"Research is to see what everybody else has seen and to think what nobody else has thought"
- *Albert Szent-Gyorgyi*

The Research & Development Cell (R&D Cell) of SRKIT intent is to nurture research activities in the institute by promoting research in new emerging and challenging areas of Engineering, Technology, Science and Humanities. It encourages research culture among the faculty and students. The major role is to stimulate contacts with the real world and promote research in young minds by way of participating in project competitions, seminars, workshops and conferences. The R&D Cell aims to reach the Vision and Mission of the Institute in February 2017.

Objectives:

1. To motivate the faculty and students to pursue research and provide support to publish their research.
2. To encourage the faculty to guide innovative research projects.
3. To organize and promote skill development trainings in emerging areas to enhance the research and innovation.

Executive Committee:

S.No	Name	Designation– Department	Designation in Committee
1	Dr.M.Ekambaram Naidu	Principal	Chairman
2	Dr.S.Sri Gowri	HOD & Professor – ECE	Coordinator
3	Dr.D.Haritha	HOD & Professor – CSE	Member
4	Dr.T.Satyanarayana	HOD & Professor – CE	Member
5	Mr.A.Stanly Kumar	HOD & Asst. Professor – ME	Member
6	Dr.A.Padmaja	HOD & Professor – S&H	Member
7	Dr.N.Subramanyam	HOD & Professor – MBA	Member

SRK INSTITUTE OF TECHNOLOGY

Enikepadu, Vijayawada 521108

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SRK INSTITUTE OF TECHNOLOGY
VIJAYAWADA

KNOWLEDGE IS POWER

Ref. No.: SRKIT/R&D/CIR-1/2017-2018   Date: 13.02.2017

CIRCULAR

It is here by informed to all the staff and students that the Research and Development cell of SRKIT is constituted with the following members for the Academic Year 2017-18. The list of members is given below.

S.No	Name	Designation – Department	Designation in Committee
1	Dr.M.Ekambaram Naidu	Principal	Chairman
2	Dr.S.Sri Gowri	HOD & Professor – ECE	Coordinator
3	Dr.D.Haritha	HOD & Professor – CSE	Member
4	Dr.T.Satyanarayana	HOD & Professor – CE	Member
5	Mr.A.Stanly Kumar	HOD &Asst.Professor – ME	Member
6	Dr.A.Padmaja	HOD & Professor – S&H	Member
7	Dr.N.Subramanyam	HOD & Professor – MBA	Member

PRINCIPAL

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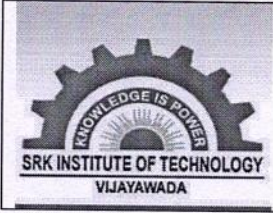
1. All HODs.
2. All committee members

ME   CE   S&H   MBA

Ref. No.: SRKIT/R&D/CIR-2 /2017-2018   **Date: 25.02.2017**

CIRCULAR

It is hereby informed to all members of committee that, Research and Development Cell is going to conduct the meeting on 27-02-2017, Monday 3.00 pm at Seminar Hall in the ground floor. All the members shall attend without fail.

Agenda:

1. About the vision, mission, objectives and functions of the cell.
2. About how to invoke the Research among Faculty and Students.
3. Any other points with the permission of chair.
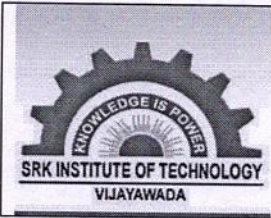
S. Sri Gowri

COORDINATOR   **PRINCIPAL**

Copy to:

1. All HODs.
2. All committee members

ME CE   SLH   HBA

Ref. No: SRKIT/R&D/MOM-1/2017-2018　　　　　　　　Date: 28.02.2017

Minutes of Meeting

Minutes of Meeting of Research and Development Cell held on 27-02-2017, Monday at 03:00 pm in ground floor seminar hall.

S.No	Name	Designation – Department	Designation in Committee	Signature
1	Dr.M.Ekambaram Naidu	Principal	Chairman	
2	Dr.S.Sri Gowri	HOD & Professor – ECE	Coordinator	
3	Dr.D.Haritha	HOD & Professor – CSE	Member	
4	Dr.T.Satyanarayana	HOD & Professor – CE	Member	
5	Mr.A.Stanly Kumar	HOD & Asst. Professor – ME	Member	
6	Dr.A.Padmaja	HOD & Professor – S&H	Member	
7	Dr.N.Subramanyam	HOD & Professor – MBA	Member	

Meeting Agenda:

1. About the vision, mission, objectives and functions of the cell.
2. About how to invoke the Research among Faculty and Students.
3. Any other points with the permission of chair.

The Principal explained vision, mission, objectives and functions of the cell.

R&D Cell has been established on 13.03.2017 in line with the guidelines of AICTE with a view to bridge the gap between industry and academia.

Vision:

To become a center of excellence.

Mission:

To achieve excellence by promoting research in newly evolving and challenging areas of Engineering, Technology, Science and Humanities by focused research pursuits through interface with industry and academia.
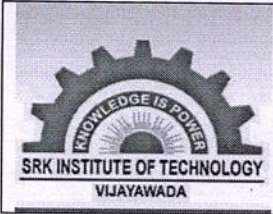
Objectives:

➢ To motivate the faculty and students to pursue research and provide support to publish their research.

➢ To encourage the faculty to guide innovative research projects.

➢ To organize and promote skill development trainings in emerging areas to enhance the research and innovation.

Functions of the cell:

1. The Research and Development Cell may provide deliberate leadership for research in college.

2. In line with the college priorities the R&D Cell may entrusted to encourage the development of interdisciplinary research,

3. The R&D Cell may develop and draft policies related to research

4. R&D Cell shall undertake college level projects of present relevance and importance.

5. This R&D Cell may be commended to organize lectures and workshops on present trends correlated to research methodology and other inter disciplinary topics.

