3.3.1: Number of research papers published per teacher in the Journals as notified on UGC CARE list during the last five years

3.3.1.1. Number of research papers in the Journals notified on UGC CARE list year wise during the last five years.

CALENDAR YEAR 2020

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Calendar Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		
						Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list
A Review on Peltier Device and Heat Dissipation of It's Hot Surface Using Fins	Prof. Kunalsinh Kathia	Mechanical	Ijraset Journal For Research in Applied Science and Engineering Technology	Jun-20	ISSN: 2321-9653	https://www.ijraset.com/research-paper/peltier-device-and-heat-dissipation-of-its-hot-surface-using-fins	A Review on Peltier Device and Heat Dissipation of It's Hot Surface Using Fins (ijraset.com)	Yes
Analysis of a New Symmetic Multilevel Inverter Topology with Reduced Component Count	Prof. Nirav Joshi	Department of Computer Engineering & Information Technology	International Conference on Emerging Trends in Information Technology and Engineering (ic-ETITE)	Apr-20	Electronic ISBN:978-1-7281-4142-8 USB ISBN:978-1-7281-4141-1 Print on Demand(PoD) ISBN:978-1-7281-4143-5	https://ieeexplore.ieee.org	https://ieeexplore.ieee.org/document/9077822	Yes

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International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** III **Month of publication:** March 2022

DOI: https://doi.org/10.22214/ijraset.2022.40819

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue III Mar 2022- Available at www.ijraset.com

A Review on Peltier Device and Heat Dissipation of It's Hot Surface Using Fins

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Abstract: ***The branch of thermal science is widely involved in refrigeration theory used at many places like Air Conditioners, Air Cooler, Refrigerator, etc. Refrigeration cycles and their concept were newly introduced in early 1834 and after that in 1913 refrigerators for possible to use for home applications and at various places. When it comes to cooling mainly the refrigeration process comes in mind for the solution, But Peltier effect which is reverse of seebeck effect is also well known for cooling as portable cooling in compact size is possible by TEC Module as Peltier devices generates heating at one side and cooling at other side when there is a voltage difference between two dissimilar metals. TEC Module of various ampere gives various ranges of temperature at different voltages and current. Different models of TEC Module (Peltier device) are mainly varied in terms of current as no. of P-N junctions remains same as voltage and current can be modified. The heat generated in at one side of Peltier device is extremely high and if that heat is not dissipating then TEC module will be damaged and won't be possible to bring back in working conditions. So, in Heat Transfer the theory of extended surface is mainly important for heat dissipation. So different geometry of fins is being used such as rectangular fins, Annular fins, Trapezoidal fins, Inversely Trapezoidal fins, etc. The shape and thickness of fins are the most important factors affects heat dissipation. Another thing needed to be taken in account is analysis on material composition of fins which is affected by the term thermal conductivity of the materials.***
Keywords: Peltier Device, Thermoelectric Module, Heat Dissipation, Fins, Peltier Effect, Refrigeration, Heating, Portable cooling, and heating.

I. INTRODUCTION

Peltier Device works on theory of Reverse Seebeck Effect. This Seebeck effect is also known as Baltic German physicist Thomas Johann Seebeck [1], this device is also known as thermoelectric device or module. Refrigeration is available on domestic and industrial uses which is installed in large devices such as Air Conditioners, Coolers, etc. This TEC modules are available of different varieties. The maximum voltage it can handle is up to 12Volts. The variety is based on different capacities of maximum current input. Common and easily available modules in the market are TEC12706, TEC12705. TEC12710, etc. The Figure below describes the standardized acronym for TEC Modules. The following acronym defines that how the TEC module is standardized over the world by the nomenclature such as size of TEC, no. of stages, no. of P-N Junctions/Couples and current rating as per various applications of the users.

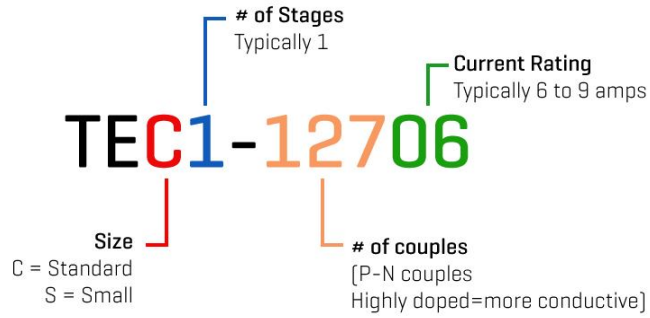

Fig. 1 Standardize acronym for TEC modules

TEC Modules are also available in special varieties like small, Multistage TEC, Current rating more than 9 amps, etc. Commonly used are square TEC Modules of sizes 40mm and 30mm followed by (Length X Width) [2]. TEC module is a well-built energy conversion device as it does not require any additional components as well as it doesn't put any external vibration or friction, or any mechanical stresses and it is portable and need less maintenance as compared to other cooling systems [3].

II. APPROACH

In order to ensure we review researches of interest only, we pre-set some important criteria. Firstly, the article must be published in year 2014 and later. This is to ensure we get only the most recent researches, so that our study is relevant and not outdated. Secondly, the article must be published in scientific journal or conference. This is to ensure the validity of the content, which have been peer reviewed and approved. Thirdly, the article must use Refrigeration with use of Peltier device and Heat dissipation of hot side of TEC Module using fins. This is our objectivefor this study, so we must work within the scope of our study.

III.PELTIER MODULE

A. Construction of TEC Module

A Peltier Module (thermoelectric module) is a type of thermal control module that has both "heating" and "cooling" properties. It is possible to adjust the surface temperature and maintain it at the target temperature by running an electric current through the module. This both the effects follow the principle of Peltier Effect which is the Reverse Seebeck Effect [3,4].

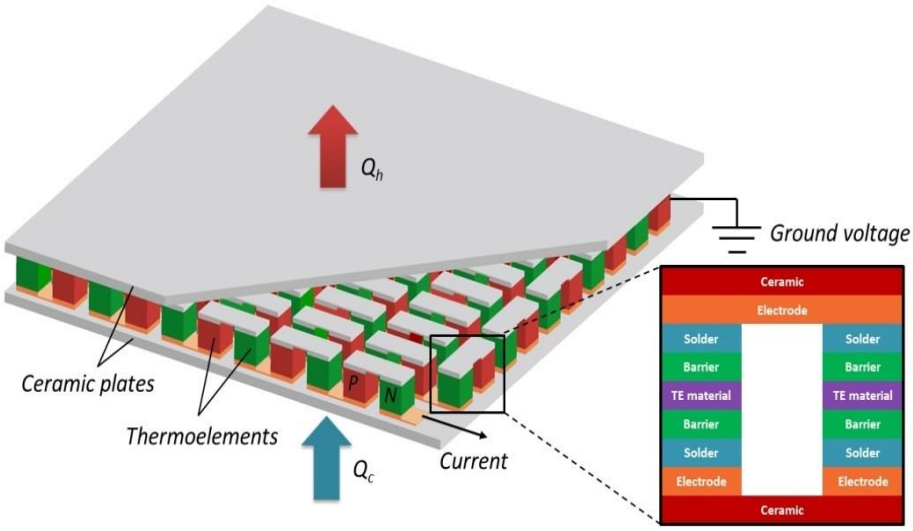

Fig. 2 Constructional cross-sectional view of TEC module

By this effect electricity can also be generated which follow the effect known as Seebeck Effect. Both the effect can be performed by Peltier Module's [5]. The image below represents the actual and cross-sectional view of TEC Module with labelled components.

