


Name:	<div style="text-align: center;">  <p>Dr. K.Sumathi</p> </div>			
Designation:	Associate Professor			
Qualification:	M.E., Ph.D			
Area of specialization:	Biomedical Image Processing			
Experience: (As on May 2022)	Industrial Experience		Teaching Experience	
	--		22 Years	
Number of workshop / FDP attended:	Number of Workshops		Number of FDPs	
	15		27	
Publications:	Conference		Journal	
	National	International	International	National
	7	21	10	1
Patents:	National		International	
	2		--	
Professional Body Membership:	<ul style="list-style-type: none"> • Life member in THE INDIAN SOCIETY FOR TECHNICAL EDUCATION (ISTE) – LM 131447 • Life Member in THE INSTITUTION OF ELECTRONICS AND TELECOMMUNICATION ENGINEERS (IETE) – LM183825 • Senior Member, Institute of Electrical and Electronics Engineers (IEEE)- Signal Processing Society (SPS), Engineering in Medicine and Biology Society (EMBS), Photonics 98083712 • Life Member in Broadcast Engineers Society (BES) -LM2121 			
Achievements:	<ul style="list-style-type: none"> • Published International Journals Annexure I • Received Best paper Award in the International conference held at chennai • Completed 25 online courses from Coursera, Udemy and Simpli learn 			

	<ul style="list-style-type: none"> • AICTE CISCO in association with NASSCOM Future skills primeconducted Cyber security Virtual Internship Program (VIP)2021, Encouraged a greater number of students to complete the Virtual Internship as Instructor in Network Academy. • Received recognition from Cisco Network Academy for partnership towards transforming India into a digital Talent Hub. • Conducted Skill rack Awareness programme to enable students to practice more in coding to do quality projects and many students placed in high package Industries. • As a Talent Enabler motivated students to register and complete more number of online courses in Coursera. Our Institution Received ORANGE WORLD RECORD. • Received certificate of appreciation in 2020 for motivating students and staff during Covid'19 pandemic time to complete many courses in Coursera, NASSCOM FS, Edx and Udemy. • Ms Dharshini Priya, studentof Electronics and Communication Engineering achieved “Orange World Record” (for completing 700+ courses in Coursera in 2020) • Organizing value added Courses with industries providing training with hands on to enable students for their Skill Enhancement in recent domains. • Organizing Department Technical Seminars/Guest Lectures/workshops in association with IETE Students Forum, IEEE Student Branch, ISTE & IEI Student Chapter (ECE) since 2008. • Based on events conducted and students’ achievements our department received Best ISF Award, IETE Chennai center, consecutively for 6 years (2014-2021) • Resource person for AICTE Sponsored 2 weeks online Faculty Development Programme (FDP) • Delivered short course on “Exemplar relevant to feature extraction techniques” in IEEE Technically sponsored International Conference on Communication, Computing and Internet of Things • Achieved 100% result in most of the subjects handled. Digital Image Processing, Wireless sensor networks, Electronic circuits I, Electronic circuits II, Communication Theory, CommunicationEngineering (EEE), Communication Engineering (CSE) & Medical Electronics.
<p>Patent Details:</p>	<p>Title of the Patent: ARTIFICIAL NEURAL NETWORK BASED DETECTION OF COVID-19 FROM CHEST X-RAY Application Number: 202121012313 A Filing Country: India Subject Category: Computer Science Filing Date: 2021-03-22 Publication Date: 2021-03-26</p>

