



Dr.R.Senthilkumar, B.E., M.E., PhD.,
AMIE, MISTE

Office Address:

Assistant Professor,
Department of Electronics and
Communication Engineering,
Institute of Road and Transport Technology,
Erode, Tamilnadu-638316, INDIA
Phone number: +91 0424-2533279
Fax Number: +91 0424-2533590
Mobile Number: +91 9940882605
Email Id: rsenthil_1976@yahoo.com,
senthilkumar@irttech.ac.in

Area of Specialization

Image Denoising, Edge Detection, Image Compression, Video Processing, Face recognition, Pattern recognition, Deep Learning, Machine Learning, Data Science & Data Analytics, Algorithm Development and Implementation, Echo Cancellation, Speech Denoising, Simple Practical Applications using Embedded Processors.

Software familiar and used for Algorithm Development, Coding, Analysis, Experiments

Scilab, Matlab, NGSpice, PSpice, KiCAD, eSim, C++(TurboC++, gcc, gcc++ compilers), J2SE, Octave, Libre office, LATEX, Packet tracer, Omnet++, Python and Python associated Libraries, tools such as NumPy, SciPy, Matplotlib, Pylab, CV2, Anaconda Python-Spyder, iPython notebook, Jupiter notebook, NI Multisim, NI LabVIEW.

Software & Hardware Interface Tools

- Embedded C using Keil C Compiler for ARM7, 8051.
- VLSI software & hardware tools like Xilinx, Modelsim, iVerilog (free source), VHDL (free source in Linux only).
- DSP software tools like Code Composer Studio-Texas instruments DSP Kit.
- Interfacing NI LabVIEW with Scilab and Matlab

Operating System Working Experience

DOS, Windows, Ubuntu Linux

Skill Set

- Ability to develop own algorithm for required applications and implementation of those algorithms using either open source software or software like Matlab.
 - Ability to develop software program, toolbox, and atoms based on the mathematical expression of algorithms for example like convolution, correlation, discrete Fourier transform, filtering in DSP etc.
 - Ability to interrupt, code and debug hardware interfacing software like KeilC, Xilinx, Code Composer studio.
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Objective

Working towards the aspect of linking Mathematics, Physics, Chemistry and Biology with Engineering Applications oriented, satisfying at least 1 part in 1 million real world much needed engineering applications.

Crisp Profile Details

- Personal website : {<https://rsenthilirtt.blogspot.com>
{http://www.geocities.ws/senthilirtt/Dr.R.Senthilkumar_ECE_IRTT}
- Researchgate : {https://www.researchgate.net/profile/Dr_Senthilkumar2}
- ORCID id : {<https://orcid.org/0000-0001-6163-8137>}
- Scopus page : {<https://www.scopus.com/authid/detail.uri?authorId=56151998400>}
- Google Scholar : {<https://scholar.google.co.in/citations?user=lik6XJ0AAAAJ&hl=en>}
- Number of patents : { filed 1 patent }
- Number of copyrights : { 2 registered, 1 pending enquiry }
- Number of Books Published : { 6 }

{Signals and Systems, Analog and Digital Communication, Digital Signal Processing and Its Applications, Electromagnetic Fields, Circuit Theory, Electric Circuits theory and Analysis}

- Number of Journals Papers Published : { 9 }
- Number of International Conference Papers Published: { 7 }
- Number of National Conference Papers Published : { 6 }
- Number of Symposium Papers presented : { 4 }
- Software Projects: Face Recognition Toolbox using Scilab software:
{<http://www.face-rec.org/source-codes/>}
- Databases created: Face Recognition databases : { 3 }
{<http://www.face-rec.org/databases/>}

- Number of Book Chapters Published : { 1 }
{Springer Publications}
 - Number of Technical Reports Published : { 1 }
{Annual Technical Volume, Electronics and Telecomm. Engineering Division, Institution of Engineers, India}
 - Number of Projects completed : { 12 }
{Mostly Scilab.in IITBombay projects, sponsored by MHRD}
 - GitHub for Project code development :
{<https://github.com/senthilkumarIRT/Scilab-communication-toolbox>}
{Internship with IIT Bombay, 2015}
 - Scilab Atoms or Toolboxes :
{https://atoms.scilab.org/toolboxes/Analog_and_DigitalCommunication/0.1.1}
 - Number of FDPs Coordinated : { 1 }
 - Number of Workshops Organized in the institution : { 7 }
 - Number of Workshops Conducted outside the institution : { 3 }
 - Number of Guest Lectures given : { 7 }
{Which includes the guest lecture delivered in IIT Bombay December 2014}
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Awards/ Honours /Achievements

1. R.Senthilkumar and P.M.Rajamanokar, IEEE student association Technical Quiz, October 8, 1997. [**WON First Prize**]. {During Under Graduate}
 2. R.Senthilkumar and P.M.Rajamanokar, IEEE student association Technical Quiz, 26th February, 1998. [**WON Second Prize**]. {During Under Graduate}
 3. R. Senthilkumar and A.Venkatesan, "DIGITAL VIDEOS", ECE Association, PSNA College of Engineering Technology, Dindigul, March 5, 1998. [**WON First Prize for Best Paper**]. {During Under Graduate}
 4. Rank Holder (top 5) in UG ECE with overall **76.7% First Class with Distinction.**
 5. IEEE student members finance secretary during 1998-1999.
 6. Cleared GATE 2001 with **88.25 percentile.**
 7. Rank Holder (top 5) in PG Applied Electronics with overall **80.02% First Class with Nil History of Arrears.**
 8. IEEE student members Joint Secretary during 2001-2002.
 9. Class representative for PG during 2001-2003.
 10. R.Senthilkumar, R.Udayachandran and Dr.S.Jothimani, "Improvement in the Peak Signal to Noise Ratio Value by Using Daubechies Wavelets for Image-Denoising Applications", National Level Conference on Advances in Computer and Communication (NCACC2005), Dept. of ECE, Periyar Maniammai College of Technology for Women, April 15-16, 2005. [**Won the best paper Award**].
 11. Received **certificate of appreciation from IRT, Director** during June 2011, for the publication of signals and systems text book.
 12. Checked the working condition of Bus Driver Simulator (BDS) machine and its parts in IRT, Chennai, during 2012 and a detailed report was given to IRT office.
 13. PhD thesis evaluation recommendation: ~~Highly commented/~~ **commented.**
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Educational Qualifications

