1. **Research Project on Assistive Device for Automated Stuttering Assessment and Therapy**

YEAR:2024-25

Sl. No.	PI name	Co-PI names if any	Name of the Dept., where project is sanctioned	Project title*	Name of the Funding agency	Duration of the project	Amount (Lacs)
1	Dr. Manjula G	PI CO-Pis: Dr. Latha M, Dr. raghavendra Y M Dr. Jagadeesha M	Department of Electronics and communication Engineering. GSSSIETW, Mysuru	Research Project on Assistive Device for Automated Stuttering Assessment and Therapy	Department of Science & Technology, Technology Bhavan, New Delhi	2.6 years	Rs 41,32,110/-
Amount received (Rs.) Rs 41,32,110/-							Rs 41,32,110/-

GSSSIETW Faculty Receives ANRF Research Grant for Women-Centric Assistive Technology Project

GSSS Institute of Engineering and Technology for Women (GSSSIETW), Mysuru, is proud to announce that a research project titled **"Assistive Device for Automated Semantic Assessment of Women Affected by Domestic Assaults using Engineering and Technology"** has been sanctioned for funding by the **Anusandhan National Research Foundation (ANRF), Government of India**.

The project, led by **Dr. D. G. Manjula**, has received a total grant of **₹41.39 Lakhs**, comprising support for advanced research equipment, infrastructure, project staff, consumables, travel, and other research-related activities.

The proposed research aims to develop an innovative assistive technology system that leverages modern engineering tools and intelligent technologies to support the semantic assessment and analysis of women affected by domestic assaults. The project seeks to contribute towards women's safety, empowerment, and well-being through technology-driven solutions.

The sanctioned grant will facilitate the procurement of advanced computing systems, embedded development platforms, recording and data acquisition equipment, and other research infrastructure required for the successful execution of the project.

This achievement reflects GSSSIETW's commitment to fostering impactful research, innovation, and societal development. The institution congratulates Dr. D. G. Manjula and the research team on this prestigious accomplishment and wishes them success in carrying out this significant research initiative.

Project Details

- **Funding Agency:** Anusandhan National Research Foundation (ANRF), Government of India
- **Principal Investigator:** Dr. D. G. Manjula
- **Project Title:** Assistive Device for Automated Semantic Assessment of Women Affected by Domestic Assaults using Engineering and Technology
- **Total Grant Sanctioned:** ₹41.39 Lakhs
- **Institution:** GSSS Institute of Engineering and Technology for Women, Mysuru

GOVERNMENT OF INDIA
Ministry of Science & Technology
Department of Science & Technology
SEED/TIDE/2023/1355 (G)
(Science for Equity Empowerment and Development (SEED))

Technology Bhawan, New Delhi
Dated: 16/04/2025

Sanction Order

Subject: Financial assistance for the project entitled **"Assistive Device for Automated Stuttering Assessment and Therapy"** submitted by **Dr. Dr G Manjula, GSSS INSTITUTE OF ENGINEERING AND TECHNOLOGY FOR WOMEN, MYSURU, MYSURU, KARNATAKA, 570016.** Release of the **First** installment regarding

Sanction of the President is hereby accorded to the approval to the above mention project at a total cost of **Rs. 41,32,110/-** **(Rupees Forty One Lakh Thirty Two Thousand One Hundred Ten only)** for a duration of **2 Years 6 Months**. The detailed breakup of the Grants-in-aid General as well as Grants for creation of capital assets are given below:-

General Component : ₹ 10,72,790/-
Capital Component : ₹ 30,59,320/-

	Budget Summary (in Rs.)			
Items	Year-1	Year-2	Year-3	Tota
1- Non-Recurring				
Microphone-. - 1	77880	0	0	7788
Seagate Expansion 64 TB Desktop External HDD Seagate-. - 1	215000	0	0	2150
Zoom H4nSP 4-Channel Handy Recorder-. - 1	58398	0	0	583
Acer Predator Helios 300 Laptop-. - 1	151611	0	0	151
Xilinx Zynq-7000 SoC ZC706 Evaluation Kit Part Number: EK-Z7-ZC706-G -. - 1	400000	0	0	400
Server 3 GHz - 16 GB-. - 1	875000	0	0	875
AD-FMCOMMS5-EBZ with Antennas-. - 2	235822	0	0	23
Raspberry pi-. - 3	75000	0	0	7
Device Development (01) Rs.3,25,750/-- Rs. 3,84,385/- (including 18% GST) - 1	384385	0	0	38
Mobile portable recording room/Interactive Room-. - 1	586224	0	0	5
Subtotal (Capital)	3059320	0	0	30
2- Recurring				
Project Staff	283200	283200	141600	
Scientific Administrative Assistance/Field Worker-1 (@, Rs.20,000/- + 18% HRA per month)	283200	283200	141600	
Consumables	20000	10000	10000	
Contingency	11796	11196	6798	
Travel	25000	25000	20000	
Overhead	25000	25000	0	

