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	Indranagar, Gachibowli, Hyderabad - 500 032, India

Date of Birth:

January 9, 1944, Rajahmundry, India

Academic Qualifications:

- PhD, Indian Institute of Science, Bangalore, 1974

- ME, Indian Institute of Science, Bangalore, 1966

- BE, Indian Institute of Science, Bangalore, 1964

- BSc, Andhra University, Waltair, 1961

Awards/Honours Received:

1. Life Fellow of IEEE (USA), 2013

2. INAE Professor S. N. Mitra Memorial Award, 2006

3. Fellow of Indian Acadamy of Sciences, 2004

4. Fellow of Indian National Science Academy, 1999

5. 3rd IETE Professor S. V. C. Aiya Memorial Award, 1996

6. Fellow of Indian National Academy of Engineering, 1995

Professional Society Involved:
 (Office bearer, member, referee, etc.)

1. IEEE (USA)

2. IETE (India)

3. Acoustical Society of India (India)

4. Associate Editor, IEEE Transactions on Speech & Audio Processing (2003-2006)

Research/Projects Guided:

PhD Theses

1. N. Dhananjaya, *Signal processing for excitation-based analysis of acoustic events in speech*, IIT Madras, 2011

2. Hussien Seid Worku, *Acoustic characterization of glottal stop and glottalized sounds in Amharic using nonspectral methods of speech analysis*, IIIT Hyderabad, 2010

3. Guruprasad S., *Significance of processing regions of high signal-to-noise ratio in speech signals*, IIT Madras, 2010

4. Anil Kumar Sao, *Representation of edge-like information in images with application for face recognition*, IIT Madras, 2010

5. Sri Rama Murty K, *Significance of excitation source information for speech analysis*, IIT Madras, 2009

6. A. Shahina, *Processing throat microphone speech*, IIT Madras, 2008

7. R. Kumara Swamy, *Processing multispeaker speech: A signal processing approach*, IIT Madras, 2007

8. C. Krishna Mohan, *Features for video shot boundary detection and classification*, IIT Madras, 2007

9. Leena Mary, *Multilevel Implicit Features for Language and Speaker Recognition*, IIT Madras, 2006

10. A. Nayeemulla Khan, *Large Span Constraint Models for Speech Systems*, IIT Madras, 2006

11. K. Sreenivasa Rao, *Acquisition and Incorporation of Prosody Knowledge for Speech Systems in Indian Languages*, IIT Madras, 2005

12. Palanivel S, *Person Authentication using Speech, Face and Visual Speech*, IIT Madras, 2005

13. Suryakanth V. Gangashetty, *Neural Network Models for Recognition of Consonant-Vowel Units of Speech in Multiple Languages*, IIT Madras, 2005

14. S. R. Mahadeva Prasanna, *Event-based Analysis of Speech*, IIT Madras, 2004

15. D. Devaraj, *Computational Intelligent Techniques in Power System Security Analysis*, IIT Madras, 2001

16. P. Satyanarayana, *Short Segment Analysis of Speech for Enhancement*, IIT Madras, 1999

17. Manish Sarkar, *Uncertainity-based Pattern Classification by Modular Neural Networks*, IIT Madras, 1998

18. C. Chandra Sekhar, *Neural Network Models for Recognition of Stop Consonant-Vowel (SCV) Segments in Continuous Speech*, IIT Madras, 1996

19. P. P. Raghu, *Artificial Neural Network Models for Texture Analysis*, IIT Madras, 1995

20. G. V. Ramana Rao, *Word Boundary Hypothesization in Hindi Speech*, IIT Madras, 1995

21. R. Ramaseshan, *Image Reconstruction from Multiple Frames of Sparse Data*, IIT Madras, 1994

22. R. Sundar, *Signal Processing for Recognition of Isolated Utterences of Speech Units*, IIT Madras, 1994

23. A. S. Madhukumar, *Intonation Knowledge for Speech Systems for an Indian Language*, IIT Madras, 1993

24. Hema A. Murthy, *Algorithms for Processing Fourier Transform Phase of Signals*, IIT Madras, 1992

25. P. Eswar, *A Rule-based Approach for Spotting Characters from Continuous Speech in Indian Languages*, IIT Madras, 1991