6. R&D Cell shall plan academic programmes such as Teacher-Exchange programmes in collaboration with other institutions of higher education and organize academic activities involving a cluster of institutions.
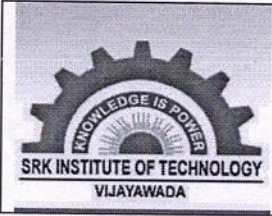
Meeting Outcomes:

1. Discussed and finalized objectives and functions of R&D Cell.
2. Principal suggested and encouraged attending workshops, conferences, FDPs to both faculty and students for improving research skills and encouraged to enroll for the Ph.D. degree.
3. The meeting ended with vote of thanks.

COORDINATOR

PRINCIPAL

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2. All committee members

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SRK INSTITUTE OF TECHNOLOGY
VIJAYAWADA
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Ref. No.: SRKIT/R&D/CIR-3/2017-2018   **Date: 23.06.2017**

CIRCULAR

It is hereby informed to all the members that, Research and Development Cell is going to conduct the meeting on 24-06-2017, Saturday at 3:00pm in the ground floor Seminar Hall. All the members shall attend without fail.

Agenda:

1. To discuss about the research progress by the faculty.
2. To arrange research training programs for faculty.
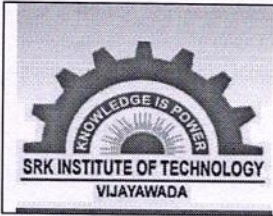3. Any other points with the permission of the chair.

S.SriGouri
COORDINATOR

PRINCIPAL

Copy to:

1. All HODs.
2. All committee members

ME   CE   S&H   MBA

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VIJAYAWADA
KNOWLEDGE IS POWER

Ref. No: SRKIT/R&D/MOM-2/2017-2018   **Date: 27.06.2017**

Minutes of Meeting

Minutes of Meeting of Research and Development Cell held on 24-06-2017, Saturday at 03:00 pm in ground floor seminar hall.

S.No	Name	Designation – Department	Designation in Committee	Signature
1	Dr.M.Ekambaram Naidu	Principal	Chairman	
2	Dr.S.Sri Gowri	HOD & Professor – ECE	Coordinator	
3	Dr.D.Haritha	HOD & Professor – CSE	Member	
4	Dr.T.Satyanarayana	HOD & Professor – CE	Member	
5	Mr.A.Stanly Kumar	HOD & Asst. Professor – ME	Member	
6	Dr.A.Padmaja	HOD & Professor – S&H	Member	
7	Dr.N.Subramanyam	HOD & Professor – MBA	Member	

Meeting Agenda:
1. To discuss about the research progress by the faculty.
2. To arrange research training programs for faculty.
3. Any other points with the permission of the chair.

Meeting Outcomes:
1. All the committee members delivered about list of faculty who published their research work in journals and FDPs conducted by all the departments in the college.
2. The Chairman appreciated the contribution of faculty through 40 research publications in various international journals.
3. The Chairman suggested the committee to plan for more FDPs to encourage the faculty and also motivate them to attend the workshops, FDPs, training programmes conducted by other college
4. Planned to conduct FDP on **"Financial Analysis & Portfolio Management"** by the department of MBA.
5. The Chairperson appreciated Dr S.Sri Gowri, HOD, department of ECE on completion of 4 scholars and guiding 3 scholars for Ph.D. offered by JNTUK, JNTUH and GITAM Universities.

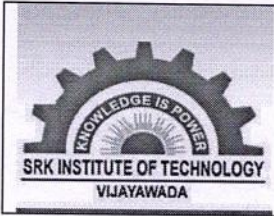**COORDINATOR**   **PRINCIPAL**

Copy to:
1. All HODs.
2. All committee members

Ref. No.: SRKIT/R&D/CIR-4/2017-2018

Date: 24.01.2018

CIRCULAR

It is hereby informed to all committee members that, Research and Development Cell is going to conduct the meeting on 25-01-2018, Thursday 4:00pm in the Seminar Hall at ground floor. All the members shall attend without fail.
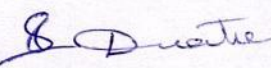
Agenda:

1. About the research work done by faculty and conduction of FDPs.
2. Any other points with the permission of chair.

S-Sri Gowri
COORDINATOR

PRINCIPAL

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1. All HODs.
2. All committee members
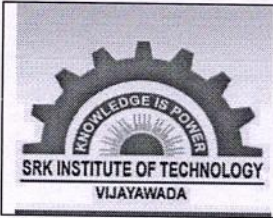
Ref. No: SRKIT/R&D/MOM-3/2018-2019   Date: 29.01.2018

Minutes of Meeting

Minutes of Meeting of Research and Development Cell held on 25-01-2018, Thursday at 04:00 pm in ground floor seminar hall.

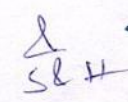| S.No	Name	Designation – Department	Designation in Committee	Signature
1	Dr.M.Ekambaram Naidu	Principal	Chairman	
2	Dr.S.Sri Gowri	HOD & Professor – ECE	Coordinator	
3	Dr.D.Haritha	HOD & Professor – CSE	Member	
4	Dr.T.Satyanarayana	HOD & Professor – CE	Member	
5	Mr.A.Stanly Kumar	HOD & Asst. Professor – ME	Member	
6	Dr.A.Padmaja	HOD & Professor – S&H	Member	
7	Dr.N.Subramanyam	HOD & Professor – MBA	Member	

Meeting Agenda:
1. About the research work done by faculty and conduction of FDPs.
2. Any other points with the permission of chair.

