Sipna Shikshan Prasarak Mandal's
SIPNA COLLEGE OF ENGINEERING & TECHNOLOGY, AMRAVATI
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Department of Information Technology

TECHNOCRAT

Departmental Newsletter

VOLUME 10, ISSUE 2

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COVER STORY
COMPUTER VISION

Volume 10, Issue 2

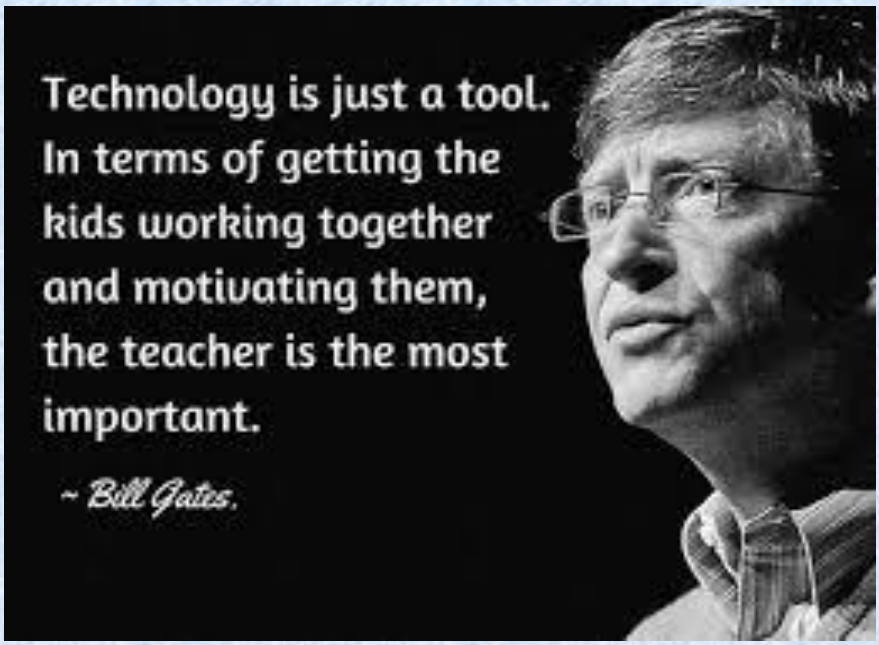
TECHNOCRAT

SIPNA COLLEGE OF ENGINEERING AND TECHNOLOGY, AMRAVATI.

DEPARTMENT OF INFORMATION TECHNOLOGY

Inside this Issue

INSPIRATIONAL QUOTE



Editor

Ms. A. B. Parandekar

About Department

- *Use of Information Technology is growing in the Government and industrial sector. The multi-national companies are building applications based on Cutting Edge Technology. They are using IT in their operations and decision making. Due to this exponential growth, computer user community is facing shortage of manpower, trained in developing quality solutions, and planning for long term IT requirements. The need for human resources in the IT industry is being addressed at various levels.*
- *Some degree programs are available at various universities, which are providing required technical manpower in IT industries of the country. These degree programs focus mainly on entry level knowledge, whereas the IT industry needs and much more refined skills for training, research and development. Our IT branch provides sophisticated academic program that will have the necessary depth and focus to meet the needs of both the user and the IT industry.*
- *The following UG, PG and Ph. D. programs are offered by the college.*

Undergraduate	***Post Graduate***	***Doctorate of Philosophy***
B. E. (Information Technology) *120 seats*	*M. E. (Information Technology)* *18 seats*	*Ph. D. (Information Technology)*

Objectives

- *Create leaders, trend-setters for the next generation of the IT industry.*
- *Offer state-of-art information technology education.*
- *Train individuals who would contribute substantially to the ambitious IT goals of the country.*
- *Undertake joint R & D with IT industry.*
- *Contribute to large developmental projects in government and public sector.*
- *Help the industry to create infrastructure that would facilitate the Indian IT industry.*

Vision of Department

- *Provide socially enriched and professional environment to transform the students into globally competent IT engineers*

Mission of Department

- *Provide learning ambience to impart quality technical education for students to develop into globally competent technology professionals.*
- *Prepare the students with strong fundamental concepts, analytical capability and problem solving skills.*
- *To provide a dynamic learning environment that emphasizes open ended design, team work, leadership and employability skills.*
- *To prepare graduates with positive professional attitude and ethical values with spirit of social commitment.*

Programme Education Outcomes

Engineering Graduates will be able to:

PEO.1:

Analyze and solve real-life problems through application of Information Technology and fundamental knowledge of mathematics and science courses

PEO.2:

Succeed in diversified and applied areas with analysis, design and synthesis of data to create novel products and solutions to meet current industrial and societal needs.

