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Indian Railways Institute of Electrical Engineering Nasik

Government of India - Ministry of Railways



A potential breakthrough for production of superior battery technology

Micro supercapacitors could revolutionise the way we use batteries by increasing their lifespan and enabling extremely fast charging. Manufacturers of everything from smartphones to electric cars are therefore investing heavily into research and development of these electronic components. Now, researchers at Chalmers University of Technology, Sweden, have developed a method that represents a breakthrough for how such supercapacitors can be produced.

"When discussing new technologies, it is easy to forget how important the manufacturing method is, so that they can actually be commercially produced and be impactful in society. Here, we have developed methods that can really work in production," explains Agin Vyas, doctoral student at the Department of Microtechnology and Nanoscience at Chalmers University of Technology and lead author of the article.

Supercapacitors consist of two electrical conductors separated by an insulating layer. They can store electrical energy and have many positive properties compared to a normal battery, such as much more rapid charging, more efficient energy distribution, and a much greater lifespan without loss of performance, with regards to the charge and discharge cycle. When a supercapacitor is combined with a battery in an electrically powered product, the battery life can be extended many times -up to 4 times for commercial electric vehicles. And whether for personal electronic devices or industrial technologies, the benefits for the end consumer could be huge.

"It would of course be very convenient to be able to quickly charge, for example, an electric car or not have to change or charge batteries as often as we currently do in our smartphones. But it would also represent a great environmental benefit and be much more sustainable, if batteries had a longer lifespan and did not need to be recycled in complicated processes," says Agin Vyas.

Manufacturing a big challenge

But in practice, today's supercapacitors are too large for many applications where they could be useful. They need to be about the same size as the battery they are connected to, which is an obstacle to integrating them in mobile phones or electric cars. Therefore, a large part of today's research and development of supercapacitors is about making them smaller -- significantly so.

Agin Vyas and his colleagues have been working with developing 'micro' supercapacitors. These are so small that they can fit on the system circuits which control various functions in mobile phones, computers, electric motors and almost all electronics we use today. This solution is also called 'system-on-a-chip'.

One of the most important challenges is that the minimal units need to be manufactured in such a way that they become compatible with other components in a system circuit and can easily be tailored for different areas of use. The new paper demonstrates a manufacturing process in which micro-supercapacitors are integrated with the most common way of manufacturing system circuits (known as CMOS).

"We used a method known as spin coating, a cornerstone technique in many manufacturing processes. This allows us to choose different electrode materials. We also use alkylamine chains in reduced graphene oxide, to show how that leads to a higher charging and storage capacity," explains Agin Vyas.

"Our method is scalable and would involve reduced costs for the manufacturing process. It represents a great step forward in production technology and an important step towards the practical application of micro-supercapacitors in both everyday electronics and industrial applications."

A method has also been developed for producing micro-supercapacitors of up to ten different materials in one unified manufacturing process, which means that properties can be easily tailored to suit several different end applications.

Source: Chalmers University of Technology
www.sciencedaily.com

Expert Lecture/Seminars/Courses/Industrial Visits Organized

- Department of Electronics and Telecommunication Engineering of K.K.Wagh Institute of Engineering Education and Research Nashik in collaboration with IETE Nashik subcenter celebrates IETE Students' day an online awareness campaign on "Electric Safety" by Er.Anant Waghchoure, Manager-Sales, Megger India Pvt.Ltd, Andheri, Mumbai on 3rd February 2022

K. K. WAGH EDUCATION SOCIETY, Nashik
**KK WAGH INSTITUTE OF ENGINEERING
EDUCATION AND RESEARCH**
IETE STUDENTS' DAY
Department of Electronics & Telecommunication
Engineering in collaboration with

Organizes Webinar On
ELECTRIC SAFETY
By
Er. Anant Waghchoure
Manager-Sales,
Megger India Pvt.Ltd,Andheri,Mumbai

3rd Feb 2022
at 11:00 AM

Meeting Details
Meeting ID: 941 8782 7825 | Passcode: isfday

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- Department of Electronics and Telecommunication Engineering of K. K. Wagh Institute of Engineering Education and Research Nashik in collaboration with IETE Nashik subcenter organized webinar on "Campus To Coporate-A transformation journey" by Mrs. Meenakshi Kulkarni, Founder-AdeptVision On 25th February 2022.

K. K. Wagh Education Society's
**K.K. Wagh Institute of
Engineering Education and Research, Nashik**
Website: www.engg.kkwagh.edu.in

Department of
Electronics & Telecommunication
in collaboration with IETE
Organizes
Webinar on

**"Campus to Corporate –
A transformation journey"**
By
Mrs. Meenakshi Kulkarni
Founder-AdeptVision

Date
25th February 2022

Time
At 03.00 pm

Meeting details: Join Zoom Meeting:
<https://zoom.us/j/98013981548?pwd=YWx1MUJkeStlMlYmpmcTNOUWJQanRIQT09>
Meeting ID: 980 1398 1548 Passcode: 787016

NAAC Accredited to NAAC
NRI
DEA Lab

Industrial Training / Seminar/Workshop done by Staff

- Prof. Dr. D. M. Chandwadkar and Mrs. K. Nirmalakumari have attended Faculty Orientation Workshop T. E. (E&TC/Electronics) Revised Syllabus 2019 Course Subject: Power Devices & Circuits (PDC during 27th and 29th January 2022.



