A T M E

College of Engineering

Tech Glimpse

CSE Department Magazine

Volume 8, 2022

Vision of the Institute

Development of academically excellent, culturally vibrant, socially responsible and globally competent human resources.

Mission of the Institute

1. To keep pace with advancements in knowledge and make the students competitive and capable at the global level.

2. To create an environment for the students to acquire the right physical, intellectual, emotional and moral foundations and shine as torchbearers of tomorrow's society.

3. To strive to attain ever-higher benchmarks of educational excellence.

Vision of the Department

To develop highly talented individuals in Computer Science and Engineering to deal with real world challenges in industry, education, research and society.

Mission of the Department

1. To inculcate professional behavior, Strong ethical values, innovative research capabilities and leadership abilities in the young minds & to provide a teaching environment that emphasizes depth, originality and critical thinking.

2. Motivate students to put their thoughts and ideas adoptable by industry or to pursue higher studies leading to research.

Program Educational Objctives (PEO's)

1. Empower students with a strong basis in the mathematical, scientific and engineering fundamentals to solve computational problems and to prepare them for employment, higher learning and R&D.

2. Gain technical knowledge, skills and awareness of current technologies of computer science engineering and to develop an ability to design and provide novel engineering solutions for software/hardware problems through entrepreneurial skills.

3. Exposure to emerging technologies and work in teams on interdisciplinary projects with effective communication skills and leadership qualities.

4. Ability to function ethically and responsibly in a rapidly changing environment by applying innovative ideas in the latest technology, to become effective professionals in Computer Science to bear a life-long career in related areas.

Program Specific Outcome (PSO's)

1. Ability to apply skills in the field of algorithms, database design, web design, cloud computing and data analytics.

2. Apply knowledge in the field of computer networks for building network and internet based applications.

CONTENTS

Editorial Desk

Editorial Committee

Chairman
Dr L Basavaraj, Principal

Chief Editor
Dr Putte Gowda D, HOD, CS

Student Coordinators
Syed Suhail
Sonu R S

Dear Readers,

We are delighted to bring out our department magazine "Tech Glimpse". This magazine will showcase the activities and credentials of CS & E department staff and students.

I wish to express my gratitude for the invaluable encouragement and support by our beloved Principal and staff.

Your valuable comments and suggestions are appreciated. We wish all the readers an enjoyable reading.

Dr Putte Gowda D
Chief Editor

Department of Computer Science & Engineering

The Department of Computer Science & Engineering started in the year 2010. It is a evolving academic centre for higher education, research and novel in the key areas of Computer Science. It has been imparting quality education to meet the technological advancements and industrial requirements. The strength of students are progressively increasing every year and this is possible due to qualified and experienced faculties with excellent academic delivery process imparted. The first initiative taken by the department is "Computer Society of India - Student Branch", which is a professional body at National Level, in the year 2012, all the students have got enrolled as a members to this branch. The department has obtained CSI institutional membership and maximum teaching faculties have become CSI life members and platform is provided for the students to enhance their technical skills by participating in various events conducted under this professional body.

Department has Centre of Excellence in networking -CISCO, by providing CCNA Certification to students in networking and all final and pre final year semester students have done internship under this programme.The Department signedMOU with ATEU Softwares, Mysore and ClassmainSoftwares, Mysore to conduct various technical training for the students. The Department got sanctioned One Lakh Rupees from SERB for the three Day National Seninar conduction. The Department has got library, which believes in sharing of knowledge in the form of books, the most novel way of building the young mind by technical and ethical knowledge for students. Department also conducts various workshops, technical talks, and CSI events to students to up skill their skills. Technical training and Aptitude training is delivered to students to improve in their placement activities. Students have published various papers on project. Students actively involved in hackthons, sports, cultural and many intercollege events and have bagged prizes.

Hackfest- 2021 National level hackathon (online [2nd & 3rd July 2021])

The Department of Computer Science & Engineering had organized 2 days National level hackathon (online) from 2nd to 3rdjuly 2021. The objectives of the hackathon were:

- To provide space for students to showcase their technical skills.
- To provide a platform for creating solutions for social causes
- To inculcate teamwork spirit among students.

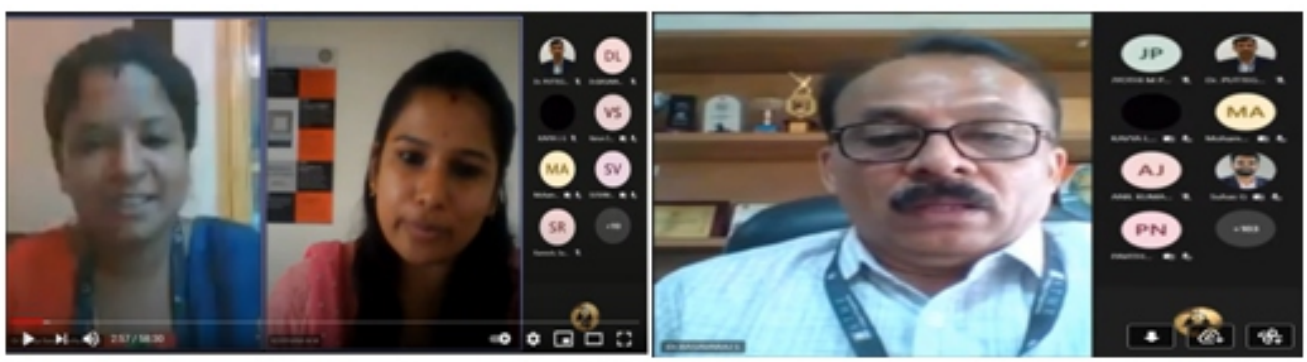
Around 40 teams enrolled in the national level hackathon and here are some of the colleges/universities that participated in hackfest:

1. P D A College of Engineering, Gulbarga, Karnataka
2. ATME, College of Engineering, Mysore, Karnataka
3. B.M.S. College of engineering, Bengaluru,Karnataka
4. Maharaja Institute of Technology Thandavpura, Mysore, Karnataka
5. Panimalar institute of technology, padarithangal, Tamil Nadu
6. The National Institute Of Engineering, Mysore, karnataka
7. Kongu engineering college, Erode, Tamil Nadu
8. KLS Gogte Institute of Technology, Belgaum, Karnataka
9. Brainware university, Kolkata, West Bengal
10. Knowledge Institute of Technology, Selliampalayam, Tamil Nadu
11. Yeshwantrao Chavan College of Engineering, Nagpur, Maharashtra

The events held on Day 1: 02/07/2021

The inauguration was held at 10 AM , the HOD of computer science and engineering Dr. Puttegowda D welcomed the guests and participants. The invocation song by Kavya L G, 4th Semester student followed by the lighting of lamp as a symbol of brightness and prosperity.