Under Graduate

- Received my Bachelor of Engineering degree in Electronics and Communication Engineering department from Madurai Kamaraj University.
- Name of the Institution: PSNA College of Technology, Dindigul, Tamilnadu.
- Period of study: 1995-1999.
- Month & Year of Passing: Apr'1999.
- Score: 76.7 % First class with distinction.
- Rank Holder in UG 5th rank out of 66 students
- IEEE student member from 1996 to 1999. Post: Finance secretary.

UG Project

Project Title: *Analysis of Cardiovascular System using Back Propagation Algorithm*

Team Members : R.Senthilkumar, A.Venkatesan, R.Ramesh and R.Muthukaruppasamy.

Project Guides : Prof. S. Selvan & Mrs. N.Kaliammal

Abstract (Synopsis)

In today life, it is difficult to classify the symptoms under various diseases. It is more difficult in the case of cardiovascular system because it has numerous amounts of diseases with complicated symptoms. So we are in need of a system which classifies the various symptoms under the corresponding disease.

For the classification problem we can use Neural Networks which biologically inspired and they work in a manner analogous to the biological neuron. It has several algorithms to work with. But the well suited algorithm for Pattern Recognition is BACK PROPAGATION algorithm.

The Back Propagation algorithm is of the type of supervised learning. Training is modification of weights (connective values between two neurons). In training, the training sets are given as input with their target vector and trained according to the algorithm until the error is minimized. The modified weights are saved and stored.

In the recognition the symptoms are given as input to neural network and the corresponding output is got. The o/p value is compared with a threshold and the disease is identified according to the threshold value. This neural system is implemented in computer by using Turbo version 2.0 of C++ and Visual Basic6.0.

C++ is used for this purpose because it works in a object oriented approach and it is very easily supports various file handling options. Hence we can easily approach the various functions as separate objects. Visual Basic is mainly used front end design and for programming as like C++.

Graduate (PG)

- Received my Master of Engineering degree in Applied Electronics, EEE department from Bharathiar University.
- Name of the Institution: Coimbatore Institute of Technology, Coimbatore, Tamilnadu.
- Period of study: 2001-2003.
- Month & Year of Passing: Feb'2003.
- Score: 80 % First class with Nil History of Arrears.
- Rank Holder in PG 5th rank out of 16 students

- IEEE student member from 2001 to 2003.

Selection from Under graduate to Graduate (PG)

Through GATE 2001. Percentile 88.25. All India Rank: 924 out of 8534.

No. of candidates appeared: 8534

No. of candidates qualified: 3161

GATE stipend provided by MHRD, Indian Government.

PG Thesis

Title: *Implementation of Acoustic Echo Canceller and Double Talk Detector.*

Team Member: R.Senthilkumar

Project Guides: Mrs.S.Umamaheswari

Abstract (Synopsis)

Echoes produced in a closed room are one among the major problems in telephone communication. These Echoes are bigger in size when compared to the echoes due to improper hybrid transformer and line mismatching. Hence Acoustic Echo Canceller (AEC) plays a vital role in telephone communication. In this project Acoustic Echo Canceller (AEC) and Double Talk Detector (DTD) are implemented by using different methods and these methods are compared. This project work also gives the solution for various problems that arise in the implementation of AEC and DTD.

Speech signals are recorded in different rooms and they are used as Far-End Speaker (FES) input and Near End Speaker (NES) input. First AEC is developed with different possible structures without considering NES and Noise. For DTD implementation, speech signals recorded in a separate room is used as NES signal. Then a final system is developed which includes all possible criteria such as room impulse response, presence of double talk and noise.

From the Matlab simulation results obtained, it is concluded that subband coding require reduced convergence time when compared to the full band coding. Polyphase DFT is superior than all other proposed systems and System using Polyphase Decimator and Interpolator is having worst execution period. In DTD methods Geigel algorithm is suitable for strong NES signal and Normalized cross correlation method is suitable for weak NES signal.

Doctoral Degree PhD

- PhD Admission 07.07.2011 Qualified through online test and interview conducted by Anna University.
- Area of research- Face Recognition -Image Processing.
- Faculty - Information and Communication Engineering.
- Branch - Electronics and Communication Engineering.
- Date of PhD Degree Awarded: 28.08.2019, Anna University, Chennai, Tamilnadu.

Steps Followed to Obtain Doctoral Degree

1. I finished my 4 course work examinations during 2011-2012.
2. Course work papers 2 nos. are implemented in Scilab and submitted as Text book companion projects in IIT Bombay 2011-2012.

3. For Face Recognition, Face databases and Algorithms are needed. First I collected all the standard face databases from different universities, institutions and research laboratories during 2012-2013.
4. I did a survey on the collected face databases during 2013-2014 and I published 2 IEEE International Conference papers.
5. I tried my own face databases using IRTT students during 2014-2015.
6. In order to familiar with face recognition algorithms, I compared 5 standard appearance based statistical face recognition algorithms. The results are published in the Journal of the Institution of Engineers India Series B (Springer) during 2014-2015.
7. A technical report based on the testing Face Recognition Algorithms on IRTT still face and video face databases in the Annual Technical Volume of Electronics and Telecommunication Engineers, Institution of Engineers India during 2015-2016.
8. A new approach based on correlation statistics had been found out and published in ACM sponsored International Conference held on June 2016 in University of Hagen, Hagen, Germany.
9. Different statistical tests and data mining done on face and video face databases collected and published in 2 International Journals; Middle East Journal, World Scientific Research which are UGC approved, in December 2016.
10. Performance of SVM classifier in face recognition improved and the work was submitted as IEEE International Conference paper during January 2017.
11. Different 1D and 2D statistical measures done 11 standard face databases and the work was submitted as IEEE International Conference paper during January 2017.
12. Performance improvement in classification accuracy and a new robust method had been found out in 2016-2017 and published as Journal paper in Cluster Computing (springer) during Jan 2018.
13. Performance improvement in classification accuracy using modified ANFIS combined with Haralick features a new method found out in 2016-2017 and published as a springer Book chapter during June 2018.
14. After submission of Synopsis in Anna University in 2018, I continued my research and filed 1 patent, 2 copyrights registered and 1 copyright filed up to PhD viva-voce during 2018-2019.
15. Thesis report recommendation: commented