16/04/2025

2026/6/17 10:10

ANNUAL PROGRESS REPORT OF PROJECTS SUPPORTED

UNDER SEED DIVISION

(For the period from 16/04/2025 to 01/05/2026)

A.SUMMARY SHEET

1. TITLE OF THE PROJECT:

Assistive Device for Automated Stuttering Assessment and Therapy

2. REFERENCE NO. OF SANCTION LETTER WITH DATE:

SEED/TIDE/2023/1355 dated on 16/04/2025

3. PI NAME & ORGANISATION:

Dr. G Manjula, Associate Professor, Dept. of ECE,

GSSS Institute of Engineering & Technology for Women,

KRS Road, Metagalli, Mysore- 570 016

Phone No. : +919481438349

E-mail: manjulag@gsss.edu.in

4. Co-PI :

Dr. Jagadisha. N, Associate Professor, Dept. of EEE, GSSSIETW, Mysuru.

Dr. Raghavendra. Y. M, Associate Professor, Dept. of ECE, GSSSIETW, Mysuru.

Dr. Latha. M, Associate Professor, Dept. of ECE, GSSSIETW, Mysuru.

5. **DATE OF START**: 16/04/2025

6. **DATE OF COMPLETION**: 16/10/2027 SCHEDULED AND LIKELY

7. **TOTAL COST OF THE PROJECT**: Rs. 41,32,110/-

8. STAFF SANCTIONED & IN POSITION: 01

Mrs. Sahana. L,

Scientific Administrative Assistance/Field Worker

9. TOTAL EXPENDITURE: Rs. 28,59,700/-

Introduction

Speech skills are an essential part of everyday life, and any delay or disorder in their development can significantly impact an individual's overall well-being. People with speech disorders face an increased risk of social, emotional, and academic challenges compared to their peers with typical speech abilities.

According to existing literature, nearly 1% of the global population is affected by speech disorders, and in India alone, over 12 million individuals experience communication disabilities.

Among these, stuttering is one of the most common speech disorders. It is characterized by disruptions in the normal flow of speech, known as disfluencies. The most frequent forms of stuttering include sound or syllable repetitions, prolongation of sounds, and dysrhythmic phonation or articulator blocks.

The proposed research titled "Assistive Device for Automated Stuttering Assessment and Therapy" has significant potential to improve the quality of life for individuals who stutter. By offering an efficient and objective means of assessment and therapeutic support, the device can enhance communication abilities, enabling individuals to engage more confidently in social interactions, education, and employment. Furthermore, this research aligns with the expanding field of augmentative and alternative communication technologies, which aim to empower individuals with communication disabilities through innovative solutions.

Work Done for objective 1 :

The acquisition of a stuttered speech database has been successfully completed and is currently being

utilized for the project. In addition to widely used publicly available datasets such as UCLASS, SEP-30K, and Kaggle repositories, a custom speech database is also being developed. This

dataset is being collected in collaboration with the All India Institute of Speech and Hearing (AIISH), Mysuru, ensuring the inclusion of diverse and clinically relevant speech samples.

Work Done for objective 2 :

Pre-processing plays a critical role in preparing stuttered speech signals for acoustic analysis and machine learning–based classification. Initially, spectral subtraction is employed to enhance the signal-to-noise ratio (SNR) by reducing background noise. Subsequently, the signal is passed through a pre-emphasis filter to amplify high-frequency components, which are typically attenuated during speech production.

Following this, distinctive acoustic features of stuttered speech are extracted and systematically compared with those of normal speech. The processed data is then evaluated using machine learning algorithms to enable accurate classification and analysis.

Work Done for objective 3 :

A prototype system for automated stuttering assessment and evaluation has been successfully

implemented using Raspberry Pi. The hardware platform integrates a high-sensitivity microphone for real-time speech acquisition and supports on-device signal processing. The acquired speech is pre-processed (noise reduction, pre-emphasis, framing, and windowing) and subjected to feature extraction techniques such as MFCCs, pitch, jitter, shimmer, and energy-based parameters.