26. K. V. Madhumurthy, *Some Issues in Processing Short Segments of Speech Signals*, IIT Madras, 1991

27. J. C. P. Mariadossou, *Solutions to Some Ill-posed Problems in Sensor Array Imaging*, IIT Madras, 1990

28. S. Raman, *Speech Recognition of Hindi Stop Consonants*, IIT Madras, 1985

29. T. V. Ananthapadmanabha, *Epoch Extraction and its Application to Voiced Speech Analysis,* IISc, Bangalore, 1977

MS Theses

1. Sathya Adithya Thati, *Analysis for synthesis of nonverbal elements of speech communication based on excitation source information,* IIIT Hyderabad, 2012

2. K. Sudheer Kumar, *Analysis of laugh signals for automatic detection and synthesis*, IIIT Hyderabad, 2010

3. Harish Reddy M, *Analysis of speech at different speaking rates using excitation source information,* IIIT Hyderabad, 2010

4. B. Avinash, *Exploring features for text-dependent speaker verification in distant speech signals,* IIIT Hyderabad, 2010

5. G. Bapineedu Chowdary, *Analysis of Lombard effect speech and its application in speaker verification for imposter detection*, IIIT Hyderabad, 2010

6. Anand Joseph Xavier M, *Extracting formant frequencies from short segments of speech*, IIT Madras, 2008

7. Suresh Vakkalanka, *Multimedia Content Analysis for Video Classification and Indexing*, IIT Madras, 2005

8. Chaitanya Mannemala, *Single Channel Speech enhancement*, IIT Madras, 2005

9. S. Guruprasad, *Exploring Features and Scoring Methods for Speaker Recognition*, IIT Madras, 2004

10. Dhananjaya N, *Speaker Segmentation using Excitation Source Features*, IIT Madras, 2004

11. Anvita Bajpai, *Exploring features for audio classification*, IIT Madras, 2004

12. Anil Kumar Sao, *Significance of Image Representation for Face Recognition*, IIT Madras, 2004

13. B. S. Venkatesh, *Face Detection in Still Gray Images Using Neural Networks*, IIT Madras, 2004

14. P. Vinod, *Text-dependent Audio-Visual Biometric Person Authentication*, IIT Madras, 2004

15. Cheedella S. Gupta, *Significance of Source Features for Speaker Recognition*, IIT Madras, 2003

16. K. Kiran Kumar, *Duration and Intonation Knowledge for Text-to-Speech Conversion System for Telugu and Hindi*, IIT Madras, 2002

17. Jinu Mariam Zachariah, *Text-Dependent Speaker Verification Using Segmental, Suprasegmental and Source Features*, IIT Madras, 2002

18. K. Sharat Reddy, *Source and System Features for Speaker Recognition*, IIT Madras, 2001

19. S. Ramesh, *Edginess Image for Face Recognition*, IIT Madras, 2001

20. S. P. Kishore, *Speaker Verification using Auto-Associative Neural Network Models*, IIT Madras, 2000

21. P. Kiran Kumar, *Texture Edge Extraction using One Dimensional Processing*, IIT Madras, 2000

22. A. V. N. S. Anjani, *Analysis of Auto-Associative Neural Network Models for Processing Degraded Speech*, IIT Madras, 2000

23. M. Mathew, *Combining Evidence from Different Classifiers forText-Dependent Speaker Verification*, IIT Madras, 1999

24. M. Shajith Ikbal, *Auto-Associative Neural Network Models for Speaker Verification*, IIT Madras, 1999

25. Hemant Misra, *Development of Mapping Feature for Speaker Recognition*, IIT Madras, IIT Madras, 1999

26. Anitha Mary Jacob, *Feedforward Neural Network Models for Processing Degraded Speech*, IIT Madras, 1998

27. G. Pavan Kumar, *Edge Detection in Textured Images*, IIT Madras, 1998

28. N. Sudha, *Principal Component Neural Networks for Applications in Signal Processing*, IIT Madras, 1996

29. Neeharika Adabala, *Generalization Capability of Feedforward Neural Networks for Pattern Recognition Tasks,* IIT Madras, 1996

30. M. Narendranath, *Transformation of Vocal Tract Characteristics for Voice Conversion using Artificial Neural Networks*, IIT Madras, 1995