PEO.3:

Endure higher studies, research activities, and entrepreneurial skills and continue with lifelong learning.

PEO.4:

Adhere to professional and ethical values, soft skills, teamwork and communication.

Programme Outcomes

Engineering Graduates will be able to:

PO1: Engineering knowledge*:*

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis:

Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

PO3: Design/development of solutions:

Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

PO4: Conduct investigations of complex problems:

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage*:*

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

***PO6: The engineer and society**:*
Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
***PO7: Environment and sustainability**:*
Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
***PO8: Ethics**:*
Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
***PO9: Individual and teamwork**:*
Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.
***PO10: Communication**:*
Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
***PO11: Project management and finance**:*
Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
***PO12: Life-long learning**:*
Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Objectives (PSOs)

***PSO.1:** Problem solving using the knowledge of programming, Theory of Computation, Data Structures and Discrete Mathematics.*

***PSO.2:** Design and develop software and hardware solution by applying knowledge in Database, Operating Systems, Computer Network & Security, System Architecture, Basic Electronics and Software Engineering.*

***PSO.3:** Analyze given information by applying Web Engineering, Communication Engineering, Internet of Things and Artificial Intelligence in Concepts.*

***PSO.4:** Demonstrate Awareness towards Professional Ethics, Environment Aspects, Social Issues and Readiness for Lifelong Learning.*

Getting Started With Computer Vision

The measurable benefits of lower costs, increased efficiency and reduced downtime mean there's significant Return on Investment (ROI) to be captured through computer vision. And thanks to the growing democratization of AI, intelligent edge and cloud solutions, these benefits are increasingly within reach.

But while the hardware, and even many off-the-shelf CV architectures are readily available, there are a few key points to consider before kicking off your pilot project.

Engage the experts.

First and foremost, you'll need to make sure you have the knowledge and resources to build, implement and operationalize a highly accurate CV system at scale. Computer vision is a unique field that requires a specialized skill set. If your organization already employs a team of data scientists, this is a great starting point, but unless your team has successfully implemented a CV model in the past, it's well worth the time to engage with an experienced consultant that can guide your project from ideation to execution.

Consider the context.

Once you've assembled your team, you'll need to analyze the problem you're trying to solve to evaluate any ethical considerations, as well as the relative risk and corresponding accuracy that will be required. While high accuracy is always the goal, anomalies, environmental changes and other unknown variables will make some degree of uncertainty inevitable. For this reason, some challenges are better suited for computer vision than others, particularly those that enable your organization to augment rather than replace the human decision-making process.

Optimize your training data.

As you prepare to develop and train a CV model, it will be important to consider not only the quantity of relevant images available but also the quality — including lighting, angle,

size, color of the backdrop and more. Due to the relative rigidity of computer vision, it can be difficult to know what types of outliers will lead to misidentification or misclassification. As a result, training will need to include a variety of positive and negative examples to improve results. An experienced CV consultant or decision scientist will be able to help direct these efforts.

Maximize the human factor.

No matter the use case, any form of AI must be put into production in a way that's verifiable and supported by human decision-making. This means that in addition to training your computer vision model, you'll need to determine the most effective way to introduce the resulting intelligence to users.

Unfortunately, when humans are consistently presented with highly accurate intelligence, we quickly become reliant upon it and may fail to notice otherwise obvious mistakes. To prevent this, CV systems should employ tactics that continue to rely upon and engage active responsibility from human workers — especially in healthcare or military environments where the risk of inaccuracy is highly consequential.

Beware of bias.

Artificial intelligence is only as accurate as the data used to train it. Sadly, but inevitably, human biases are reflected in human data, often in ways that can be difficult to perceive. To overcome these challenges, developers must understand and adhere to the practices of responsible AI, ensuring CV models are consciously structured and rigorously tested under a range of conditions — particularly when human imagery is involved. In addition to relying on experienced consultants in this field, engaging a diverse range of decision-makers can help to broaden perspectives, uncover unexpected challenges and safeguard against the perpetuation of bias in your model.

Think long term.

AI, including computer vision, represents an entire business lifecycle. As a result, you'll need to make sure you're not only investing in the skills needed to develop an effective model, but also the infrastructure, pipeline

and operational expertise to implement that model in a way that creates real, long-term business value. This is where MLOps comes into play.