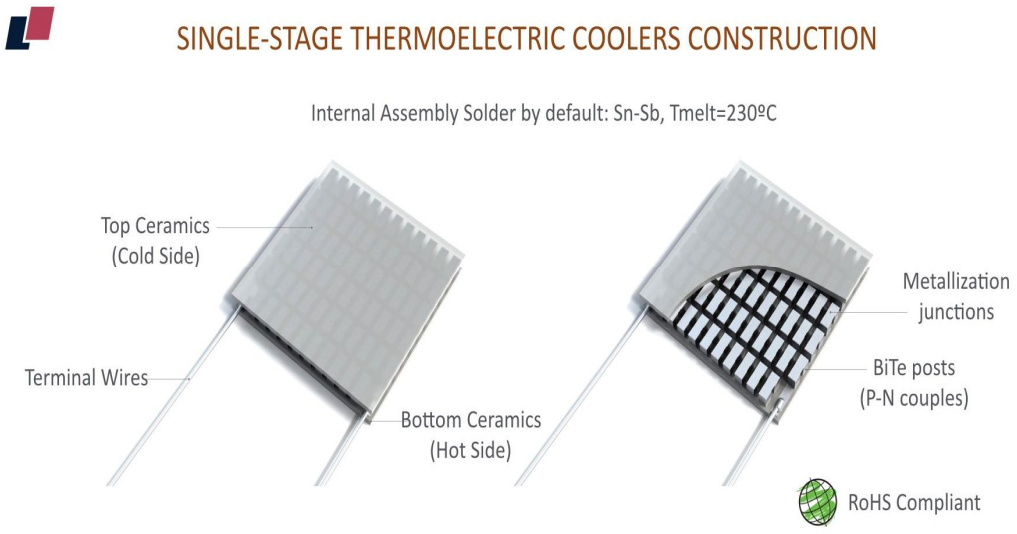

Fig. 3 Constructional cross-sectional view of single-stage TEC module

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue III Mar 2022- Available at www.ijraset.com

B. Working Principle

The TEC module works by transferring the heat from hot side to cold side. During the cooling or heating mode, the direct current passes from n-type to p-type semiconductor material. The principal of the Peltier Effect involves the absorption of thermal energy from one dissimilar metal junction and release the thermal energy to another junction [5].

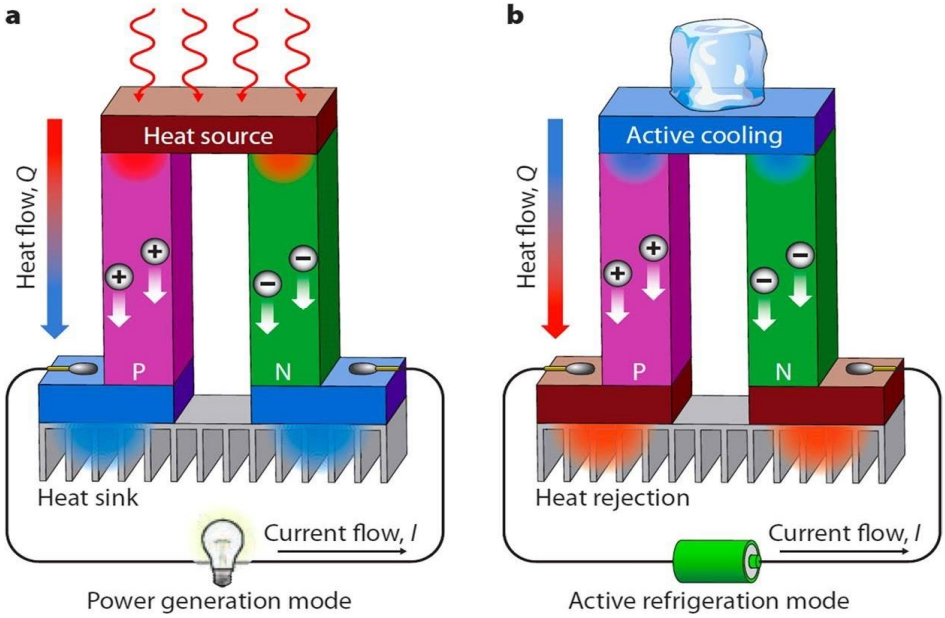

Fig. 4 Working principle of seebeck and peltier effect

C. Material Influence on TEC Module

The quality of a thermoelectric material (TEM) depends on three factors: electrical conductivity, thermal conductivity, and TEM efficiency. Thermal conductivity determines the heat passing through the module due to the decrease in temperature [6]. The efficiency of TEC depends on the quality factor, ZT (Figure of merit), which is the ratio of electricity generated per unit area [5].

$$ZT = S2\sigma/\kappa \text{ [5]}$$

The conflict tracts to develop the evolved ZT and power factor of TEC material are optimized and considered as below

1) ZT about 1 is hamstrung;
2) ZT = 2 is suitable to recover waste heat;
3) ZT = 4/5 is suitable to match the refrigerator

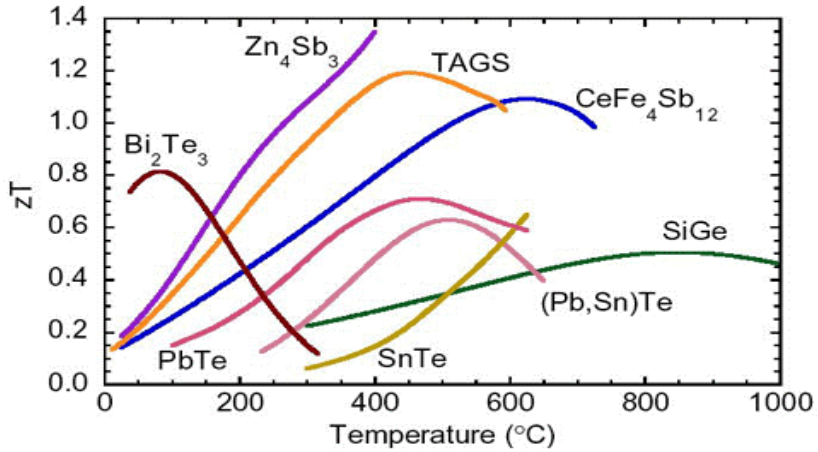

Fig. 5 The TEC figure of merit ZT, depend on the electrical conductivity and the best figure of merit was found in Bismuth Telluride semiconductor [5,8]

Thermoelectric efficiency (TEC) is the ratio of electrical energy produced to the amount of thermal energy received from a heat source [5]. The ZT quality index is a key parameter that can improve the efficiency of TEC modules. High quality elements require low thermal conductivity but high electrical conductivity [7].

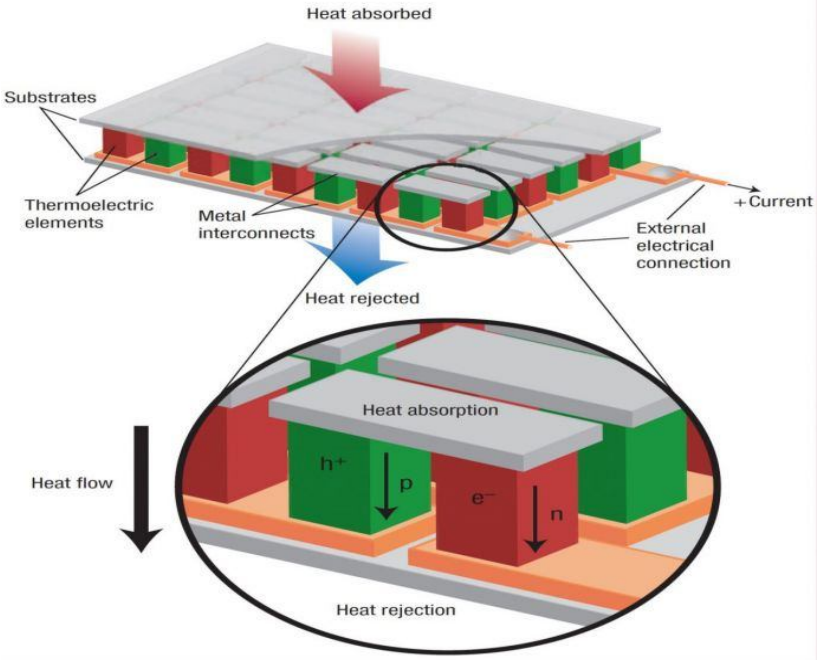

Fig. 6 Enlarged view of P-N junctions

The overall heat decrement and external thermal resistance are established along the consistence of module and the most TEM efficiency. Thermal conductivity determines the heat passing through the module due to the decrease in temperature [6]. The efficiency of TEC depends on the quality factor, ZT (Figure of merit), which is the ratio of electricity generated per unit area [5]

D. Efficiency of TEC Module

Figures the word "efficiency" refers to the ratio of the work a person gets to the amount of power a machine utilizes. For thermoelectric modules, it is standard to use the term "efficiency" rather than "efficiency". COP is the amount of heat transferred divided by the amount of electricity supplied [9]. The COP depends on the heat payload, input power, and the desired temperature differential. usually, the COP is between0.3 and 0.7 for single-stage usages. Still, COPs higher than1.0 can be achieved especially when the module is pumping against a positive temperature difference (that is, when the module is removing heat from an object that's warmer than the environment) [10]. The figure below shows a regularized graph of COP versus I/ Imax (the proportion of input current to the module's Imax specification). Each line corresponds with a constant DT/ DTmax (the proportion of the needed temperature difference to the module's DTmax specification).