31. A. Ravichandran, *Object Recognition from Degraded Images Using Neural Networks*, IIT Madras, 1993

32. A. Arulvalan, *Neural Network Architectures for Preattentive Visual Processing*, IIT Madras, 1993

33. V. R. Ramachandran, *Coarticulation Knowledge for a Text-to-Speech System for an Indian Language*, IIT Madras, 1993

34. S. R. Rajesh Kumar, *Significance of Durational Knowledge for a Text-to-Speech System in an Indian Language*, IIT Madras, 1990

35. Pramod Saini, *Algorithm for Image Reconstruction from Quantized Phase*, IIT Madras, 1989

36. Shriram Revankar, *Computer Drafting of Hand-drawn Line Sketches*, IIT Madras, 1987

37. S. Tanveer Fathima, *Studies on a Class of Information Recovery Problems*, IIT Madras, 1987

Continuing Education Programs/Conferences Organized:

1. Chair, Workshop on Image and Speech Processing (WISP) 2009, Dec. 17, 2012, IIIT Hyderabad, India.

2. Chair, Workshop on Image and Speech Processing (WISP) 2009, Dec. 17, 2011, IIIT Hyderabad, India.

3. Chair, Workshop on Image and Speech Processing (WISP) 2009, Dec. 16, 2010, IIIT Hyderabad, India.

4. Chair, Workshop on Image and Speech Processing (WISP) 2009, Dec. 19, 2009, IIIT Hyderabad, India.

5. Co-Chair (Technical Program Committee), IEEE-TENCON, Nov. 18-21, 2008, University of Hyderabad, Hyderabad, India.

6. Convenor, UKIERI Round Table Meeting, Dec. 11-12, 2008, IIIT Hyderabad, India.

7. Chair, Workshop on Image and Speech Processing (WISP) 2008, Dec. 13, 2008, IIIT Hyderabad, India.

8. Short-term course on Speech Processing at NIT Warangal, on March 25, 2008.

9. CEP course on signal processing, at DLRL, Hyderabad on February 11, 2008.

10. RSPS-2008 at KLCE, Guntur Dt., Andhra Pradesh, on February 2, 2008.

11. Talk on Speech processing at Short-term course on DSP Processor & Applications, at IETE building, Hyderabad, on July 26, 2007.

12. Talk on Basics of Digital Signal Processing at the CEP course at RCI (DRDO), Hyderabad on November 20, 2006.

13. Lectures on Signal Processing at CEP course at NSTL, Visakhapatnam, October 9-10, 2006.

14. Tutorial on Nonspectral Features in Speech Processing, INTERSPEECH 2006, Pittsburgh, USA, September 2006.

15. INAE Workshop on Image and Speech Processing, (WISP-2006), IIT Madras, February 26-28, 2006.

16. Tutorial on Neural Network Models for Speech and Image Processing, WCCI, Hawaii, May 12, 2002.

17. Tutorial on Neural Network Models for Speech and Image Processing, International Conference on High Performance Computing, Hyderabad, India, December 18-20, 2001.

18. International Conference on Multimedia Processing and Systems, IIT Madras, August 13-15, 2000.

19. Short-Term Course on Speech Technology, IIT Madras, 1997.

20. Short-Term Course on Artificial Neural Networks, IIT Madras, 1994.

21. Tutorial on Speech Technology, IIT Madras, December 6-8, 1992.

22. Workshop on Speech Technology, IIT Madras, December 9-11, 1992.

Publications:

Text Books, Monographs, Conference Proceedings - Authored/Edited:

1. L. Rabiner, B-H. Juang, and B. Yegnanarayana, **Fundamentals of speech recognition**, Pearson Education Inc., Delhi (Indian Subcontinent Adaptation), 2009.

2. **B. Yegnanarayana**, C. Chandra Sekhar, S. Palanivel, V. Suresh, Anil Kumar Sao and Dhananjaya N., Issues in the Development of an Audio-Video based Person Authentication System, in Jana Dittmann, Claus Vielhauer and Jan Hansen (Eds.), *New Advances in Multimedia Security, Biometrics, Watermarking and Cultural Aspects*, pp. 53-76, Logos Verlag Berlin, Berlin, 2006.

3. S. V. Gangashetty, C. Chandra Sekhar, and **B. Yegnanarayana**, Spotting Multilingual Consonant-Vowel Units of Speech using Neural Network Models, in Marcos Fundez-Zanuy, ... (Eds.), *Nonlinear Analyses and Algorithms for Speech Processing (Revised Selected Papers from International Conference on Non-linear Speech Processing, NOLISP 2005, Barcelona, Spain, April 19-22) (LNAI Vol. 3817, ISBN: 3-540-31257-9)*, pp. 303-317, Springer Lecture Notes in Artificial Intelligence, 2005.