Professional Body Membership/ Licence

- (1). **Associated Member in Institution of Engineers – AMIE (India).**
Membership type: Life Member
Membership Grade & Number: AM/ 093047/7.
Date of Election: 17/01/2005.
Division of Attachment: ET, Coimbatore Centre, Tamilnadu state.
 - (2). **Life Member in Indian Society for Technical Education (ISTE).**
Life Member
Membership number: LM43264.
 - (3). **IEEE Member From 2015-2018**
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(4). **Amateur Wireless Radio Communication License**

Name of the Licensee: R.Senthilkumar
Category of License : Restricted
Call sign : VU3ONL
License No : 40416
Valid up to : 23.04.2056

WORK Experience

Total teaching experience 18.5 years

- From 20.8.1999 to 31.7.2001, Lecturer in Electronics and Communication Engineering Department, Dr.Navalar Neduchezeian College of Engineering, Cuddalore District, Tamilnadu.
- From 30.4.2003 to 06.05.2006, Lecturer in Electronics and Communication Engineering Department, V.L.B.Janakiammal College of Engineering and Technology (currently renamed as Sri Krishna Institute of Technology, Coimbatore, Tamilnadu.
- Currently working as an Assistant Professor in Electronics and Communication Engineering department, Institute of Road and Transport Technology, Erode, Tamilnadu from 12th May 2006 to till date.

Achevements in the Institutions

➤ ***Dr.Navalar Neduchezeian Engineering College***

- (1). Establishment of Microprocessor and Microcontroller Laboratories for B.Tech Information technology and Master of Computer Applications (MCA) departments from March 2001 to June 2001.
- (2). Establishment of Communication Engineering Laboratory for B.Tech Information Technology and Analog & Digital Communication Laboratory for Dept. of Computer Science and Engineering in the period December 1999 to October 2000.
- (3). Establishment of Electronics Lab and Digital Lab for Dept. of Electronics and Communication Engineering in the period from December 1999 to July 2001.
- (4). Head of the Department In-charge for Electronics and Communication Engineering Department from March 2001 to June 2001.

➤ ***V.L.B.Janakiammal College of Engineering and Technology (Sri Krishna Institute of Technology)***

- (1). Established Digital Signal Processing Laboratory and Electronic System Laboratory in ECE Department. Electronic System Laboratory experiments were designed by me and I was the first person who conducted this lab successfully in all over 300 Anna University Affiliated colleges in Academic Year 2003-2004, even semester.

(2). The following departments EEE, ECE, CIVIL, MECH were accredited by NBA, AICTE in the year 2004-2005. I played key role in this NBA accreditation for 4 departments.

➤ **Institute of Road and Transport Technology**

❖ Workshops, Seminar and Winter School, Summer School Organized and Coordinated:

S.No	Workshops /Seminar /FDP /SDP	Coordinators /Organizer	Sponsor	Grant received in Rupees
1.	Intensive Workshop on "MATLAB for Research Applications" 26.6.2009 to 28.6.2009	M.Raja, ASP/ECE Dr.R.Senthilkumar, AP/ECE	Self Supported	---
2.	Two Day Workshop on "Open Source Signal Processing Software Scilab" 18-07-2009 to 19-07-2009	S.Shanmugam, ASP/ECE Dr.R.Senthilkumar, AP/ECE	IIT Bombay MHRD India	40,000/-
3.	One Day Workshop on "Replacing Matlab using Open Source Scilab for Digital Signal Processing Lab Applications" 10-09-2011	Dr.R.Senthilkumar, AP/ECE	IIT Bombay MHRD India	16,000/-
4.	One Day Workshop on "Digital Image Processing using Scilab and Its Atoms IPD & SIVP" 17-09-2011	Dr.R.Senthilkumar, AP/ECE	IIT Bombay MHRD India	13,000/-
5.	One day workshop on Interfacing LabVIEW with MATLAB & Scilab and Real Time DAQ 22.09.2012	Dr.R.Senthilkumar, AP/ECE	AECE of IRTT & National Instruments	8,000/-
6.	One day workshop on Engineering Applications using Python 29.09.2012	Dr.R.Senthilkumar, AP/ECE	IIT Bombay MHRD India	15,000/-
7.	AICTE Sponsored Faculty Development Programme on Application of Open Source Free Software in Electronics, Telecommunication & Engineering 02.06..2013 to 15.06.2013	Dr.R.Senthilkumar, AP/ECE	AICTE, India	3,68,885/-
8.	C and C++ training Workshop 28.01.2015	Dr.R.Senthilkumar AP/ECE Coordinator	Organizer Spoken-Tutorial.org MHRD	Free