The Chief Guest for the event was Dr. Saranya, customer success manager GUVI Chennai and the Guest of honour: Mrs. Sahana Ramesh, business management professional Sony India. Dr. Saranya tended to crowd about the significance of hackathon and emphasized on the importance of getting placed in product-based company .



Chief guest, Dr. Saranya addressing the Audience Presidential speech by Dr. L Basavaraj, Principal, ATMECE, Mysuru

Mrs. Sahana Ramesh in her speech pushed on the savvy work than the difficult work. She emphasized on the importance on teams focus areas such as customer electricity, core technology support and digital process enablement. The hackathon guidelines was read by Mr.Anilkumar C J, Associate professor Department of CSE.

The summary of software based hackathon event is to build mobile application or web application that has to be built from the scratch and the evaluation process were in 3 stages and they were **Evaluation 1:** Day 1(3PM to 5PM), **Evaluation 2:** Day2(10AM to 12PM) and in this evaluation, the teams with best ideas will be chosen that is 8 teams will be shortlisted. **Final round of evaluation:** Day 2(3:30 PM to 5:30 PM). From the top 8 teams, 2 teams were selected and were awarded.

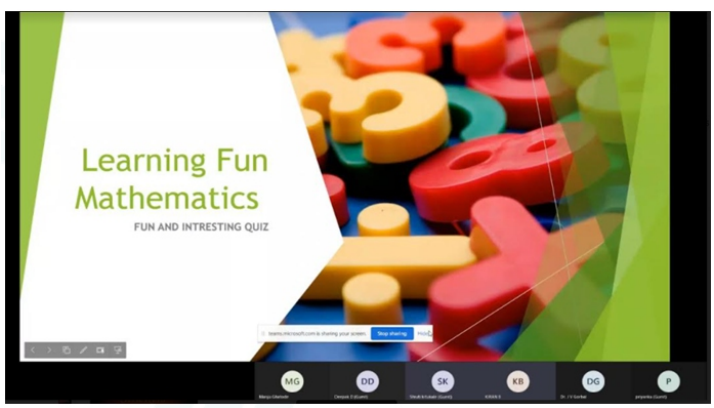
The principal Dr.Basavaraj L gave a presidential speech on updating their skills and knowledge and also congratulating all the participants in the event and the vote of thanks proposed by Mrs. Akshatha A, Assistant professor , Dept of CSE.

The students continued with their coding and some of the screenshots of the teams presenting their ideas were:

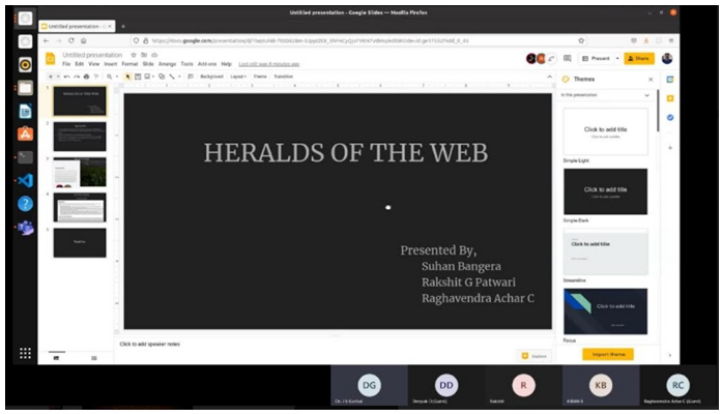
The team strickers presenting their ideas in ppt

The team learning fun mathematics presenting their ideas

The students presented their ideas in ppts and there by developing a mobile application. From each teams, 2-3 students participated.



The team heralds of the web presenting their ideas



In continuing with the event, at 3 PM, the judges evaluated all the teams and the judges were as follows:
1) Santosh Kumar J and Santosh B from VHU Technologies, Bengaluru.
2) Deepak and Hemanth kumar from Rubix technologies, Bengaluru.

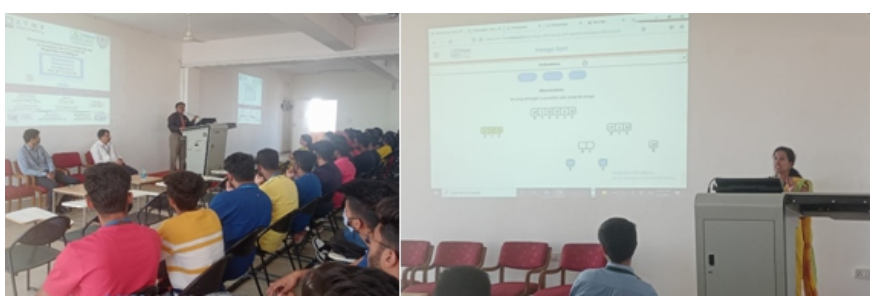
The events held on Day 2:03/07/2021

The event started in the morning at 10 AM where the second evaluation began, top 8 teams were shortlisted based on their skills and work. The event continued till evening 3:30 PM. The final around of evaluation began in the evening and 2 teams were awarded.The winners of the event received a cash prize of rupees 8,000 for first prize and rupees 4,000 for second prize.

In the valedictory function, the chief guest was Smt. K A Anitha Venkatesh, state student coordinator CSI, Karnataka and guest of honour was Prof. Mohamed minaz, chairman, CSI, Mysore chapter thanked all the winners of the event and in their speech they both stressed the participants to develop the coding skills.The chief guest and guest of honour announced the winners in the last round.

The winners were as follows:

Winner: Team- Coding geeks
Participants: Their zephanial, Nithinkumar, Soumya surrender
Institution: Indian institute of information technology and management, Gwalior
Runner: Team - Buzzinga
Participants: Goutham M, Dhanjaya S
Institution: KSIT, Bengaluru



Industry Visit Report

Faculty: Mr. Anil Kumar C J

Department of Computer science and Engineering, ATMECE arranged an industrial visit as a part of the co-curricular activity to Bharat Earth Movers Limited (BEML) on December 17th 2021. About 48 students from the department participated in the visit. The industrial visit (exhibition) was organized on behalf of 75 years of India's Independence and to celebrate 'Azadi Ka Amrit Mahotsav'. The exhibition catalogues through a visual display highlighting BEML's growth over the years and its contribution in making an 'AtmaNirbhar Bharat'. The exhibition was on 'BEML Journey since 1964' where there was a showcase of 3 trucks and their new models like BH205E-Electric dump truck, BH 100-Dump truck, BG 6051-Motor grader WS28, Ws70.