- Mrs. M. P. Joshi has attended Faculty Orientation Workshop T. E. (E&TC/Electronics) Revised Syllabus 2019 Course Subject: Project Management during on 27th and 29th January 2022.



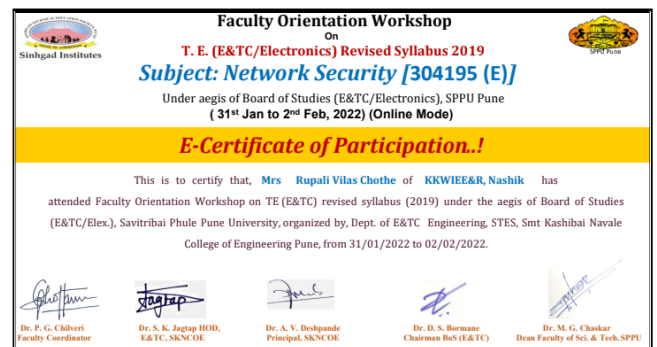
- Ms. S. V. Shelke has attended Faculty orientation workshop on TE E&TC revised syllabus (2019 C) under the aegis of Board of Studies (E&TC/ Electronics) Savitribai Phule Pune University Subject: Cellular Network during on 27th and 29th January 2022.



- Dr. S. S. Morade and Mrs. M. P. Joshi have attended Faculty Orientation Workshop on TE(E&TC) revised syllabus (2019 Course) under the aegis of Board of Studies (E&TC), Savitribai Phule Pune University, organized by, Dept. of E&TC Engineering, Sinhgad College of Engineering, Pune from 31st January 2022 to 02nd February 2022



- Mr R. R. Khinde and Mrs. R. V. Chothe have attended Faculty Orientation Workshop on TE (E&TC) revised syllabus (2019) under the aegis of Board of Studies (E&TC/Elex.), Savitribai Phule Pune University, organized by, Dept. of E&TC Engineering, STES, Smt Kashibai Navale College of Engineering Pune, from 31st January 2022 to 02nd February 2022.



- Prof. Dr. D. M. Chandwadkar was the Keynote speaker at 3 days AICTE Sponsored First International Conference on Recent Trends in Engineering Technology and Management at Guru Gobind Singh Polytechnic, Nashik on 23/02/2022 to 25/02/2022.
- The Staff member have delivered expert talks on various topics at Indian Railways Institute of Electrical Engineering, Nashik

Sr. No.	Name of Staff	Topic	Date
1.	Prof. Dr. D. M. Chandwadkar	“Computer-I” and “Computer II” (Advance Features of Microsoft word and Expert Features of MS PowerPoint)	09/02/2022
2.	Prof. Dr. D. M.	“Computer-III” (Advance	10/02/2022

	Chandwadkar	Features of MS Excel-III)	
3.	Dr. S. A. Patil (Ugale)	“Computer-IV” and “Computer-V” (Advance Features of MS Excel-I and MS Excel-II)	08/02/2022
4.	Mr. K. S. Navale	“Power Electronics” (Semiconductor, switches, IGBT, GTO, Rectifier & Inverters)	02/02/2022
5.	Mr. K. S. Navale	“Power Electronics” (Semiconductor, switches, IGBT, GTO, Rectifier & Inverters)	02/02/2022

Alumni Achievement

- Alumnus of Department of Electronics & Telecommunication Engineering, Mr. Shubham Raut Mr. Vishal Talekar Mr. Aniket Govardhan presented paper on “Digital Electronic Voting Machine Using Raspberry Pi and Touchscreen Display” in IEEE conference International Conference on Electrical, Electronics, Communication, Computer and Optimization Techniques (ICEECOT).
- Link of Research Paper: <https://ieeexplore.ieee.org/document/9707960>

The screenshot shows the IEEE Xplore interface for a paper titled "Digital Electronic Voting Machine Using Raspberry Pi and Touchscreen Display". The paper is published by IEEE and has 5 full text views. The abstract discusses the challenges of voting in India and the need for an Electronic Voting Machine (EVM) that can handle migration between constituencies. The document sections listed are: I. Introduction, II. Present Electronic Voting System, and III. Literature Survey.

