# SRUJANI

## 2021

C. V. Raman Polytechnic

A constituent organization of C.V. Raman Global University

# C. V. Raman Polytechnic

| Vision | Mission |
|---|---|
| **To emerge as a global leader in the area of higher education through the pursuit of excellence with future of skills and innovation to match the ever changing global scenario.** | • Inculcating best engineering skills, professional ethics and practices.<br>• Working collaboratively with technical Institutes / Universities/ Industries of National and International repute.<br>• Providing strong foundations by adopting effective teaching learning methods.<br>• Developing leadership qualities, effective soft skills, critical thinking and attitude of lifelong learning by organizing student centric activities. |
| | |

# Department of Computer Science and Engineering

| Vision | Mission |
|---|---|
| **To become a leader to providing quality education with the state-of-art technologies to address Industrial and societal problems.** | • To build human resource with sound theoretical and practical knowledge in the discipline of Computer Science & Engineering.<br>• To work in teams for Research, Projects, and Co-Curricular activities involving modern approaches, tools and technology.<br>• To interact and collaborate with professionals from industry, academia, professional societies, community groups for improvements of quality of education. |
| | |

| Program Educational Objectives (PEO) | |
|---|---|
| **PEO1** | Apply the principles of Computer Engineering to identify and solve real world problems. |
| **PEO2** | Excel in professional career, exhibit leadership qualities with ethics and soft skills. |
| **PEO3** | Pursue higher education, research or entrepreneurship. |
| **PEO4** | Develop a positive attitude towards lifelong learning and succeed in industry or higher education. |

| Program Outcomes (PO) | |
|---|---|
| **PO1** | Basic and discipline specific knowledge |
| **PO2** | Problem analysis |
| **PO3** | Design/development of solutions |
| **PO4** | Engineering tools, experimentation and testing |
| **PO5** | Engineering Practices for society, sustainability and environment |
| **PO6** | Project Management |
| **PO7** | Lifelong Learning |

| Program specific outcomes (PSO) | |
|---|---|
| **PSO1** | The ability to understand, analyze and develop computer programs in the area of computer science and to solve computer software and hardware related engineering problems. |
| **PSO2** | The ability to develop software systems to allow convenient use of computing system and possess professional skills and knowledge of software design process. |

# Editorial Board

# Content

# Biometrics: Future scope


It is possible to confirm or establish an individual's identity based on “who she is”, rather than by “what she possesses” (e.g., an ID card, key) or “what she remembers” (e.g., a password, pin). Biometrics are automated methods of recognizing a person's identity based on a physiological (face, fingerprints, hand geometry, iris, retinal, vein, DNA, ear print) or behavioral (handwriting, voice, keystroke) characteristic.
The need for biometrics can be found in government, military, and commercial applications example: workstations, network and domain access, single sign- on, application logon, data protection, remote access to resources, transaction security and web security.
Biometric recognition can be done via verification/authentication (one-one) or identification (one-many).
The authentication process involves:

- Feature Extraction
- Pattern Matching
- Decision Making

Biometric traits are subject to:

- Noise in sensed data
- Intraclass variation

- Interclass similarity

- Spoof attacks

The above limitations can be overcome by using Multimodal Biometrics. Following fusion scenarios may be presented:

- Single biometric trait, multiple sensors (2D and 3D image of face)
- Single biometric trait, multiple classifiers (combine PCA, LDA, ICA for face or minutiaeand texture based for fingerprint)
- Single biometric trait, multiple units (combine 2 or more fingers of single user or both irises)
- Multiple biometric traits (face, voice or face, fingerprint) A particular biometric must possess following characteristics: Universality (every individual must possess the biometric)
- Distinctiveness (unique to each individual)
- Permanence (invariant with time)
- Collectability (measurable)
- Resistance to circumvention.

However, a human characteristic that possesses all these properties has not yet been identified. As a result, none of the existing unimodal biometric systems provides perfect recognition and there is a scope for improving the performance of these systems.

Characteristics like skin color, eye color, hair color, presence of beard, presence of moustache, height, weight, gait, keystroke, clothes color, tattoos, accessories, gender, ethnicity, age, height, weight and eye color though not unique and reliable, provide some information about the user. These characteristics are referred as “soft” biometric traits and can complement the identity information provided by the primary biometric identifiers. These are easier to capture from a distance and do not require cooperation from the subjects.

Although biometrics is a powerful tool against repudiation and has been widely deployed in various security systems, biometric characteristics are largely immutable, resulting in permanent biometric compromise when a template is stolen. Thus, there is the need to improve public confidence and acceptance of biometrics.