9.	KiCAD training Workshop 28.08.2015	Dr.R.Senthilkumar AP/ECE Coordinator	Organizer Spoken- Tutorial.org MHRD	Free
10.	Java training Workshop 30.03.2016	Dr.R.Senthilkumar AP/ECE Coordinator	Organizer Spoken- Tutorial.org MHRD	Free
11.	Python training Workshop 28.02.2017	Dr.R.Senthilkumar AP/ECE Coordinator	Organizer Spoken- Tutorial.org MHRD	Free
12.	Scilab training Workshop 28.02.2017	Dr.R.Senthilkumar AP/ECE Coordinator	Organizer Spoken- Tutorial.org MHRD	Free
13.	Cpp online test 20.03.2017	Dr.R.Senthilkumar AP/ECE Coordinator	Organizer Spoken- Tutorial.org MHRD	Free
14.	Java online test 21.03.2017	Dr.R.Senthilkumar AP/ECE Coordinator	Organizer Spoken- Tutorial.org MHRD	Free
15.	Python online test 21.03.2017	Dr.R.Senthilkumar AP/ECE Coordinator	Organizer Spoken- Tutorial.org MHRD	Free
16.	Scilab online test 24.03.2017	Dr.R.Senthilkumar AP/ECE Coordinator	Organizer Spoken- Tutorial.org MHRD	Free
17.	LaTeX online test 28.03.2017	Dr.R.Senthilkumar AP/ECE Coordinator	Organizer Spoken- Tutorial.org MHRD	Free
18.	Introduction to Scientific Computing using Python 06.09.2018	Dr.R.Senthilkumar AP/ECE Coordinator	FOSSEE, IIT Bombay Organizer	Free and supported by FOSSEE
19.	Workshop on Embedded and Real Time Systems 19.08.2019 to 22.08.2019	Dr.R.Senthilkumar AP/ECE Coordinator	AECE of I.R.T.T Self supported	-----

- ❖ Guest Lectures Delivered in the workshops, FDP and Seminars conducted by various institutions:

S.No	Workshops/Seminar/ Winter school/Summer school FDP/SDP Title	Organized Institutions/ Department	Guest Lecture on Topic
1.	Intensive Workshop on “MATLAB for Research Applications” 26.6.2009 to 28.6.2009	ECE department, Institute of Road and Transport Technology, Erode	MATLAB Neural Network Toolbox
2.	Two Day Workshop on “Open Source Signal Processing Software Scilab” 18-07-2009 to 19-07-2009	ECE department, Institute of Road and Transport Technology, Erode	1.Introduction to Signals & Systems and programming using Scilab 2.FIR & IIR Filter Design and Implementation using Scilab 3.Speech Noise Cancellation using LMS Adaptive Filter and Its Implementation using Scilab
3.	Scilab Workshop 28-08-2010	ECE department, SASTRA University, Tanjavur	Signals processing using Scilab
4.	Scilab Workshop 29-08-2010	IT & CSE department, Vivekanandha College of Engineering for Women’s, Thiruchengode	Introduction to Scilab
5.	Scilab Workshop 01-11-2010	Rajiv Gandhi Institute of Technology, Kottayam, Kerala	Introduction to Scilab and Signal Processing using Scilab

6.	Scilab Workshop 18-09-2010	EEE department, V.L.B.Janakiammal College of Engineering & Technology, Coimbatore	Open Source software uses in DSP applications
7.	Python Workshop 29-09-2012	ECE department, Institute of Road and Transport Technology, Erode	Python for Engineering Applications
8.	One Day Workshop on Interfacing LabVIEW with MATLAB & Scilab and Real- Time DAQ 22-09-2012	ECE department, Institute of Road and Transport Technology, Erode	Interfacing LabVIEW with MATLAB & Scilab
9.	AICTE Sponsored Faculty Development Programme on Application of Open Source Free Software in Electronics, Telecommunication & Engineering 02.06.2013 to 15.06.2013	ECE department, Institute of Road and Transport Technology, Erode	1.Introduction to NGspice and Scilab 2.Scilab for research applications-Facial Recognition
10.	Scilab India Conference 2014 3-4 December 2014	FOSSEE, Indian Institute of Technology, Bombay	Workshop on Digital Image Processing using Scilab
11.	Anna University Faculty Development Programme 23-29 May 2016	ECE department, M.P.Nachimuthu M.Jaganathan Engineering College, Chennimalai, Erode District	EC6502 - Principles of Digital Signal Processing
12.	Two day Faculty Development Programme on Applications of Scilab in DSP and Image Processing 12-13 August 2016	ECE Department, Navodaya Institute of Technology, Raichur, Karnataka	Applications of Scilab in DSP and
13.	SciPy India Conference 2019- International conference on Scientific computing using Python 29-30 2019. Workshop speaker	FOSSEE, IIT Bombay, Mumbai	Digital Signal Processing using Python (Windows, Ubuntu Linux, Android App)

- ❖ List of Proposals submitted to receive grants in various organizations but not sanctioned:
 1. R.Senthilkumar, Dr.V.N.Janakiraman, "Water purification using Carbon Nano tubes", Project Proposal submitted to Department of Science and Technology, during December 2008.
 2. R.Senthilkumar, to attend the International conference in Germany, Travel Grant proposal submitted to SERB, DST, during June 2016.
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Projects

➤ Lab Migration from licensed software (like MATLAB) to Open Source Scilab software

- [1]. Project Title: Lab Migration Project: **Digital Signal Processing Laboratory** (Anna University Syllabus)
 Principle Investigator/coordinator: R.Senthilkumar (both proposal and solution provider)
 Sponsor: IIT Bombay through Ministry of Human Resource and Development, Government of India.
 Project submitted to: Indian Institute of Technology, Bombay. (www.scilab.in)
 Date: 11 september 2012. [weblink](#)
- [2]. Project Title: Lab Migration Project: **Communication System Laboratory** (Anna University Syllabus)
 Principle Investigator/coordinator: R.Senthilkumar (both proposal and solution provider)
 Sponsor: IIT Bombay through Ministry of Human Resource and Development, Government of India.
 Project submitted to : Indian Institute of Technology, Bombay. (www.scilab.in)
 Date: 11 september 2012. [weblink](#)
- [3]. Project Title: Lab Migration Project: **Digital Signal Processing Laboratory** (Electronics Engineering Department, S.S.V.P'S B.S.D College of Engineering, Dhule, Syllabus)
 Principl Investigator/coordinator: R.Senthilkumar (solution provider)
 Sponsor: IIT Bombay through Ministry of Human Resource and Development, Government of India.
 Project submitted to: Indian Institute of Technology, Bombay.(www.scilab.in)
 Date: 1 June 2013. [weblink](#)
- [4]. Project Title: Lab Migration Project: **Digital Signal Processing Laboratory** (Electronics Engineering Department, Visvesvraya Technological University Syllabus)
 Principle Investigator/coordinator: R.Senthilkumar (solution provider)

Sponsor: IIT Bombay through Ministry of Human Resource and Development, Government of India.