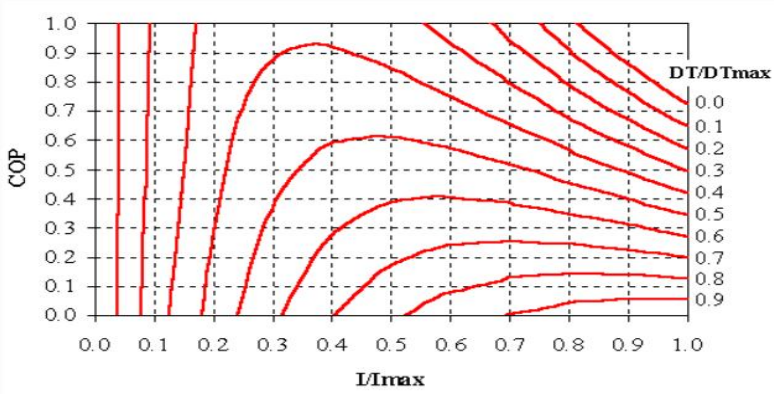

Fig.7 Graphical image of I/Imax current output ratio by DT/DTmax

E. Reliability of TEC Module

All thermoelectric modules experience the same loads during operation, but how to withstand these loads is a matter of build quality. A "point of failure" depends on operating temperature, number of thermal cycles, and the degree of degradation a particular system can tolerate before performance becomes unacceptable [11].

To improve reliability, exposure to high temperatures must be minimized. All modules, regardless of manufacturer, are exposed to high temperatures. Standard modules have a maximum temperature of 80 °C, while high temperature modules can reach 200 °C [11].

F. Benefits of Tec Module Over Conventional Refrigeration System

Tables must be numbered using uppercase Roman numerals. Table captions must be centred and in 8 pt Regular font with Small While maximum conventional refrigeration system uses designs primarily based totally on compressors and refrigerants; an increasing number of applications are turning to thermoelectric cooling as an opportunity to standard refrigeration technology [12]. While thermoelectric cooling isn`t feasible for each refrigeration, thermoelectric modules can appreciably outperform conventional refrigerant-primarily based totally cooling system in sure applications. TEC Technology have following benefits mention below: -

Table I
Benefits Over Traditional Systems

Sr No.	Benefits	Features
1.	Solid state design	✓ No moving components.
		✓ Integrated chip design.
		✓ Noiseless operation.
		✓ Integrated chip design
2.	Accurate temperature stability	✓ Tolerances of better than +/- 0.1°C.
		✓ Accurate and reproducible ramp and dwell times.
3.	Rapid response times	✓ Instantaneous and rapid temperature change.
		✓ Reduced power consumption.
4.	Compact and lightweight	✓ Low profile.
		✓ Sizes to match your component footprint.
		✓ No bulky compressor units.
		✓ Excellent for benchtop application.
5.	Cooling/heating mode options	✓ Fully reversible system with switch in polarity.
		✓ Supports rapid temperature cycling.
6.	Low DC voltage designs	✓ It utilizes only up to 12 Volts
7.	Localized Cooling	✓ Spot cooling for parts or scientific applications.
		✓ Perfect for temperature calibration in precision detection systems.
8.	High reliability	✓ 100,000 hours + MTBF
9.	Dehumidification	✓ Efficient condensation of atmospheric water vapor

G. Configuration for P-N Junctions/No. of Couples

However, notice at the sides of an opened/unsealed thermoelectric device. Each individual column is a pellet. (Observe side view of the TEC Module) These thermoelectric pellets do the effective heat pumping work of a TE device. A thermoelectric device contains both P and N semiconductor pellets arranged in duos called Couples, so mostly there are double as multiple pellets as there are couples. For illustration, a single 127 couple TEC will actually contain 254 pellets (127 N and 127 P). Each of these pellets will have two solder connections making for a sum total of 508 solder joints!

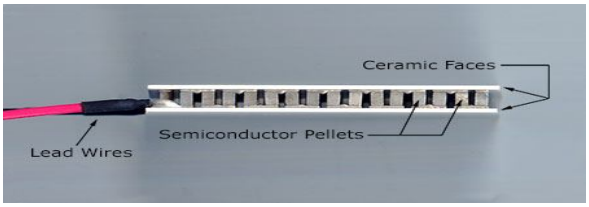

Fig. 8 Side view of an unsealed TEC module

Have a look from the side view of the Peltier and opposite the side from the wires. (See the image below) Count the no. of pellets that you see. It's generally an even number.
Use the following formula Couples = ((Count2)/ 2)-1
For sample, you count 12 pellets;
therefore (122/2)-1 = 71 couples.

Similarly**,** some commonly calculated values are given in the Table below: -

Table III
Calculation for Different No. of Pellets

Pellet Counts	*Couples in TEC*
4	7
6	17
8	31
10	49
12	71
14	97
16	127
18	161
20	199
22	241
24	287

IV. HEAT DISSIPATION USING FINS

A. Heat Sink Consideration

Instead of being a heat absorber that consumes heat by magic, a thermoelectric cooler is a heat pump which moves heat from one location to another. When electric power is applied to a TE module, one face becomes cold while the other is heated. In accordance with the laws of thermodynamics, heat from the (warmer) area being cooled will pass from the cold face to the hot face [14]. To complete the thermal system, the hot face of the TE cooler must be attached to a suitable heat sink that is capable of dissipating both the heat pumped by the module and Joule heat created as a result of supplying electrical power to the module. A warmth sink is an imperative a part of a thermoelectric cooling machine and its significance to overall machine overall performance need to be emphasized. Since all operational traits of TE gadgets are associated with warmth sink temperature, warmth sink choice and layout have to be taken into consideration carefully [15].
Several forms of heat sinks are available consist of natural convection, forced convection, and liquid-cooled. Natural convection heat sinks may prove satisfactory for very low power applications especially when using small TE devices operating at 2 amperes or less. A natural convection heat sink should be positioned so that (a) the long dimension of the fins is in the direction of normal air flow and (b) there are no significant physical obstructions to impede air flow. It is important to consider that other heat generating components located near the heat sink may increase the ambient air temperature, thereby affecting overall performance [15].

B. Fins and it's Effectiveness on Heat Transfer

Heat sink having various profiles namely Rectangular, Trapezoidal and inverted Trapezoidal also called as dovetail fin which are the commonly used devices for enhancing heat transfer in electronic components. The temperature along the inverted trapezoidal fins has the best performance (108%) with uniform distribution, while the temperature in the trapezoid fins increased in the positions near the base plate surface because of the complication in moving the heated air. Heat transfer coefficient from of the rectangular fins is higher by (89%) than the heat transfer coefficient of the trapezoidal fins [16].
The shape of the fins is important as they play a major role in the cooling system due to the passage of the air flow into the fins those parameters should be taking in consideration carefully when choosing or designing a heat sink. The number of fins should be optimized because it should be noted that adding more fins also decrease the distance between the adjacent fins [16].

The heat flows through the fins having the same base thickness increase as the values of the length become larger, so that the tapered fin has the lowest heat flow and the dovetail (inverted trapezoidal) fin the largest. It's concluded that the air flow through the inverted trapezoidal fins is much faster due to its geometrical shape that also implies that it is less heated as shown in figure. The inverted trapezoidal fins are also known as Dovetail Fins [17].