The visit had live demonstration of various dump trucks that were manufactured in the Mysuru plant, simulations of dump trucks, and a detailed demonstration of applications of AI and Computer Vision in the manufactured hi-tech dump trucks.

At the industrial visit students witnessed the following:
- Applications of AI in driver fatigue detection in dump trucks.
- Applications of Computer Vision in accident prevention in mining areas.
- Applications of Automation in heavy duty vehicles.
- Applications of Computer Graphics in simulation of dump truck driving environment.
- Various types of dump trucks manufactured at BEML's Mysuru plant.

The visit ended with a detailed display of BEML's history and its achievements in manufacturing highly equipped earth movers for the world's ever-growing demand.

One-day workshop on Awareness on Virtual Lab & Its Utilization

A one-day workshop on"Awarenesson Virtual Lab and its utilization" was organized for the 3rd Semester Students of Computer Science & Engineering on 05/03/2022.

The main aim of the workshop is to bring the awareness on the Virtual Lab and utilization in the regular curriculum. The workshop was inaugurated by Dr. Govinde Gowda M S, Dean Academics, ATME College of Engineering, Mysuru. Dr. Puttegowda D, Prof. & Head, Department of Computer Science & Engineering, ATME College of Engineering, Mysuru presided over the function.

In his inaugural address, he spoke about the importance of learning and how virtual lab is contributing as a blended learning tool by enhancing the better understanding of the concepts learnt. He also insisted the students to go through the experiments of the V-labs before actually conducting the experiment in the physical lab. This will bring a better understanding and the deep learning among the concepts learnt. And also informed the students to use the virtual labs not only for the lab component but also this can be used to substitute the theory concepts learnt in the few of the courses in the regular curriculum.

Also, the students were taken to hands on session on the Virtual lab portal, where they were guided about how to use the web portal, search for experiments, choosing the experiment to conduct and its simulation. Students worked on the Virtual lab platform and had hands on experience in conducting experiments and learnt the navigation in Virtual lab Platform.

PROTECTION OF HUMAN RIGHTS - Online Quiz Competition

The Department of Computer Science & Engineering in commemoration of 75th Independence Day has organized Online Quiz Competition “PROTECTION OF HUMAN RIGHTS” on 21st March 2022.

The main objective of this event was to awaken the knowledge & the basic insights on the Protection of Human rights, which are basic rights that belong to all of us simply because we are human. They embody key values in our society such as fairness, dignity, equality and respect. They are an important means of protection for us all, especially those who may face abuse, neglect and isolation. Human rights constitute a set of rights and duties necessary for the protection of human dignity, inherent to all human beings, irrespective of nationality, place of residence, national or ethnic origin, colour, religion, language, or any other status.

SERB Sponsored 3-Day Seminar

Department of Computer Science and Engineering, ATME College of Engineering organized a 3-Day National Level Seminar on “Research Avenues in Artificial Intelligence and Allied Areas” in association with Science and Engineering Research Board (SERB), New Delhia statutory body of the Department of Science and Technology (DST), Government of India, from 24th - 26th March, 2022.

The department has received a partial grant of Rs. 80000/- from SERB, New Delhi. This program aimed to provide opportunities to acquire research skills in the domain of AI and its allied areas such as Machine Learning, Natural Language Processing, IoT, Cloud Computing, and Cyber Security. Registration for the seminar was open to engineering students, research scholars, academicians, and industry people. In total, 61 registrations were received for the event. This included 25 faculty members, 16 research scholars, 04 industry people, 06 UG and 10 PG students. All participants received a welcome kit that included a button file, a note book, and a pen.

The 3-day Seminar event comprised of 10 plenary sessions and we invited 10 distinguished academicians from premier institutes and universities to share their views and research experiences in AI. Each speaker was given one and half-hours time to present, followed by 5 to 10 minutes to address questionnaires. The event was conducted in both online and offline modes together.

Three Day Workshop on Basics of Object Oriented Programming using C++ for IV Sem Students

Department of Computer Science and Engineering, ATME College of Engineering, Mysore organized Three Day Workshop on Basics of Object Oriented Programming using C++ for IV Sem Students from 19th May 2022 to 21st May 2022.

Workshop Objectives :

- Differentiate between object oriented programming and procedure oriented programming.
- The basic programming and OOPs concepts
- Develop the skills of designing and developing C++ programs using OOP features.
- Disseminate the importance of Object oriented programming

Workshop Context :

Introduction to Object Oriented Programming

- Concept of OOP
- Features of OOP
- Introduction of 'C++'
- Structure of 'C++' program
- Executing and Debugging a 'C++' Program

C++ Tokens and Type Casting

- Keywords and Identifiers
- Operators
- Constants
- Variables
- Data Types
- Precedence of Operators
- Scope and Lifetime of Variables

Classes & Objects

- Classes & Object Specifier
- Defining data members and member functions
- Array of objects
- Managing console I/O
- C++ stream classes
- Formatted and unformatted console I/O
- Usage of manipulators

Classes & Objects
- Classes & Object Specifier
- Defining data members and member functions
- Array of objects
- Managing console I/O
- C++ stream classes
- Formatted and unformatted console I/O
- Usage of manipulators

Function in C++
- Call by reference, Return by reference
- Function overloading and default arguments
- Inline function
- Static class members
- Friend functions
- Virtual Functions

Constructors and Destructor
- Concept of Constructor
- Types of Constructors
- Memory allocation (new and delete)
- Usage of destructor

Operator Overloading
- Overloading Unary and Binary operators
- Overloading using friend function

Inheritance
- Types of inheritance
- Virtual base classes and abstract base classes
- Constructor and destructor in derived class
- Working with files

File operations
- File pointer and their manipulation
- File updation with random access

Exception Handling
- Various Exception Handling classes
- Implementing try and catch block
- Use of throw keyword

Workshop Methodology:
Interactive action learning methodology included in the worshop:
- Presentation & Quiz
- Test, Exercises
- Individual feedbacks
- MS Power Point for their presentation and discussion throughout the workshop.

Resource Persons: Kiran B, Asst. Prof. Dept. of CSE, ATMECE, Mysuru.