4. **B. Yegnanarayana**, Suryakanth V. Gangashetty, and S. Palanivel, Autoassociative Neural Network Models for Pattern Recognition Tasks in Speech and Image, in Ashish Ghosh and Sankar K. Pal (Eds.), *Soft Computing Approach to Pattern Recognition and Image Processing,* World Scientific Publishing Co. Pte. Ltd., Singapore, 2002.

5. **B. Yegnanarayana** and C. Chandra Sekhar, Pattern Recognition Issues in Speech Processing, in Sankar K. Pal, and Amita Pal (Eds.), *Pattern Recognition from Classical to Modern Approaches,* World Scientific Publishing Co. Pte. Ltd., Singapore, 2001.

6. **B. Yegnanarayana** and S. Ramesh, *Solution Manual to Artificial Neural Networks* by B. Yegnanarayana, New Delhi, Prentice-Hall of India, 2001.

7. **B. Yegnanarayana** and M. Narendranath, Neural Networks, Voice Conversion, in S. Katagiri (Ed.), *Handbook of Neural Networks for Speech Processing*, Artech House Inc., Massachusetts, 2000.

8. Manish Sarkar and **B. Yegnanarayana,** Application of Fuzzy-Rough Sets in Modular Neural Networks, in S. K. Pal and A. Skowron (Eds.), *Rough Fuzzy Hybridization: A New Trend in Decision Making,* Springer-Verlag Singapore Pte. Ltd., 1999.

9. **B. Yegnanarayana**, *Artificial Neural Networks*, New Delhi, Prentice-Hall of India, 1999.

10. **B. Yegnanarayana**, M. Narendranath and S. Rajendran, *Voice Conversion* , Indian Institute of Technology Madras, September 1995.

11. **B. Yegnanarayana**, N. Sudha, P.P. Raghu and C. Chandra Sekhar, *Artificial Neural Networks for Classification of Sonar Targets*, Indian Institute of Technology Madras, August 1995.

12. P. P. Raghu, R. Poongodi and **B. Yegnanarayana**, *Application of Artificial Neural Networks in Remote Sensing*, Indian Institute of Technology Madras, November 1995.

13. **B. Yegnanarayana** and V. R. Ramachandran, "Group Delay Processing of Speech Signals in Martin Cooke", Steve Beet and Malcom Crawford (Eds.), *Visual Representations of Speech Signal,* John Wiley and Sons Ltd., 1993.

14. **B. Yegnanarayana** et al.,Proceedings of Workshop on Speech Technology, Indian Institute of Technology Madras, December 1992.

15. **B. Yegnanarayana** et al., *Tutorial on Speech Technology,* Indian Institute of Technology Madras, December 1992.

16. **B. Yegnanarayana**, R. Ramaseshan and A. Ravichandran, *Studies in Sensor Array Imaging,* Indian Institute of Technology Madras, November 1992.

17. V. V. S. Sarma, N. Viswanadham, **B. Yegnanarayana** and B. L. Deekshatulu, *Aritificial Intelligence and Expert System Technologies in the Indian Context,* vol.1 & 2, Tata McGraw-Hill, 1991.

18. **B. Yegnanarayana** and P. V. S. Rao (Eds.), *Special issue on Speech Processing,* JIETE, vol.34, no.1, Jan-Feb 1988.

Publications in Journals

Publications in International Journals

1. Vinay Kumar Mittal and B. Yegnanarayana, **Effect of glottal dynamics in the production of shouted speech**, accepted for publishing in Journal of Acoustical Society of America, May 2013.

2. B. Yegnanarayana and N. Dhananjaya, **Spectro-temporal analysis of speech signals using zero-time windowing and group delay function**, accepted for publishing in Speech Communication, 2013.

3. Sathya Adithya Thati, Sudheer K. and B. Yegnanarayana, **Synthesis of laughter by modifying excitation characteristics**, accepted for publishing in Journal of Acoustical Society of America, May 2013.

4. N. Dhananjaya, B. Yegnanarayana and P. Bhaskararao, **Acoustic analysis of trill sounds**, *Journal of the Acoustical Society of America*, vol. 131, no. 5, May 2012.