Artificial intelligence is self-disrupting by nature, meaning the circumstances for which a model is trained are bound to change from the moment of implementation. MLOps goes beyond traditional DevOps to ensure that once a model is deployed, it's constantly tested and retested, and that it can retrain itself against data dynamically so that it continues to provide high-quality intelligence even as the surrounding business environment changes.

Looking forward

By embracing computer vision, modern organizations have a unique opportunity to drive higher quality, reduce the cost of goods and services, and position themselves at the forefront of disruption. As advancements in custom vision, new methodologies and algorithms continue to progress, computer vision will become easier and more cost-effective to deploy.

Already, the market has seen an influx of new products geared toward localized AI and CV as manufacturers begin to recognize the demand for these solutions. While some of today's edge devices have the ability to run smaller AI models independent of the cloud, in the next few years, increased efficiencies will make it possible to run higher accuracy models on lower power devices. This will enable companies to adopt computer vision more rapidly and at lower cost.

Those that begin exploring, investing in and piloting CV solutions today will be well-positioned to capitalize on these benefits while driving industry transformation in a way that improves employee safety, increases engagement and boosts customer satisfaction.

What if there's a smarter way to identify and respond to modern business challenges? See what's possible with computer vision.

Article By:

Ms. Gunjan Chandak

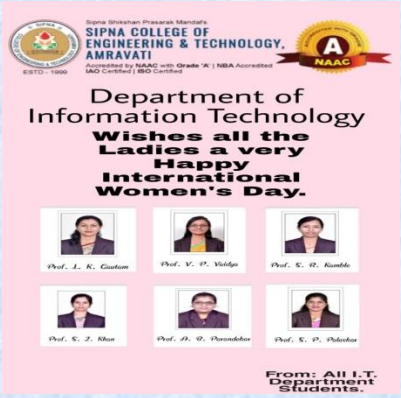
Our Achievements

Seminars and Workshops taken under Student Activity

*1. **Name of Event: Online Poster Making Competition organized on the occasion of National Science Day***

Theme: The importance of Science in the field of Healthcare

Date: 28/02/2021 to 07/03/2021



2. Name of Department: Department of Information Technology

Name of Event: Women's Day Celebration

Date: 08/03/2021

3. Name of Event: Technical Session on "Fundamental Aspects of Artificial Intelligence and Machine Learning" on the occasion of Computer Society of India (CSI) Foundation Day

Date: 12/03/2021 Mode of Session: Online through Google Meet

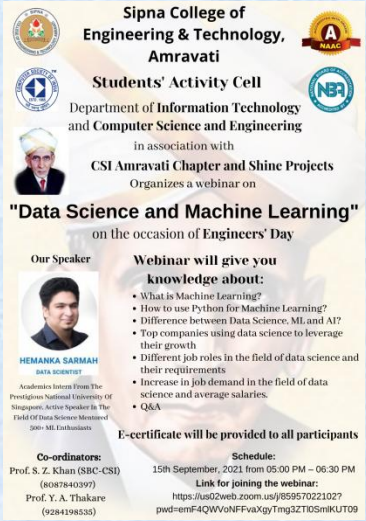
Chief Guest: Dr. Mohammad Atique (Managing Committee Member, CSI Amravati Chapter and Professor, P. G. Department of Computer Science & Engineering, SGBAU, Amravati)

4. Name of Event: Webinar on "Be Fit with Yoga"

Date: 29/04/2021

Mode of Webinar: Online through Microsoft Teams

Chief Guest: Mrs. Leena Chandak (IT Professional and Certified Yoga Wellness Instructor by Ministry of AYUSH, Government of India.)

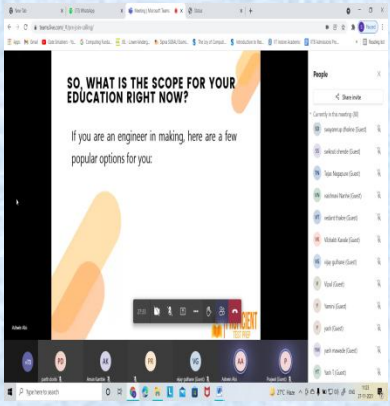


5. Name of Event: Webinar on Data Science and Machine Learning

Date: 15/09/2021

Mode of Session: Online through Zoom

Chief Guest: Mr. Hemanka Sarmah (Data Scientist, Academics Intern from the prestigious National University of Singapore, Active speaker in the field of Data Science, Mentored 500+ Enthusiasts.)



