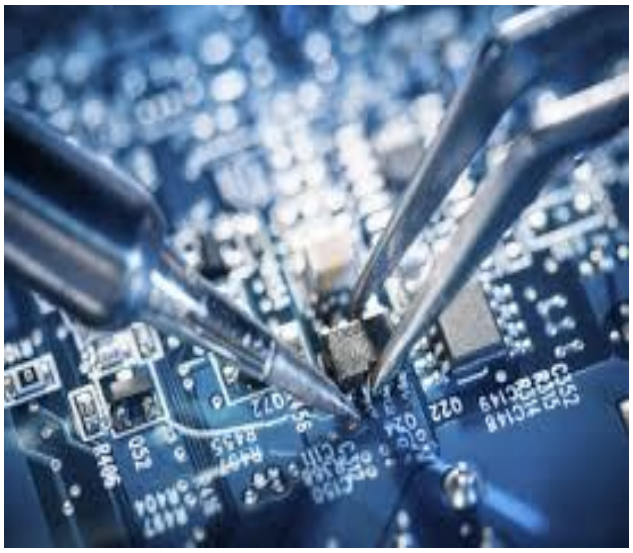
Er. PERUMAL MANIMEKALAI POLYTECHNIC COLLEGE
An ISO 9001:2015 Certified Institutions
(Approved by AICTE, New Delhi, and Government of Tamil Nadu)
Koneripalli, Hosur - 635 117.

PMC TECH
INSPIRE TO INNOVATE

# Er. Perumal Manimekalai Polytechnic college

## Department of Electronics (Robotics) Engineering

*2nd National level Technical symposium – CHROMEFEST 2020*



**Held on 07-02-2020**

# Our Institution

"PMC TECH play influential role with Industries for providing meaningful impact on overall competency and skill levels of the students in relation to knowledge updating with practicality in learning and professionalizing them aiming at the developing scenario of current and future technologies."

PMC TECH Group of Institutions, Hosur, Tamilnadu established in the year 1996 is run by "Er. Perumal Manimekalai Telugu Minority Educational and Charitable Trust" under the dynamic leadership of Shri. Er. P. Perumal, Founder Chairman. The Institutions comprise Matriculation School, ITI, Polytechnic, Engineering College and Research Studies providing quality education in the region.

Er. Perumal Manimekalai polytechnic college (established 1996) approved by AICTEand affiliated to DOTE Chennai, is an ISO 9001:2015 certified Institution. The Institute provide scholarly and professional environment with quality education & skill oriented training that help students becoming best employable for Industries and professional entrepreneurs for the Nation. The Institute supports students' creativity/innovations by establishing Scientific and Industrial Research Organization (SIRO), Women Technology Park (WTP), Centre for IIT Bombay Employability Skill Trainings, Business Incubation Centre (MSME BI), Innovation & Entrepreneurship Development Centre (IEDC) etc., for research and developments.

## Vision:

PMC Tech -Polytechnic College shall emerge as a premier Institute for valued added technical education coupled with Innovation, Incubation, Ethics and Professional values.

## Mission:

1. To foster the professional competence through excellence in teaching and learning.
2. To nurture overall development of students by providing Quality Education & Training.
3. To provide innovative environment to learn, innovate and create new ideas for the betterment of oneself and society.

# About the Department

The Department of Diploma in Electronics (Robotics) Engineering was established in the academicyear 2005-2006. It has well equipped laboratories with a state of art Computer Laboratory, Electronics Devices etc… Robotics, and Mechanical Related Labs Pneumatic, Hydraulic, Manufacturing, CNC, CAD Laboratories, Qualifiedand experienced faculty members have been involved in teaching and conducting various short term courses for the benefit of students.

## Vision:

To develop Electronics (Robotics) Engineering diploma holders to meet the Growing needs of Industry and Society.

## Mission:

- To foster the professional competence through excellence in teaching and learning.
- To nurture overall development of students by providing Quality Education & Training.
- To create conducive environment for students to learn, innovate and conceive for the betterment of oneself and society.