Project submitted to: Indian Institute of Technology, Bombay. (www.scilab.in)

Date: 18 July 2013. [weblink](#)

- [5]. Project Title: Lab Migration Project: **Digital Image Processing Laboratory** (Dept. of Computer Science Engineering, Tripura Institute of Technology, Tripura University Syllabus)

Principle Investigator/coordinator: R.Senthilkumar (solution provider)

Sponsor: IIT Bombay through Ministry of Human Resource and Development, Government of India.

Project submitted to: Indian Institute of Technology, Bombay.(www.scilab.in)

Date: 2 December 2013. [weblink](#)

- [6]. Project Title: Lab Migration Project: **Digital Image Processing Laboratory** (Baptala University Syllabus)

Principle Investigator/coordinator: R.Senthilkumar (solution provider)

Sponsor: IIT Bombay through Ministry of Human Resource and Development, Government of India.

Project submitted to: Indian Institute of Technology, Bombay.(www.scilab.in)

Date: 18 December 2013. [weblink](#)

- [7]. Project Title: Lab Migration Project: **Signal Processing Laboratory** (Delhi University Syllabus)

Principle Investigator/coordinator: R.Senthilkumar (solution provider)

Sponsor: IIT Bombay through Ministry of Human Resource and Development, Government of India.

Project submitted to: Indian Institute of Technology, Bombay.(www.scilab.in)

Date: 23 February 2011.

- [8]. Project Title: Lab Migration Project: **Signal Processing Laboratory** (Sasthra University Syllabus, Tanjavur, Tamilnadu)

Principle Investigator/coordinator: R.Senthilkumar (solution provider)

Sponsor: IIT Bombay through Ministry of Human Resource and Development, Government of India.

Project submitted to: Indian Institute of Technology, Bombay.(www.scilab.in)

Date: 5 September 2010.

➤ **Text Book Companion Project (Solved Example problems in standard text books are coded with open source Scilab)**

- [1]. **“Research Methodology”** by R.Panneerselvam. [scilab programmed by R.Senthilkumar, Dr. R.K.Gnanmurthy] (PhD Course Work).

- [2]. **“Digital Image Processing”** by Dr.S.Jayaraman, S.Esakkirajan, T.Veerakumar. [scilab programmed by R.Senthilkumar, Dr.R.K.Gnanmurthy](PhD Course Work).[Link](#)

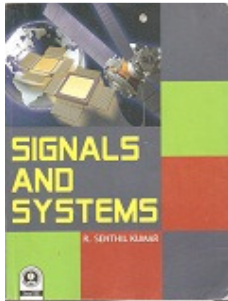
- [3]. “**Digital Communication**”, by Simon Haykin. [Scilab programmed by R.Senthilkumar] (UG students). [Link](#)
- [4]. “**Signals and Systems**”, by Alan V. Oppenheim, Alan V. Willsky, S.Hamid Nawab. [Scilab programmed by R.Senthilkumar](UG students). [Link](#)
- [5]. “**Digital Signal Processing Principles, Algorithms and Applications**”, by J. G. Proakis & D. G. Manolakis.[Scilab programmed by R.Senthilkumar](UG students). [Link](#)
- [6]. “**Optical Fiber Communication**”, by Gerd Keiser. [Scilab programmed by R.Senthilkumar](UG students). [Link](#)
- [7]. “**Engineering Electromagnetics**”, by William Hayt & John Buck. [Scilab programmed by R.Senthilkumar](UG students). [Link](#)

➤ List of Projects submitted to My Institution and IRT Head office

- [1]. Project Title: **Keeping Bridges Safe: New Imaging Program Automatically Detects Irregularities in Bridges**. (software used: scilab, case studied: Bridge along Cauvery river between Bhavani (near Bhavani Bus stand and Komarapalayam)
Principle Investigator/coordinator: R.Senthilkumar
Sponsor: Supported by IRT, Taramani, Chennai and Institute of Road and Transport Technology, Erode.
Project submitted to : Institute of Road and Transport (IRT- Head Office of our Institution), Taramani, Chennai.
Date : 11 September 2012.
- [2]. Project Title: Lab Migration Project: **Communication System Laboratory** (Anna University Syllabus)
Principle Investigator/coordinator: R.Senthilkumar (both proposal and solution provider)
Sponsor: IIT Bombay through Ministry of Human Resource and Development, Government of India.
Project submitted to: Indian Institute of Technology, Bombay. (www.scilab.in)
Date: 11 September 2012. Grant received in Rs.10,000/- [Project Weblink](#)
- [3]. Project Title: Lab Migration Project: **Digital Signal Processing Laboratory** (Anna University Syllabus)
Principle Investigator/coordinator: R.Senthilkumar (both proposal and solution provider)
Sponsor: IIT Bombay through Ministry of Human Resource and Development, Government of India.
Project submitted to: Indian Institute of Technology, Bombay. (www.scilab.in)
Date: 11 September 2012. Grant received in Rs.10,000/- [Project Weblink](#)

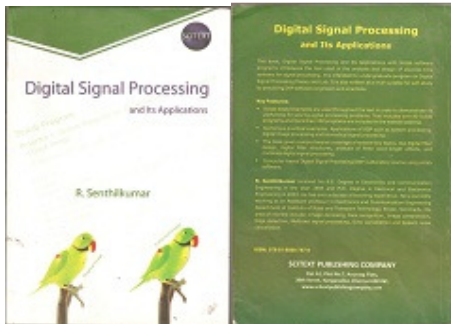
Text Books Published

- [1]. **Signals and Systems (with scilab programs)**, R.Senthilkumar, Anuradha Publications, 2012 (second edition).