The analysis performed in fig. below is CFD Analysis (Computational fluid dynamics) which shows the flow of air & area of contact of air with fins. Researchers have shown that the trapezoid fins can improve heat transfer performance by at least 14% as compared to the rectangular fins, and it is expected that 20% or more improvements can be achieved through further acquisition of data. The SolidWorks Flow Simulation and the experimental data indicate that this could lead to significant improvements in overall performance. The heat transfer coefficient characteristics of rectangular, trapezoidal and inverted trapezoidal pin fin heat sinks subject to the influence of orientation are examined under natural convection [16].

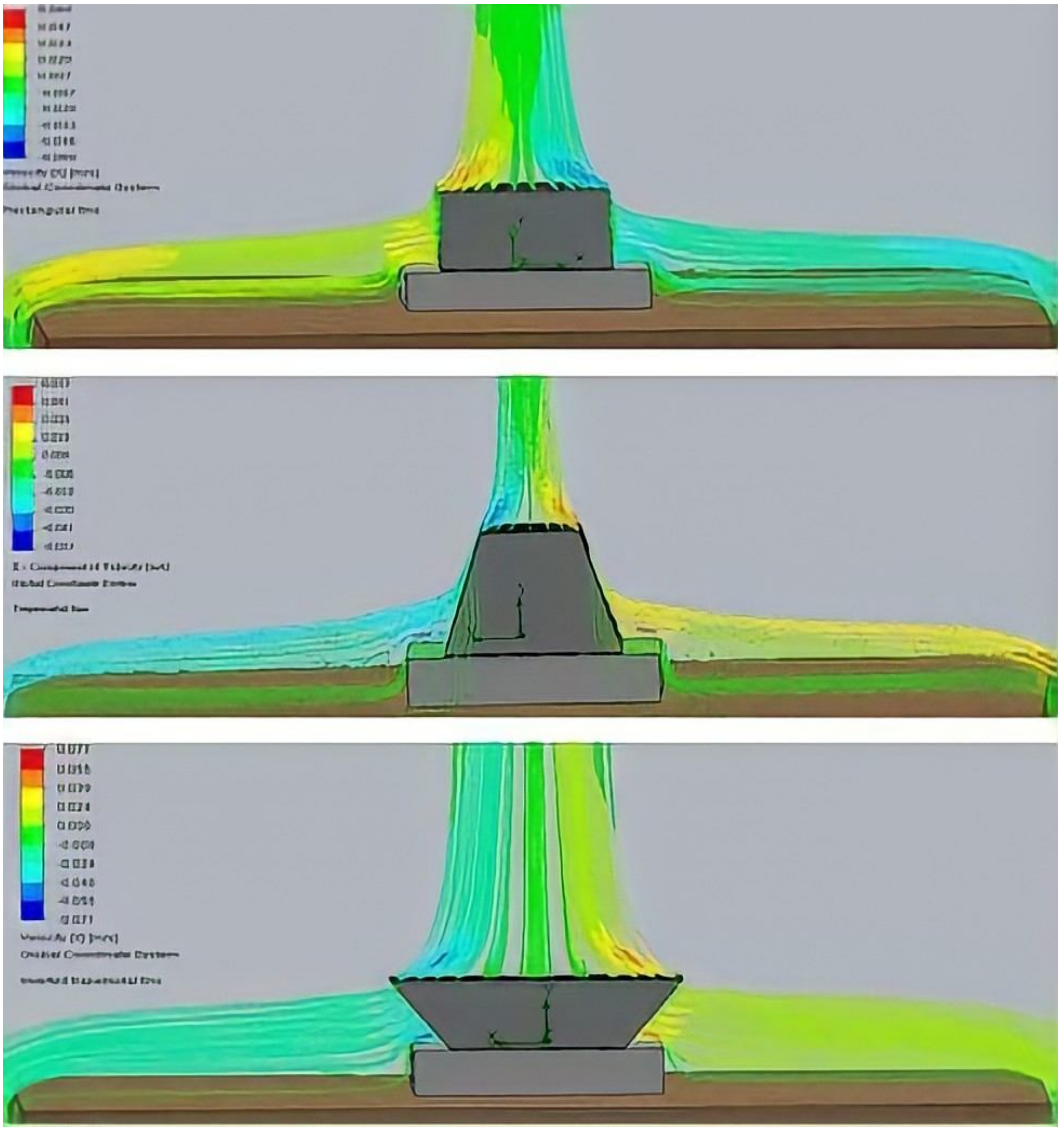

Fig. 9 Air flow simulation on various geometries of fins [16]

The results shows that there is improvement over the other by more than 20%. The heat transfer decreases with increase in length but is insensitive regarding fin thickness and fin height [16]. From fig.10 the heat transfer coefficient of the inverted Trapezoidal fins was way greater than original design which are the rectangular fins. This is because of its height and the smaller edges expose to the ambient air, and required some time to cool down the device. The trapezoidal design was more heated due to its wide part exposing to the air [16].

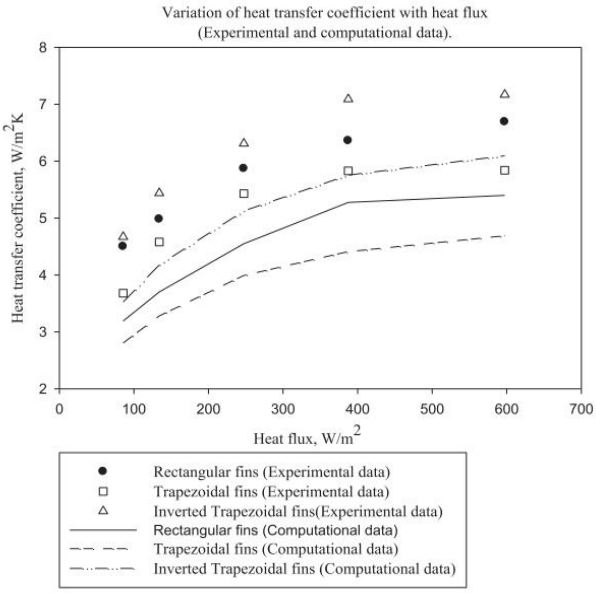

Fig. 10 Efficiency of the heat transfer coefficient with comparison to the heat flux [16]

From figure above (fig.10) the heat transfer coefficient of the inverted Trapezoidal fins was way greater than original design which are the rectangular fins. This is because of its height and the smaller edges expose to the ambient air, and required some time to cool down the device. The trapezoidal design was more heated due to its wide part exposing to the air [16].

V. LITERATURE VIEW

Thermoelectric system is determined by two major factor the material properties and the system. TEC work on material, module, construction, and application. Thermoelectric coolers can be used as power generation using low intensity energy sources if consideration is made for effects of exposure to high temperatures. They are fabricated in tec form the high-performance material available for that temperature range in tec module. Two TEC cooler are experimental test that this type of cooling mechanism has two main problem (1) providing negligible surface contact (2) the natural convection from taking place. they have a positive result to improve material properties and improving module shape and structure such as reducing thermal conductivity. Thermoelectric module has been used many areas such as automobiles, aerospace, and domestic sector. TEC would be an effective cooling and heating device with the proper design system. The proper mathematical model of tec need to obtain for more effectiveness performance of cooling and heating. And the thermal performance actual working environment. they provide the high conversion thermoelectric can provide at below temperatures. Power supply in tec module is D.C. and 12 voltages and 5A. further the new tec module when implementing new material with the higher thermal conductivity in fabricates of TEC device [18].