	<p>Status: Published</p> <p>Title of the Patent: A Car Roof Spoiler Fin with Solar Light Application Number:352851-001 Filing Country: India Patent Number:209639 Subject Category: Design Patent Filing Date:10/11/2021 Status: Acceptance for Grant</p>
Responsibilities:	<ul style="list-style-type: none"> • Talent Enabler • PGPA (Performance Grade Point Average) Calculations • Strategist TAP Cell Sairam Institution • Skill rack Scope member-organizing Awareness programme & encouraging students to practice well in skill rack and following by sending reports • Online courses coordinator NPTEL, NASSCOM FS, EDX, UDEMY etc.. • Value Added Course coordinator • Seminar/Guest Lectures /Workshop Coordinator • Department Academic Activities Planner • News Letter • Certified ISO Auditor • NBA Criteria 2 Coordinator department • NAAC Criteria 7 Coordinator department • IETE Ex-com Member 2021-2022, IETE Chennai Centre • Mentor for 13 students of 2019-23 batch, Class coordinator & Project coordinator for batches 2004-2008, 2007-2011, 2010-2014, 2013-2017 & 2017-2021 • Department Symposium coordinator for Zenista' 2011 • ATAL Mentor of Change • Talent Enhancement Syllabus
Universal Human Values:	<ul style="list-style-type: none"> • Completed AICTE online Orientation Programme for Mentors organized from 26th-30th July 2021 • Completed AICTE 5 Day online UHV -I FDP conducted at Sri Sairam Engineering College Autonomous, Chennai from 17th-21st May 2021 • Completed AICTE 5 Day face to face UHV -II FDP conducted at Sri Sairam Engineering College Autonomous, Chennai from 26-30 July 2022
Industrial Training:	<ul style="list-style-type: none"> • 6 Days Faculty Training Programme at GH Induction India Private Limited, SIDCO, Thirumudivakkam, Chennai 600044 from 20.06.2022 to 25.06.2022
CCNA Training:	<ul style="list-style-type: none"> • Completed CCNA Training course in Besant Technologies, Chennai on from 25.09.2022 to 12.12.2022

NITTT:	<ul style="list-style-type: none"> Completed AICTE all 8 Modules in National Initiative for Technical Teachers Training (No:08/2022/1/M1-M8/1178)
Guest Lectures:	<ul style="list-style-type: none"> Delivered short course on “Exemplar relevant to feature extraction techniques” in IEEE Technically sponsored Internal Conference on Communication, Computing and Internet of Things, IC3IOT 18” Conducted on 16th& 17th February 2018. Project Judge for IEI & IETE Sponsored “Mini Project Contest 2019” conducted by the Department of ECE on 6th March 2019 at Sri Sairam Institute of Technology, Chennai. As Resource person to AICTE Sponsored 2 weeks Faculty Development Programme (FDP) on “Machine Learning Techniques for Imaging and Healthcare with PYTHON”, from 18.03.2021 to 31.03.2021 organized by the department of Instrumentation and Control Engineering, Sri Sairam Engineering College, Chennai.

National /International Conference Attended/Presented:

1. Presented paper titled “**Energy Efficient using watermarked video**” at II National conference on Signals systems & Communication (NCSSC-2006)” at Anna University, Chennai on 1st and 2nd June 2006
2. Attended National conference on “**Biomedical Electronics & Biomedical Informatics**” Sponsored by DRDO at Sri Sairam Engineering College Chennai on 5th& 6th February 2009
3. Attended “**Innovative Computing, Information and Communication Technology (ICICT’09)**” AICTE Sponsored International conference at Sri SaiRam Engineering College Chennai on 16th to 18th December 2009
4. Presented paper titled, “**Speckle Reduction and 3D Volume Evaluation of 2D Ultrasound Images**” at an International Conference on Information, Communication & Embedded Systems (ICICES-2011) at S.A. Engineering College, Chennai on 23rd & 24th February 2011
5. Presented a paper “**Denoising and volume estimation of 2D Ultrasound Images**” in a National conference on Recent advances in communication, Electrical & Electronics and Information Technology (RACEIT’2011) Organized by IETE Chennai Centre at Prathiyusha Institute of Technology & Management on 28th February and 1st March 2011
6. Presented paper titled “**Speckle Reduction and 3D Volume Evaluation of 2D Ultrasound Images**” at National conference on Signals, systems & Technologies in Media (NCSSTM-2011) at Karunya Institute of Technology and Sciences, Coimbatore on 25th & 26th February 2011
7. Attended a National conference on “**Advanced communication and computing techniques (NCACCT’11)**” Sri Sairam Engineering College Chennai on 29th April 2011
8. Presented paper titled “**MRI brain tumor segmentation using FCM and MGMR Algorithms**” in a National conference on Emerging Trends in communication and Information Technology at Sri Sairam Engineering College, Chennai on 1st & 2nd March 2012
9. Presented paper titled “**Scanned compound Document Encoding Based on MMP**” in a National conference on Emerging Trends in communication and Information Technology at Sri Sairam Engineering College, Chennai on 1st & 2nd March 2012
10. Presented paper titled “**Texture analysis of carotid plaque ultrasound images**” Proceedings of 6th Asian conference on Intelligent Information and Database Systems (ACIIDS2014) at King Monts Institute of Technology, Bangkok, Thailand from 7th to 9th April 2014
11. Presented paper titled “**Analysis of Intima Media Thickness in Ultrasound Carotid Artery Images Using Level Set Segmentation Without Re-initialization**” Proceedings of 3rd