Meeting Outcomes:

1. Committee members delivered the details about list of faculty publications, workshops and FDPs attended by the faculty.
2. The Chairman appreciated the committee for encouraging the faculty contributing research publications in various international journals.
3. Conducted and reviewed the report of the FDP on "**Financial Analysis & Portfolio Management**" by the department of MBA from 12-10-2017 to 14-10-2017.
4. Conducted and reviewed the report of the FDP on "**Long Term Evolution (LTE)**" by the department of Electronics and Communication Engineering from 26-11-2017 to 31-12-2017.
5. Planned to conduct FDP on "**Applications of Computational Fluid Dynamics**" by the department of Electronics and Communication Engineering.

S. Sri Gowri
COORDINATOR

PRINCIPAL

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1. All HODs
2. All committee members
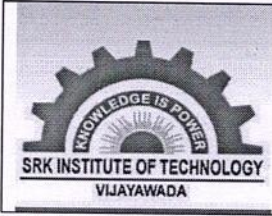
Ref. No.: SRKIT/R&D/CIR-5/2017-2018   Date: 28.08.2018

CIRCULAR

It is hereby informed to all members of Research and Development Cell is going to conduct the meeting on 01-09-2018, Saturday 3:00pm in the Seminar Hall at ground floor. All the members shall attend without fail.

Agenda:

1. About FDPs for the A.Y 2017-2018.
2. About the research work done by faculty.
3. Any other points with the permission of chair.

S-Sri Gouri
COORDINATOR

PRINCIPAL

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2. All committee members

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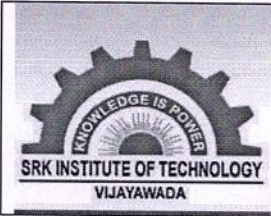
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Ref. No: SRKIT/R&D/MOM-4/2018-2019   Date: 04.09.2018

Minutes of Meeting

Minutes of Meeting of Research and Development Cell held on 01-09-2018, Saturday at 03:00 pm in ground floor seminar hall.

S.No	Name	Designation – Department	Designation in Committee	Signature
1	Dr.M.Ekambaram Naidu	Principal	Chairman	
2	Dr.S.Sri Gowri	HOD & Professor – ECE	Coordinator	S.Sri Gowri
3	Dr.D.Haritha	HOD & Professor – CSE	Member	
4	Dr.T.Satyanarayana	HOD & Professor – CE	Member	
5	Mr.A.Stanly Kumar	HOD & Asst. Professor – ME	Member	
6	Dr.A.Padmaja	HOD & Professor – S&H	Member	
7	Dr.N.Subramanyam	HOD & Professor – MBA	Member	

Meeting Agenda:
1. About FDPs for the A.Y 2017-2018.
2. About the research work done by faculty.
3. Any other points with the permission of chair.

**Meeting Outcomes**:
1. Committee members delivered the details about the list of faculty publications, Ph.D. admissions, conducted FDPs.
2. Planned to conduct FDP on "**Power System De-regulation**" organized by the department of EEE.
3. Planned to conduct FDP on "**Automotive Design Using CATIA**" organized by the department of Mechanical Engineering.
4. Planned to conduct "A one week FDP on **Cloud Computing with AWS**" organized by the department of Information Technology.
5. The Chairman congratulated Dr.N.Neelima Priyanka for achieving her Ph.D. Degree from Adikavi Nannayya University, Rajamahendravaram.
6. Planned to conduct FDP on "**Motivational Training**" organized by the department of MBA.
7. Conducted and reviewed the report of the FDP on "**Applications of Computational Fluid Dynamics**" by the department of Electronics and Communication Engineering from 02-04-2018 to 06-04-2018.

S.Sri Gowri
COORDINATOR

PRINCIPAL

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2. All committee members
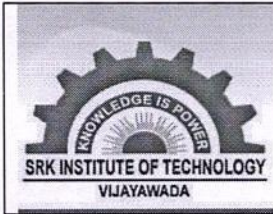
Ref. No.: SRKIT/R&D/CIR-6/2018-2019   **Date: 25.01.2019**

CIRCULAR

It is hereby informed to all Staff members that, Research and Development Cell is going to conduct the meeting on 28-01-2019, Monday 4:00pm in the Seminar Hall at ground floor. All the members shall attend without fail.

Agenda:

1. About the research work done by faculty.
2. About Faculty Exchange Program in Advanced Robot Control from 15-05-2019 to 24-05-2019 at Aachen University, Germany,
3. Any other points with the permission of chair.

S.Sri Gouri
COORDINATOR

PRINCIPAL

Copy to:

1. All HODs.
2. All committee members CSE   ME   CE   MBA   S&H

Ref. No: SRKIT/R&D/MOM-5/2018-2019   Date: 29.01.2019

Minutes of Meeting

Minutes of Meeting of Research and Development Cell held on 28-01-2019, Monday at 04:00 pm in ground floor seminar hall.

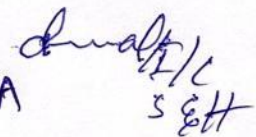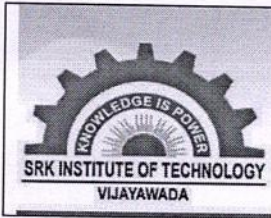| S.No	Name	Designation – Department	Designation in Committee	Signature
1	Dr.M.Ekambaram Naidu	Principal	Chairman	
2	Dr.S.Sri Gowri	HOD & Professor – ECE	Coordinator	
3	Dr.D.Haritha	HOD & Professor – CSE	Member	
4	Dr.T.Satyanarayana	HOD & Professor – CE	Member	
5	Mr.A.Stanly Kumar	HOD & Asst. Professor – ME	Member	
6	Dr.A.Padmaja	HOD & Professor – S&H	Member	
7	Dr.N.Subramanyam	HOD & Professor – MBA	Member	

Meeting Agenda:
1. About the research work done by faculty.
2. About Faculty Exchange Program in **Advanced Robot Control** from **15-05-2019 to 24-05-2019** at **Aachen University, Germany,**
3. Any other points with the permission of chair.