5. Guruprasad S. and B. Yegnanarayana, **Performance of an event-based instantaneous fundamental frequency estimator for distant speech signals**, *IEEE Transactions on Audio, Speech and Language Processing*, vol. 19, no. 7, pp. 1853 -1864, Sep. 2011.

6. Anil Kumar Sao and B. Yegnanarayana, **On the use of phase of the Fourier transform for face recognition under variations in illumination**, *Signal, Image and Video Processing*, vol. 4, no. 3, pp. 353-358, Sep. 2010.

7. Srinivas Desai, Alan W Black, B. Yegnanarayana, and Kishore Prahallad, **Spectral mapping using Artificial Neural Networks for voice conversion**, *IEEE Transactions on Audio, Speech and Language Processing*, vol. 18, no. 5, pp. 954-964, July 2010.

8. N. Dhananjaya and B. Yegnanarayana, **Voiced/nonvoiced detection based on robustness of voiced epochs**, *IEEE Signal Processing Letters*, vol. 17, no. 3, pp. 273-276, Mar. 2010.

9. K. Sreenivasa Rao and B. Yegnanarayana, **Duration modification using glottal closure instants and vowel onset points**, *Speech Communication*, vol. 51, no. 12, pp. 1263-1269, Dec. 2009.

10. Guruprasad S. and B. Yegnanarayana, **Perceived loudness of speech based on the characteristics of glottal excitation source**, *Journal of the Acoustical Society of America*, vol. 126, no. 4, pp. 2061-2071, Oct. 2009.

11. B. Yegnanarayana, R. Kumara Swamy and K. S. R. Murty, **Determining mixing parameters from multispeaker data using speech-specific information**, *IEEE Transactions on Audio, Speech, and Language Processing*, vol. 17, no. 6, pp. 1196-1207, Aug. 2009.

12. K. S. R. Murty, B. Yegnanarayana and M. Anand Joseph, **Characterization of glottal activity from speech signals**, *IEEE Signal Processing Letters*, vol. 16, no. 6, pp. 469-472, Jun. 2009.

13. B. Yegnanarayana and K. S. R. Murty, **Event-based instantaneous fundamental frequency estimation from speech signals**, *IEEE Transactions on Audio, Speech, and Language Processing*, vol. 17, no. 4, pp. 614-624, May 2009.

14. K. Sreenivasa Rao and B. Yegnanarayana, **Intonation modeling for Indian languages**, *Computer Speech and Language,* vol. 23, no. 2, pp. 240-256, Apr. 2009

15. C. Krishna Mohan and B. Yegnanarayana, **Classification of sport videos using edge-based features and autoassociative neural network models**, *Signal, Image and Video Processing,* Dec. 2008, published online, doi:10.1007/s11760-008-0097-9.

16. K. S. R. Murty and B. Yegnanarayana, **Epoch extraction from speech signals**, *IEEE Transactions on Audio Speech and Language Processing*, vol. 16, no. 8, pp. 1602-1613, Nov. 2008.

17. Leena Mary and B. Yegnanarayana, **Extraction and representation of prosodic features for language and speaker recognition**, *Speech Communication*, vol. 50, no. 10, pp. 782-796, Oct. 2008.

18. N. P. Cuntoor, B. Yegnanarayana and R. Chellappa, **Activity modeling using event probability sequences**, *IEEE Transactions on Image Processing*, vol. 17, no. 4, pp. 594-607, Apr. 2008.

19. N. Dhananjaya and B. Yegnanarayana, **Speaker change detection in casual conversations using excitation source features**, *Speech Communication*, vol. 50, no. 2, pp. 153-161, Feb. 2008.

20. S. Palanivel and B. Yegnanarayana, **Multimodal person authentication using speech, face and visual speech**, *Computer Vision and Image Understanding*, vol. 109, no. 1, pp. 44-55, Jan. 2008.

21. K. Sreenivasa Rao, S. R. M. Prasanna and B. Yegnanarayana, **Determination of instants of significant excitation in speech using Hilbert envelope and group delay function**, *IEEE Signal Processing Letters,* vol. 14, no. 10, Oct. 2007.