Venue: Seminar Hall,401.Dept. of CSE, ATME Campus, Mysore

Workshop Date & Time: 19th May 2022 to 21th May 2022 9.30 am to 4.30 pm

Workshop Outcome:

- Describe OOPs concepts
- Differentiate between object oriented programming and procedure oriented programming.
- Use functions and pointers in your C++ program
- To demonstrate an understanding of primitive data types, tokens,control structures values, operators and expressions in C/C++
- Explain and apply fundamental syntax rules for identifiers, declarations, expressions, statements, and function
- Explain arrays and strings and create programs using them
- Define and Describe Classes, objects, constructors, destructors, inheritance, operator overloading, and Polymorphism, Template and exception handling.
- Understand and employ file management
- Demonstrate how to control errors with exception handling.

Technical Talk On "Technology Trends"

Department of Computer Science & Engineering had organized one days Technical Talk on "Technology Trends" on 15th June 2022 11:00 AM at Seminar Hall (Room No 401) in association with Class Main Software, Mysore.

Around 60 participants were attended for the event. Many students and faculties have effectively participated.

Objective: A lot more has changed this year due to the pandemic, making professionals realize that their role will not stay the same in the contactless world tomorrow. The webinar was aimed at gaining insight in to the latest technology trends and related career opportunities.

The Speaker

Mr. Srivthsa, Project Leader, Class Main Software, Mysore is a highly motivated and dynamic technology leader who has success fully led IT, digitalization and business transformation programs supporting cross-functional teams. He currently holds the position of Class Main Software at Mysore. His cross-industry experience includes business and IT consulting, renewable energy, consumer durables and manufacturing. He also has a strong experience with startups, global organizations and great knowledge about the corporate world.

Dr. Puttegowda D, HOD, CSE, thanked to speaker Mr. Srivthsa for delivering their topicsexcellently and also the management and Principal Dr. Basavaraj L for their kind support in organizing the event. Mr. Kiran B coordinated the events and event was hosted by Mrs.Sushama V.

Summary of the Webinar

The speaker started the session by providing an insight about some key statistics concerned with the IT industry and major technology trends that have took the world by stormin the year 2021. Main areas which were emphasized up on include - advanced analytics, IoT, AI, robotics, VR and AR, mixed reality. The speaker emphasized the role of IT in business and other industries. Furthermore, the students learned about the vast number of careers opportunities in these fields. A few of them are: data scientist, data analyst, cloudarchitect, full stack developer, product manager and cyber security specialist. The key topics discussed by him were as follows:

- 92% of the world's currency is digital while 44% of businesses are up for digital transformation.
- Number of IoT devices expected to reach 75billion by 2025.
- Advanced analytics and the role of data scientist and data analyst.
- Artificial intelligence, machine learning and deep learning.
- Foundation and future of Internet of Things.
- Robotics process automation.
- Cyber Security- Challenges with digitalization.
- Career opportunities, skill set required and responsibilities associated with them.

The webinar concluded with a quick Q & A session. Some of the major questions asked were as follows:

- “Which programming language is suitable to start with - Python or R?”
- “What is the scope of digital marketing in the future?”
- “Which job profiles require a professional certification?”
- “What kinds of technologies pose cyber security threats?”
- “What are the truths and myths about robotic process automation?”

Hence, it was a really knowledgeable and interesting session. All the students and teachers thanked Mr. Srivathsa for inspiring every one. The department looks forward to conducting more such webinars in the future.

GLIMPSES FROM THE WEBINAR

CSEISMIC – 2022 (Two days College Level Technical Events)

The Department of Computer Science & Engineering has organized 2 days' College Level Technical events CSEISMIC - 2022 on 30th June & 1st July 2022.

Day 1: 30/06/2022

The day started with Dr. Puttegowda, Professor and Head, Department of CSE addressing the students and briefing them about the technical events. Mr. Anil Kumar C J briefed about the rules of the technical events. The following are the events conducted.

- Blind coding
- Code debugging
- Quiz
- Code relay

Day 2: 01/07/2022

The day started with the Hackathon conducted from 9:30 AM to 4:00 PM, and event Code Relay from 11:00 AM to 12:30 PM. Totally 10 teams participated in the Hackathon. Two rounds of evaluation were conducted and the Juries were DR. J V Gorabal, Professor, Department of CSE and Dr. Deepu R, Professor, Department of CSE.

The winners of the event are,

Blind Coding:

First Prize:	Lakshmi C	4th semester, CSE
Second Prize:	Nikitha	4th semester, CSE

Code Debugging:

First Prize:	Muzammil Husain Shantageri	4th semester, CSE
Second Prize:	Mohammed Labeeb	4th semester, CSE

Technical Quiz:

First Prize: Mohammed Rayan Khan, Mohammed Afnan M and Hashim Farooq sheikh of 2nd semester, CSE.

Second Prize: Manvitha B, Kavya L G and Kavya G D of 6th semester, CSE.Hackathon

Hackathon:

First Prize: Pratheek B, Prerana N and Pramod B S of 6th semester, CSE.

Second Prize: Pooja S, Sharya G and Sneha N of 2nd semester, CSE.

Code Relay:

First Prize: Mithilesh A, Mohamed Farooq Hagalwadi and Mohamed Raihan of 6th semester, CSE.

Achievers List

The details of the students who achieved in various sports

SL.NO.	NAME	EVENT	YEAR	PHOTO
1	Aishwarya	Baseball	2021-2022	
2	Pooja S Hebbar	Baseball	2021-2022	

Funding Details

Name of Faculty (Principal Investigator)	Name of the Funding Agency	Title of the Project	Sanctioned order no.	Sanctioned date	Amount Sanctioned
M S Sunitha Patel	VTU Sponsored Student Project Proposal	To develop a block chain technology - b system for establishing traceability for exports and organic products	VTU/Aca./A4/2021-22/2631/2	20-09-2021	5,200
Raghuram A S	VTU Sponsored Student Project Proposal	Smart Intelligent Traffic accident Monitoring Systems	VTU/Aca./A4/2021-22/2631/2	20-09-2021	5,100

Student Toppers

4th Semester		
USN	**STUDENT NAME**	**SGPA**
4AD20CS032	KAVANA K R	9.50
4AD20CS034	LAKSHMI CHANDRASEKER	9.30
4AD21CS404	MOHAMMED ARSHAD	9.00

6th Semester		
USN	**STUDENT NAME**	**SGPA**
4AD19CS003	AMOGH P	9.38
4AD19CS007	ANIRUDH NITIN BAKARE	9.25
4AD19CS042	MOHAMED FAROOQ HAGALWADI	9.00

8th Semester		
USN	**STUDENT NAME**	**SGPA**
4AD18CS072	SHASHANK K	10.00
4AD19CS408	KHUTEJATUL KUBRA	9.83
4AD18CS001	ADVIYA SABA	9.67

Applications of Computer Science in biometrics

Biometrics are body measurements and calculations related to human characteristics. Biometric authentication (or realistic authentication) is used in computer science as a form of identification and access control. It is also used to identify individuals in groups that are under surveillance.