International Conference on Informatics, Electronics & Vision (ICIEV'14) at University of Dhaka, Dhaka, Bangladesh on 23rd and 24th May 2014

12. Presented paper titled “**Analysis of plaque in ultrasound carotid artery using phase based distance regularized level set evolution**” at National symposium on instrumentation (NSI-39) at Gurukul kangri university, Haridwar from 15th to 17th October 2014
13. Presented paper titled “**Ultrasound and MRI Image Fusion Using Dual Tree Complex Curvelet Transform with Non Orthogonal Filter Bank**” National Conference on Construction, Computing Control, Communication and Manufacturing NC4M'15 from 23rd to 28th February 2015
14. Presented paper titled “**Automatic Segmentation of Carotid Intima-Media Thickness and Analysis of Significant Features**” International Conference on Advances in Science, Management and Engineering (ICASME), 18th&19th December 2015 Organized by International Organization of Scientific Research and Development (IOSRD), Chennai, India (Achieved Best Paper Award)
15. Presented paper titled “**Total Variation Based Edge Enhancement for Level set Segmentation of Intima-Media Layer in Carotid Arteries and analysis of shape based features**” International Conference on Biomedical Engineering Innovation-ICBEI2015 (A sub-conference of the International Multi-Conference on Engineering and Technology Innovation (IMETI), Oct 30 – Nov 03, Kaohsiung, Taiwan (Scopus Indexed)
16. Presented paper titled “**Anisotropic Diffusion Filter based Edge Enhancement for the Segmentation of Carotid Intima-Media Layer in Ultrasound Images using Variational Level Set method without Re-initialization**” Proceeding of 36th International Conference on IEEE Engineering in Medicine and Biology Society (EMBC'14), August 26-30, 2014 at Chicago, Illinois, USA, pp. 238-241. doi: 10.1109/EMBC. 6943573 (PMID: 25569941). (Scopus Indexed)
17. Presented paper titled “**Characterization of B-mode ultrasound carotid images using random forest and neural network classifiers**” at an International conference on Conference on Broadband & Wireless Technologies ICBWT-2016 in Association with ICT Academy of Tamilnadu from 23rd to 24th June 2016
18. Presented paper titled “**Detection and classification of Microneurysms Diabetic Retinopathy**” at International conference at Sairam engineering college and published in an International Journal of Engineering Research Applications (IJERA'13) (IF- 1.69)
19. Presented paper titled “**Notifying Glove for Dumb People**” in an International Conference on Communication, Computing and Internet of Things, IC3IoT 2022 - Proceedings, 2022

conducted at Sri Sairam Engineering College, Chennai held on 10.03.2022 & 11.03.2022 (Scopus Indexed)

20. Presented paper titled “**Feasibility of Brain Computer Interface (BCI) and Internet (IoT) in assisting Elderly and Disabled people**” in the International Conference on power of Artificial Intelligence and Machine Learning for Human Empowerment-IETE CHENCON 2022 organized by IETE Chennai Centre during May 20 & 21, 2022.
21. Published paper titled “**IoT based Novel Face Detection Scheme using Machine Learning Scheme**” in Proceedings - IEEE International Conference on Advances in Computing, Communication and Applied Informatics, ACCAI 2022 (Scopus Indexed).