The extracted feature vectors are processed using embedded machine learning models deployed on the Raspberry Pi, enabling real-time classification of stuttered versus fluent speech. The system is designed to operate as a standalone, low-cost assistive device with potential for portability and scalability. Additionally, the prototype supports data logging and feedback mechanisms, facilitating both objective assessment and therapeutic monitoring.

Work Done for objective 3 :

An Interactive Acoustic Room / Portable Recording Laboratory has been successfully established to support advanced research on stuttered speech. The facility is specifically designed to enable controlled speech recording, objective assessment, and therapeutic interventions, with a focus on automated stuttering evaluation systems.

The laboratory integrates key hardware components to ensure precise signal acquisition and processing, including:

- Calibrated condenser microphones and reference speakers for accurate audio capture and playback
- High-fidelity signal acquisition modules with analog-to-digital conversion
- A dedicated processing unit for real-time signal analysis and feature extraction
- The acoustic environment has been engineered to meet speech research standards, with controlled
  parameters such as:
- Ambient noise level maintained at approximately 30 dB, ensuring minimal background
- interference
- Reverberation time (RT60) of approximately 0.4 seconds, providing a balanced acoustic response suitable for speech intelligibility and analysis

These specifications enable high-quality, noise-resilient speech recordings, which are critical for reliable feature extraction and machine learning–based evaluation of stuttering patterns.

In parallel, the development and expansion of a comprehensive stuttered speech database is ongoing. The dataset is being curated to support clinical assessment, model training, and validation, thereby strengthening the effectiveness and applicability of automated stuttering assessment systems.

Publications:

1. Manjula, G., et al. (2026). Smart stuttering assessment and therapy: Advanced speech signal analysis with real-time feedback, Information and Communication Systems, pp. 831–837, Taylor

& Francis. https://doi.org/10.1201/9781003650201-132.

2. Dr. Manjula.G et al “Acoustic Analysis, Classification, and Correction of Stuttered Speech Using

Machine Learning Techniques”, 2025 International Conference on Signal Processing,

Computation, Electronics, Power and Telecommunication (iConSCEPT), 979-8-3315-7120-

7/25, ©2025 IEEE, DOI: 10.1109/IConSCEPT66142.2025.11436659 (Scopus Indexed)

Patent:

A utility patent has been filed for the invention titled

“Compact Interactive Acoustic Recording Room for Controlled Capture and Analysis of

Disordered Speech Signals”.

Filing Date: 07/04/2026

Status: Filed (Under Examination)

Copyright:

A copyright has been filed for the software titled

“Hybrid Model to Detect and Correct Stuttered Speech”.

Date of Filing: 09/04/2026

Type: Software Copyright

Status: Filed (Under Process)

Inauguration of Interactive Acoustic Room at GSSSIETW, Mysuru under DST-TIDE Project

The Department of Electronics and Communication Engineering at GSSS Institute of Engineering and Technology for Women (GSSSIETW), Mysuru, inaugurated an **Interactive Acoustic Room** established under a Department of Science and Technology (DST) – TIDE sanctioned research project.

The **Interactive Acoustic Room** was inaugurated by **Smt. Anupama B. Pandit, Secretary, GSSS (R)** and **Sri R. K. Bharath, CEO and MCM, GSSS (R)**, in the presence of **Dr. M. Shivakumar, Principal, GSSSIETW**, **Dr. Rajendra R. Patil, Professor and Head, Department of ECE**, **Dr. G Sreeramulu Mahesh**, **Professor and Head, Department of EEE,** and staff of GSSSIETW on 4th March 2026.

Addressing the gathering, the Secretary extended her best wishes to the project team and emphasized the importance of effectively utilizing the laboratory for societal benefit and

continued research. The CEO encouraged students and faculty to leverage the facility to develop innovative ideas and products that can contribute meaningfully to society.

Dr. M. Shivakumar highlighted that the project, sanctioned under the DST-TIDE scheme, is the first research project awarded to the institution. He appreciated the efforts of the project team and expressed confidence that the initiative would result in a valuable product outcome.

The Interactive Acoustic Room is designed to support research in speech processing and assistive technologies. The system developed under this project is expected to aid individuals with stuttering, thereby contributing to speech therapy and improved communication.

The project team comprises:

- Dr. G. Manjula, Principal Investigator (PI)
- Dr. Jagadisha N, Co-Principal Investigator (Co-PI)
- Dr. Raghavendra Y. M., Co-Principal Investigator (Co-PI)
- Dr. Latha M., Co-Principal Investigator (Co-PI)

Glimpses of Inauguration of Interactive Acoustic Room