Biometric identifiers are the distinctive, measurable characteristics used to label and describe individuals. Biometric identifiers are often categorized as physiological characteristics which are related to the shape of the body. Examples include, but are not limited to fingerprint, palm veins, face recognition, DNA, palm print, hand geometry, iris recognition, retina, odor/scent, voice, shape of ears and gait. Behavioral characteristics are related to the pattern of behavior of a person, including but not limited to mouse movement, typing rhythm, gait, signature, behavioral profiling, and credentials. Some researchers have coined the term behaviometrics to describe the latter class of biometrics.

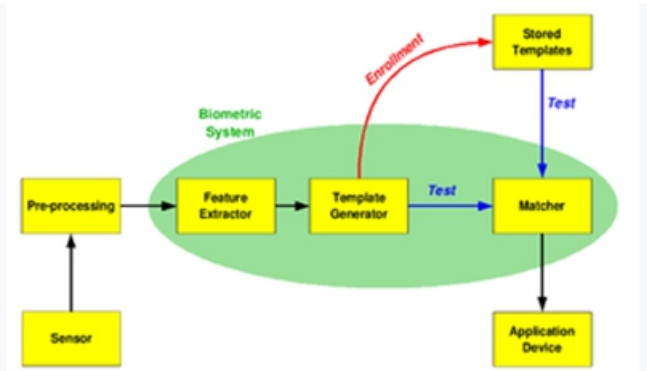
More traditional means of access control include token-based identification systems, such as a driver's license or passport, and knowledge-based identification systems, such as a password or personal identification number. Since biometric identifiers are unique to individuals, they are more reliable in verifying identity than token and knowledge-based methods; however, the collection of biometric identifiers raises privacy concerns about the ultimate use of this information.

Biometric Functionality

Many different aspects of human physiology, chemistry or behavior can be used for biometric authentication. The selection of a particular biometric for use in a specific application involves a weighting of several factors. Jain identified seven such factors to be used when assessing the suitability of any trait for use in biometric authentication. Biometric authentication is based upon biometric recognition which is a advanced method of recognising biological and behavioural characteristics of an Individual.

- Universality means that every person using a system should possess the trait.
- Uniqueness means the trait should be sufficiently different for individuals in the relevant population such that they can be distinguished from one another.
- Permanence relates to the manner in which a trait varies over time. More specifically, a trait with good permanence will be reasonably invariant over time with respect to the specific matching **algorithm.**
- Measurability (collectability) relates to the ease of acquisition or measurement of the trait. In addition, acquired data should be in a form that permits subsequent processing and extraction of the relevant feature sets.
- Performance relates to the accuracy, speed, and robustness of technology used (see performance section for more details).
- Acceptability relates to how well individuals in the relevant population accept the technology such that they are willing to have their biometric trait captured and assessed.

- Circumvention relates to the ease with which a trait might be imitated using an artifact or substitute.
- Proper biometric use is very application dependent. Certain biometrics will be better than others based on the required levels of convenience and security.No single biometric will meet all the requirements of every possible application.



The block diagram illustrates the two basic modes of a biometric system. First, in verification (or authentication) mode the system performs a one-to-one comparison of a captured biometric with a specific template stored in a biometric database in order to verify the individual is the person they claim to be. Three steps are involved in the verification of a person. In the first step, reference models for all the users are generated and stored in the model database. In the second step, some samples are matched with reference models to generate the genuine and impostor scores and calculate the threshold. The third step is the testing step. This process may use a smart card, username, or ID number (e.g. PIN) to indicate which template should be used for comparison. Positive recognition is a common use of the verification mode, "where the aim is to prevent multiple people from using the same identity".

Biometric Island examining facial image 2D and 3D, voice timbre, and verifying handwritten signature

Second, in identification mode the system performs a one-to-many comparison against a biometric database in an attempt to establish the identity of an unknown individual. The system will succeed in identifying the individual if the comparison of the biometric sample to a template in the database falls within a previously set threshold. Identification mode can be used either for positive recognition (so that the user does not have to provide any information about the template to be used) or for negative recognition of the person "where the system establishes whether the person is who she (implicitly or explicitly) denies to be". The latter function can only be achieved through biometrics since other methods of personal recognition, such as passwords, PINs, or keys, are ineffective.

The first time an individual uses a biometric system is called enrollment. During enrollment, biometric information from an individual is captured and stored. In subsequent uses, biometric information is detected and compared with the information stored at the time of enrollment. Note that it is crucial that storage and retrieval of such systems themselves be secure if the biometric system is to be robust. The first block (sensor) is the interface between the real world and the system; it has to acquire all the necessary data.

Multimodal biometric system

Multimodal biometric systems use multiple sensors or biometrics to overcome the limitations of unimodal biometric systems. For instance, iris recognition systems can be compromised by aging irises and electronic fingerprint recognition can be worsened by worn-out or cut fingerprints. While unimodal biometric systems are limited by the integrity of their identifier, it is unlikely that several unimodal systems will suffer from identical limitations. Multimodal biometric systems can obtain sets of information from the same marker (i.e., multiple images of an iris, or scans of the same finger) or information from different biometrics (requiring fingerprint scans and, using voice recognition, a spoken passcode).

Performance

The discriminating powers of all biometric technologies depend on the amount of entropy they are able to encode and use in matching. The following are used as performance metrics for biometric systems:

- **False match rate** (FMR, also called FAR = False Accept Rate): the probability that the system incorrectly matches the input pattern to a non-matching template in the database. It measures the percent of invalid inputs that are incorrectly accepted. In case of similarity scale, if the person is an imposter in reality, but the matching score is higher than the threshold, then he is treated as genuine. This increases the FMR, which thus also depends upon the threshold value.
- **False non-match rate** (FNMR, also called FRR = False Reject Rate): the probability that the system fails to detect a match between the input pattern and a matching template in the database. It measures the percent of valid inputs that are incorrectly rejected.