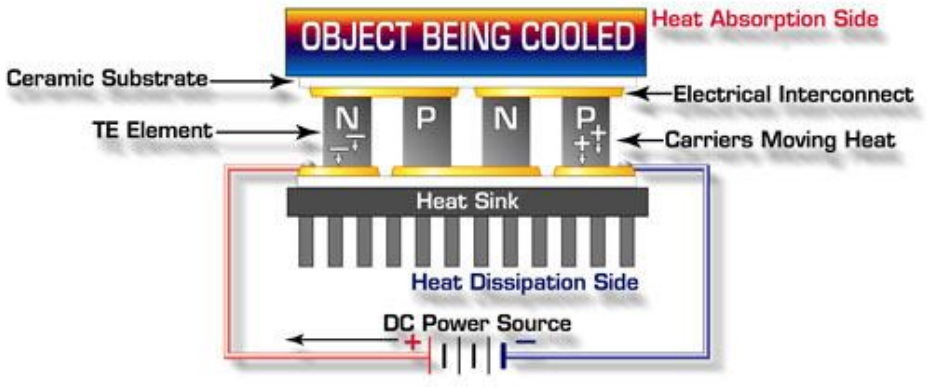

Fig. 11 **S**chematic diagram of cooling and heating of TEC module

Radiation is relatively in more case. Comparing Peltier module to different conventional heating/cooling devices, Peltier module has better power saving capability. Also, it is possible to control the output of a Peltier module by adjusting the voltage supply which is requirement in case human use. Peltier module are less bulky are portable and user friendly [19]. Although Peltier module have a reliability it overcome of most of the conventional heating/cooling devices such as a power consumption and portability and the same module. Since Peltier cooling is not efficient comparatively and due to its small size application, it is not widely used. It found its application only in electronics cooling etc. researcher are working on reducing irreversibility's in the systems because which we can see from the vast difference between value of the first law efficiency and second law. A tec cooling system has been designed and developed to effectively provide active cooling to the head without any element of safety [20]. A single 12-volt tec module was used which provide adequate cooling but less than 2 amp of currant from the power system. Cooling of the head is established the most efficient method of cooling of the body material should be studied to get better performance of tec module.

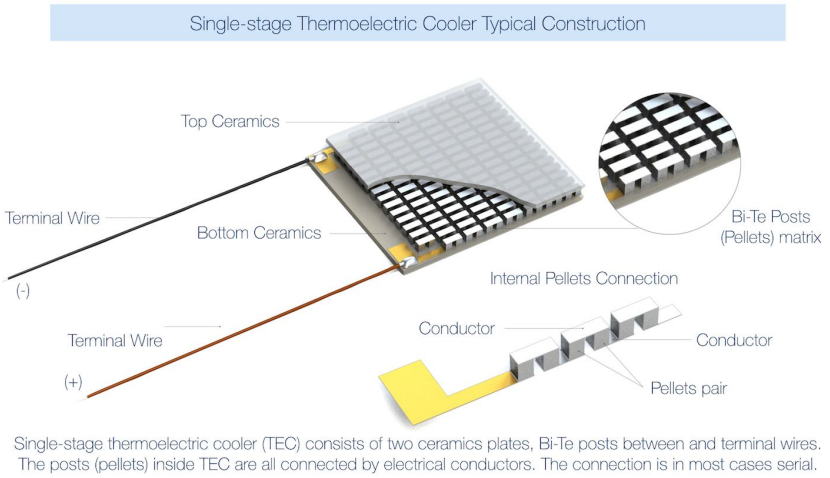

Fig. 12 Single stage module of TEC device

TEC would be an effective cooling and heating device with the proper design system. Thermoelectric devices involve tec and thermoelectric generation. This work focus on tec that generates a temperatures difference when it is supplied with electrical power due to the Peltier effect. Tec is preferable and has been used frequently in recent years because of its small weight, low cost, and environmental friendliness. Tec can work without being connected to a grid, and it has low noise and vibration. It is also easy maintain. The properties of thermo-elements and the main parameter such as cop and cooling capacity, were discussed separately [21]. The results showed that increasing the size and reducing the contact resistance improve parameter. This review mentioned the application used for this purpose. A limited application range was noted due to the low cop of tec improvement of this parameter was discussed together with tec application. Such as refrigerator, cooling for electronic components and as a sensor. In the use of thermoelectric device in power generation was presented. Tec device have the same structure as tec and could have a high potential for use as a future power generation green source.

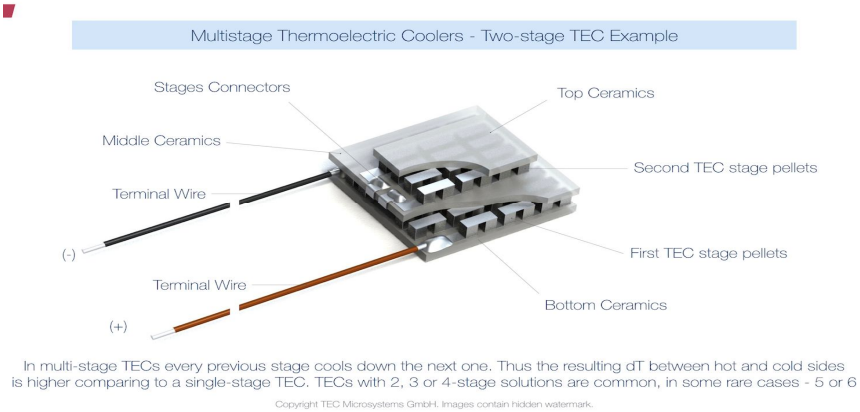

Fig. 13 Multistage module of thermoelectric cooler

The development of a homemade high voltages power supply enabled to gratings in the dispersion of turning point of thermoelectric cooler. Tec provide of automatically controlling the power of a thermoelectric cooler system to maximum net cooling for heat sink performance can quick as testing individual single stage of tec module. The experimental optimum power level was very complicated because it was not only dependent on the hot side of the tec module but also on the air flow rate. It can also provide the tec material can be used in an effective of tec module to the determined the cooling performance of the any thermal and electric condition. It is suggested that the thermoelectric module be tested to determine its physical properties and the performance curves, especially when the manufacturer is not able to provide the basic data of a thermoelectric module [22]. The test facility can be simple if time or budget is limited. Basically, the results from a simple thermal conduction. thermoelectric will not be a serious candidate for high performance electronic cooling application. It is hoped that the work that is being done on development of imploded thermoelectric materials and thin film thermoelectric will ultimately alter this situation. The cooling used in the present study can be replaced by a high-performance heat sink with a DC cooling.

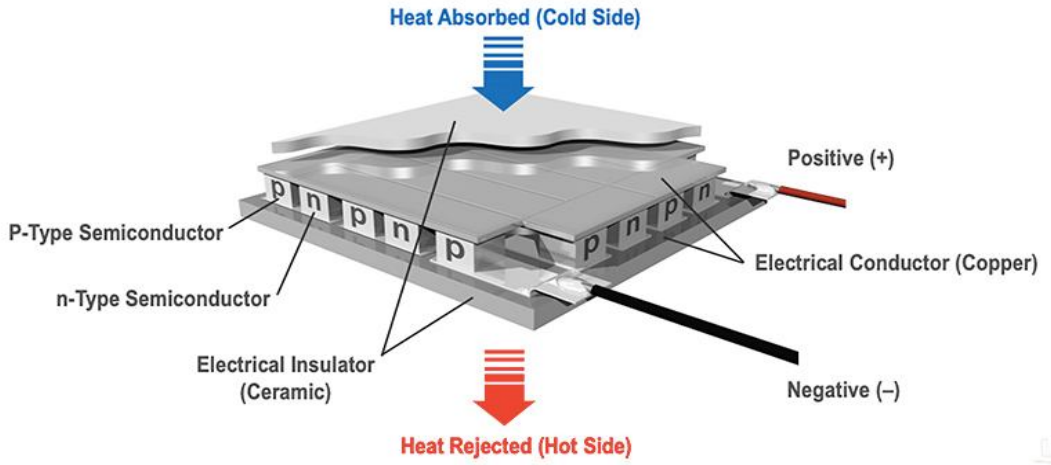

Fig. 14 A diagram of a TEC when electric current passed through a join two ceramic insulators.

TEC module was used as an alternative method to reduce the operating temperature. TEC component is important because it affects the entire application that uses it thermoelectric coolers are usually controlled by varying the voltage/current. Thermal electricity is a phenomenon that produces heat from a DC power supply and vice versa by using the Peltier effect. Heat with low efficiency can generate tec quality depending on parameters. The present air conditioning system produces cooling effect by refrigerants like Freon, Ammonia, etc. Using these refrigerants can get maximum output but one of the major disadvantages is harmful gas emission and global warming. This problem can be overcome by using thermoelectric modules (Peltier effect) air-conditioner and they're by protecting the environment. Thermoelectric air conditioner using different modules is discussed. Peltier cooling module which works on thermoelectric refrigeration to provide cooling by using thermoelectric effects. There are three types of thermoelectric effects. See back effect, politer effect, Thomson effect. From these three effects on Peltier cooler works on Peltier effect. Which seats that when voltages applied to junction of dissimilar electric conductor, heat absorbers from one junction and heat are rejected at another junction [23].