Meeting Outcomes:
1. The Chairman discussed and suggested to committee make a plan for conducting FDP on Artificial Intelligence for the A.Y 2019-2020.
2. Committee members delivered the details about the A.Y 2018-2019 list of faculty publications.
3. Conducted and reviewed the report of the FDP on **"Power System De-regulation"** organized by the department of EEE from 12-011-2018 to 14-11-2018
4. Conducted and reviewed the report of the FDP on **"Automotive Design Using CATIA"** organized by the department of Mechanical Engineering from 15-10-2018 to 18-10-2018.
5. Conducted and reviewed the report of the **"A one week FDP on Cloud Computing with AWS"** organized by the department of Information Technology from 05-11-2018 TO 10-11-2018.
6. Conducted and reviewed the report of the FDP on **"Motivational Training"** organized by the department of MBA from 26/9/2018 to 28/9/2018.
7. The chairman suggested encourage one faculty from ECE to attend Faculty Exchange Program in **Advanced Robot Control** from **15-05-2019 to 24-05-2019** at **Aachen University, Germany,**

COORDINATOR   PRINCIPAL
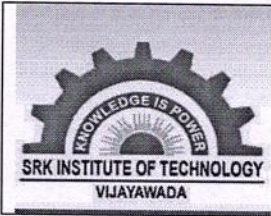
Copy to:
1. All HODs.
2. All committee members

Ref. No.: SRKIT/R&D/CIR-7/2019-2020   Date: 26.09.2019

CIRCULAR

It is hereby informed to all committee members that, Research and Development Cell is going to conduct the meeting on 28-09-2019, Saturday 3:00pm in the Seminar Hall at ground floor. All the members shall attend without fail.

Agenda:

1. About the research work done by faculty.
2. Any other points with the permission of chair.

S. Sri Gouri
COORDINATOR   **PRINCIPAL**

Copy to:
1. All HODs.
2. All committee members
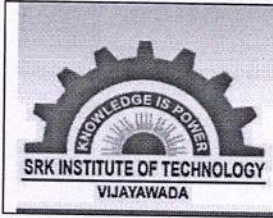
Ref. No: SRKIT/R&D/MOM-6/2019-2020   Date: 30.09.2019

Minutes of Meeting

Minutes of Meeting of Research and Development Cell held on 28-09-2019, Saturday at 03:00 pm in ground floor seminar hall.

S.No	Name	Designation – Department	Designation in Committee	Signature
1	Dr.M.Ekambaram Naidu	Principal	Chairman	
2	Dr.S.Sri Gowri	HOD & Professor – ECE IQAC – Coordinator	Coordinator	
3	Dr.D.Haritha	HOD & Professor – CSE	Member	
4	Dr.T.Satyanarayana	HOD & Professor – CE	Member	
5	Mr.A.Stanly Kumar	HOD & Asst. Professor – ME	Member	
6	Dr.A.Padmaja	HOD & Professor – S&H	Member	
7	Dr.N.Subramanyam	HOD & Professor – MBA	Member	

Meeting Agenda:
1. About the research work done by faculty.
2. Any other points with the permission of chair.

Meeting Outcomes:

1. Committee members delivered the details about the list of Faculty publications of A.Y 2019-2020.
2. Planned to conduct "**a one week FDP on Data Analytics with Python Programming**" by the department of Information Technology.
3. The Chairman appreciated the Department of Science and Humanities for the FDP on "**Enhancing Classroom Communication**" conducted on 24/06/2019 to 29/06/2019 for enhancing the skills of faculty in classroom.
4. Planned to conduct FDP on "**Data Science Using Python Programming**" by the department of MCA from 06-01-2020 to 11-01-2020.
5. Conducted and reviewed FDP on "**Building Brand Strategies**" organized by the department of MBA with the help of S&H Department from 23/09/2019 to 24/09/2019.
6. Planned to conduct FDP on "**Transformer based facts Controller**" organized by the department of Electrical and Electronics Engineering.
7. The Chairperson appreciated Dr.D.Haritha HOD, department of CSE on completion of 1 scholar and guiding 2 scholars for Ph.D. offered by Rayalaseema University, JNTUK and Bennet Universities.
8. By following Chairman Suggestions Mrs. Y. Sri Lakshmi, Assistant Professor, ECE have participated in Faculty Exchange Program in **Advanced Robot Control** from
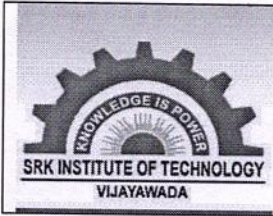
**15-05-2019 to 24-05-2019** at **Aachen University, Germany,** conducted by APSSDC-European Center for Mechatronics Convergence Training Center in association with Indo-European Skilling Centres for Mechatronics & Industrial Robotics and Applied Robot Control.

S Sri Gowri
COORDINATOR

PRINCIPAL

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1. All HODs.
2. All committee members
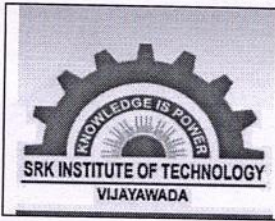
Ref. No.: SRKIT/R&D/CIR-8/2020 – 2021

Date: 20.11.2020

CIRCULAR

It is hereby informed to all Staff members that, Research and Development Cell is going to conduct the meeting on 21-11-2020, Saturday 3:00pm in the Seminar Hall at ground floor. All the members shall attend without fail.