- **Receiver operating characteristic** or relative operating characteristic (ROC): The ROC plot is a visual characterization of the trade-off between the FMR and the FNMR. In general, the matching algorithm performs a decision based on a threshold that determines how close to a template the input needs to be for it to be considered a match. If the threshold is reduced, there will be fewer false non-matches but more false accepts. Conversely, a higher threshold will reduce the FMR but increase the FNMR. A common variation is the Detection error trade-off (DET), which is obtained using normal deviation scales on both axes. This more linear graph illuminates the differences for higher performances (rarer errors).
- **Equal error rate** or crossover error rate (EER or CER): the rate at which both acceptance and rejection errors are equal. The value of the EER can be easily obtained from the ROC curve. The EER is a quick way to compare the accuracy of devices with different ROC curves. In general, the device with the lowest EER is the most accurate.
- **Failure to enroll rate** (FTE or FER): the rate at which attempts to create a template from an input is unsuccessful. This is most commonly caused by low-quality inputs.
- **Failure to capture rate** (FTC): Within automatic systems, the probability that the system fails to detect a biometric input when presented correctly.
- **Template capacity:** the maximum number of sets of data that can be stored in the system.

Adaptive biometric systems

Adaptive biometric systems aim to auto-update the templates or model to the intra-class variation of the operational data. The two-fold advantages of these systems are solving the problem of limited training data and tracking the temporal variations of the input data through adaptation. Recently, adaptive biometrics have received a significant attention from the research community. This research direction is expected to gain momentum because of their key promulgated advantages. First, with an adaptive biometric system, one no longer needs to collect a large number of biometric samples during the enrollment process. Second, it is no longer necessary to enroll again or retrain the system from scratch in order to cope with the changing environment. This convenience can significantly reduce the cost of maintaining a biometric system. Despite these advantages, there are several open issues involved with these systems. For mis-classification error (false acceptance) by the biometric system, cause adaptation using impostor sample. However, continuous research efforts are directed to resolve the open issues associated to the field of adaptive biometrics.

Recent advances in emerging biometrics

In recent times, biometrics based on brain (electroencephalogram) and heart (electrocardiogram) signals have emerged.An example is finger vein recognition, using pattern-recognition techniques, based on images of human vascular patterns. The advantage of this newer technology is that it is more fraud resistant compared to conventional biometrics like fingerprints. However, such technology is generally more cumbersome and still has issues such as lower accuracy and poor reproducibility over time.

On the portability side of biometric products, more and more vendors are embracing significantly miniaturized biometric authentication systems (BAS) thereby driving elaborate cost savings, especially for large-scale deployments.

Animal biometrics

Rather than tags or tattoos, biometric techniques may be used to identify individual animals: zebra stripes, blood vessel patterns in rodent ears, muzzle prints, bat wing patterns, primate facial recognition and koala spots have all been tried.

Privacy and discrimination

It is possible that data obtained during biometric enrollment may be used in ways for which the enrolled individual has not consented. For example, most biometric features could disclose physiological and/or pathological medical conditions (e.g., some fingerprint patterns are related to chromosomal diseases, iris patterns could reveal sex, hand vein patterns could reveal vascular diseases, most behavioral biometrics could reveal neurological diseases, etc.). Moreover, second generation biometrics, notably behavioral and electro-physiologic biometrics (e.g., based on electrocardiography, electroencephalography, electromyography), could be also used for emotion detection.
There are three categories of privacy concerns:

- Unintended functional scope: The authentication goes further than authentication, such as finding a tumor.
- Unintended application scope: The authentication process correctly identifies the subject when the subject did not wish to be identified.
- Covert identification: The subject is identified without seeking identification or authentication, i.e. a subject's face is identified in a crowd.

Danger to owners of secured items

When thieves cannot get access to secure properties, there is a chance that the thieves will stalk and assault the property owner to gain access. If the item is secured with a biometric device, the damage to the owner could be irreversible, and potentially cost more than the secured property. For example, in 2005, Malaysian car thieves cut off a man's finger when attempting to steal his Mercedes-Benz S-Class.

Attacks at presentation

In the context of biometric systems, presentation attacks may also be called "spoofing attacks". As per the recent ISO/IEC 30107 standard,presentation attacks are defined as "presentation to the biometric capture subsystem with the goal of interfering with the operation of the biometric system". These attacks can be either impersonation or obfuscation attacks. Impersonation attacks try to gain access by pretending to be someone else. Obfuscation attacks may, for example, try to evade face detection and face recognition systems. Several methods have been proposed to counteract presentation attacks.

Surveillance humanitarianism in times of crisis

Biometrics are employed by many aid programs in times of crisis in order to prevent fraud and ensure that resources are properly available to those in need. Humanitarian efforts are motivated by promoting the welfare of individuals in need, however the use of biometrics as a form of surveillance humanitarianism can create conflict due to varying interests of the groups involved in the particular situation. Disputes over the use of biometrics between aid programs and party officials stalls the distribution of resources to people that need help the most. In July 2019, the United Nations World Food Program and Houthi Rebels were involved in a large dispute over the use of biometrics to ensure resources are provided to the hundreds of thousands of civilians in Yemen whose lives are threatened. The refusal to cooperate with the interests of the United Nations World Food Program resulted in the suspension of food aid to the Yemen population. The use of biometrics may provide aid programs with valuable information, however its potential solutions may not be best suited for chaotic times of crisis. Conflicts that are caused by deep-rooted political problems, in which the implementation of biometrics may not provide a long-term solution.

Cancelable biometrics

One advantage of passwords over biometrics is that they can be re-issued. If a token or a password is lost or stolen, it can be cancelled and replaced by a newer version. This is not naturally available in biometrics. If someone's face is compromised from a database, they cannot cancel or reissue it. If the electronic biometric identifier is stolen, it is nearly impossible to change a biometric feature. This renders the person's biometric feature questionable for future use in authentication, such as the case with the hacking of security-clearance-related background information from the Office of Personnel Management (OPM) in the United States.

Cancelable biometrics is a way in which to incorporate protection and the replacement features into biometrics to create a more secure system. It was first proposed by Ratha.

"Cancelable biometrics refers to the intentional and systematically repeatable distortion of biometric features in order to protect sensitive user-specific data. 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. Cancelable biometrics is one of the major categories for biometric template protection purpose besides biometric cryptosystem."In biometric cryptosystem, "the error-correcting coding techniques are employed to handle intraclass variations." This ensures a high level of security but has limitations such as specific input format of only small intraclass variations.

Several methods for generating new exclusive biometrics have been proposed. The first fingerprint-based cancelable biometric system was designed and developed by Tulyakov Essentially, cancelable biometrics perform a distortion of the biometric image or features before

matching. The variability in the distortion parameters provides the cancelable nature of the scheme. Some of the proposed techniques operate using their own recognition engines, such as Teoh and Savvides whereas other methods, such as Dabbah take the advantage of the advancement of the well-established biometric research for their recognition front-end to conduct recognition. Although this increases the restrictions on the protection system, it makes the cancellable templates more accessible for available biometric technologies.