Journal publications (Research):

1. **Sumathi, K** & Mahesh, V 2019, ‘An Approach for Detection of Edges in Carotid Ultrasound Images and Analysis of Intima-Media Complex using Morphological Features’, International Journal of Biomedical Engineering and Technology, vol. 29, No.4 , ISSN 1752-6426 (**Annexure I**).
2. **Sumathi, K**, Mahesh, V & Christopher, J 2017, ‘Analysis of Carotid Ultrasound Images for the Assessment of Stroke Risk using Level Set Method’, Current Medical Imaging Reviews, vol. 13, no. 3, ISSN 1875-6603 (**Annexure I, IF-0.613**).
3. **Sumathi, K** & Mahesh, V 2014, ‘Texture Analysis of Carotid Plaque Ultrasound Images’, Advanced approaches to Intelligent Information and Database Systems, Studies in Computational Intelligence, Springer vol. 551, pp. 335-44, ISSN 1860949X, (**Annexure II**).
4. **Sumathi, K** & Mahesh, V 2015, ‘Automatic Segmentation of Carotid Intima-Media Thickness and Analysis of Significant Features’, Australian Journal of Basic and Applied sciences, vol. 9, no. 33, pp. 84-91, ISSN 1991-8178.
5. **Sumathi, K** & Mahesh, V 2015, ‘Automatic Segmentation of Carotid Intima-Media Thickness and Analysis of Significant Features’ International Conference on Advances in Science, Management and Engineering (ICASME), Dec 18 & 19, Organized by International Organization of Scientific Research and Development (IOSRD), Chennai, India (Achieved Best Paper Award).
6. **Sumathi, K** & Mahesh, V 2015, ‘Total Variation Based Edge Enhancement for Level set Segmentation of Intima-Media Layer in Carotid Arteries and analysis of shape based features’, International Conference on Biomedical Engineering Innovation-ICBEI2015 (A sub-conference of the International Multi-Conference on Engineering and Technology Innovation (IMETI), Oct 30 – Nov 03, Kaohsiung, Taiwan.
7. **Sumathi, K**, Mahesh, V & Ramakrishnan, S 2014, ‘Analysis of Intima-Media Thickness in Ultrasound Carotid Artery Images using Level Set Segmentation without Re-initialization’,

IEEE, International Conference on Informatics, Electronics & Vision (ICIEV'14), pp. 1-4 Dhaka, Bangladesh, doi :10.1109/ICIEV.2014.7136009. (Scopus Indexed)

8. **Sumathi, K**, Anandh, KR, Mahesh, V & Ramakrishnan, S 2014, 'Anisotropic Diffusion Filter based Edge Enhancement for the Segmentation of Carotid Intima-Media Layer in Ultrasound Images using Variational Level Set method without Re-initialization', Proceeding of 36th International Conference on IEEE Engineering in Medicine and Biology Society (EMBC'14), August 26-30, 2014 at Chicago, Illinois, USA, pp. 238-241. doi: 10.1109/EMBC.6943573(PMID: 25569941). (Scopus Indexed)
9. **Sumathi, K** & Mahesh, V 2014, 'Texture Analysis of Carotid Plaque Ultrasound Images', Proceedings of 6th Asian conference on Intelligent Information and Database Systems (ACIIDS2014) 7-9th April 2014, Bangkok, Thailand (Scopus Indexed)
10. **Thamil Selvi.J, Sumathi.K, Kavitha.G, Sujatha.C.M**, "Analysis of Plaque in Ultrasound Carotid Artery using Phase Based Distance Regularized Level Set Evolution", National Journal of Instrumentation Society of India, ISSN 0970-9983, Vol.45, No.1, March 2015.

Workshops attended:

1. "**Recent Trends in wireless information networks and systems**" Sri Sairam Engineering college on 1st February 2008
2. "**Creative Teaching**" GKM College of Engineering and Technology, Chennai on 22nd February 2008
3. "**Getting Started with MATLAB**" at Sri Sairam Engineering College from 30th June to 3rd July 2008
4. "**Wireless communication & Radiating Systems**" at Sri Sairam Engineering College from 21th June to 22nd March 2011
5. "**MATLAB in Electrical Engineering**" at Department of EEE, Sri Sairam Engineering College from 7th March 2012
6. "**Applications of wavelets in life sciences**" at Department of Biomedical Engineering, SSN College of Engineering from 13th to 15th December 2012
7. "**Recent Trends In Medical Image Diagnostics**" VIT University, Vellore from 25th & 26th May 2012
8. "**Neural Networks, Fuzzy Logic and Pattern Recognition for Engineering & Healthcare Applications**" at MS Ramaiah Institute of Technology, Bangalore in Association with SCS and IEEE –EMBS Chapter of Bangalore from 27th to 29th September 2013