A thermoelectric device created voltage when there is a different temperature on each side. Thermoelectric coolers can be used effectively as power generators. TEC module to convert heat flow to DC power with the highest level of performance thermoelectric can provided. TEC modules normally designed for cooling are the best choice for these applications because they are manufactured form materials of highest efficiency at these nominal temperatures. Thermoelectric module (TEM) is a device that environmentally friendly utilizing for cooling and heating application such as heat pump and power generation. The understanding of relation between electrical conductivity and heat conductivity of the TEC material is essentially to improve the coefficient of performance. Thermoelectric modules are solid state heat pumps that utilize the Peltier effect. During operation DC current flows through the thermoelectric module causing heat to be transferred from one side of the thermoelectric device to other creating a cold and hot side. A thermoelectric cooling system I am power source to provide a direct current through the electrical circuit a thermoelectric module with at least one heat sink and at least one heat source and a control assembly. This section a basic understanding of the performance of a thermoelectric module [24].

VI. CONCLUSIONS

In this work Peltier cooling is not efficient comparatively and due to its small size application, it is not widely used. It found its application only in electronic cooling but we have seen that there is huge scope of research in this field about thermoelectric material its fabrication, heat sink design etc. researcher is working on reducing irreversibleness in system because of Peltier cooler has more potential which we can see from vast difference between the value.

VII. ACKNOWLEDGMENT

A. This review paper was supported by (Prof. Kunalsinh Kathia), who provide insight and expertise knowledge that greatly assisted the review paper.

B. We thank to our (Design Engineering team) for assistance with all new techniques like methodology literature review etc. that we learn from them and improve our knowledge.

C. We would also like to show our Gratitude to (Prof. Kunalsinh Kathia) professor in (mechanical engineering department) of (saffron institute of technology) for sharing their pearls of wisdom with us during the course of review paper.

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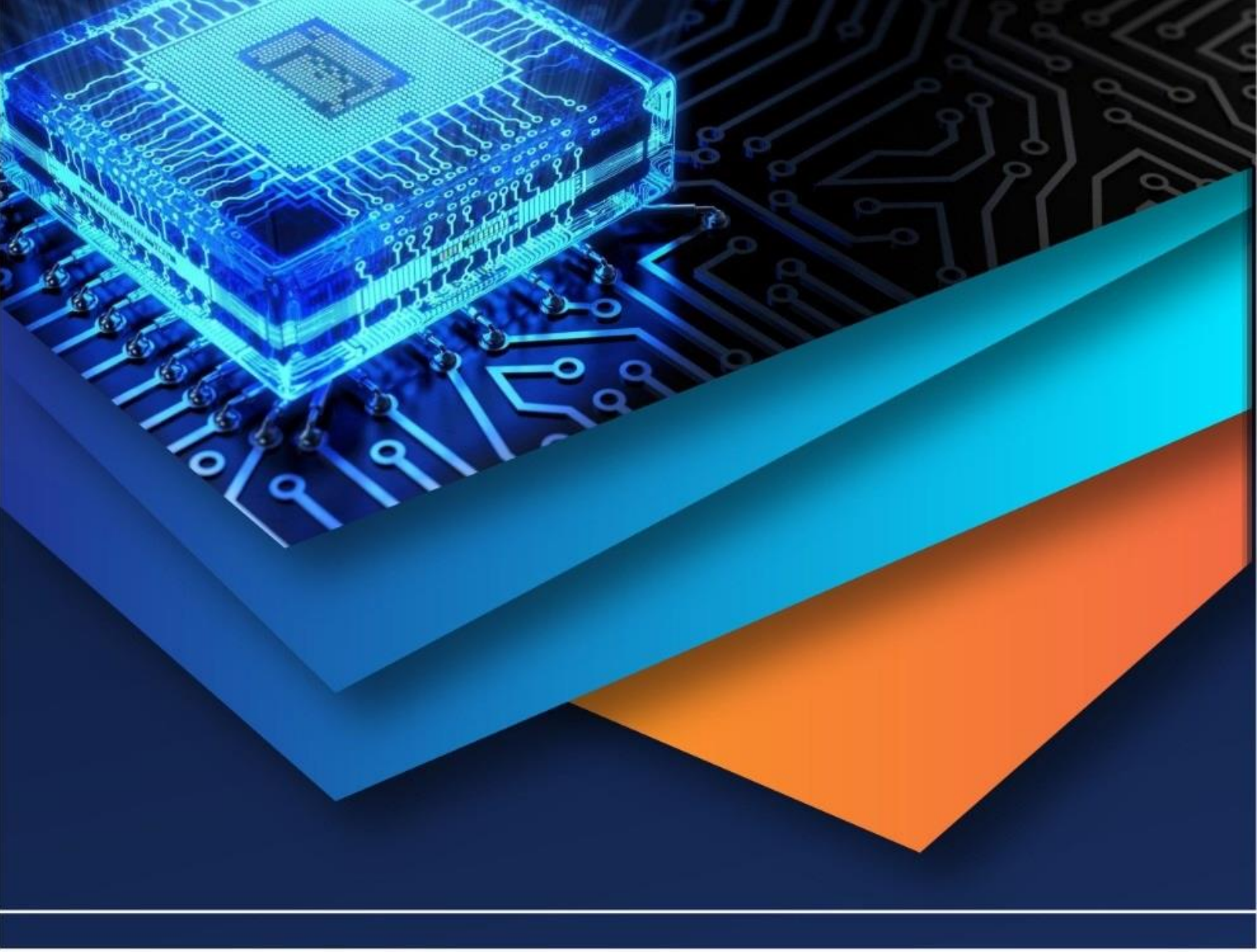

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IC-ETITE'20
IEEE Conference ID: 47903

24 – 25 February 2020

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Contents

PREFACE

We are honored to bring you this collection of articles from the International Conference on Emerging Trends in Information Technology and Engineering (ic-ETITE'20). ic-ETITE'20 is technically co-sponsored by the IEEE Computer Society, Madras Chapter & IEEE Communications Society, Madras Chapter and supported by ACM-Madras Chapter. This event was organized by the School of Information Technology and Engineering, Vellore Institute of Technology, Vellore, during 24-25, February 2020. The purpose of this conference is to enhance the research in Information Technology, Computer Engineering, Communication Engineering, Electronics Engineering and to afford an international platform for the researchers, academicians, engineers, industrialists and students around the world to share their research findings with the global experts in the field of Science and Technology. The primary goal of the conference is to help the delegates to launch their research or business relations and to associate for future collaborations in their career path.

ic-ETITE'20 expresses its concern towards the up-gradation of researchers in Information Technology and Engineering. It motivates to provide a worldwide platform to researchers far and widespread by exploring their innovations in the field of science and technology. The mission is to promote and improve the research and development related to the topics of the conference. The essential objective of the conference is to assist the researchers in discovering the global linkage for future joint efforts in their academic and research outlook. This volume of proceedings from the conference provides an opportunity for readers to engage with a selection of refereed papers that were presented during this conference. The conference chairs would like to thank the participants who have contributed to the volume. We also express our gratitude to every faculty and staff members of the School of Information Technology and Engineering for their unwavering commitment as the conference organizer. Lastly, we are most indebted for the generous support given by the IEEE Computer Society, Madras Chapter and the IEEE Communications Society, Madras Chapter.

Conference Chairs

Dr. K. John Singh

Dr. P.G. Shynu

Foreword

Dr. G. Viswanathan, Chancellor

It gives me immense pleasure to welcome you all to the International Conference, ic-ETITE 20.

I am sure that this conference will offer suitable solutions to several global issues with the expertise of the International and National Advisory Committee Members and Reviewers. I am delighted to present the proceedings of ic-ETITE'20. There is a considerable amount of research work reported in the areas of Science, Technology and Management, which should be utilized for the betterment of life on this planet.

We have given opportunities to those who wish to keep abreast of the present technological developments to share their ideas. Furthermore, this conference will facilitate the participants to share various novel ideas.

The success of this conference is the result of the dedication and efforts of innumerable people, right from the Organizing Committee, which started working on the preparations almost a year ago, to the Technical Program Committee and the Editorial Board that offered their best to make this conference a reality. The enthusiasm, commitment and dedication of the organizing team will make this conference a successful event.

