Finolex Academy of Management and Technology, Ratnagiri

Information Technology Department

presents…

INFOVIBE

In touch with tomorrow…

Academic year : 2021-22

Editor's Message

As we proudly unveil the latest edition of "CodeChronicle" the heartbeat of innovation within the Department [Grab your reader's attention with a great quote from the document or use this space to emphasize a key point. To place this text box anywhere on the page, just drag it.] of Information Technology at Finolex Academy of Management and Technology, I extend a warm welcome to all enthusiasts, scholars, and pioneers of the tech domain.

In the ever-evolving landscape of information and technology, this magazine stands as a testament to our collective pursuit of excellence. It is a canvas where ideas converge, where theories find practical expression, and where the limitless potential of technology is explored by the bright minds that constitute our academic community.

Serving as the editor of this remarkable publication, I am honoured to witness the synergy of intellect and creativity that flows through the veins of our contributors. Their dedication to pushing boundaries and unravelling the mysteries of technology is showcased in the diverse array of articles and insights presented in these pages.

Thank you for being an integral part of the "CodeChronicle" community. May this magazine serve as a catalyst for your own technological explorations, sparking curiosity, and guiding you through the realms of information and technology.

Creative Team:

1. Sujay Khedekar
2. Jafar Beldar

Message From HOD

It is with immense pride and excitement that I extend my heartfelt greetings as we unveil another edition of " **CodeChronicle** " the quintessential expression of technological prowess within the Department of Information Technology at Finolex Academy of Management and Technology.

As the Head of the Department, I am privileged to witness the remarkable journey of our students, faculty, and researchers who continue to push the boundaries of knowledge in the dynamic realm of information and technology. " CodeChronicle " serves as a testament to our commitment to fostering innovation, nurturing talent, and contributing to the ever-evolving landscape of IT.

THANK YOU

Dr.Vinayak A.Bharadi

VISION AND MISSION

VISION

To provide excellent information technology education and aspire to nurture students as leaders who are in tune with global IT trends.

MISSION

M1 To enrich students by rigorously implementing quality education (Knowledge)

M2 To empower the students with the required skills to solve the complex problems of modern society by following collaborative, multidisciplinary and sustainable activities

(Skills)

M3 To imbibe professional ethics and social values in the students and make them responsible citizens (Attitude)

PEO'S, PO'S AND PSO'S

PEO's

PEO1 TO PROVIDE LEARNERS WITH CORE COMPETENCE IN MATHEMATICAL, SCIENTIFIC AND BASIC ENGINEERING FUNDAMENTALS NECESSARY TO FORMULATE, ANALYSE AND SOLVE HARDWARE/SOFTWARE ENGINEERING PROBLEMS.

PEO2 TO PREPARE LEARNERS TO SOLVE BUSINESS-CENTERED PROBLEMS BY IDENTIFYING, ANALYZING, DEVELOPING, AND IMPLEMENTING INFORMATION SYSTEM-BASED SOLUTIONS WITH MODERN PROGRAMMING TOOLS. TO ENCOURAGE LEARNERS TO USE BEST PRACTICES AND IMPLEMENT TECHNOLOGIES TO ENHANCE INFORMATION SECURITY AND ENABLE COMPLIANCE, ENSURING CONFIDENTIALITY, INFORMATION INTEGRITY, AND AVAILABILITY.

PEO3 TO PREPARE LEARNERS FOR SUCCESSFUL CAREER IN INDIAN AND MULTINATIONAL ORGANIZATIONS, IDENTIFY AND EVALUATE CURRENT AND EMERGING TECHNOLOGIES. TO PROVIDE OUR GRADUATES WITH LEARNING ENVIRONMENT AWARENESS OF THE LIFE-LONG LEARNING. TO MOTIVATE STUDENTS TO PURSUE IT THROUGHOUT THEIR CAREER AND HIGHER STUDIES. TO ENCOURAGE AND MOTIVATE LEARNERS FOR RESEARCH & DEVELOPMENT AND ENTREPRENEURSHIP.

PEO4 TO INTRODUCE LEARNERS TO ETHICAL CODES AND GUIDELINES INCLUDING PROFESSIONAL, ETHICAL, LEGAL AND PUBLIC POLICY ISSUES TO PERFORM EXCELLENCE, SHOW LEADERSHIP SKILLS AND DEMONSTRATE GOOD CITIZENSHIP.