22. Anil Kumar Sao and B. Yegnanarayana, **Face verification using template matching**, *IEEE Transactions on Information Forensics and Security*, Special Issue on 'Human Detection and Recognition', vol. 2, no. 3, pp. 636-641, Sep. 2007.

23. Anil Kumar Sao, B. Yegnanarayana and B. V. K. Vijaya Kumar, **Significance of image representation for face verification**, *Signal, Image and Video Processing*, Special issue on 'Multi-sensor object detection and tracking', vol. 1, no. 3, pp. 225-237, Aug. 2007.

24. A. Shahina, and B. Yegnanarayana, **Mapping Speech Spectra from Throat Microphone to Close-Speaking Microphone: A Neural Network Approach**, *EURASIP Journal on Advances in Signal Processing*, vol. 2007, Article ID 87219, 10 pages, 2007. doi:10.1155/2007/87219.

25. R. Kumara Swamy, K. Sri Rama Murty and B. Yegnanarayana, **Determining number of speakers from multispeaker speech signals using excitation source information**, *IEEE Signal Processing Letters*, vol. 14, no. 7, pp. 481-484, Jul. 2007.

26. K. Sreenivasa Rao and B. Yegnanarayana, **Modeling durations of syllables using neural networks,** *Computer Speech and Language*, vol. 21, no. 2, pp. 282-295, Apr. 2007.

27. S. R. Mahadeva Prasanna, Cheedella S. Gupta and B. Yegnanarayana, **Extraction of speaker-specific excitation information from linear prediction residual of speech**, *Speech Communication*, vol. 48, no. 10, pp. 1243-1261, Oct. 2006.

28. K. Sreenivasa Rao and B. Yegnanarayana, **Prosody modification using instants of significant excitation**, *IEEE Transactions on Speech and Audio Processing,* vol.14, no.3, pp. 972-980, May 2006.

29. K. Sri Rama Murty and B. Yegnanarayana, **Combining Evidence from Residual Phase and MFCC Features for Speaker Recognition,** *IEEE Signal Processing Letters,* vol.13, no.1, pp. 52-56, Jan. 2006.

30. B. Yegnanarayana, S. R. M. Prasanna, R. Duraiswamy and D. Zotkin, **Processing reverberant speech for time-delay estimation,** *IEEE Transactions on Speech and Audio Processing,* vol.13, no.6, Nov. 2005.

31. Vikas C. Raykar, B.Yegnanarayana, S.R.M. Prasanna and R. Duraiswami, **Speaker localization using excitation source information,** *IEEE Transactions on Speech Audio Processing,* vol.13, no.5-II, pp. 751-761, Sep. 2005.

32. B. Yegnanarayana, S. R. M. Prasanna, J. M. Zachariah and C. S. Gupta, **Combining evidence from source, suprasegmental and spectral features for fixed-text speaker verification,** *IEEE Transactions on Speech and Audio Processing*, vol.13, no.4, pp. 575-582, Jul. 2005.

33. Vikas C. Rayakar, Ramani Duraiswami and B. Yegnanarayana, **Extracting the frequencies of the pinna spectral notches in measured head-related impulse response,** *Journal of Accoustical Society of America,* vol.118, no.1, pp. 364-374, Jul. 2005.

34. V. Shiv Naga Prasad and B. Yegnanarayana, **Finding axes of symmetry from potential fields**, in *IEEE Transactions on Image Processing,* vol. 13, no. 12, pp. 1559-1566, Dec. 2004.

35. Hemant Misra, Shajith Ikbal and B. Yegnanarayana, **Speaker-specific mapping for text-independent speaker recognition,** *Speech Communication,* vol.39, no.3-4, pp. 301-310, Feb. 2003.

36. C. Chandra Sekhar and B. Yegnanarayana, **A constraint satisfaction model for recognition of stop consonant vowel (SCV) utterences,** *IEEE Transactions on Speech and Audio Processing,* vol.10, no.7, pp. 472-480, Oct. 2002.

37. D. Devaraj, B. Yegnanarayana and K. Ramar, **Radial basis function networks for fast contingency ranking,** *Electric Power and Energy Systems Journal,* vol. 24, no.5, pp. 387-393, Jun. 2002.

38. B. Yegnanarayana and S. P. Kishore, **AANN: an alternative to GMM for pattern recognition,** *Neural Networks,* vol.15, no.3, pp. 459-469, Apr. 2002.