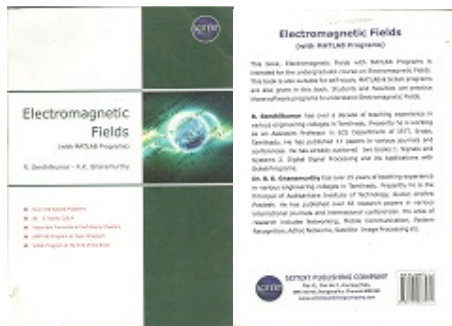
Each Chapter sample examples are coded with Scilab Software

- [2]. **Digital Signal Processing and Its Applications** (with scilab programs), R.Senthilkumar, Scitext Publications, 2012.



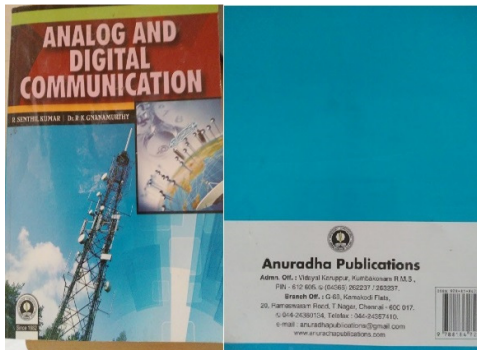
Each Chapter sample examples are Scilab coded

- [3]. **Electromagnetic Fields with Matlab and Scilab Programs**, R.Senthilkumar and R.K.Gnanamurthy, Scitext Publications, 2013.



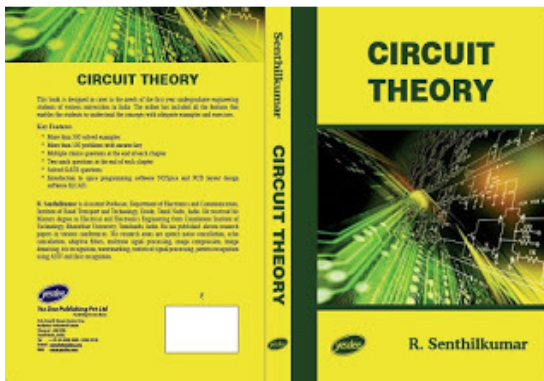
Each chapter sample examples are coded with Scilab and Matlab

- [4]. **Analog and Digital Communications**, R.Senthilkumar and R.K.Gnanamurthy, Anuradha Publications, 2015.



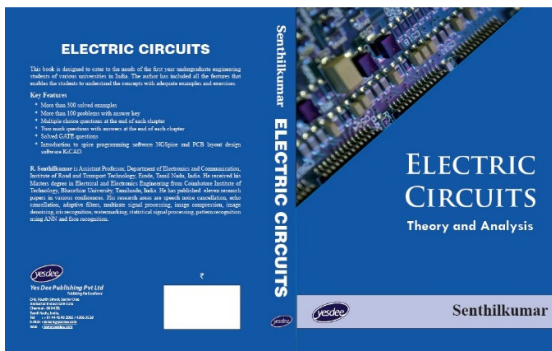
Each chapter sample examples are Scilab coded

- [5]. **Circuit Theory**, R.Senthilkumar, YesDee publications, 2017



In Appendix (end of all chapters) sample examples using NGSpice, KiCAD are given.

- [6] **Electric Circuits, Theory and Analysis**, R.Senthilkumar, YesDee publications, 2018



In Appendix (end of all chapters) sample examples using NGSpice, KiCAD are given.

Publications

➤ Journal Publications

1. **Senthilkumar, R** 2007, '**Performance Improvement in the Bivariate Models by using Modified Marginal Variance of Noisy Observations for Image-Denoising Applications**', International Journal of Computer and Information Engineering (World Academy of Science, Engineering and Technology), vol.1,No.11,pp.1729-1733, 2007. **[Open Science Indexed]** <https://publications.waset.org/6515/pdf> (or) <https://panel.waset.org/Publications?p=11> article no.177
[\[https://publications.waset.org/6515/bibtex\]](https://publications.waset.org/6515/bibtex). <https://doi.org/10.5281/zenodo.1063062>.
2. **Senthilkumar, R & Gnanamurthy, RK** 2013, '**Face Databases for 2D and 3D Facial Recognition: A Survey**', IOSR Journal of Engineering, vol. 3, issue. 4, pp. 44-49.
3. **Senthilkumar, R & Gnanamurthy, RK** 2016, '**A Comparative Study of 2D PCA Face Recognition Method with Other Statistically Based Face Recognition Methods**', Journal of the Institution of Engineers India Series B (Springer Journal), vol. 97, pp. 425-430, ISSN: 2250-2106. **[UGC approved, Scopus Indexed]**. <https://doi.org/10.1007/s40031-015-0212-6>. **Citescore 0.42. Impact Factor 0.55.**
4. **Senthilkumar, R & Gnanamurthy, RK** 2016, '**Improvement and Solution to the Problems Arise in the Implementation of Facial Image Recognition Algorithms Using Open Source Software Scilab**', World Applied Sciences Journal, vol. 34, issue. 12, pp. 1754-1761, ISSN: 1818-4952. **Annexure-II, [UGC Approved]** [https://www.idosi.org/wasj/wasj34\(12\)16/20.pdf](https://www.idosi.org/wasj/wasj34(12)16/20.pdf).
5. **Senthilkumar, R & Gnanamurthy, RK** 2016, '**Performance Analysis of 1D and 2D Statistical Measures on Standard Facial Image Databases**', Middle-East Journal of Scientific Research, vol. 24, issue. 12, pp. 3826-3832. ISSN: 1990-9233, **Annexure-II, [UGC Approved]** [https://www.idosi.org/mejsr/mejsr24\(12\)16/20.pdf](https://www.idosi.org/mejsr/mejsr24(12)16/20.pdf).
6. **Senthilkumar, R & Gnanamurthy, RK** 2018, '**A robust wavelet based decomposition of facial images to improve recognition accuracy in standard appearance based statistical face recognition methods**', Cluster Computing (Springer Journal), pp. 1-10, online: ISSN: 1573-7543. <https://doi.org/10.1007/s10586-018-1759-1>. **Annexure-I, [UGC approved, Scopus Indexed], Impact Factor 1.851.**
7. **R.Senthilkumar, T Dhanu Prakash, A.Kannan, S.Selvaprasath, P.T.Karthikrajan**, '**Embedded System for Automatic Vehicle Speed Control and Data Analysis Using Python Software**', Journal of Control System and Control Instrumentation, Vol.5(2), May 2019. <http://doi.org/10.5281/zenodo.3048906>