I commend the Conference Committee Members for sparing their valuable time in organizing the programme in a grand manner. I congratulate the authors, reviewers and other contributors for their sparkling efforts in ensuring excellence in ic-ETITE 20

I wish the Conference all success. Best wishes

Mr. Sankar Viswanathan,Vice President

My warm greetings to all!

I am very happy to note that the School of Information Technology and Engineering is organizing the International Conference, ic-ETITE'20 to be held between 24th and 25th February 2020. Conferences like these offer a premier platform for researchers, practitioners, and educators to present and discuss the recent innovations, trends, and concerns as well as the practical challenges encountered and the solutions adopted in the fields of science and technology. We are thankful to the International and National advisory committee members as well as all the reviewers who have put in their whole hearted efforts. I record my congratulations to the organizing team, conveners and Members of various committees organizing such mega event and also for getting support from IEEE for this conference.

This conference ic-ETITE'20 will surely be an ideal place for participants to showcase their ideas and also to learn from the expertise and knowledge of others.

Best wishes for the success of the event.

Ms. Kadhambari S. Viswanathan, Assistant Vice President

I am happy to note that the International Conference, ic-ETITE'20 is being organized by the School of Information Technology and Engineering (SITE) following the successful events conducted previously.

It is undeniable that Science and Technology is an effective instrument of growth and change. I understand that this International Conference has attracted many participants from all over the country. This technical fest will definitely be an ideal platform for the researchers, from both academics and the industry, to showcase their innovative ideas and aspirations. I wish the conference a grand success.

Best wishes to all.

Dr. Anand A. Samuel, Vice Chancellor

I am pleased to know that SITE, VIT Vellore, is organizing the International Conference, ic-ETITE'20, in the field of engineering and technology. Today the technology is developing at a very fast pace, we have observed the progress of the last 100 years, but if we compare it with the progress of last 10 years it is much more than last 100 years. We experience new development everyday and every moment. Technology is changing and new areas of research are coming up. Now it is high time that each one of us will have to think and commit to the contribution to us and commit to the contribution towards technology.

Moreover, there is a growing need of more and more industry-institute interaction and linkage. The students and researchers have highly sensed this need and provided a good platform for the researchers around the globe to bring forward their thoughts and help society at large scale. Many congratulations to whoever involved for organizing and making this a success.

May God Bless You All!

Dr. S. Narayanan, Pro-Vice Chancellor

I write this foreword to the proceedings of International conference ic ETITE'20, Vellore, 24-25th Feb, 2020 with deep satisfaction.

The high quality of the papers and the discussion represent the thinking and experience of experts in their particular fields. Their contributions helped to make the Conference as outstanding as it has been. The papers contributed the most recent scientific knowledge known in the field of Science and Technology.I sincerely hope that the proceedings will help the scientific groups working in these areas around the world to stimulate further study and research.

Dr. K. Sathiyanarayanan, Registrar

I am very happy to note that the School of Information Technology and Engineering (SITE) is organizing the conference, ic-ETITE'20. It will be helpful for the students and researchers to study the case studies on international digital library initiatives, efforts to promote digital archives and new methods of delivery and supply of the documents. It will also help to learn about teaching through the internet and networked technologies used for commercial and academic applications. It will pave the way for increased association between academicians and administrators to increase the efficiency of computing by finding ways and means by organizational changes. Papers have been selected carefully and many of them are for concurrent discussion sessions. I want to mention the great support of many sponsors and without their support, it is impossible to organize a conference of this magnitude.

Dr. Balakrushna Tripathy, Dean -SITE

It is with deep satisfaction that I write this Foreword to the Proceedings of the ic-ETITE'20 held in Vellore, Feb 24 - 25, 2020.

I hope, ic-ETITE'20 continues a tradition of bringing together researchers, academics and professionals from all over the world, experts in economic and social sciences.

The conference particularly encouraged the interaction of research students and developing academics with the more established academic community in an informal setting to present and to discuss new and current work. Their contributions helped to make the Conference as outstanding as it has been. The papers contributed the most recent scientific knowledge known in the field of Science and Technology, Engineering fields, Communication and Circuitry, Quantitative Methods and Business and Economics.

These Proceedings will furnish the scientists of the world with an excellent reference book. I trust also that this will be an impetus to stimulate further study and research in all these areas.

We thank all authors and participants for their contributions.

Dr. K. John Singh & Dr. P. G. Shynu, Conference Chairs

We welcome you to the International Conference ic-ETITE'20, held February 24–25, 2020 in VIT, Vellore. As a premier conference in the field, ic-ETITE'20 provides a highly competitive forum for reporting the latest developments in the research. We are pleased to present the proceedings of the conference as its published record. ic-ETITE'20 received 498 submissions, The conference accepted 268 papers (53.8%). The authors of submitted papers come from many different regions. The conference program represents the efforts of many people.

We want to express our gratitude to the members of the Program Committee and the Senior Program Committee, and the external reviewers for their hard work in reviewing submissions. Additional thanks are given to the IEEE Computer Society, Madras Chapter, IEEE Communications Society Madras Chapter and ACM Madras Section for their technical co-sponsorship and support. The paper submission and reviewing process was managed using the EasyChair system. Finally, the conference would not be possible without the excellent papers contributed by authors. We thank all the authors for their contributions and their participation in ic-ETITE'20. We hope that this program will further stimulate research, and provide practitioners with better techniques, algorithms, and tools for deployment. We feel honoured and privileged to serve the best recent developments in you through this exciting program.

Dr. Vanitha. M & Dr. Sumaiya Thaseen, Publication Chairs

Welcome to ic-ETITE'20. On behalf of the Publication Committee, we would like to thank all the authors, programme committee members and reviewers for their contributions towards the success of the conference. It is our great pleasure to present the accepted papers from the ic-ETITE'20, held in Vellore Institute of Technology, Vellore, on February 24th & 25th , 2020. The aim of the conference is to encourage discussion of emerging work that can improve its sophistication and potential for future impact. The outstanding scientific and technical quality of the conference is reflected in the manuscripts. The papers contributed the most recent scientific knowledge known in the field of Information Technology, Computer Engineering, Communication Engineering and Electronics Engineering. A total of 498 manuscripts were submitted for consideration for publication in the present volume.

The review process was overseen by a team of faculty, based on their expertise in order to reflect the broad variety of topics presented at the conference. Sufficient novel contributions and a basic magnetism was required in order for a manuscript to be eligible for publication. After the standard IEEE review process, 268 manuscripts were selected for publication in the proceedings. I would like to thank the authors, session chairs, and anonymous reviewers for conscientiously executing their duties to maintain the high scientific quality of the papers published in this volume. We are grateful to the Conference chair Dr. K. John Singh for giving us this opportunity to contribute for this conference and the co-publications chair Dr. T. Chellatamilan for a great deal of his time and his expertise in order to ensure the high standards for the selected papers.

We trust that this will be an impetus to stimulate further study and research in all the emerging areas.

Dr. R. K. Nadesh, Technical Programme Chair

On behalf of the Technical Program Committee, it is my great pleasure to welcome you to the International Conference on Emerging Trends in Information Technology and Engineering, organized by the School of Information Technology and Engineering, Vellore Institute of Technology, Vellore. ic-ETITE'20 brings together researchers from all over the world to discuss the latest advancement in Information and Communication Technology. ic-ETITE'20 marks the first of its series being held in VIT, Vellore.

The technical program of the conference will streak 22 different tracks of presentation in the emerging areas of Information and Communication Technology like Brain Computing Interface, BlockChain, Data Analytics, Natural Language Processing, Optimization Techniques, Communication Technologies, Security Algorithms, Software Defined Network, Green Computing, Machine Learning, Deep Learning, Cloud Computing and the Internet of Things. Besides, a poster presentation will be on the various techniques in data mining and warehouse, Enterprise Computing, Advancement in Operating System, Neural Network, Computer Architecture, Electrical, and Electronics Engineering. The conference also features interesting keynote speakers who will highlight the state-of-the-art advancements in wireless communications, artificial intelligence, machine learning, Industry 4.0 and the Internet-of-Things, Quantum communication and computing, Security and trust, Cyber-Physical System. Together, all these forums present cutting-edge advances in both the scientific and industrial specific applications.