Agenda:

1. About the research work done by faculty.
2. Any other points with the permission of chair.

S. SriGouri
COORDINATOR

PRINCIPAL

Copy to:

1. All HODs
2. All committee members
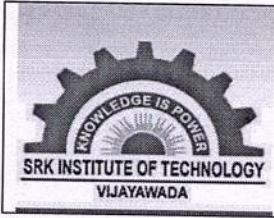
Ref. No: SRKIT/R&D/MOM-7/2020-2021   Date: 23.11.2020

<u>**Minutes of Meeting**</u>

Minutes of Meeting of Research and Development Cell held on 21-11-2020, Saturday at 03:00 pm in ground floor seminar hall.

S.No	Name	Designation – Department	Designation in Committee	Signature
1	Dr.M.Ekambaram Naidu	Principal	Chairman	
2	Dr.S.Sri Gowri	HOD & Professor – ECE IQAC Coordinator	Coordinator	
3	Dr.D.Haritha	HOD & Professor – CSE	Member	
4	Dr.T.Satyanarayana	HOD & Professor – CE	Member	
5	Mr.A.Stanly Kumar	HOD & Asst. Professor – ME	Member	
6	Dr.A.Padmaja	HOD & Professor – S&H	Member	
7	Dr.N.Subramanyam	HOD & Professor – MBA	Member	

Meeting Agenda:

1. About the research work done by faculty.
2. Any other points with the permission of chair.

Meeting Outcomes:

1. All the members of committee discussed about faculty publications and Ph.D. admissions.
2. The Chairman congratulated **Dr.B.Ashalatha** from CSE Dept. for achieving her Ph.D. degree from Krishna University, Machilipatnam.
3. The Chairman congratulated **Dr.B.Krishnayya** from MBA Dept. for achieving his Ph.D. degree from Acharya Nagarjuna University, Guntur.
4. The Chairman congratulated **Dr. G.Mythreyi** from S&H Dept. for achieving her Ph.D. degree from IGNOU, Delhi
5. Conducted and reviewed the report of the FDP on "**Data Science Using Python Programming**" by the department of MCA from 06-01-2020 to 11-01-2020.
6. Conducted and reviewed the report of the FDP on "**Transformer based facts Controller**" organized by the department of Electrical and Electronics Engineering from 18-11-2019 to 20-11-2019.
7. Conducted and reviewed the report of a two day FDP on "**Contemporary Teaching Pedagogy for Effective Teaching Learning Process**" organized by Science and Humanities Department from 11-11-2020 to 12-11-2020.
8. The chairman congratulated the faculty who registered for Ph.D. and encouraged to do research on current challenging issues.
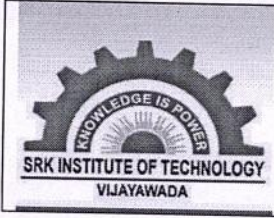
9. The Chairman congratulated Dr.N.Neelima Priyanka from CSE department and Mrs.G.Srilakshmi from IT Department for getting the patent publication titled as "Artificial Intelligence based Pest Control system for Agriculture Crops" on 27-03-2020.

S. Sri Gowri

COORDINATOR

PRINCIPAL

Copy to:

1. All HODs.
2. All committee members

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Application Details

APPLICATION NUMBER	202131014648
APPLICATION TYPE	ORDINARY APPLICATION
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TITLE OF INVENTION	IOT BASED PANDEMIC RELATED SMART ROOM DISINFECTING SYSTEM
FIELD OF INVENTION	BIO-MEDICAL ENGINEERING
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(54) Title of the invention : ARTIFICIAL INTELLIGENCE BASED PEST CONTROL SYSTEM FOR AGRICULTURE CROPS

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(57) Abstract :

ABSTRACT: Title: Artificial Intelligence based Pest Control System for Agriculture crops The present disclosure proposes an artificial intelligence based pest control system for agriculture crops. The artificial intelligence based pest control system comprises an image capturing means 101, a pest detection unit 102, a control unit 103, and an ultrasonic sound generating means 104. The system uses an ultrasonic sound generating means to repel the pests. The ultrasonic sound generating means emits the frequencies according to the type, size and age of the pests at regular or random intervals. The system captures everyday crop images using drone cameras and provides as input to CNN model to identify the type of the pest in the crop. The proposed system is cost-effective and eco-friendly in nature. The pest control system reduces unnecessary usage of pesticides and insecticides in the agriculture field without knowing their presence. Fig 1.

No. of Pages : 15 No. of Claims : 7

(54) Title of the invention : IOT BASED PANDEMIC RELATED SMART ROOM DISINFECTING SYSTEM

(51) International classification	:A61L0002100000, G01S0007481000, A61L0002240000, G01S0017860000, G01S0017580000	(71)Name of Applicant : 1)Dr Suresh Kumar Agarwal,International Institute of Lifestyle Management Address of Applicant :Director, International Institute of Lifestyle Management 48, Flat 2F, Gariahat Road Kolkata West Bengal India 700019 48, Flat 2F, Gariahat Road Kolkata, West Bengal India 700019 2)S. Hema Priyadarshini ,Dayananda Sagar College of Engineering 3)Dr. Neelima Priyanka Nutulapati,SRK Institute of Technology 4)Dr. Catherine T. J.,RMK College of Engineering and Technology 5)Akshatha Hari Bhat,Vidyalankar Institute of Technology 6)Mr. S.P. Cowsigan,KPR Institute of Engineering and Technology 7)Praful Nandankar,Government Engineering College 8)Mr. T CH Anil Kumar,VFSTR (Deemed To Be University) 9)Mr. Haqqani Arshad,Yanbu Industrial College 10)Dr. Bhagyashree Ambore,Cambridge Institute of Technology 11)Dr Harshita Vachhani,Pratibha college of Commerce and computer studies 12)Khallikkunaisa,HKBK College of Engineering 13)Rajesh A S,Maharaja Institute of Engineering
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Filing Date	:NA	12)Khallikkunaisa,HKBK College of Engineering 13)Rajesh A S,Maharaja Institute of Engineering