Abstract: India is one of the democratic countries; the two major elections in India are General elections and Assembly elections. These elections are taken with the help of an Electronic

Voting Machine (EVM). It is necessary to be present in the home constituency during elections, one cannot vote from another constituency to the candidate of his/her constituency. As a result, lots of people are not able to cast their votes in elections. To solve this issue there is a necessity of such a system that enables voters to vote in their respective constituency from another constituency. Digital Electronic Voting Machine (DEVVM) allows voters to vote who are not available in their constituency during elections because of their employment, education, business, etc. This proposed system should be implemented in the area where the migration of people from another constituency is more. There should be a special polling booth for migrant people, where those people can cast their vote on DEVVM. People of that constituency can vote in an ordinary way using EVM. This system is implemented using Raspberry Pi 4 and Touchscreen Display. The Graphical User Interface is created using Python that gives voters an option to select their home constituency to cast their vote. The system includes the candidate data of all 543 constituencies. The result of the votes is stored in the memory of Raspberry Pi with respect to the selected constituency. As a result, the voting percentage will increase which is a good sign for democracy.

Digital Electronic Voting Machine Using Raspberry Pi and Touchscreen Display

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Abstract— India is one of the democratic countries; the two major elections in India are General elections and Assembly elections. These elections are taken with the help of an Electronic Voting Machine (EVM). It is necessary to be present in the home constituency during elections, one cannot vote from another constituency to the candidate of his/her constituency. As a result, lots of people are not able to cast their votes in elections. To solve this issue there is a necessity of such a system that enables voters to vote in their respective constituency from another constituency.

Digital Electronic Voting Machine (DEVVM) allows voters to vote who are not available in their constituency during elections because of their employment, education, business, etc. This proposed system should be implemented in the area where the migration of people from another constituency is more. There should be a special polling booth for migrant people, where those people can cast their vote on DEVVM. People of that constituency can vote in an ordinary way using EVM. This system is implemented using Raspberry Pi 4 and Touchscreen Display. The Graphical User Interface is created using Python that gives voters an option to select their home constituency to cast their vote. The system includes the candidate data of all 543 constituencies. The result of the votes is stored in the memory of Raspberry Pi with respect to the selected constituency. As a result, the voting percentage will increase which is a good sign for democracy.

Keywords—Electronic Voting Machine, Voting, constituency, Digital Electronic Voting Machine, Raspberry Pi 4, Touchscreen Display, Graphical User Interface, Python

I. INTRODUCTION

Democracy is the world's most healthy and participatory form of government. It promotes cooperation and coordination between public and private systems, as well as between citizens and government. It allows residents to elect their representatives and engage in the workings of government, where people exert power and political importance by voting. India is the largest democracy which consists of the 2nd largest population in the world. A large number of people of this population migrate to urban areas for various reasons like education, employment, business, etc. hence unable to vote for their home constituency. According to the most current voting system used in Indian elections, the average voting percentage ranges from 60% to 70%. There can be many reasons for it, one of them is because a person cannot vote from any constituency^[1].

Voters used to cast their votes on ballot paper back in the day. EVMs were initially deployed on an experimental basis in Kerala's No.70 Parvur assembly constituency in 1982, as a replacement for ballot paper. In 1998, the widespread use of EVM began. Since then, EVMs have been used in all Lok Sabha and legislative assembly elections. The election commission establishes voting booths in each locality. The voter is unable to select the voting centre of his or her choice. If a voter is not present in that locality during the election, he or she cannot cast their vote. This is the biggest disadvantage of current system^[7].

Taking into consideration of all limitations of EVM, the proposed system suggests a solution for voting of migrants. Digital Electronic Voting Machine allows voter to choose their home constituency. The system consists of candidate data of all 543 constituencies. Admin will grant permission to vote by adding his credentials and add voters constituency number so that voter will be able to cast his or her vote. A vote cast by voter gets saved in candidate data and increments each time a new vote is added. Security is always been the main concern when it comes to digital voting and to avoid any security breach whole process will be offline and require admin involvement to make voting easy and secure. The final result will be announced after combining the count collected from all DEVVM^[4].

II. PRESENT ELECTRONIC VOTING SYSTEM

In 1989, the Election Commission of India collaborated with Bharat Electronics Limited and Electronics Corporation of India Limited to develop the Indian electronic voting machine (EVM). An EVM is made up of two components: a control unit and a ballot unit. A five-meter cable connects the two components. The ballot unit allows voters to vote via labelled buttons, while the control unit manages the ballot units, stores voting counts, and displays them on 7 segment LED displays. The controller in EVMs has been permanently programmed by the manufacturer at the time of production. Once the controller is manufactured and the programmed, no one (including the manufacturer) can change it^{[8][11]}.

One of the voting booth officers operates the control unit, while the voter operates the ballot unit in private. After verifying the voter's identity, the officer electronically activates the ballot unit, allowing a new vote to be cast. When a voter casts a vote, the ballot unit registers it in its memory. The polling booth officer enters a close command from the control unit to register the vote and reload the unit

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