PEO5 TO DEVELOP EFFECTIVE WRITTEN AND ORAL COMMUNICATION SKILLS TO INTERACT WITH CLIENTS, USERS, CO-WORKERS AND MANAGERS. TO ENABLE LEARNERS TO WORK AS PART OF TEAMS ON MULTIDISCIPLINARY PROJECTS AND DIVERSE PROFESSIONAL ENVIRONMENTS TO ACCOMPLISH A COMMON GOAL BY INTEGRATING PERSONAL INITIATIVE AND GROUP COOPERATION.

PEO'S, PO'S AND PSO'S

PO's and PSO's

SR.	PO DOMAIN	PROGRAM OUTCOMES: THE STUDENTS OF INFORMATION TECHNOLOGY (IT) DEPARTMENT WILL BE ABLE TO:
PO1	ENGINEERING KNOWLEDGE	APPLY THE KNOWLEDGE OF MATHEMATICS, SCIENCE AND IT FUNDAMENTALS TO THE SOLUTION OF COMPLEX ENGINEERING PROBLEMS.
PO2	PROBLEM ANALYSIS	IDENTIFY, FORMULATE, REVIEW RESEARCH LITERATURE, AND ANALYSE COMPLEX IT PROBLEMS REACHING SUBSTANTIATED CONCLUSIONS USING PRINCIPLES OF MATHEMATICS, NATURAL SCIENCES, AND ENGINEERING.
PO3	DESIGN/DEVELOPMENT OF SOLUTIONS	USE RESEARCH-BASED KNOWLEDGE OF IT AND RESEARCH METHODS INCLUDING DESIGN OF EXPERIMENTS, ANALYSIS AND INTERPRETATION OF DATA, AND SYNTHESIS OF THE INFORMATION TO PROVIDE VALID CONCLUSIONS.
PO4	INVESTIGATION OF USER NEEDS	ABILITY TO INVESTIGATE, IDENTIFY AND ANALYSE USER NEEDS, AND TAKE THEM INTO ACCOUNT IN SELECTION, CREATION, EVALUATION, ADMINISTRATION OF IT-BASED SOLUTIONS INTO THE USER ENVIRONMENT.
PO5	MODERN TOOL USAGE	CREATE, SELECT, AND APPLY APPROPRIATE TECHNIQUES, RESOURCES, AND MODERN ENGINEERING AND IT TOOLS INCLUDING PREDICTION AND MODELLING TO COMPLEX IT 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 IN THE FIELD OF IT.
PO7	ENVIRONMENT AND SUSTAINABILITY	UNDERSTAND THE IMPACT OF THE PROFESSIONAL IT 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 IT PRACTICE.

PEO'S, PO'S AND PSO'S

PO's and PSO's

PO9	INDIVIDUAL AND TEAM WORK	FUNCTION EFFECTIVELY AS AN INDIVIDUAL, AND AS A MEMBER OR LEADER IN DIVERSE TEAMS, AND IN MULTIDISCIPLINARY SETTINGS.
PO10	COMMUNICATION	COMMUNICATE EFFECTIVELY ON COMPLEX IT 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 IT AND MANAGEMENT PRINCIPLES AND APPLY THESE TO ONE'S OWN WORK, AS A MEMBER AND LEADER IN A TEAM, TO MANAGE PROJECTS AND IN MULTIDISCIPLINARY ENVIRONMENTS.
PO12	LIFE-LONG LEARNING	RECOGNISE THE NEED FOR, AND HAVE THE PREPARATION AND ABILITY TO ENGAGE IN INDEPENDENT AND LIFE-LONG LEARNING IN THE BROADEST CONTEXT OF TECHNOLOGICAL CHANGE.
PSO 1	REALISTIC FRAMEWORK DESIGNING	DESIGN AN ALGORITHM, COMPONENT, OR PROCESS TO MEET DESIRED NEEDS, WITHIN REALISTIC CONSTRAINTS THROUGH ANALYTICAL, LOGICAL AND PROBLEM-SOLVING SKILLS.
PSO2	IT INTEGRATION AND ADAPTABILITY	EFFECTIVELY INTEGRATE IT-BASED SOLUTIONS INTO THE USER ENVIRONMENT AND ADAPT THEMSELVES EASILY TO EMERGING TRENDS IN INFORMATION TECHNOLOGY.