(57) Abstract :
In this pandemic era, safety is demanded by everyone in the universe. Spread of the pandemic disease can be prevented by effective disinfecting process. Ultra Violet radiation of C spectrum with wavelength shorter than that of 300 nm is effective in killing micro organism as can significantly provide disinfection process, able to destroy the DNA of microorganisms such as viruses, bacteria, molds and fungi. But it is not easy to operate these UV radiators by human as it can affect the operating personnel. In this invention, an autonomous IOT based robotic system is proposed which can disinfect the room using ultraviolet radiation without any human intervention. Movement of this system is based on the sensed data from LiDAR which transmits light rays and collects the reflected signal thereby providing three dimensional perception of the room to be disinfected. Obstacle detection is based on the LiDAR operation along with Infrared sensor which can detect obstacle upto 2 cm. Servo motor and DC motor together facilitate the movement of the robotic system. The system can be operated from remote location through the technology of Internet of Things either by Webpage or by using user Mobile Application.

No. of Pages : 11 No. of Claims : 6

1. TITLE OF THE INVENTION

A METHOD AND A SYSTEM FOR EMOTION RECOGNITION FROM SPEECH

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2.   PREAMBLE TO THE DESCRIPTION

The following specification particularly describes the invention and the manner in which it is to be performed.

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FIELD OF THE INVENTION

[001]   The present invention relates to a method and a system for emotion recognition from speech

BACKGROUND

[002]   An emotion is a human state of a mental behaviour that is expressed the feeling by physical moments or by words. As the physical moments are the facial expression and the body language, words are the way they speak and the way they pronounce the words.

[003]   Human beings express their feelings through emotions, and the way of expression may be through face, gesture and speech. Emotions are essential for conveying crucial information. Presence of emotion makes speech more natural.

[004]   Speech recognition known in the prior art as a process that extracts features from an input speech, and after applying a pattern recognition algorithm, estimates whether a phoneme or word sequence is from a speaker. In appliances that have a speech recognition function, such as a cellular phone, PDA, automobile navigation system, a user can input a control command through speech.

[005]   The combination of speech recognition and natural language understanding processing techniques is commonly referred to as speech processing. Speech processing may also convert a user's speech into text data, which may then be provided to various text-based software applications.

[006] Computers, hand-held devices, telephone computer systems, kiosks, and a wide variety of other devices are used to improve human-computer interactions may use speech processing. For example, when using an automobile navigation system that has a speech recognition function, a user can get destination information simply by speaking the destination address instead of pressing search buttons.

[007] However, the conventional knowledge and technology are not advanced to provide appropriate and reliable recognition about the person's emotions from their speech. Most of the speech recognition technologies are focussed on the success rate of the speech recognition and do not focus on the recognition of emotions. For example, U.S. Pat. No. 6,567,778 entitled "Natural Language Speech Recognition Using Slot Semantic Confidence Scores Related to Their Word Recognition Confidence Scores" describes a technology that calculates confidence scores for an input speech and if the confidence score is over the threshold value, it outputs a corresponding recognition candidate as the result of recognition without a user confirmation process.

[008] Accordingly, there is a need to provide a method and a system for emotion recognition from speech, which is accurate and reliable based on the words used in the speech.

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[009] **OBJECTS OF THE INVENTION**

[0010] The main object of the present invention is to provide a method and a system for emotion recognition from speech.

[0011] Another object of the present invention is to provide an efficient method to correctly recognise speech.

[0012] Another object of the present invention is to provide an efficient method to recognise human emotions from the words used in the speech.

[0013] Yet another object of the present invention is to provide a method to accurately and reliably recognise emotions based on the words used in the speech.

[0014] Another object of the present invention is to improve both the naturalness and efficiency of human - machine interactions by emotion recognition.

SUMMARY OF THE INVENTION

[0015] The present invention provides a system and a method of emotion recognition using the speech of the person, as it is reliable and accurate. It has been experimented that the humans are very good at hiding the feelings from others at that particular situation and humans couldn't judge at what state the person is really in, but in speech the automatic human-machine translation can, by the pronounce of a word and stresses of a particular letter. Accordingly, if humans try to hide also they couldn't do as much long as they want, at some time they could caught, so the present invention can recognise using the speech.

[0016] The present invention through experiments concluded that people express emotions as part of everyday communication. Emotions can be judged by a combination of cues such as facial expressions, prosodies, gestures, and actions. Emotions are also articulated by written texts. Inspired by works in sentiment analysis, the present invention provides an approach to automatic detection of emotions from speech.

[0017] Thus, no system or method exists that can accurately identify the human emotions based on the speech. For instance, when a person is angry, his tone raises, his expression becomes stern and the content of his speech no longer remains pleasant. Similarly, when a person is happy, he speaks in a musical tone, there is a look of glee on his face and the content of his speech is rather pleasant and joyous. Based on these observations, a person can quickly identify the state of the speaker – whether he is happy, sad, angry, depressed, disgusted etc.

[0018] Accordingly, we analysed that human being use emotion extensively for expressing their intention through speech. It is observed that same message can be conveyed in different ways by using appropriate emotion. Thus, the present invention proposed a technology described

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below on the basis of the artificial intelligence using a convolutional neural network (CNN) to recognise human emotions based on the human speech.