This privacy concern can be overcome by following emerging technologies:

Cancelable biometrics consists of intentional, repeatable distortions of biometric signals based on non-invertible transforms or biometric salting which provide

a comparison of biometric templates in the transformed domain. If a cancelable feature is compromised, the distortion characteristics are changed, and the same biometrics is mapped to a new template, which is used subsequently. The application of transforms provides irreversibility and un-link-ability of biometric templates, which prevents the use of same captured template for other applications.

Biometric cryptosystems are designed to securely bind adigital key to a biometric or generate a digital key from a biometric to benefit from the strengths of both fields. ***For example:*** Bio-Hash. It requires storage of biometric- dependent public information, which is applied to retrieve or generate keys, also referred to as helper data There are further challenges involved in biometric key generation primarily due to drastic acquisition variations in the representation of a biometric identifier and the imperfect nature of biometric feature extraction and matching algorithms.

Vibek Pradhan
F20029007043

# 3D Printing

3D printing or additive manufacturing (AM) is the use of one of various processes to make a three-dimensional object. In 3D printing, primarily additive processes are used, in which successive layers of material are laid down under computer control. These objects can be of almost any shape or geometry, and are produced from a 3D model or other electronic data source. A 3D printer is a type of industrial robot.
You've heard of 3D printing from newscasters and journalists, astonished at what they've witnessed. 3D Printer is a machine, which can “print” using plastic, metal, nylon, and over a hundred other materials. It can be used for making nonsensical little models like the over- printed Yoda, yet it can also print manufacturing prototypes, end user products, legal guns, aircraft engine parts, innovative jewelry design and even human organs using a person's own cells.

It all starts with making a virtual design of the object you want to create. This virtual design is made in a CAD (Computer Aided Design) file using a 3D modeling program (for the creation of a totally new object) or with the use of a 3D scanner. (to copy an existing object). This scanner makes a 3D digital copy of an object and puts it into a 3D modeling program.
To prepare the digital file created in a 3D modeling program for printing, the software slices the final model into hundreds or thousands of horizontal layers. When this prepared file is uploaded in the 3D printer, the printer creates the object layer by layer. The 3D printer reads every slice (or 2D image) and proceeds to create the object blending each layer together with no sign of the layering visible, resulting in one three dimensional object.

Methods and Technologies of 3D Printing:
Some methods use melting or softening material to produce the layers. Selective laser sintering(SLS) and Fused Filament Fabrication (FFF) are the most common technologies using this way of printing. Another method of printing is to lay liquid materials that are cured with different technologies.

3-D Printing Advantages:

**Shorter response times**

Three-dimensional printing allows businesses to construct working models in just hours instead of days or weeks.

**Lower Cost**

Generating prototypes with 3D printers is much easier and cheaper than making molds.

**Superior Surface Finish**

Certain three-dimensional printing methods enable the production of objects with excellent surface features. This makes it very easy to create construction models or prototypes for a wide variety of projects within many industries.

**Durability**

The objects obtained in many types of 3-D printing are quite long lasting and durable, as they do not absorb moisture or warp over time.

**Functional Models**

This special printing method allows you to display 3-D models to customers that are fully functional and look very much like the real thing. This enables you to demonstrate how a product operates in a straightforward fashion, as opposed to a model that can be viewed only with computer assistance.

***VISHVA*** 3D Printer builds concept models, functional prototypes and end use parts in standard. It's the professional 3D printer based on FFF (Fused Filament Fabrication) Technology. This Technology is clean, simple-to-use and office-friendly.

Complex geometries that would otherwise be problematic become practical and easy to understand with FFF Technology.

VISHVA 3D Printer process starts with importing an STL file of a model into a Pre-processing software. It operates in X,Y and Z axes, drawing the model one layer at a time. It works by melting filament material that is deposited, via a print head, a layer at a time, onto a build platform according to the 3D data supplied to the printer form SD card. Each layer hardens as it is deposited and bonds to the previous layer.

**3D Printer Use for Various Applications such as:**

- Prototype model making
- Automation industries
- Design and Engineering
- Architecture model making
- Toy manufacturer etc.

**Why 3D Printer for Education?**

- It provides teachers with 3 dimensional visual aids that they can use in their classroom particularly in illustrating a hard to grasp concept.
- 3D printer makes it easy for teachers to seize the interest of their students compared to just showing the pictorial representations of objects.