I want to thank all reviewers, especially for their dedication; I would also like to thank all the Keynote Speakers, Session Chairs, Session In-Charges, and all the authors & participants. Finally, I express my sincere thanks to all the contributing committee members to this important part of the program. I hope all the technical papers presented by their authors will increase the discussions and lead to fruitful technical exchanges.

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KEYNOTE SPEAKERS

Dr. Brian A. Barsky

Professor, Electrical Engineering and Computer Sciences

University of California,

Berkeley,USA

Dr. Ajith Abraham

Machine Intelligence Research Labs,

Washington, USA

Dr. Raija Halonen

University of Oulu

Finland

Dr. Pooja Jain
HOD/Dept. of CSE
IIIT,Nagpur

Dr. G. Santhosh Kumar
Cochin University of Science and Technology, Kerala

Dr. Varun G Menon
(ACM Distinguished Speaker) SCMS School of Engineering and Technology, Kerala

Dr. Chandrashekar Subramanyam
IFIM
Bangalore

Dr. Sougata Mukherjea
Program Director-
Hybrid Cloud Center of Excellence, IBM

Dr. Thangavel
Registrar,
Periyar University

Dr. Srinivas Talabattula
Indian Institute of Science, Bangalore

Dr. R. Manimegalai
PSG Institute of Technology and
Applied Research, Coimbatore

Dr. K. K. Soundra Pandian

Scientist, O/o CCA

Ministry of Electronics & Information Technology.
Government of India

Dr. P. Saravanan
PSG College of
Technology,Coimbato

Dr. M. R Kaimal

Amrita Vishwa Vidyapeetham,
Amritapuri

Dr. V. N. Mani

Scientist
Dept. of Electronics and Information
Technology, Govt. of India

Sriram Natarajan
Director - Engineering,
GlobalLogic

Sreekanth Reddy
Product Manager,
GlobalLogic

Keynote Schedule

Keynote No.	Date/Time	Venue	Name & Affiliation	Topic
1	24.02.2020 (11:45 AM– 12:15 PM)	Dr.ChannaReddy Auditorium, (Dr MGR Block)	**Dr. Ajith Abraham** Machine Intelligence Research Labs, Washington,USA	INDUSTRY 4.0 AND SOCIETY 5.0: ROLE OF AI AND DATA SCIENCES
2	24.02.2020 (12:20 PM – 12:50 PM)	Dr.ChannaReddy Auditorium, (Dr MGR Block)	**Dr. Srinivas Talabattula** Department of Electrical Communication Engineering. Indian Institute of Science, Bangalore	QUANTUM COMMUNICATIONS AND COMPUTING USING PHOTONICS
3	24.02.2020 (2:00 – 2:40 PM)	Homibaba Gallery (SJT- 412, 4th Floor)	**Dr. Brian A. Barsky** Professor, Electrical Engineering and Computer Sciences University of California, Berkeley USA	BOEING 737 MAX: MONEY, MACHINES, AND MORALS IN CONFLICT
4		Sarojini Naidu Gallery (SJT- 614, 6th Floor)	**Dr. K. K. Soundra Pandian** Scientist, O/o CCA Ministry of Electronics & Information Technology. Government of India.	IMPACT AND ROLE OF CYBER SECURITY/ CYBER PHYSICAL SYSTEMS ON IOT FOR INDUSTRIAL / INFORMATION REVOLUTION
5	24.02.2020 (2:45 – 3:25 PM)	Sarojini Naidu Gallery (SJT- 614, 6th Floor)	**Dr. M. R Kaimal** Professor Department of CSE Amrita Vishwa Vidyapeetham, Amritapuri	MACHINE LEARNING ALGORITHMS: ON SOME RECENT APPROACHES

6		Homibaba Gallery (SJT- 412, 4th Floor)	**Dr.Pooja Jain** HOD/Dept. of CSE Indian Institute of Information Technology, Nagpur	NATURAL LANGUAGE PROCESSING WITH MACHINE LEARNING AND IT'S OPEN CHALLENGES
7	24.02.2020 (3:30 – 4:10 PM)	Sarojini Naidu Gallery (SJT- 614, 6th Floor)	**Dr. R. Manimegalai** Professor and Head Department of CSE PSG Institute of Technology and Applied Research, Coimbatore	ALGORITHMS FOR FPGA DESIGN FLOW
8		Homibaba Gallery (SJT- 412, 4th Floor)	**Dr.Sougata Mukherjea** Program Director, Cloud Design, Cloud Center of Excellence,I BM	IBM WATSON - WINNING JEOPARDY & BEYOND
9	24.02.2020 (4:30 – 5:10 PM)	Homibaba Gallery (SJT- 412, 4th Floor)	**Mr. Sreekanth Reddy** Product Manager GlobalLogic Bangalore	PLATFORMIZATION OF PRODUCTS
10			**Dr. G. Santhosh Kumar**	SPATIOTEMPORAL DATA MINING:

		Sarojini Naidu Gallery (SJT- 614, 6th Floor)	Professor and Head Department of Computer Science Cochin University of Science and Technology, Kerala	CHALLENGES AND OPPORTUNITIES
11	25.02.2020 (10:00 – 10:45 AM)	Homibaba Gallery (SJT- 412, 4th Floor)	**Dr. Chandrashekar Subramanyam** Professor IFIM Bangalore	APPLICATION OF SENTIMENT ANALYSIS FOR BETTER DECISION MAKING IN FINANCIAL SECTOR
12	25.02.2020 (10:00 – 10:45 AM)	Sarojini Naidu Gallery (SJT- 614, 6th Floor)	**Dr. P. Saravanan** Associate Professor & Programme Coordinator (PG)Department of Electronics and Communication Engineering PSG College of Technology, Coimbatore	HARDWARE SECURITY AND TRUST
13	25.02.2020 (11 AM-12:00 Noon)	Homibaba Gallery (SJT- 412, 4th Floor)	**Dr. V. N. Mani** Scientist-F & Head High Pure Electronic Materials, Devices & Systems, Development Division Dept. of Electronics and Information Technology, Govt. of India	ROLE OF ADVANCED ELECTRONIC MATERIALS AND DEVICES AND VLSI AND PACKAGING TECHNOLOGIES FOR SELECT SPACE AND DEFENSE APPLICATIONS-A BIRD'S EYE VIEW

14		Sarojini Naidu Gallery (SJT- 614, 6th Floor)	**Dr. K. Thangavel** Registrar, Periyar University, Salem	BREATHOMICS: CHALLENGES AND FUTURE PERSPECTIVES
15	25.02.2020 (12:00 – 12:45 Noon)	Sarojini Naidu Gallery (SJT- 614, 6th Floor)	**Mr. Sriram Natarajan** Director, Engineering GlobalLogic Bangalore	POTENTIAL OF AI/ML ACROSS INDUSTRIES
16	25.02.2020 (2:00 – 2:40 PM)	Dr.ChannaReddy Auditorium, (Dr MGR Block)	**Dr. Varun G Menon** (ACM Distinguished Speaker) Associate Professor, Senior Member IEEE SCMS School of Engineering and Technology, Kerala	SECURING RESEARCH PAPERS FROM FAKE/HIJACKED JOURNALS
17	25.02.2020 (2:45 – 3:25 PM)	Dr.ChannaReddy Auditorium, (Dr MGR Block)	**Dr. Raija Halonen** Faculty of Information Technology and Electrical Engineering. University of Oulu Finland	STATE-OF-THE-ART ICT FOR PERSONAL CARE AT HOME & FUTURE

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2Development of Local Control Panel Interface for Fresh Subassembly Inspection Facility of sPFBR

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3.Development of FPGA based TCP/IP Communication Module for Embedded Systems of Nuclear Reactors

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4.Porting of Open Core Processor to FPGA based CPU Module of custom DAQs of FBRs

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6.Operating System Process Using Message Passing Concept in Military

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7.Spindle Torus Asymmetric Key Cryptosystem

K. John Singh and Kunal Gagneja

8.Wrong Lane Driving Detection using Satellite Navigation

K. John Singh and Kunal Gagneja

9.Artificial Intelligence in 3D CAD Modelling

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