## Program Educational Objectives (PEOs)

1. **Core Competence**: Our students will exhibit the knowledge in Mathematics, fundamentals of Mechanical, Electrical, Electronics and Computer Engineering to solve Engineering problems.
2. **Breadth:** Our students will be able to design and create novel products and solutions for real life problems using the knowledge of Scientific, Mechanical, Electronics and Computer Engineering.
3. **Professionalism:** Our students exhibit professional and ethical attitude, effective communication skills and exhibit teamwork over multidisciplinary areas.
4. **Higher studies and Employability:** Our students succeed in industry / technical profession by creating an environment excellence and a high order of ethics and a zeal for lifelong learning.

## Program Specific Outcomes (PSOs)

**PSO1:** Ability to understand the integration of engineering applications such as electronic, Mechanical, electromechanical, control and computer systems that contain software And hardware components including sensors, actuators and controllers.

**PSO2:** An ability to exhibit the knowledge of electrical and electronic circuits, Hydraulic & Pneumatic control system, logic design and image processing using hardware and Soft programming for automation.

# About the Symposium

Most of the present day research are taking place with focus towards technology and education in this engineering the foremost leader. It plays a unique role in exploiting innovative technology

This Conference provides a real opportunity to bring together scientists, researchers and academician of different disciplines to discuss new issues, tackle complexproblems and find advanced solutions breeding new trends in Engineering.

## Chairman's Message

# Organizing Committee Members

### Chief Patrons

**Er. P. Perumal, Chairman, PMC TECH – Group of Institutions**

**Shri. P. Kumar, Secretary, PMC TECH – Group of Institutions**

**Smt. P. Mallar, Trustee, PMC TECH – Group of Institutions**

### Patron

**Mr. N. Balasubramaniam, Principal, PMC TECH – Polytechnic College**

### Convener

**Mr. K. Arunkumar M.E., HOD/ E(Robotics)**

### Co-ordinators

**Mr. M. Mohamed Jinna M.E., Lecturer /E(Robotics)**

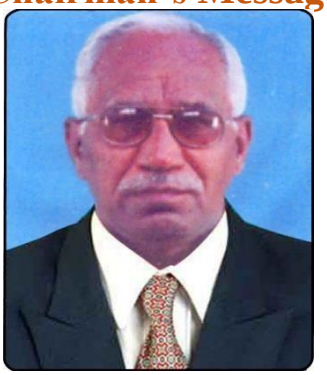
### Members

**Mr. A. Ravikumar B.E., Lecturer/ E(Robotics)**

**Mr. K. Muralidharan M.E., Lecturer / E( Robotics)**

**Mr. D. Subramani M.E., Lecturer / E(Robotics)**

## Chairman's Message



I feel immense pleasure to inscribe my message for the souvenir. It has been saidthat the mask of success contains many hidden faces behind it. ***CHROMEFEST 2020*** **SYMPOSIUM** as well as this institution is an assertion of this fact.

Absolute teamwork and strong vision resulted in Digital Marketing (***CHROMEFEST 2020***)" a National level symposium organized by the Department of Electronics (Robotics) Engineering. Our Institution Strive to travel beyond the boundaries of Mere books. We have realizedthat our future is abstract and unknown but youth in our hands are real and can be molded. This souvenir gives us just the glimpses of the achievements be held by our institution. Brighter days are still to come. And my heartfelt wishes for that.

The diligent contribution made by our faculty members and elaborated endeavor done by our students are the foundations of ***CHROMEFEST 2020***Conference.

"Be with wise people that make you wise"

My best wishes for the future!

**Er. P. PerumalChairman,**

**PMC TECH – Group of Institutions.**

# Secretary's Message

It gives me great pleasure to send the message for the souvenir, which is to be released at ***CHROMEFEST 2020***Symposium. ***CHROMEFEST 2020***Symposium is being organized on 7th Feb 2020 by Department of Electronics (Robotics),Hosur.

An Institution of Higher Education, where students and faculty members are busy in learning and research, organizes such co-curricular activities for giving an opportunity to the students to celebrate their competence in technology and to inculcate in them the qualities of confidence, innovative thinking and analytical abilities. Co-curricular activities are intimately connected with the inner-being of a person. On the one hand, these permit an individual to express oneself and understand oneself better.