6. Name of Event: Webinar on "Abroad Education and Opportunities"

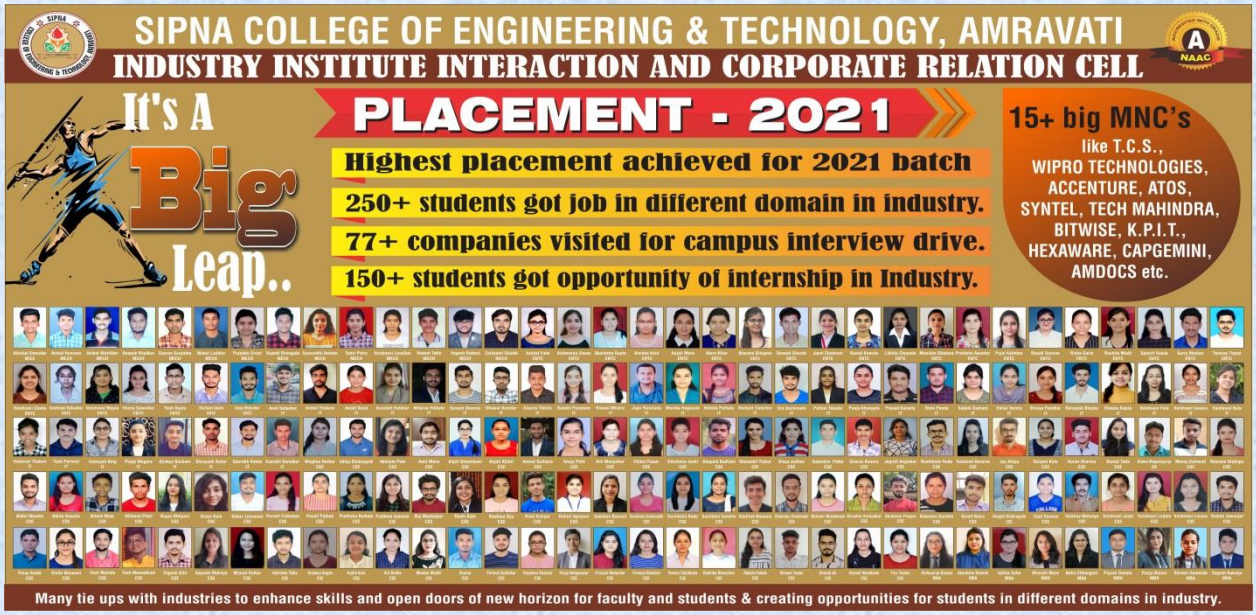
Date: 27/11/2021

Mode of Session: Online through Microsoft Teams

Chief Guest: Mr. Ashwin Alsi (B. E., M. S. (Mechanical Engineering) University of Illinois, Chicago and Director, Proficient Test Prep, Amt.)

Placement

Following students got placed from Department of I. T. in different companies.



Sr. No.	*Name of Student*	*Company Name*
1	Amit Salpekar	Infosys
2	Monika Dnyaneshwar Hagwane	Tata Consultancy Services
3	Himani Shivprasad Mishra	Tata Consultancy Services
4	Gayatri Paraswar	Tata Consultancy Services
5	Atharva Vibhute	Cognizant
6	Shweta Kapse	Cognizant
7	Rishi Pande	Cognizant
8	Vaishnavi Fale	Capgemini
9	Atharva Vibhute	Capgemini
10	Gaurav Tikhile	Capgemini
11	Devesh Sharma	Capgemini
12	Vaishnavi Sanjay Fale	Atos Global IT Solutions
13	Amit Salpekar	L&T Infotech
14	Pallavi Tekade	Tech Mahindra
15	Shital Verma	Wipro

16	Prasad Diliprao Kalanke	Collabera
17	Nikhita Sanjay Potfode	Collabera
18	Vaishnavi Thakare	Excellon
19	Vaishnavi Isasare	Excellon
20	Pooja Khangale	Excellon
21	Shreya Pundkar	Excellon
13	Amit Salpekar	L&T Infotech
14	Pallavi Tekade	Tech Mahindra
15	Shital Verma	Wipro
16	Prasad Diliprao Kalanke	Collabera
17	Nikhita Sanjay Potfode	Collabera
18	Vaishnavi Thakare	Excellon
19	Vaishnavi Isasare	Excellon
20	Pooja Khangale	Excellon
21	Shreya Pundkar	Excellon
22	Aniket Thakre	Team Lease
23	Nishant Tinturkar	Team Lease
24	Shreyas Bhojane	Team Lease
25	Yash Parimal	Team Lease
26	Om Deshmukh	Team Lease
27	Ajinkya Bochare	Team Lease
28	Shreyas Saloo	Team Lease
29	Saurabh Nanotkar	Team Lease
30	Saurabh Kakade	Team Lease
31	Pooja Wagare	Team Lease
32	Sakshi Sunil Sadrani	Coditas
33	Atharva Vibhute	Bitwise
34	Jigar Manoj Raichada	CredFlow
35	Shweta Kapse	E-Zest
36	Anjali Bajaj	PlanetSpark
37	Vaishnavi Sanjay Kale	AFPL
38	Zubaiyah Baig	Yardi
39	Arundati Hatekar	Jio Platform
40	Amit Salpekar	Jio Platform
41	Dhawal Kamdar	Thinkitive Technologies private limited