Proposed soft biometrics

Soft biometrics are understood as not strict biometrical recognition practices that are proposed in favour of identity cheaters and stealers.

Traits are physical, behavioral or adhered human characteristics that have been derived from the way human beings normally distinguish their peers (e.g. height, gender, hair color). They are used to complement the identity information provided by the primary biometric identifiers. Although soft biometric characteristics lack the distinctiveness and permanence to recognize an individual uniquely and reliably, and can be easily faked, they provide some evidence about the users identity that could be beneficial. In other words, despite the fact they are unable to individualize a subject, they are effective in distinguishing between people. Combinations of personal attributes like gender, race, eye color, height and other visible identification marks can be used to improve the performance of traditional biometric systems.Most soft biometrics can be easily collected and are actually collected during enrollment. Two main ethical issues are raised by soft biometrics. First, some of soft biometric traits are strongly cultural based; e.g., skin colors for determining ethnicity risk to support racist approaches, biometric sex recognition at the best recognizes gender from tertiary sexual characters, being unable to determine genetic and chromosomal sexes; soft biometrics for aging recognition are often deeply influenced by ageist stereotypes, etc. Second, soft biometrics have strong potential for categorizing and profiling people, so risking of supporting processes of stigmatization and exclusion.

Data protection of biometric data in international law

Many countries, including the United States, are planning to share biometric data with other nations.

In testimony before the US House Appropriations Committee, Subcommittee on Homeland Security on "biometric identification" in 2009, Kathleen Kraninger and Robert A Mocny commented on international cooperation and collaboration with respect to biometric data, as follows:

To ensure we can shut down terrorist networks before they ever get to the United States, we must also take the lead in driving international biometric standards. By developing compatible systems, we will be able to securely share terrorist information internationally to bolster our defenses. Just

as we are improving the way we collaborate within the U.S. Government to identify and weed out terrorists and other dangerous people, we have the same obligation to work with our partners abroad to prevent terrorists from making any move undetected. Biometrics provide a new way to bring terrorists' true identities to light, stripping them of their greatest advantage—remaining unknown.

According to an article written in 2009 by S. Magnuson in the National Defense Magazine entitled "Defense Department Under Pressure to Share Biometric Data" the United States has bilateral agreements with other nations aimed at sharing biometric data. To quote that article:

Miller [a consultant to the Office of Homeland Defense and America's security affairs] said the United States has bilateral agreements to share biometric data with about 25 countries. Every time a foreign leader has visited Washington during the last few years, the State Department has made sure they sign such an agreement.

Likelihood of full governmental disclosure

Certain members of the civilian community are worried about how biometric data is used but full disclosure may not be forthcoming. In particular, the Unclassified Report of the United States' Defense Science Board Task Force on Defense Biometrics states that it is wise to protect, and sometimes even to disguise, the true and total extent of national capabilities in areas related directly to the conduct of security-related activities. This also potentially applies to Biometrics. It goes on to say that this is a classic feature of intelligence and military operations. In short, the goal is to preserve the security of 'sources and methods'.

India's national ID program

India's national ID program called Aadhaar is the largest biometric database in the world. It is a biometrics-based digital identity assigned for a person's lifetime, verifiable online instantly in the public domain, at any time, from anywhere, in a paperless way. It is designed to enable government agencies to deliver a retail public service, securely based on biometric data (fingerprint, iris scan and face photo), along with demographic data (name, age, gender, address, parent/spouse name, mobile phone number) of a person. The data is transmitted in encrypted form over the internet for authentication, aiming to free it from the limitations of physical presence of a person at a given place.

About 550 million residents have been enrolled and assigned 480 million Aadhaar national identification numbers as of 7 November 2013. It aims to cover the entire population of 1.2 billion in a few years. However, it is being challenged by critics over privacy concerns and possible transformation of the state into a surveillance state, or into a Banana republic. The project was also met with mistrust regarding the safety of the social protection infrastructures. To tackle the fear amongst the people, India's supreme court put a new ruling into action that stated that privacy

from then on was seen as a fundamental right. On 24 August 2017 this new law was established.

Malaysia's MyKad national ID program

The current identity card, known as MyKad, was introduced by the National Registration Department of Malaysia on 5 September 2001 with Malaysia becoming the first country in the world to use an identification card that incorporates both photo identification and fingerprint biometric data on a built-in computer chip embedded in a piece of plastic.

Besides the main purpose of the card as a validation tool and proof of citizenship other than the birth certificate, MyKad also serves as a valid driver's license, an ATM card, an electronic purse, and a public key, among other applications, as part of the Malaysian Government Multipurpose Card (GMPC) initiative,if the bearer chooses to activate the functions.

By
Department of CS & E Faculties

A ROBOT THAT FINDS LOST ITEMS

Kavya L G
6th Sem A section, CSE

Researchers developed a fully-integrated robotic arm that fuses visual data from a camera and radio frequency (RF) information from an antenna to find and retrieve object, even when they are buried under a pile and fully out of view.

The system, RFusion, is a robotic arm with a camera and radio frequency (RF) antenna attached to its gripper. It fuses signals from the antenna with visual input from the camera to locate and retrieve an item, even if the item is buried under a pile and completely out of view.

The RFusion prototype the researchers developed relies on radio frequency identification(RFID) tags, which are cheap, battery-less tags that can be stuck to an item and reflect signals sent by an antenna. Because RF signals can travel through most surfaces (like the mound of dirty laundry that may be obscuring the keys), RFusion is able to locate a tagged item within a pile.

Using machine learning, the robotic arm automatically zeroes-in on the object's exact location, moves the items on top of it, grasps the object, and verifies that it picked up the right thing. The camera, antenna, robotic arm, and AI are fully integrated, so RFusion can work in any environment without requiring a special set up.

While finding lost keys is helpful, RFusion could have many broader applications in the future, like sorting through piles to fulfill orders in a warehouse, identifying and installing components in an auto manufacturing plant, or helping an elderly individual perform daily tasks in the home, though the current prototype isn't quite fast enough yet for these uses.

Sending signals

RFusion begins searching for an object using its antenna, which bounces signals off the RFID tag (like sunlight being reflected off a mirror) to identify a spherical area in which the tag is located. It combines that sphere with the camera input, which narrows down the object's location. For instance, the item can't be located on an area of a table that is empty.

But once the robot has a general idea of where the item is, it would need to swing its arm widely around the room taking additional measurements to come up with the exact location, which is slow and inefficient.

The researchers used reinforcement learning to train a neural network that can optimize the robot's trajectory to the object. In reinforcement learning, the algorithm is trained through trial and error with a reward system.