We want PMC Tech to be a great Institution. While making every single classroom, laboratory and workshop interesting is important, while working to make our programs practice-oriented is PMC Tech's mission, development of the complete personality of every student in all the hues, which come together to create a great human being, is the objective of the Institution. Such programs contribute a great deal in achieving the PMC Tech's objectives.

I convey my Best Wishes for the success of ***CHROMEFEST 2020***, organized by department of Electrical and Electronics Engineering.

**Shri. P. Kumar,**

**Secretary,**

**PMC TECH – Group of Institutions.**

## Trustee's Message

A feeling of great pride and contentment rises to witness our event "***CHROMEFEST 2020***"and this souvenir is nothing else but the reflection of the success saga our institution has created.

It has always been a tradition of our institution of confer holistic education to the learners which not only gives the qualification but also intends to mold them into better human beings. And I wish the same tradition will be followed in future years. Being a constant witness of the progress of our institution, I can surely acclaim that in times to come, our institution will prove to be an epitome of excellence in imparting quality education.

The sincere work and strength put up by our faculties and dear students in materializing this conference is worth admiring. This souvenir reflects aspiring vision and inspiring insight of our students and faculties.

So, my good wishes are always with them.

Many congratulations to all!

**Smt. P. Mallar,**

**Trustee,**

**PMC TECH – Group of Institutions.**

## Principal's Message

Er. Perumal Manimekalai Polytechnic College has been the crest of jewels in the educational map of Tamilnadu. Its unrivalled excellence in conferring quality education of PMC Tech has played pivotal role in the technical development of the learners.

The sincere and meticulous work pattern has been the heritage given by our Institution. As a consequence, our institution has cultivated a tradition of bestowing learners with best quality academic education. Apart from that, to develop creative, conceptive and analytical skills as well as to furnish the learners with research and leadership skills technical festivals are essential. So the Department of Electronics (Robotics) Engineering has organized "***CHROMEFEST 2020"*** a National level Symposium andit stands a class apart from all the events. And I dream our conference will provide a forum for all the students to exchange their learning experiences as well as their creativetechnical knowledge. I am assured that our Symposium will represent the students bothquantitatively and qualitatively.

My cordial felicitations to all!

Congratulation to all of the students. Yours efforts have not gone unnoticed!

Best wishes for this, **National Level Symposium – *CHROMEFEST 2020***.

**Mr. N. Balasubramaiam,**

**Principal,**

## HoD's Message

This National conference on " ***CHROMEFEST 2020*** " organized by E(Robotics) department, to focus the attention of all concerned professionals to discuss at length concern with emerging trends in engineering and technology.

To seek solutions wherever possible and identify areas where further in research. Invited contributions from professional bodies for knowledge sharing. Enormous participants confirmed their registration and presentation in National level symposium.

PMC Tech is making strides towards evolving directions for the growth and dissemination of technical knowledge for the purpose of research and innovation. It is with these clear thoughts the department of Electronics (Robotics) Engineering has been organizing National level Symposium. This year the focus is on

Moreover, this whole event is a conclusion of synchronized efforts done by our faculty members and students. Congratulations to them for their sincere and earnest hard work. I, hope this conference will be a platform for all our energized students where they can explore their hidden potential.

Wish you best of luck in your endeavor.

**Mr. K. Arunkumar HOD/ E(Robotics)**

**PMC TECH – Polytechnic College.**

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# ROBOTICS AND ARTIFICIAL INTELLIGENCE


## ABSTRACT

The goal of the paper is to present the ideal form of an NDN forwarding engine on a commercial off-the-shelf (COTS) computer. In this paper, we design a reference forwarding engine by selecting well-established high-speed techniques and then analyze a state-of-the-art prototype implementation to identify its performance bottleneck. The microarchitectural analysis at the level of CPU pipelines and instructions reveals that dynamic random access memory (DRAM) access latency is one of bottlenecks for high-speed forwarding engines. Based on the analysis result, we design two prefetch-friendly packet processing techniques to hide DRAM access latency. The prototype employing the techniques achieves a forwarding rate exceeding 40 million packets per second on a COTS computer.