8. **R.Senthilkumar, S.Jamuna,M.Manogari, R.Ranjitha, M.Yallini, 'Embedded Based Anti-Earthquake Bed with Health Monitoring System and Data Analysis using Python Software'**, Journal of Embedded System and Processing, Vol.4 (2), May 2019. <http://doi.org/10.5281/zenodo.3068003>
9. **R.Senthilkumar, R.K.Gnanamurthy, R.Ravichandran, 'Statistical Measures to Test the Stability of Face Recognition Approach: Duplicating Human Faces based on Cross-correlation Study'**, Journal of Image Processing and Artificial Intelligence, Vo.5(3), Nov'2019. <http://doi.org/10.5281/zenodo.3524850>.

➤ Technical Report

10. **Senthilkumar, R & Gnanamurthy, RK 2016, 'Construction of Own Face and Video Face Databases for Face Recognition and Testing with Standard Face Recognition Methods'**, the Institution of Engineers (India)- Annual Technical Volume of Electronics and Telecommunication Engineering Division, pp. 9-12. ISBN: 978-81-932567-1-8. <https://www.ieindia.org/webui/IEI-Publication.aspx#annual-technical-volume>.

➤ Book Chapter

11. **Senthilkumar, R & Gnanamurthy, RK 2018, HANFIS: A New Fast and Robust Approach for Face Recognition and Facial Image Classification**, Advances in Intelligent Systems and Computing, Smart Innovations in Communication and Computational Sciences (Springer Book Series), Chapter 8, pp.81-99, ISBN: 978-981-10-8968-8. https://doi.org/10.1007/978-981-10-8968-8_8.

➤ Copyright

12. **Senthilkumar, R & Gnanamurthy, RK 2018, 'A Novel Artificial Neural Network and 2DPCA Based Hybrid Approach for Face Recognition'**, Copyright Registered in Copyright Office, Intellectual Property(India), January 2018. Registration no.L-72758/2018. Under Class of Work: Literary.
13. **Senthilkumar, R & Gnanamurthy, RK 2018, 'Automatic Rearrangement of Face Images in Train Set Face Database Based on Correlation Statistics Using Scilab Software'**, Copyright Filed in Copyright Office, Intellectual Property (India), September 2018. Diary No: 11876/2018-Co/Sw. Under the Class of Work: Computer Software.
14. **Senthilkumar, R & Gnanamurthy, RK 2019, 'Statistical Measures to Test the Stability of Face Recognition Approach: Duplicating Human Faces based on Cross-correlation study'**, Copyright Registered in Copyright Office, Intellectual Property(India), July 2019. Registration no.L-85333/2019. Under Class of Work: Literary.

➤ Patent Filed-Patent Journal

15. **Senthilkumar, R & Gnanamurthy, RK**, 'A Fast Accurate Face Recognition System Using Combined Wavelet Decomposition System And Correlation Test System', Patent Journal no.37/2018, dated: 14/09/2018, Page no: 34672, Application number: 201841033876. <http://www.ipindia.nic.in/journal-patents.htm>.

➤ Research work related Projects

16.(A). Software Toolbox

Scilab Based Face Recognition Toolbox. <http://www.face-rec.org/source-codes/>

16.(B). Own Face Databases

IRTT Students and Prof. Senthilkumar Own Face Databases. <http://www.face-rec.org/databases/>

16.(C). Course Work - Text Book Companion Projects

1. **Senthilkumar, R & Gnanamurthy, RK** 2012, 'Digital Image Processing by Jayaraman, Esakkirajan and Veerakumar', Scilab coded Text book companion project, funded by National Mission on Education through ICT, IIT Bombay, <https://scilab.in/textbook-companion/generate-book/125>.
2. **Senthilkumar, R & Gnanamurthy, RK** 2012, 'Research Methodology by Pannerselvam', Scilab coded Text book companion project, funded by National Mission on Education through ICT, IIT Bombay. https://www.researchgate.net/publication/322487438_Research_Methodology <https://doi.org/10.13140/RG.2.2.28543.10409>

➤ International Conferences and Proceedings

17. R.Senthilkumar, "**Performance Improvement in the Bivariate Models by using Modified Marginal Variance of Noisy Observations for Image-Denoising Applications**", Proceedings of the Third World Enformatika Conference, Istanbul, Turkey, vol.5,pp.294- 298, April 27-29, 2005. **(Scopus Indexed)** Proceedia: <https://publications.waset.org/6515/performance-improvement-in-the-bivariate-models-by-using-modified-marginal-variance-of-noisy-observations-for-image-denoising-applications>
18. **Senthilkumar, R & Gnanamurthy, RK** 2014, '**A Detailed Survey on 2D and 3D Still Face and Face Video Databases Part I**', International Conference on Communications and Signal Processing (ICCSP 2014), 3-5 April 2014, pp.1405-1409 IEEE Xplore Digital Library ISBN: 978-1-4799-3358-7/14, <https://doi.org/10.1109/ICCSP.2014.6950080>, **(Scopus Indexed)**.
19. **Senthilkumar, R & Gnanamurthy, RK** 2014, '**A Detailed Survey on 2D and 3D Still Face and Face Video Databases Part II**', Recent Advances in

Engineering and Communication Systems(RAECS 2014), 6-8, March 2014, pp: 1-6. IEEE Xplore Digital Library ISBN: 978-1-4799-2291-8/14. <https://doi.org/10.1109/RAECS.2014.6799620>, (**Scopus Indexed**).