[0019] According to an embodiment of the present invention, a method for recognition of emotions from an audio data comprising providing the audio data for emotion recognition to an extractor, extracting emotion signals by the extractor from the provided audio data in a local storage, transferring the extracted emotion signals to an external storage, training the extracted emotion signals using neural network in an external storage, classifying the trained emotion signals in the external storage using a classifier, transferring the classified emotion signals back to the local storage and testing the trained emotion signals with the audio data provided in the local storage to recognise emotions.

[0020] According to an embodiment of the present invention, the extractor is trained on an MFCC or LPCC model.

[0021] According to an embodiment of the present invention, the extractor extracts spectral signals.

[0022] According to an embodiment of the present invention, spectral signals are MFCC, Spectral Centroid, Spectral Skewness or Pitch Chroma.

[0023] According to an embodiment of the present invention, the extracted emotion signals are trained by applying by a Convolutional Neural Network (CNN).

[0024] According to an embodiment of the present invention, wherein the classifier is a Gaussian Mixture Model (GMM).

[0025] According to an embodiment of the present invention, the GMM classifier classifies the extracted signals based on the use of words in the audio data.

[0026] According to an embodiment of the present invention, the external data storage is provided with database of difference languages and preferably with Telugu Speech Corpus.

[0027] According to an embodiment of the present invention, the external data storage is comprised in the local data storage.

[0028] According to an embodiment of the present invention, a system for recognition of emotions comprising an audio component configured with audio, an extractor to extract emotion signals from the audio, a classifier to classify the extracted emotions based on a trained data using neural network; and a tester to test the classified emotion in the audio data.

[0029] According to an embodiment of the present invention, the extracted emotion signals are MFCC, Spectral Centroid, Spectral Skewness, and Pitch Chroma.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] These and other features, aspects, and advantages of the present invention will become better understood when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

[0031] Fig.1 shows a flowchart of a method to recognise emotion from speech according to an embodiment of the present invention.

DETAILED DESCRIPTION OF DRAWINGS

[0032] For the purpose of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated system, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates. Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skilled in the art to which this invention belongs. The system, methods, and examples provided herein are illustrative only and not intended to be limiting.

[0033] Embodiments of the present invention will be described below in detail with reference to the accompanying drawings.

[0034] It will be understood by those skilled in the art that the foregoing general description and the following detailed description are explanatory of the invention and are not intended to be restrictive thereof.

[0035] Reference throughout this specification to "an aspect", "another aspect" or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrase "in an embodiment", "in another embodiment" and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment.

[0036] The terms "comprises", "comprising", or any other variations thereof, are intended to cover a nonexclusive inclusion, such that a process or method that comprises a list of steps does not include only those steps but may include other steps not expressly listed or inherent to such process or method. Similarly, one or more devices or subsystems or elements or structures or components proceeded by "comprises... a" does not, without more constraints, preclude the existence of other devices or other sub-systems or other elements or other structures or other components or additional devices or additional sub-systems or additional elements or additional structures or additional components.

[0037] Reference is made herein to some "embodiments." It should be understood that an embodiment is an example of a possible implementation of any features and/or elements presented in the attached claims. Some embodiments have been described for the purpose of illuminating one or more of the potential ways in which the specific features and/or elements of the attached claims fulfil the requirements of uniqueness, utility and non-obviousness.

[0038] Embodiments of the present invention will be described below in detail with reference to the accompanying drawings.

[0039] According to an embodiment of the present invention, a method 100 is provided to recognition of emotions from an audio data. The audio data may be preferably a speech, recorded discussion, real-time chatting etc. The audio data is provided to a convention extraction model or an extractor like Mel Frequency Cepstral Coefficient (MFCC), LPCC (perceptual linear prediction as acoustic features to recognize emotion from speech) or any other extraction model working on the similar platform like MFCC or LPCC.

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[0040] The extractor is specially modelled to extract some features from the audio data that would be utilised for recognition of emotions from speech. According to am embodiment, the extractor may be trained to recognise features like spectral features which carry large information about the speech signal and these features which are extracted from the longer speech signal to represent perceptual quality of the speech. In another embodiment of the present invention, the extractor is trained to extract features like MFCC, Spectral Centroid, Spectral Skewness, and Pitch Chroma.

[0041] According to one embodiment of the present invention, the extractor is connected to a cloud storage having a database. The database may be an external database or a local database. According to another embodiment, the present invention may be provided only with the local storage. The storage both the local and the external are provided with database for emotion recognition. The database carries information about the trained data, which can be used for classification of the speech, or the audio data.

[0042] According to an embodiment of the present invention, the storage may also be comprised of a raw data. Preferably, the invention uses a Telugu Speech Corpus (IITKGP-SESC). In any case, the data is trained using the model of Convolutional Neural Network (CNN) and the database is then classified using the Gaussian Mixture Model, or any other conventional model used to develop the classification models.

[0043] The present invention uses the testing model to recognise emotions from the classifier. The extracted spectral features of the audio data based is classifed by the classfied based on the emotions. For instance, when a person is angry, his tone raises, his expression becomes stern and the content of his speech no longer remains pleasant. Similarly, when

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a person is happy, he speaks in a musical tone, there is a look of glee on his face and the content of his speech is rather pleasant and joyous. Based on these observation, the present invention can quickly identify the state of the speaker – whether he is happy, sad, angry, depressed, disgusted etc.

[0044] According to an embodiment of the present invention, a method for recognition of emotions from an audio data comprising providing **S1** the audio data for emotion recognition to an extractor, extracting **S2** emotion signals by the extractor from the provided audio data in a local storage, transferring the extracted emotion signals to an external storage, training **S3** the extracted emotion signals using neural network in an external storage, classifying the trained emotion signals in the external storage using a classifier, transferring the classified emotion signals back to the local storage and testing **S4** the trained emotion signals with the audio data provided in the local storage to recognise emotions.