9. IEEE sponsored Workshop on "**Emerging Trends and Future Perspective in Image Processing and Computer Vision**" on 22nd and 23rd September 2015 at Sri Sairam Engineering College.
10. 3 day workshop on "**Rapid Prototyping- IoT and Embedded System Design**" at Sri Sairam Engineering College by Digital Shark Technologies, Bengaluru from 12th to 14th November 2018

FDP/SDP/STTP Attended:

1. "**Bio signal processing conducted by Department of Biomedical Engineering**" (FDP) at Department of Biomedical Engineering, SSN College of Engineering, Chennai from 20th to 24th December 2010
2. "**Programme Soft computing with AI**" (SDP) at Department of Computer Science and Engineering at Sairam Institute of Technology, Chennai from 15th to 28th September 2011
3. "**Biomedical Systems, Signals and Images**" (STTP) at Biomedical Engineering Department, IIT Madras, Chennai from November 21st to 25th 2011
4. "**Training Programme in Image Processing and supporting Tools**" (MATLAB Training Programme), MIT Chromepet, Anna University, Chennai from 9th to 11th March 2012
5. "**Health care Instrumentation present and future :clinical & Technology Perspective**" (Symposium) Organised by National Hub for Healthcare Instrumentation Development (NHHID), Anna University and Apollo Telemedicine Networking Foundation (ATNF) on 1st November 2014
6. "**Embedded and Real Time Systems**" (Anna University sponsored FDTP) at Sri Sai ram Engineering College, Chennai from 6th to 13th June 2016
7. "**Python Programming**" (FDTP) at Sri Sai ram Engineering College, Chennai from 30th Oct to 6th November 2017
8. Successfully Completed on line certification course on "**Digital Image Processing**" 12 Weeks NPTEL Course (Jul - Oct 2018) - FDP - 1.5 Weeks by AICTE sponsored /IIT Karagpur.
9. Successfully Completed on line certification course on "**Machine Learning**" 8 Weeks NPTEL course (Feb-April 2019)-FDP 1 week by AICTE sponsored /IIT Madras.
10. "**Recent Trends in Information, Computing ,Communication and Teaching Methodology Competency**" Two weeks online refresher course from 4th to 17th May 2020 conducted by Department of CSE,ECE &IT at Sri Sai Ram Engineering College, Chennai.

11. **“Machine Learning and Data Manipulation using R and SQL”** 6 Days FDP Program from 30.10.2019 to 6.11.2019 conducted at Sri Sairam Engineering College, Chennai.
12. **“Get ready for AI with MATLAB and Simulink”** conducted by IQAC & HRD centre of Sri Sairam Engineering College, Chennai from 18th to 20th June 2020
13. **“Ethical Practices in Engineering”** 7 days FDP from 28th May to 3rd June 2020 organised by Department of Mechanical Engineering, Sri Sairam Engineering College, Chennai.
14. **“R&D Proposal Writing for Faculties”** one day webinar held on 12.06.2020 conducted by Department of Mechanical Engineering , Sri Sairam Engineering College, Chennai.
15. **“Relevance of IEEE Standards in Teaching, Learning and Industry Collaborations”** participated in webinar conducted by EBSCO Information services and IEEE on 4.06.2020
16. AICTE online **Orientation Programme for Mentors** organized from 26th-30th July 2021.
17. **AICTE 5 Day online UHV -I FDP** conducted at Sri Sairam Engineering College Autonomous, Chennai from 17th-21st May 2021.
18. **AICTE 5 Day face to face UHV -II FDP** conducted at Sri Sairam Engineering College Autonomous, Chennai from 26-30 July 2022.
19. Completed **AICTE NITTT-(1-8 modules)** at National Initiative for Technical Teachers Training during February 2021-July 2022 (**No:08/2022/1/M1-M8/1178**)

Additional Details:

1. **Presented** paper titled “Texture Analysis of Carotid Plaque Ultrasound Images” at 6th Asian conference on Intelligent Information and Database Systems (ACIIDS2014) 7-9th April 2014, **Bangkok, Thailand.**
2. **Presented** paper titled “Analysis of Intima-Media Thickness in Ultrasound Carotid Artery Images using Level Set Segmentation without Re-initialization” at 3rd International Conference on Informatics, Electronics & Vision (ICIEV’14), **University of Dhaka, Bangladesh, 2014.**
3. **Presented** paper titled “Anisotropic Diffusion Filter based Edge Enhancement for the Segmentation of Carotid Intima-Media Layer in Ultrasound Images using Variational Level Set method without Re-initialisation” in 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC’14) , August 26-30, 2014 at **Chicago, Illinois, USA**
4. **Presented** paper titled “Total Variation Based Edge Enhancement for Level set Segmentation of Intima-Media Layer in Carotid Arteries and analysis of shape based features”, International Conference on Biomedical Engineering Innovation-ICBEI2015 (A sub-conference of the

International Multi-Conference on Engineering and Technology Innovation (IMETI), Oct 30 – Nov 03, Kaohsiung, **Taiwan**.