# SIX SIGMA

## ABSTRACT

Femur fracture reduction surgery is a good candidate for robotics applicationA compliant parallel robot is designed for femur fracture reduction.Mechanism design, analysis and optimization is presented.Control of the parallel robot is performed.The feasibility of use of a parallel robot for fracture reduction is established.A robotic system for the reduction of fractured femur bone is proposed in this research to help orthopedics during the labor intensive bone reduction procedures and also save them from radiation stimulated environment. Fractured femur reduction is a good candidate for robotics application owing to its elongated anatomy and strong counteracting forces from surrounding muscles. However, the robot forces should be compliant, and motions need to be accurate. Aiming to achieve these two conflicting objective, a parallel robot actuated by six intrinsically compliant actuators is being proposed here. After an initial design analysis, three performance metrics, namely, the conditioning index, actuator force index and interaction compliance index were identified and formulated. An evolutionary algorithm SPEA2 was employed to simultaneously optimize these objectives by varying the key robot design variables. Subsequent to the optimization, an optimal robot design is obtained which provides the best trade-off between the performance measures. Initial proof of concept experiments were carried out whereby the robot was tested for trajectory following accuracies while maneuvering the moving platform about the three axes. A fuzzy based closed loop feedback controller was implemented on the robot. Excellent trajectory tracking results were observed in response to the sinusoidal inputs.

# FUSION TECHNOLOGY IN ROBOTICS


## ABSTRACT

Since the dynamic nature of human–robot interaction becomes increasingly prevalent in our daily life, there is a great demand for enabling the robot to better understand human personality traits and inspiring humans to be more engaged in the interaction with the robot. Therefore, in this work, as we design the paradigm of human–robot interaction as close to the real situation as possible, the following three main problems are addressed:

(1) fusion of visual and audio features of human interaction modalities, (2) integration of variable length feature vectors, and

(3) compensation of shaky camera motion caused by movements of the robot's communicative gesture. Specifically, the three most important visual features of humans including head motion, gaze, and body motion were extracted from a camera mounted on the robot performing verbal and body gestures during the interaction.

# NANO FUEL CELL


## ABSTRACT

Cerium incorporated barium zirconate nano-ceramics $BaZr_{1-x}Ce_xO_{3-x/2}$ were fabricated by eco-friendly green combustion using honey as a fuel. FTIR spectra evidenced a prominent band between 400 and 700 $cm^{-1}$ characteristics of $ABO_3$ perovskites. The bond-length ($r$) of Zr–O bond is extended through doping of Ce ions. Consequently, the communication among Zr and O bond is weakened. The electrical conductivity rises with temperature, demonstrating that $BaZr_{1-x}Ce_xO_{3-x/2}$ exhibits ionic and/or electron-hole conduction. The conductivity is observed to enhance with the $Ce^{3+}$ concentration. At 850 °C, the solid $x$ = 0.10 exhibits enhanced conductivity of 0.0190 S/cm than that of pristine $BaZrO_3$ (0.010 S/cm). The increasing trend of conductivity may be due to decreased grain boundary resistance effect and generation of oxygen vacancies. Dielectric behaviour shows slight frequency dependence performance, the dielectric constant was high ($\varepsilon$ = 35–45) in lower frequency region. The dielectric constant declines on enhancing Ce-content which can be explained on the Maxwell-Wagner model.

# MICRO ELECTRO MECHANICAL SYSTEM


## ABSTRACT

Capacitive MEMS (micro-electromechanical systems) accelerometers have inherent parasitic capacitors, the existence of which will increase the system bias-instability and non-linearity. The parasitic mismatch induced signal is indistinguishable to the sensed signal and cannot be canceled by traditional offset cancellation technique. In this paper, a method to realize the on-line measuring and calibrating of this parasitic effect is proposed, which is based on the digital harmonic distortion self-test. The effect of different parasitic mismatch on the system output response is analyzed in detail. As will show, in self-test mode, the parasitic mismatch will induce distinctive even-order harmonics. An on-chip digital self-test circuit is built to excite and measure this characteristic. According to the measured results, the parasitic mismatch of the front-end interface can be effectively tuned out whereby preserved calibrating unit. The test result shows, using proposed technique, the parasitic mismatch could be reduced in two orders of magnitude.