- It enhances hands-on learning and learning by doing. Using this prototyping technology, students will be able to produce realistic 3 dimensional mini-models (Great for engineering, architecture, and multi- media arts students).
- It provides more room for interactive class activities. In biology, for instance , teachers can create a 3D model of the human heart, head, skeleton...etc to teach

***The Future of 3D Printing***

This is a disruptive technology of mammoth proportions, with effects on energy use, waste, customization, product availability, art, medicine, construction, the sciences, and of course manufacturing. It will change the world as we know it.

It is predicted by some additive manufacturing advocates that this technological development will change the nature of commerce, because end users will be able to do much of their own manufacturing rather than engaging in trade to buy products from other people and corporations.

Sweta Shaswat Mishra
F20029007040

# Cyber Threats

Cybercrime is an ongoing threat. You might think that the only form of cybercrime you have to worry about is hackers stealing your financial information. But it may not be so simple. There are far more concerns than just basic financial ones. Cybercrime continues to evolve, with new threats surfacing every year.

When you hear and read about the range of cybercrimes out there, you might be tempted to stop using the internet entirely. That's probably too drastic.

Instead, it's a good idea to know how to recognize cybercrime, which can be the first step to helping protect yourself and your data. Taking some basic precautions and knowing who to contact when you see others engaged in criminal activities online are also important steps.

You might want to learn how to prevent cybercrime, but here's the thing: You can't.

You can, however, take precautions to help protect against it.

Cybercrime is any crime that takes place online or primarily online. Cybercriminals often commit crimes by targeting computer networks or devices. Cybercrime can range from security breaches to identity theft.

Other cybercrimes include things like "revenge porn," cyber-stalking, harassment, bullying, and child sexual exploitation.

Terrorists collaborate on the internet, moving terrorist activities and crimes into cyberspace.

# HOW TO PROTECT YOURSELF AGAINST CYBERCRIME?

Anyone using the internet should exercise some basic precautions. Here are 11 tips you can use to help protect yourself against the range of cybercrimes out there.

## 1. Use a full-service internet security suite

For instance, Norton Security provides real-time protection against existing and emerging malware including ransomware and viruses, and helps protect your private and financial information when you go online.

## 2. Use strong passwords

Don't repeat your passwords on different sites, and change your passwords regularly. Make them complex. That means using a combination of at least 10letters, numbers, and symbols. A password management application can help you to keep your passwords locked down.

## 3. Keep your software updated

This is especially important with your operating systems and internet security software. Cybercriminals frequently use known exploits, or flaws, in your software to gain access to your system. Patching those exploits and flaws can make it less likely that you'll become a cybercrime target.

## 4. Manage your social media settings

Keep your personal and private information locked down. Social engineering cybercriminals can often get your personal information with just a few data points, so the less you share publicly, the better. For instance, if you post your pet's name or reveal your mother's maiden name, you might expose the answers to two common security questions.

## 5. Strengthen your home network

It's a good idea to start with a strong encryption password as well as a virtual private network. A VPN will encrypt all traffic leaving your devices until it arrives at its destination. If cybercriminals do manage to hack your communication line, they won't intercept anything but encrypted data. It's a good idea to use a VPN whenever you a public Wi-Fi network, whether it's in a library, café, hotel, or airport.

## 6. Talk to your children about the internet

You can teach your kids about acceptable use of the internet without shutting down communication channels. Make sure they know that they can come to you if they're experiencing any kind of online harassment, stalking, or bullying.

## 7. Keep up to date on major security breaches

If you do business with a merchant or have an account on a website that's been impacted by a security breach, find out what information the hackers accessed and change your password immediately.

## 8. Take measures to help protect yourself against identity theft

Identity theft occurs when someone wrongfully obtains your personal data in a way that involves fraud or deception, typically for economic gain. How? You might be tricked into giving personal information over the internet, for instance, or a thief might steal your mail to access account information. That's why it's important to guard your personal data. A VPN — short for virtual private network — can also help to protect the data you send and receive online, especially when accessing the internet on public Wi-Fi.

## 9. Know that identity theft can happen anywhere

It's smart to know how to protect your identity even when traveling. There are a lot of things you can do to help keep criminals from getting your private information on the road. These include keeping your travel plans off social media and being using a VPN when accessing the internet over your hotel's Wi-Fi network.

## 10. Keep an eye on the kids

Just like you'll want to talk to your kids about the internet, you'll also want to help protect them against identity theft. Identity thieves often target children because their Social Security number and credit histories frequently represent a clean slate. You can help guard against identity theft by being careful when sharing your child's personal information. It's also smart to know what to look for that might suggest your child's identity has been compromised.

