



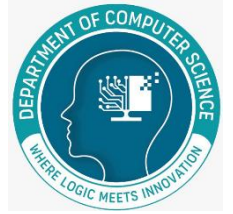
PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A)

KAKINADA

An outcome based, NAAC accredited, Green Autonomous institution
4th Cycle NAAC accreditation grade B++

Affiliated to Adikavi Nannaya University

E-mail: Kakinada.jkc@gmail.com



REPORT ON WORKSHOP

TITLE: SPEAKER DIARIZATION SYSTEM USING DEEP LEARNING

Date: 06-JANUARY-2026

Venue: LCD HALL -1

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A), KAKINADA.
NAAC Accredited with "B++" Grade (4th Cycle)
Affiliated to Adikavi Nannaya University, Rajamahendravaram.

DEPARTMENT OF COMPUTER SCIENCE

WORK SHOP - 2026

Topic: Speaker Diarization System Using Deep Learning

DATE: 06-JANUARY-2026

VENUE: LCD HALL - I

CIRCULAR:



PITHAPUR RAJAH'S GOVERNMENT COLLEGE (A)
KAKINADA
Affiliated to Adikavi Nannaya University
E-mail: Kakinada.jkc@gmail.com
Department of Computer Science



Circular

All the students are hereby informed that the **Department of Computer Science** is conducting a **Workshop on “Speaker Diarization System Using Deep Learning”** as per the details given below:

Title of the Workshop: Speaker Diarization System Using Deep Learning

Date: 06-01-2026

Time: 10:30 AM onwards

Venue: LCD Hall – 1

The workshop aims to provide insights into modern deep learning techniques used for identifying and segmenting speakers in audio data, which is an important application in speech processing and artificial intelligence.

All interested students are encouraged to attend the workshop and make the best use of this learning opportunity.

Lecturer In-Charge
Dept. of Computer Science
P.R. Govt. College (A)
KAKINADA-533001

Objective of the Workshop

The main objective of the workshop was to provide students with a comprehensive understanding of **Speaker Diarization Systems using Deep Learning techniques**. The workshop aimed to:

- Introduce the concept of speaker diarization and its importance in speech processing.
- Explain modern machine learning and deep learning approaches used in audio analytics.
- Demonstrate feature extraction techniques such as MFCC, LPCC, and LSF.
- Create awareness about real-time applications of speaker diarization in AI.
- Encourage students to pursue research in speech processing and artificial intelligence.

Description of the Workshop

The workshop began with an introduction to **Speaker Diarization**, which is the process of identifying “*who spoke and when*” in an audio stream containing multiple speakers. The resource person explained the importance of diarization in areas such as:

- Broadcast news analysis
- Meeting and conference transcription
- Speech recognition systems
- Audio indexing and surveillance

The session covered the difference between **Speaker Diarization and Speech Recognition**, helping students clearly understand their functional roles in speech technology.

Key Topics Covered

1. Introduction to Machine Learning

- Definition and importance of Machine Learning
- Types: Supervised and Unsupervised Learning
- Role of ML in speech processing

2. Feature Extraction Techniques

The following features were explained in detail with diagrams and examples:

- **MFCC (Mel Frequency Cepstral Coefficients)**
- **LPCC (Linear Predictive Cepstral Coefficients)**
- **LSF (Line Spectral Frequencies)**
- Spectral Spread
- Spectral Rolloff
- Spectral Skewness
- Logarithmic Band Power
- Zero Crossing Rate
- FFT and Power Spectral Density

The importance of combining multiple features for better speaker recognition accuracy was highlighted.

3. Speech Activity Detection (SAD)

- Silence removal
- Music removal
- Separation of speech and non-speech regions
- Use of Gaussian Mixture Models

4. Speaker Segmentation

- Detection of speaker change using
 - GMM (Gaussian Mixture Model)
 - BIC (Bayesian Information Criterion)
- Explanation of segmentation using distance measures and thresholds

5. Clustering Techniques

- Deep Fuzzy Clustering
- Deep Embedded Clustering (DEC)
- Entropy Weighted Power K-Means

6. Optimization Techniques

The workshop introduced advanced optimization algorithms such as:

- **ACWOA (Anti-Corona Whale Optimization Algorithm)**

- **FrACWOA (Fractional Anti-Corona Whale Optimization Algorithm)**
- **FEOSA (Fractional Ebola Optimization Search Algorithm)**

These algorithms were used to improve accuracy in speaker segmentation and clustering.

Dataset Used

The experiments were conducted using the **Eenadu Prathidwani Dataset**, which contains:

- Real-world speech data
- Multiple speakers
- Duration: ~1.5 hours
- Used for evaluating diarization accuracy

Performance Evaluation

The system performance was evaluated using:

- **Diarization Error Rate (DER)**
- **False Discovery Rate (FDR)**
- **False Positive Rate (FPR)**
- **False Negative Rate (FNR)**

The proposed FEOSA-based model achieved:

- High accuracy ($\approx 91.3\%$)
- Reduced diarization error
- Better segmentation efficiency compared to existing methods

Outcomes of the Workshop

After attending the workshop, students were able to:

- Understand the concept of speaker diarization clearly
- Learn advanced feature extraction techniques
- Gain knowledge of deep learning-based clustering
- Understand real-time speech processing challenges
- Get exposure to research-oriented methodologies
- Develop interest in AI, ML, and Speech Processing domains

Student Participation

A good number of students actively participated in the workshop. The interactive session helped them clarify their doubts regarding:

- Speech processing
- Machine learning algorithms

Research opportunities in AI

PARTICIPANT SIGNATURES:

TOTAL 93 STUDENTS PARTICIPATED

Topic Name : Workshop on Speaker Disigiation System
using Deep Learning

Date : 06th Jan 2026.

Venue :- LCD Hall-1

Resource Person: Dr. K. Vijay kumar — 19/01/26

Participated students : 93 students.

Roll No.	Group	Name of the Student	Signature
24A136	AI (1 st)	A. C. Vinayak	A. C. Vinayak
24A137	AI (1 st)	V. Divya Prasad	V. Divya Prasad
24A138	AI (1 st)	G. Divyashikha	G. Divyashikha
24A139	DS (1 st)	E. Bhaskar	E. Bhaskar
24A140	DS (1 st)	E. DORSH	E. DORSH
24A141	BI (1 st)	F. D. Sampath	F. D. Sampath
24A142	AI (1 st)	T. D. S. Ram Kumar	T. D. S. Ram Kumar
24A143	DS (1 st)	P. Anand	P. Anand
24A144	AI (1 st)	G. Anand	G. Anand
24A145	AI (1 st)	B. Anand Kumar	B. Anand Kumar
24A146	AI (1 st)	S. Anand	S. Anand
24A147	AI (1 st)	G. D. S. Anand	G. D. S. Anand
24A148	AI (1 st)	N. S. Anand	N. S. Anand
24A149	AI (1 st)	M. Anand	M. Anand
24A150	AI (1 st)	V. Anand	V. Anand
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Roll No.	Group	Name of the Student	Signature
24A201	AI (1 st)	R. Anand	R. Anand
24A202	AI (1 st)	S. Anand	S. Anand
24A203	AI (1 st)	G. Anand	G. Anand
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24A299	AI (1 st)	K. Anand	K. Anand
24A300	AI (1 st)	S. Anand	S. Anand

GALLERY