About Institution

DEPARTMENT
OF
INFORMATION TECHNOLOGY

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Sipna College of Engineering and Technology, Amravati.

Vision:

To provide quality professional education and conducive environment to students to emerge as a model proficient institute.

Mission:

- To create scholarly and vibrant environment for professional excellence.
- To contribute to advancement of knowledge in basic and applied areas of engineering and technology.
- To be an institute of choice in the region by developing, managing and transferring contemporary technologies.
- To build mutually valuable terms with society, industry and Alumni.

Website: www.sipnaengg.ac.in

The Evolution Of Computer Vision

Before the advent of deep learning, the tasks that computer vision could perform were very limited and required a lot of manual coding and effort by developers and human operators. For instance, if you wanted to perform facial recognition, you would have to perform the following steps:

•Create a database: You had to capture individual images of all the subjects you wanted to track in a specific format.

•Annotate images: Then for every individual image, you would have to enter several key data points, such as distance between the eyes, the width of nose bridge, distance between upper-lip and nose, and dozens of other measurements that define the unique characteristics of each person.

•Capture new images: Next, you would have to capture new images, whether from photographs or video content. And then you had to go through the measurement process again, marking the key points on the image. You also had to factor in the angle the image was taken.

After all this manual work, the application would finally be able to compare the measurements in the new image with the ones stored in its database and tell you whether it corresponded with any of the profiles it was tracking. In fact, there was very little automation involved and most of the work was being done manually. And the error margin was still large.

Machine learning provided a different approach to solving computer vision problems. With machine learning, developers no longer needed to manually code every single rule into their vision applications. Instead they programmed "features," smaller applications that could detect specific patterns in images. They then used a statistical learning algorithm

such as linear regression, logistic regression, decision trees or support vector machines (SVM) to detect patterns and classify images and detect objects in them.

Machine learning helped solve many problems that were historically challenging for classical software development tools and approaches. For instance, years ago, machine learning engineers were able to create a software that could predict breast cancer survival windows better than human experts. However building the features of the software required the efforts of dozens of engineers and breast cancer experts and took a lot of time develop.

Deep learning provided a fundamentally different approach to doing machine learning. Deep learning relies on neural networks, a general-purpose function that can solve any problem representable through examples. When you provide a neural network with many labeled examples of a specific kind of data, it'll be able to extract common patterns between those examples and transform it into a mathematical equation that will help classify future pieces of information.

For instance, creating a facial recognition application with deep learning only requires you to develop or choose a preconstructed algorithm and train it with examples of the faces of the people it must detect. Given enough examples (lots of examples), the neural network will be able to detect faces without further instructions on features or measurements.

Deep learning is a very effective method to do computer vision. In most cases, creating a good deep learning algorithm comes down to gathering a large amount of labeled training data and tuning the parameters such as the type and number of layers of neural networks and training epochs. Compared to previous types of machine learning, deep learning is both easier and faster to develop and deploy.Most of current computer vision applications such as cancer detection, self-driving cars and facial recognition make use of deep learning. Deep learning and deep neural networks have moved from the conceptual realm into practical applications thanks to availability and advances in hardware and cloud computing resources.

How Long Does It Take To Decipher An Image? In short not much. That's the key to why computer vision is so thrilling: Whereas in the past even supercomputers might take days or weeks or even months to chug through all the calculations required, today's ultra-fast chips and related hardware, along with the a speedy, reliable internet and cloud networks, make the process lightning fast. Once crucial factor has been the willingness of many of the big companies doing AI research to share their work Facebook, Google, IBM, and Microsoft, notably by open sourcing some of their machine learning work.

This allows others to build on their work rather than starting from scratch. As a result, the AI industry is cooking along, and experiments that not long ago took weeks to run might take 15 minutes today. And for many real-world applications of computer vision, this process all happens continuously in microseconds, so that a computer today is able to be what scientists call "situationally aware."

By: Chaitanya Chaudhari