In the case of RFusion, the optimization algorithm was rewarded when it limited the number of moves it had to make to localize the item and the distance it had to travel to pick it up.

Once the system identifies the exact right spot, the neural network uses combined RF and visual information to predict how the robotic arm should grasp the object, including the angle of the hand and the width of the gripper, and whether it must remove other items first. It also scans the item's tag one last time to make sure it picked up the right object.

Cutting through clutter

The researchers tested RFusion in several different environments. They buried a keychain in a box full of clutter and hid a remote control under a pile of items on a couch.

But if they fed all the camera data and RF measurements to the reinforcement learning algorithm, it would have overwhelmed the system. So, drawing on the method a GPS uses to consolidate data from satellites, they summarized the RF measurements and limited the visual data to the area right in front of the robot.

Their approach worked well -- RFusion had a 96 percent success rate when retrieving objects that were fully hidden under a pile.

In the future, the researchers hope to increase the speed of the system so it can move smoothly, rather than stopping periodically to take measurements. This would enable RFusion to be deployed in a fast-paced manufacturing or warehouse setting.

Beyond its potential industrial uses, a system like this could even be incorporated into future smart homes to assist people with any number of household tasks.

IS GAMING A BAD CAREER TO PURSUE?

Gaming, what most parents across our country consider as a big waste of time is an industry that is bigger than all of us imagine. A person who plays a game as part of his/her profession on a regular basis can be called as a gamer. These players can be streamers on streaming platforms like Twitch or Facebook and earn their living along with making content for their YouTube channel as well.Today, it is one of the biggest forms of business and also entertainment and the games that are being played vary from casual mode to extremely levels of adrenaline rushing games.

The question still remains, “Is gaming a bad career to pursue?” and the answer is- no it is not. I can tell this from my own experience being a casual gamer for the last three and a half years. There are two types of gamers- Hardcore and Casual gamers. A casual gamer is a person who plays a particular game for a long period of time but just of a time pass or to get rid of the boredom can be called casual gamer. A Hardcore or a Professional gamer is someone who dedicates all his time to be get good at the game and knows the game he/she is playing inside out. As long as you understand the functionalities of the game you are playing and have the basic necessary skills for the job; yes, even in this field there are some basic skills that are necessary for it, and these skills can be useful in real life as. Some of them are-

1. Understanding the rules: It is important for any type of gamer to understand a game's rules and objectives in a match, so that you can be more useful to your team as an asset to win. Sometimes, not understanding the rules or skipping the tutorial is an easy sign that you have no patience to learn the core mechanics in a game or let be it for any matter.

2. Be civilised to your competitors: Being a decent person in the chat box given for communicating or even while communicating on the public server, because your respect and courtesy that you gave to other players gives the community you play with a good feeling impression about your character and would always want to be in touch with you for the various events and competitions that will come in the future.

3. Learning from the mistakes of the past: We all make mistakes, and it is okay to make it once or maybe twice but always learn from them this will show that you always improvise from the past and keep up with your own abilities.

4. Have good critical thinking skills: Many at times in real life we are hesitant to make a choice in a limited time, it is the same thing in a game as well you need to be able to make the right decisions soon and stick to the choice you have made. This will always give you and edge over others around you to make those quick and critical decisions, it is also important that you also have a good enough explanation which sounds logical and seems agreeable to your teammates.

5. Knowledge is the first key to success: Having knowledge of the equipment you are using is absolutely in all walks of life. In the gaming world it is important to know the advantages and limitations of the equipment you are given with in the virtual and the real world. This not only help you to be good at the task you are assigned but also give you the flexibility to adjust your offensive and defensive actions.

6. Situational Awareness: This skill is one of the important factors for every person whether its in the virtual world or the real world. The sheer ability to know the position of almost every object around you is a key ability that will help you make more efficient decisions for the final end result to be sweet and happy.

7. Good communication skills: One might think what communication has to do within the gaming industry, the fact is that it is one of the most important skills one must have. It is important that you respond to the messages in the chat box judicially and make your decisions based on it.

Now the next question comes to your mind is who can be a gamer and what are the necessary needs that one must have to be a professional gamer? The answer is anyone in this world can be a professional gamer, when you start the career of gaming depends on you. To be a good professional gamer first you need to establish yourself as a gamer by playing a game that will help you grow financially and that is in demand. To be a good gamer or to be a good player in any sport is to first to know the rules and make sure that you know every single bit of it. If you do not know how to play the game or familiarise with the game itself, YouTube is a fantastic platform to learn. Watch videos of some of the best players and get know the tricks and tactics you need to use while you yourself are playing.

Now the qualifications you need to be a professional gamer you need to have spent at least a year trying to know the basics of the game and then another six months understanding the tactics that can be used, this time frame can vary person to person. If a person used to play a particular game that person will adjust to similar categories faster meanwhile a new player will take his own time to understand the game. Once, you are familiar with the game know your way around it pretty well you can now look into commercialising the knowledge and videos you create from the games you play. Depending on the budget you are trying to invest into it you have different ways to make a good profit of your gaming skills. One way of commercialising your gaming knowledge is by broadcasting your gaming time on various platforms like Twitch and YouTube. You can dedicate a set number of hours for the broadcast, another way is to record a set of videos and then upload them to YouTube this will help you in growing at reasonable pace. Staying connected with other players and gamers is important because, the more you grow that number the more your popularity and fame rises which means you can start making a little more money.

When do you start this career of yours as a gamer? My suggestion would be first trying to have a proper job that you can always rely on even when things in your gaming profession might not be smooth. Once, you have found that you can now have a backup plan if you are streaming, or YouTube career ends or needs a break. It is also important to have an initial amount of money to start this career of gaming, and this includes a good gaming device and if you want to switch from just YouTube videos to live streams you might also have have to invest in a good webcam hence it is important that you always a good source of income to backup your gaming profession; once you are settled into the second profession it is upto you if you are willing to continue your first profession or not based on the income you are getting from your videos and live streams.

To end, from my experience just being a casual gamer has helped me grow skills like patience, better critical thinking, team management and make choices based on the limited information I get. At the end of the day, you are the one making the decision no matter who influences you need to make that final move to win your life's dream, so do not just reach it strive for it, fight for it and earn that satisfaction of being top of what you were at the start.

College Office
ATME College of Engineering
13th Kilometer
Mysuru-Kanakapura-Bengaluru Road
Mysuru - 507 028
P: +91-821-2954081

Trust Office
#2904 (Ch67), II Floor
Kantharaj Urs Road
Saraswathipuram
Mysuru - 570 009
P: +91-821-4191552

Email : info@atme.in
Web : www.atme.in