PAPER PRESENTATION AT INTERNATIONAL CONFERENCES



Presented research paper titled “Total Variation Based Edge Enhancement for Level set Segmentation of Intima-Media Layer in Carotid Arteries and analysis of shape based features” at an International Conference on Biomedical Engineering Innovation-ICBEI2015 (A sub-conference of the International Multi-Conference on Engineering and Technology Innovation 2015- IMETI) at **Kaohsiung, Taiwan**, during October 30 – Nov 03, 2015



Presented research paper titled “Texture Analysis of Carotid Plaque Ultrasound Images” at 6th Asian conference on Intelligent Information and Database Systems (ACIIDS2014) 7-9th April 2014, **Bangkok, Thailand**



Presented research paper titled “Texture Analysis of Carotid Plaque Ultrasound Images” at 6th Asian conference on Intelligent Information and Database Systems (ACIIDS2014) 7-9th April 2014, **Bangkok, Thailand**



Presented research paper titled “Analysis of Intima-Media Thickness in Ultrasound Carotid Artery Images using Level Set Segmentation without Re-initialization” at 3rd International Conference on Informatics, Electronics & Vision (ICIEV’14), University of **Dhaka, Bangladesh.**



Presented research paper titled “Analysis of Intima-Media Thickness in Ultrasound Carotid Artery Images using Level Set Segmentation without Re-initialization” at 3rd International Conference on Informatics, Electronics & Vision (ICIEV’14), University of **Dhaka, Bangladesh.**



Presented research paper at an International Conference on Biomedical Engineering Innovation-ICBEI2015 (A sub-conference of the International Multi-Conference on Engineering and Technology Innovation 2015- IMETI) at **Kaohsiung, Taiwan**, during October 30 – Nov 03, 2015

Workshops/Symposium/Seminars Organized

1. Coordinator of TNSCST sponsored National Level workshop on “Recent Trends in Artificial Intelligence and Robotics” on 10th and 11th June 2019
2. Organized and acted as Convener for 14th National Level Technical Symposium Zenista’2011 for Various Inter and Intra college students and Engineering colleges.
3. Organized Department Seminars from 2008 to till date.
4. Organized Value added training program on “Embedded Protocol Developer” from 16.9.2019 to 21.9.2019.
5. Organized value added training course on “IoT System Architecture & Protocols” from 10.9.2019 to 18.9.2019
6. Organized value added training course on “Smart phone servicing and troubleshooting” on 18.12.2019 & 19.12.2019.
7. Organized Value-added training course on “Smart phone servicing and Trouble shooting” on 23.03.2022 & 24.03.2022
8. Organized 5 Days Value Added Training Programme on “IoT and Embedded Systems” from 12.12.2022 to 16.12.2022
9. Organized Value-added Training Programme on “CANSAT” from 28.03.2022 to 01.04.2022 in association with Sairam Space Science Programme conducted by Hyoristic Innovations Pvt Ltd., Coimbatore

Invited Talk/Judge

1. Delivered short course on “**Exemplar relevant to feature extraction techniques**” in IEEE Technically sponsored Internal Conference on Communication, Computing and Internet of Things, IC3IOT 18” Conducted on 16th& 17th February 2018.
2. Project Judge for IEI & IETE Sponsored “**Mini Project Contest 2019**” conducted by the Department of ECE on 6th March 2019 at Sri Sairam Institute of Technology, Chennai.
3. Resource person to AICTE Sponsored 2 weeks Faculty Development Programme (FDP) on “**Machine Learning Techniques for Imaging and Healthcare with Python**”, from 18.03.2021 to 31.03.2021 organized by the department of Instrumentation and Control Engineering, Sri Sairam Engineering College, Chennai