39. B. Yegnanarayana and P. Satyanarayana Murthy, **Enhancement of reverberant speech using LP residual,** *IEEE Transactions on Speech and Audio Processing,* vol.8, no.3, pp. 267-281, May 2000.

40. N. Malayath, H. Hermansky, S. Kajarekar and B. Yegnanarayana, **Data-Driven Temporal Filters and Alternatives to GMM in Speaker Verification,** in *Digital Signal Processing,* vol. 10, pp. 55-74, Jan-Jul. 2000.

41. P. Satyanarayana Murthy and B. Yegnanarayana, **Robustness of group-delay-based method for extraction of significant instants of excitation from speech signals**, *IEEE Transactions on Speech and Audio Processing,* vol.7, no.6, pp. 609-619, Nov. 1999.

42. B. Yegnanarayana, C. Avendano, H. Hermansky and P. Satyanarayana Murthy, **Speech enhancement using linear prediction residual**, *Speech Communication*, vol.28, no.1, pp. 25-42, May 1999.

43. B. Yegnanarayana and R. N. J. Veldhuis, **Extraction of vocal-tract system characteristics from speech signals,** *IEEE Transactions on Speech and Audio Processing.* Vol.6, no.4, pp. 313-327, Jul. 1998.

44. P. P. Raghu and B. Yegnanarayana, **Supervised texture classification using a probabilistic neural network and constraint satisfaction model,** *IEEE Transactions on Neural Networks,* vol.9, no.3, pp. 516-522, May 1998.

45. C. d'Alessandro, V. Darsinos and B. Yegnanarayana, **Effectiveness of a periodic and aperiodic decomposition method for analysis of voice sources,** *IEEE Transactions on Speech and Audio Processing,* vol.6, no.1, pp. 12-23, Jan. 1998.

46. B. Yegnanarayana, C. d'Alessandro and V. Darsinos, **An iterative algorithm for decomposition of speech signals into periodic and aperiodic components,** *IEEE Transactions on Speech and Audio Processing,* vol.6, no.1, pp. 1-11, Jan. 1998.

47. M. Sarkar, B. Yegnanarayana and D. Khemani, **Backpropagation learning algorithms for classification with fuzzy mean square error,** *Pattern Recognition Letters,* vol.19, no.1, pp. 43-51, Oct. 1997.

48. M. Sarkar, B. Yegnanarayana and D. Khemani, **A clustering algorithm using an evolutionary programming-based approach,** *Pattern Recognition Letters,* vol.18, no.10, pp. 975-986, Aug. 1997.

49. P. P. Raghu, R. Poongodi and B. Yegnanarayana, **Unsupervised texture classification using vector quantization and deterministic relaxation neural network,** *IEEE Trans. on Image Processing*, vol.6, no.10, pp. 1376-1387, Oct. 1997.

50. P. P. Raghu and B. Yegnanarayana, **Multispectral image classification using Gabor filters and stochastic relaxation neural network**, *Neural Networks*, vol.10, no.3, pp. 561-572, May 1997.

51. P. P. Raghu and B. Yegnanarayana, **Segmentation of Gabor filtered textures using deterministic relaxation,** *IEEE Trans. on Image Processing,* vol.5, no.12, pp. 1625-1636, Dec. 1996.

52. B. Yegnanarayana and P. Satyanarayana Murthy, **Source-system windowing for speech analysis and synthesis,** *IEEE Trans. on Speech and Audio Processing*, vol.4, no.2, pp. 133-137, Mar. 1996.

53. S. Rajendran and B. Yegnanarayana, **Word boundary hypothesization for continuous speech in Hindi based on F0 patterns,** *Speech Communication*, vol.18, no.1, pp. 21-46, Jan. 1996.

54. R. L. H. M. Smits and B. Yegnanarayana, **Determination of instants of significant excitation in speech using group delay function**, *IEEE Trans. on Speech and Audio Processing*, vol.3, no.5, pp. 325-333, Sep. 1995.

55. M. Narendranath, H. A. Murthy, S. Rajendran, and B. Yegnanarayana, **Transformation of formants for voice conversion using artificial neural networks**, *Speech Communication*, vol.16, no.2, pp. 206-216, Feb. 1995.

56. A. Ravichandran and B. Yegnanarayana, **Studies on object recognition from degraded images using neural networks**, *Neural Networks*, vol.8, no.3, pp. 481-488, May 1995.

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