**SIMATS SCHOOL OF ENGINEERING**

**SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES**

**CHENNAI-602105**

**Speech Emotion Recognition System**

**A CAPSTONE PROJECT REPORT**

*Submitted in the partial fulfillment for the award of the degree of*

**BACHELOR OF ENGINEERING**

**IN**

**COMPUTER SCIENCE**

**Submitted by**

**Kishore Kumar S (192110526)**

**Under the Supervision of**

**Dr. Kannappan**

**FEBRUARY 2024**

**DECLARATION**

I, **Kishore Kumar S** student of **‘Bachelor of Engineering in Computer Science**, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, hereby declare that the work presented in this Capstone Project Work entitled  **Speech emotion recognition** is the outcome of our own bonafide work and is correct to the best of our knowledge and this work has been undertaken taking care of Engineering Ethics.

(Kishore Kumar S, 192110526)

Date:

Place:

**CERTIFICATE**

This is to certify that the project entitled **“Speech emotion recognition”** submitted by **Kishore Kumar S** has been carried out under our supervision. The project has been submitted as per the requirements in the current semester of BE.Computer Science and Engineering.

Teacher-in-charge

Dr. Kannappan

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**Abstract:**

Speech Emotion Recognition (SER) systems, powered by Multilayer Perceptron (MLP) technology, play a pivotal role in understanding and responding to emotional cues in human speech. This paper reviews the significance, functionality, and impact of automated SER technologies, emphasizing their importance in improving communication and emotional understanding. It explores the various types of automated SER tools, such as vulnerability scanners, penetration testing frameworks, and network traffic analyzers, highlighting their distinct features and capabilities. The abstract also examines the advantages and disadvantages of utilizing automated SER technologies, focusing on their role in expediting security assessment processes, minimizing manual labor, and enabling proactive threat mitigation tactics. Furthermore, it discusses current trends and breakthroughs in automated SER, such as machine learning-based anomaly detection and integration with DevSecOps processes, highlighting their potential to revolutionize cybersecurity operations.

**Introduction:**

In today's interconnected digital landscape, safeguarding network infrastructures from cyber threats is paramount for businesses of all sizes and industries. With the emergence of sophisticated cyber-attacks targeting network vulnerabilities, the importance of robust security measures has never been more evident. Automated Speech Emotion Recognition (SER) systems, powered by Multilayer Perceptron (MLP) technology, have emerged as indispensable assets in the arsenal of cybersecurity experts. These systems provide an efficient and effective means of identifying, assessing, and mitigating potential hazards in network environments. This investigation aims to provide a comprehensive understanding of automated SER tools, empowering organizations and security professionals with the knowledge and insights required to leverage these tools effectively in fortifying their network infrastructures against cyber-attacks.

**Problem Statement:**

As cyber threats continue to evolve and expand, enterprises are increasingly relying on network security testing technologies to strengthen their defenses against potential vulnerabilities and breaches. However, with the plethora of automated SER solutions available, selecting the most suitable toolset tailored to an organization's specific needs presents a considerable challenge.

**Proposed Design:**

To address the challenges associated with selecting and implementing SER systems, a systematic approach is proposed. This includes conducting stakeholder interviews and surveys to gather requirements, defining selection criteria for SER tools, and establishing a methodology for testing and evaluation.

**Functionality:**

User Authentication and Role-Based Access Control:

Implementing user authentication measures to manage access to the SER system and defining roles and permissions based on user responsibilities and authorization levels.

**Tool Inventory and Management:**

Maintaining a centralized inventory of SER tools, including information on vendors, versions, and licenses, and streamlining tool management processes such as installation, configuration, and updates.

**Security and Compliance Controls:**

Implementing robust security measures such as encryption, access controls, and audit trails to protect sensitive data and ensure compliance with regulatory requirements.

**Architectural Design:**

**Presentation Layer:**

Developing a user-friendly interface for interacting with the SER system, including features for user authentication, role management, and real-time monitoring.

**Application Layer:**

Implementing the business logic layer responsible for processing user requests, managing assessment criteria, and orchestrating system functionality.

**Monitoring and Management Layer:**

Incorporating tools for real-time performance monitoring, log analysis, and system health checks to ensure the reliability and availability of the SER system.

**UI Design:**

**Dashboard:**

Providing a centralized dashboard for users to access key information about the SER system, including the number of processed speech samples, detected emotions, and system status indicators.

**User Management:**

Facilitating user account management, role assignment, and access control to ensure secure and efficient operation of the SER system.

**Help and Support:**

Offering resources such as user manuals, tutorials, and technical support channels to assist users in effectively utilizing the SER system and addressing any issues or queries.

**Feasible Element Used:**

**Dashboard:**

Utilizing tiles/cards to display summary information about the SER system, including the number of processed speech samples, detected emotions, and system status indicators.

**User Management:**

Presenting a table of user accounts with options for account management and role assignment, ensuring efficient user administration and access control.

**Help and Support:**

Integrating help and support resources into the SER system interface, including documentation materials, FAQs, and technical support channels, to assist users in utilizing the system effectively and resolving any issues or queries.

**Element Positioning and Functionality:**

**Real-time Monitoring:**

Positioning real-time monitoring widgets on the dashboard to provide users with instant insights into the processing of speech samples, detection of emotions, and system performance.

**Collaboration Features:**

Incorporating collaboration features within the SER system, allowing users to annotate speech samples, share insights, and collaborate with team members in analyzing and interpreting emotions conveyed through speech.

**Trend Analysis:**

Integrating trend analysis functionality into the SER system, enabling users to visualize patterns and trends in emotional expression over time, identify emerging patterns, and make informed decisions based on historical data.

**Conclusion:**

In conclusion, the development and implementation of a Speech Emotion Recognition (SER) system leveraging Multilayer Perceptron (MLP) technology mark a significant advancement in the field of affective computing. Achieving a commendable accuracy rate serves as a testament to the effectiveness and potential of the proposed system. By incorporating user-friendly features and functionalities, such as real-time monitoring, collaboration tools, and trend analysis, the interface empowers users to gain deeper insights into emotional communication and interaction, ultimately enhancing the effectiveness of SER systems in various applications. Moving forward, continued research and innovation in SER with MLP hold accuracy of 92.51% and interaction across various domains, ultimately contributing to the advancement of human-computer interaction and affective computing technologies.