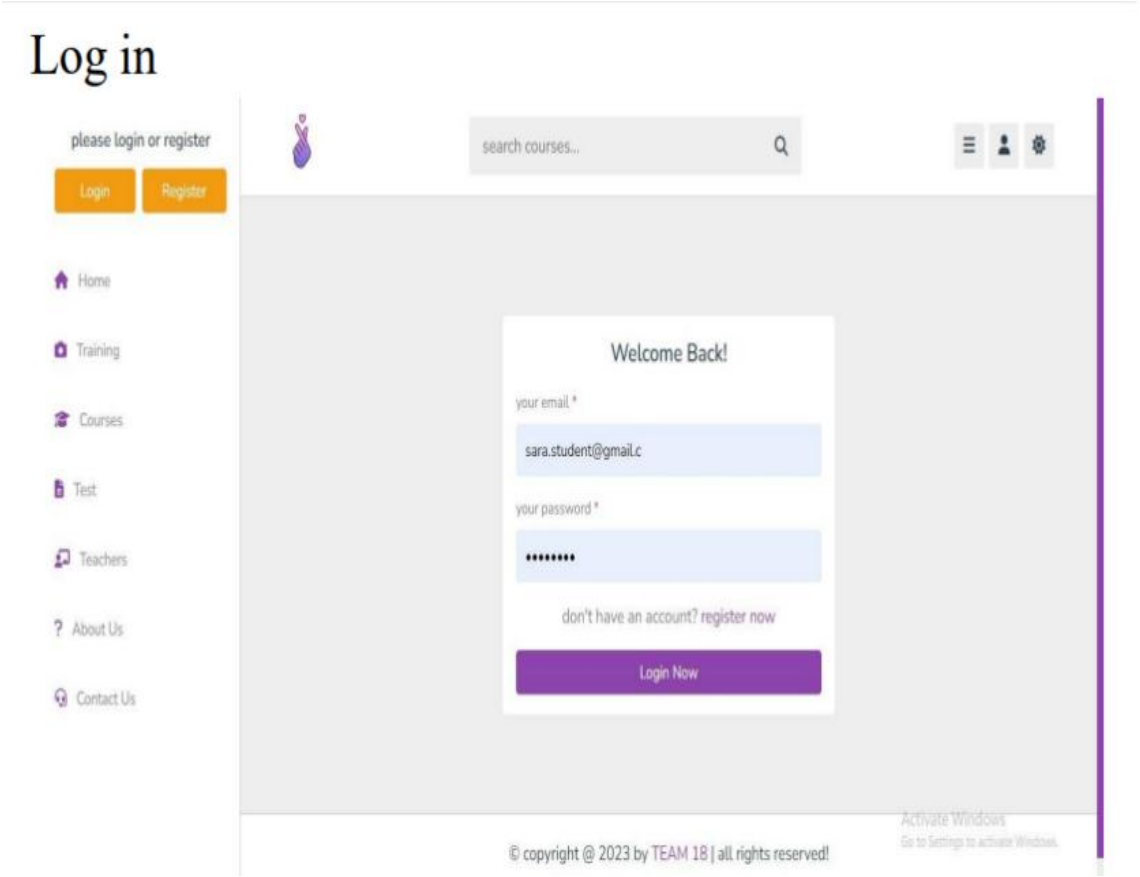

Figure 2.1 (c): Login Page

Figure 2.1: (a), (b) are input image and (c) is the corresponding output image

ACKNOWLEDGEMENT

We would like to express our heartfelt gratitude to all those who have contributed to the successful completion of our final project on College Information Technology at Misr University for Science and Technology.

First and foremost, we extend our sincere appreciation to our esteemed faculty members, whose guidance and support have been instrumental in shaping our knowledge and skills throughout our academic journey. Their expertise, encouragement, and valuable insights have been crucial in our understanding of the subject matter and the development of this project.

We would also like to acknowledge the administrative staff and management of Misr University for Science and Technology for providing us with the necessary resources and facilities to carry out our project effectively. Their continuous efforts in fostering a conducive learning environment have played a significant role in our academic pursuits.

We are deeply grateful to our classmates and friends who have been a constant source of motivation and collaboration. Their willingness to share ideas, discuss concepts, and provide constructive feedback has enhanced the quality of our project.

Furthermore, we would like to extend our gratitude to the IT professionals and experts who generously shared their industry knowledge and experiences during interviews and discussions. Their valuable insights have enriched our project and provided us with real-world perspectives on the field of Information Technology.

Last but not least, we would like to acknowledge our families for their unwavering support and encouragement throughout our academic endeavors. Their belief in our abilities and sacrifices made it possible for us to pursue our passion for technology and complete this project successfully.

To all those who have directly or indirectly contributed to our project, we express our heartfelt thanks. Your involvement has been invaluable, and we are truly grateful for your support.

Sincerely,
our project members: Abd-Elrahman, Barakat, Alaa, Sara.

5. REFERENCES

1. A. K. Tripathy, D. Jadhav, S. A. Barreto, D. Rasquinha, and S. S. Mathew (2018), "Voice For TheMute," Issue: pp. 2-7.
2. .H.Y.LaiandH.J.Lai(2017),"RealTimeDynamicHandGestureRecognition,"IEEEInt.Symp.Comput. Consum. Control, Issue :01, pp. 658-661
3. J. S. Sonkusare, N. B. Chopade, R. Sor, and S. L. Tade (2017), "A Review on Hand GestureRecognition System,"Issue: pp. 790- 794.
4. K. K. Dutta, S. A. Swamy (2017), E. Engineering, K.S. Language, I. Introduction, B. Sign,F.S. Language,
5. and J. S. Language, "Double Handed Indian Sign Language to Speech and Text," Issue: pp. 374- 377.