[0045] According to an embodiment of the present invention, a system for recognition of emotions comprising an audio component configured with audio, an extractor to extract emotion signals from the audio, a classifier to classify the extracted emotions based on a trained data using neural network; and a tester to test the classified emotion in the audio data. The extracted emotion signals are MFCC, Spectral Centroid, Spectral Skewness, and Pitch Chroma.

[0046] Moreover, the actions of any flow diagram need not be implemented in the order shown; nor do all of the acts necessarily need to be performed. Also, those acts that are not dependent on other acts may be performed in parallel with the other acts. The scope of

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embodiments is by no means limited by these specific examples. Numerous variations, whether explicitly given in the specification or not, such as differences in structure, dimension, and use of material, are possible. The scope of embodiments is at least as broad as given by the following claims.

[0047] Benefits, other advantages, and solutions to problems have been described above with regard to specific embodiments. However, the benefits, advantages, solutions to problems, and any component(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential feature or component of any or all the claims.

[0048] While specific language has been used to describe the present subject matter, any limitations arising on account thereto, are not intended. As would be apparent to a person in the art, various working modifications may be made to the method in order to implement the inventive concept as taught herein. The drawings and the foregoing description give examples of embodiments.

CLAIMS:

We claim:

[1] A method for recognition of emotions from an audio data comprising:

    a.   providing **S1** the audio data for emotion recognition to an extractor;

    b.   extracting **S2** emotion signals in a local storage by the extractor from the provided audio data

    c.   transferring the extracted emotion signals to an external storage from the local storage;

    d.   training **S3** the extracted emotion signals using neural network in an external storage;

    e.   classifying the trained emotion signals in the external storage using a classifier;

    f.   transferring the classified emotion signals back to the local storage; and

    g.   testing **S4** the trained emotion signals with the audio data provided in the local storage to recognise emotions.

[2] The method for recognition of emotions as claimed in claim 1, wherein the extractor is trained on an MFCC or LPCC model.

[3] The method for recognition of emotions as claimed in claim 2, wherein the extractor extracts spectral signals.

[4] The method for recognition of emotions as claimed in claim 3, wherein the spectral signals are MFCC, spectral centroid, spectral skewness or pitch chroma.

[5] The method for recognition of emotions as claimed in claim 1, wherein the extracted emotion signals are trained by applying by a Convolutional Neural Network (CNN).

[6] The method for recognition of emotions as claimed in claim 1, wherein the classifier is a Gaussian Mixture Model (GMM).

[7] The method for recognition of emotions as claimed in claim 6, wherein the GMM classifier classifies the extracted signals based on the use of words in the audio data.

[8] The method for recognition of emotions as claimed in claim 1, wherein the external data storage is provided with database of difference languages and preferably with Telugu Speech Corpus.

[9] The method for recognition of emotions as claimed in claim 1, wherein the external data storage is comprised in the local data storage.

[10] A system for recognition of emotions comprising:

- an audio component configured with audio,

- an extractor to extract emotion signals from the audio,

- a classifier to classify the extracted emotions based on a trained data using neural network; and

- a tester to test the classified emotion in the audio data,

wherein,

the extracted emotion signals are MFCC, Spectral Centroid, Spectral Skewness, and Pitch Chroma.

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ABSTRACT

A METHOD AND A SYSTEM FOR EMOTION RECOGNITION FROM A SPEECH

The present invention provides a method and a system for emotion recognition from a speech. The method for recognition of emotions from an audio data comprising providing S1 the audio data for emotion recognition to an extractor, extracting S2 emotion signals by the extractor from the provided audio data in a local storage, transferring the extracted emotion signals to an external storage, training S3 the extracted emotion signals using neural network in an external storage, classifying the trained emotion signals in the external storage using a classifier, transferring the classified emotion signals back to the local storage and testing S4 the trained emotion signals with the audio data provided in the local storage to recognise emotions.

Fig. 1

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(54) Title of the invention : SYSTEM AND METHOD FOR FAST CONVERGENCE IN IP NETWORKS OF AVOIDING TRANSIENT LOOPS AND PACKET LOSS BY REVERSE SHORTEST PATH TREE USING SPANNING TREE ALGORITHM OF THE GRAPH

(51) International classification :H04L 12/00 (31) Priority Document No :NA (32) Priority Date :NA (33) Name of priority country :NA (86) International Application No :NA Filing Date :NA (87) International Publication No : NA (61) Patent of Addition to Application Number:NA Filing Date :NA (62) Divisional to Application Number :NA Filing Date :NA	(71)Name of Applicant : 1)SANAKKAYALA SATYANARAYANA Address of Applicant :Department of Computer Science and Engineering, K L University, Green Fields, Vaddeswaram, Guntur District-522502, Andhra Pradesh, India. Andhra Pradesh India (72)Name of Inventor : 1)SANAKKAYALA SATYANARAYANA (India) 2)V. SRIKANTH (India) 3)B. NAGA JAGADESH (India) 4)K BHAGAVAN (India) 5)N. VENKATA MADHU BINDU (India)

(57) Abstract :
Exemplary embodiments of the present disclosure are directed towards a system and method for fast convergence in IP networks of avoiding transient loops and packet loss by reverse shortest path tree using spanning tree algorithm of the graph. The system comprises a link state routing protocols module comprising at least one node connected to at least two other nodes by means of at least one link connected between the two nodes. The system further comprises a shortest path computing module configured for avoiding a plurality of transient loops and a packet loss between the nodes. The shortest path computing module comprises at least one fast reroute module and at least at least one reverse shortest path computing module.

Number of Pages = 18

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