## 11. Know what to do if you become a victim

If you believe that you've become a victim of a cybercrime, you need to alert the local police and, in some cases, the FBI and the Federal Trade Commission. This is important even if the crime seems minor. Your report may assist authorities in their investigations or may help to thwart criminals from taking advantage of other people in the future. If you think cybercriminals have stolen your identity. These are among the steps you should consider.

- Contact the companies and banks where you know fraud occurred.
- Place fraud alerts and get your credit reports.
- Report identity theft to the FTC.

Sunayana Sahu
F20029007037

# Machine vision

Machine vision (MV) is the technology and methods used to provide imaging-based automatic inspection and analysis for such applications as automatic inspection, process control, and robot guidance in industry. The scope of MV is broad. MV is related to, though distinct from, computer vision

While conventional (2D visible light) imaging is most commonly used in MV, alternatives include imaging various infrared bands line scan imaging, 3D imaging of surfaces and X-ray imaging. Key divisions within MV 2D visible light imaging are monochromatic vs. color resolution, and whether or not the imaging process is simultaneous over the entire image, making it suitable for moving processes. The most commonly used method for 3D imaging is scanning based triangulation which utilizes motion of the product or image during the imaging process. Other 3D methods used for machine vision are time of flight, grid based and stereoscopic.

The imaging device (e.g. camera) can either be separate from the main image processing unit or combined with it in which case the combination is generally called a smart camera or smart sensor. When separated, the connection may be made to specialized intermediate hardware, a frame grabbed using either a standardized (Camera Link, CoaXPress) or custom interface. MV implementations also have used digital cameras capable of direct connections (without a framegrabber) to a computer via FireWire, USB or Gigabit Ethernet interfaces

Though the vast majority of machine vision applications are solved using 2 dimensional imaging, machine vision applications utilizing 3D imaging are growing niche within the industry. One method is grid array based systems using pseudorandom structured light system as employed by the Microsoft Kinect system circa 2012.

Abhijit Panda
F21029007002

# Whispers of the Midnight Muse

Beneath the veil of the twilight's hue,
A whispered dance, the stars pursue.
In the canvas of night, where dreams align,
A poet's heart weaves a serenade, divine.

Moonlight whispers to the silent trees,
As shadows waltz with a gentle breeze.
A symphony of crickets, a nocturnal choir,
In the quiet embrace, passion takes fire.

The ocean hums its lullaby,
A rhythmic tide, a celestial tie.
Silver waves caress the shore,
As midnight secrets start to pour.

With quill in hand, ink's silent kiss,
The poet conjures verses, a sweet abyss.
Stanzas like constellations, a cosmic design,
In the boundless universe of the poet's mind.

A sonnet to the stars, a ballad to the moon,

Verse by verse, a universe in bloom.

Emotions cascade in poetic rhyme,

Echoing through the corridors of time.

In the garden of words, where feelings bloom,

Metaphors unfurl, dispelling gloom.

Lines of solace, verses of glee,

A lyrical haven, where hearts roam free.

As dawn tiptoes, the inkwell rests,

Yet the echoes linger, the poet's best.

A poem, a vessel for stories untold,

In the poet's embrace, a timeless hold.

Annapurna Sethi
F21029007010

# Songs of Sunlit Serenity

Beneath the sun's warm, golden embrace,

Nature dances in a gentle grace.

Leaves whisper secrets to the breeze,

A symphony of life, in moments like these.

Birds in flight, a fleeting ballet,

Colors bloom in the light of day.

Simple joys in each breath we take,

A tranquil poem that the earth does make.

Bulbul priyadarshini
F21029007015

# Beyond the Campus Gates: Echoes of Higher Learning

In halls of learning, where minds take flight,
A haven of knowledge, bathed in the light.
College days, a chapter to unfold,
In stories written, in friendships bold.

Lectures echo in the bustling halls,
A tapestry of dreams on classroom walls.
Challenges faced, lessons learned,
In every twist, in each page turned.

Dorm room tales and midnight chats,
Through highs and lows, where courage sat.
Exams that tested the limits of will,
Yet in shared struggles, bonds did fill.

Professors, mentors, guiding the way,
Igniting minds in the light of day.
Campus pathways, where footsteps trace,
The journey of knowledge, a timeless grace.

Clubs and events, a vibrant scene,
A kaleidoscope where passions convene.
From libraries silent to cafés alive,
In the heart of campus, memories thrive.

Graduation day, a bittersweet end,

A new beginning around the bend.

In the tapestry of time, a college's story,

A cherished chapter of academic glory.

Dibyajyoti Das
F21029007017

# PHOTO GALLERY


CALVIN KLEANS