20. Senthilkumar, R & Gnanamurthy, RK 2016, '**A New Approach in Face Recognition: Duplicating Facial Images Based on Correlation Study**', the Proceedings of the 11th International Knowledge Management in Organizations Conference on The changing face of Knowledge Management Impacting Society, ACM press, 25-29 July 2016, pp.1-10. ACM Digital Library ISBN: 978-1-4503-4064-9. <https://doi.org/10.1145/2925995.2926032>. (**Scopus Indexed**).
21. Senthilkumar, R & Gnanamurthy, RK 2016, '**Performance Analysis of 1D and 2D Statistical Measures on Standard Facial Image Databases**', International Conference on Emerging Trends in Engineering & Technology, (ICETET-2K16), 10 December 2016, pp.1-8.
22. Senthilkumar, R & Gnanamurthy, RK 2016, '**Facial image database mining and classification analysis using different distance metrics**', the IEEE International Conference on Advanced Computing and Communication Systems (ICACCS), 6-7 January 2017, pp. 753-760. IEEE Xplore Digital Library ISBN:978-1-5090-4559-4. <https://doi.org/10.1109/ICACCS.2017.8014619>, (**Scopus Indexed**).
23. Senthilkumar, R & Gnanamurthy, RK 2017, '**Performance improvement in classification rate of appearance based statistical face recognition methods using SVM classifier**', the IEEE International Conference on Advanced Computing and Communication Systems (ICACCS), 6-7 January 2017, pp. 286-292. IEEE Xplore Digital Library. <https://doi.org/10.1109/ICACCS.2017.8014584>. (**Scopus Indexed**).

➤ **National Conferences and Proceedings**

24. R.Senthilkumar, S.Umamaheswari and Dr.P.Anbalagan, "**Problems in the Implementation of Acoustic Echo Canceller and Remedy to these Problems**", National Conference on Innovations in Information and Communication Technology (NCIICT 2003), Dept. of Information Technology, PSG College of Technology, March 7-8, 2003.
25. R.Senthilkumar, S.Muthukumaran and T.Gopalakrishnan, "**Performance Comparison of Different Bivariate Models on Image Denoising and Optimum Window Size for Local Variance Estimation**", National conference CONET 2005, Jayam College of Engineering & Technology, Dharmapuri, April 4, 2005.
26. R.Senthilkumar, S.Muthukumaran, J.Emmanuel sundarsingh and R. Arish kumar, "**Performance Comparison of Adaptive Filter Algorithms Used for**

Speech Noise Cancellation", National Conference on VLSI, EMBEDDED SYSTEMS, SIGNAL PROCESSING AND COMMUNICATION (VESCO M 2005), Dept. of ECE, Kongu Engineering College, April 8, 2005.

27. R.Senthilkumar, S.Muthukumaran and T.Gopalakrishnan, "**Selection of Better Shrinkage Function for Image Denoising and Optimum Window Size for Bivariate Shrinkage with Local Variance Estimation**", National Conference on VLSI, EMBEDDED SYSTEMS, SIGNAL PROCESSING AND COMMUNICATION (VESCO M 2005), Dept. of ECE, Kongu Engineering College, April 8, 2005.
28. R.Senthilkumar, R.Udayachandran and Dr.S.Jothimani, "**Improvement in the Peak Signal to Noise Ratio Value by Using Daubechies Wavelets for Image-Denoising Applications**", National Level Conference on Advances in Computer and Communication (NCACC2005), Dept. of ECE, Periyar Maniammai College of Technology for Women, April 15-16,2005. [**Won the best paper Award**].
29. R.Senthilkumar, S.Muthukumaran and T.Gopalakrishnan, "**Performance Improvement in Image Denoising Using Dual-Tree Complex Wavelet Transform for Multistage Decomposition of Noisy Image**",National Conference on Recent Trends in Communication Engineering (NCRTC2005), Dept. Of ECE, Arulmigu Kalasalingam College of Engineering, May 12-13, 2005.

➤ **Symposium Paper publications and Competitions attended in State level and National level (During Under Graduate Level)**

30. R.Senthilkumar and A.Venkatesan, "DIGITAL VIDEOS", ECE Association, **PSNA College of Engineering Technology**, Dindigul, March 5,1998. [**WON First Prize for Best Paper**].
31. R.Senthilkumar and P.M.S.Rajamanokar, **IEEE** Technical Quiz,**PSNA College of Engineering Technology**, 26th February, 1998.[**WON Second Prize**].
32. R.Senthilkumar and P.M.S.Rajamanokar, **IEEE** Technical Quiz,**PSNA College of Engineering Technology**, October 8, 1997.[**WON First Prize**].
33. R.Senthilkumar, "Visually Evoked Potential as a Diagnostic Tool", National Students Symposium **Shanelsy 98**, Dept. of EEE, Shanmugha College of Engineering, September 18-19, 1998.
34. R.Senthilkumar and A.Venkatesan, "MULTIMEDIA", National Level Symposium **CYBER TORNADO'98**, Dept. of CSE, Arulmigu Kalasalingam College of Engineering, March 7,1998.

35. R.Senthilkumar and P.M.S.Rajamanokar, "VSAT Communication", National level Symposium **Communica'98**, Tamilnadu Engineering College, February 13, 1998.
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Consultancy Work

1. ***Design Desk (India) Private Limited /Chennai, India.***

Spectrum analysis of data from wind mill fans, turbines, generators.

Duration 1 week from 6th August 2012 to 13th August 2012.

Code snippets

<https://www.dsprelated.com/code-1/mp/Scilab/all.php#tabs1-popular>