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AI Based Interview Preparation System

- **Dr. Vinayak A. Bharadi**

Introduction:

The AI-Based Interview Preparation System is a cutting-edge solution designed to revolutionize the way individuals prepare for job interviews and enhance their chances of success in the highly competitive job market. This system leverages the power of artificial intelligence (AI) and natural language processing (NLP) technologies to provide personalized and comprehensive interview preparation experiences. In an era defined by rapid technological advancements and dynamic changes in the job market, securing a coveted position through a job interview has become an increasingly competitive and challenging endeavour. As individuals endeavour to navigate the intricate landscape of employment, the need for innovative solutions that foster interview preparedness and confidence has never been more paramount. The AI-Based Interview Preparation System emerges as a groundbreaking solution, combining the prowess of Artificial Intelligence (AI) and Natural Language Processing (NLP) to equip job seekers with the tools they need to excel in interviews.

❖ Specific objectives of a system:

- **Personalized Preparation:**

Customize interview preparation plans for individual users based on their skills, experience, and career goals. Offer tailored recommendations to address each user's unique needs and weaknesses.

- **Mock Interviews with AI Feedback:**

Conduct simulated interview sessions with AI interviewers that mimic real interview scenarios. Evaluate user responses for content, tone, and body language, providing constructive feedback for improvement.

- **Performance Tracking and Analytics:**

Monitor user progress and performance throughout their interview preparation journey. Provide analytics and insights to help users identify areas for improvement and track their growth. Enable users to align their responses and knowledge with current industry demands.

- **Confidence Building:**

Boost users' confidence by offering guidance and practice that simulates real interview experiences. Encourage users to overcome nervousness and perform at their best during interviews.

- **User Satisfaction and Success:**

Measure and track user satisfaction and success rates, such as the percentage of users securing job offers after using the system. Continuously gather user feedback to enhance the system's effectiveness and user experience

Methodology:

- **Project Planning and Requirements Gathering**
- **Data Collection**
- **Data Pre-processing**
- **Speech Recognition**
- **Natural Language Processing (NLP)**
- **User Interface Development**
- **Question and Response Generation**
- **Practice Mode**
- **Feedback Mechanism**

*Technology Used:

The AI-Based Interview Preparation System incorporates a range of cutting-edge technologies to provide an advanced and comprehensive preparation experience for job seekers. Some of the key technologies used in developing this system include:

- **Artificial Intelligence (AI):** AI forms the backbone of the system, enabling it to simulate human-like intelligence and decision-making capabilities. It facilitates tasks such as analysing user data, generating personalized recommendations, and providing real-time feedback during mock interviews.

- **Natural Language Processing (NLP):** NLP enables the system to understand, interpret, and respond to human language input. It allows for the analysis of text and speech data, aiding in tasks such as resume analysis, question understanding, and the evaluation of user responses during mock interviews.

- **Machine Learning (ML):** ML algorithms are employed to enable the system to learn from user interactions and continuously improve its performance. It adapts its recommendations, question sets, and feedback based on us progress and performance, enhancing the overall learning experience and personalization.

- **Voice Recognition Technology**: Voice recognition technology enables the system to accurately transcribe and analyse spoken responses during mock interviews. It helps in assessing the user's communication skills, intonation, and overall verbal presentation, providing tailored feedback for improvement.

- **Application Programming Interfaces (APIs):** Integration with various APIs allows the system to access external data sources, industry insights, and real-time information about job trends and market dynamics. This enriches the user experience by providing up-to-date and relevant information to enhance interview preparedness.

Data : A Golden Era

- **Prof. Ashish Vartak**

In the digital age, data has become the new gold. It's more than just information; it's the key to understanding, progress, and innovation. From personal preferences to global trends, data fuels decision-making in virtually every aspect of our lives. Data is abundant, generated by everything from smartphones to IoT devices, and it's constantly growing. Its value lies in our ability to collect, analyze, and extract insights from it. Businesses, governments, and individuals are harnessing the power of data to make smarter choices, optimize operations, and drive economic growth. One of the most prominent examples of data's importance is in artificial intelligence. Machine learning and deep learning algorithms rely on vast datasets to train and make predictions. Data enables these technologies to recognize patterns, recommend products, and even diagnose medical conditions with unprecedented accuracy.
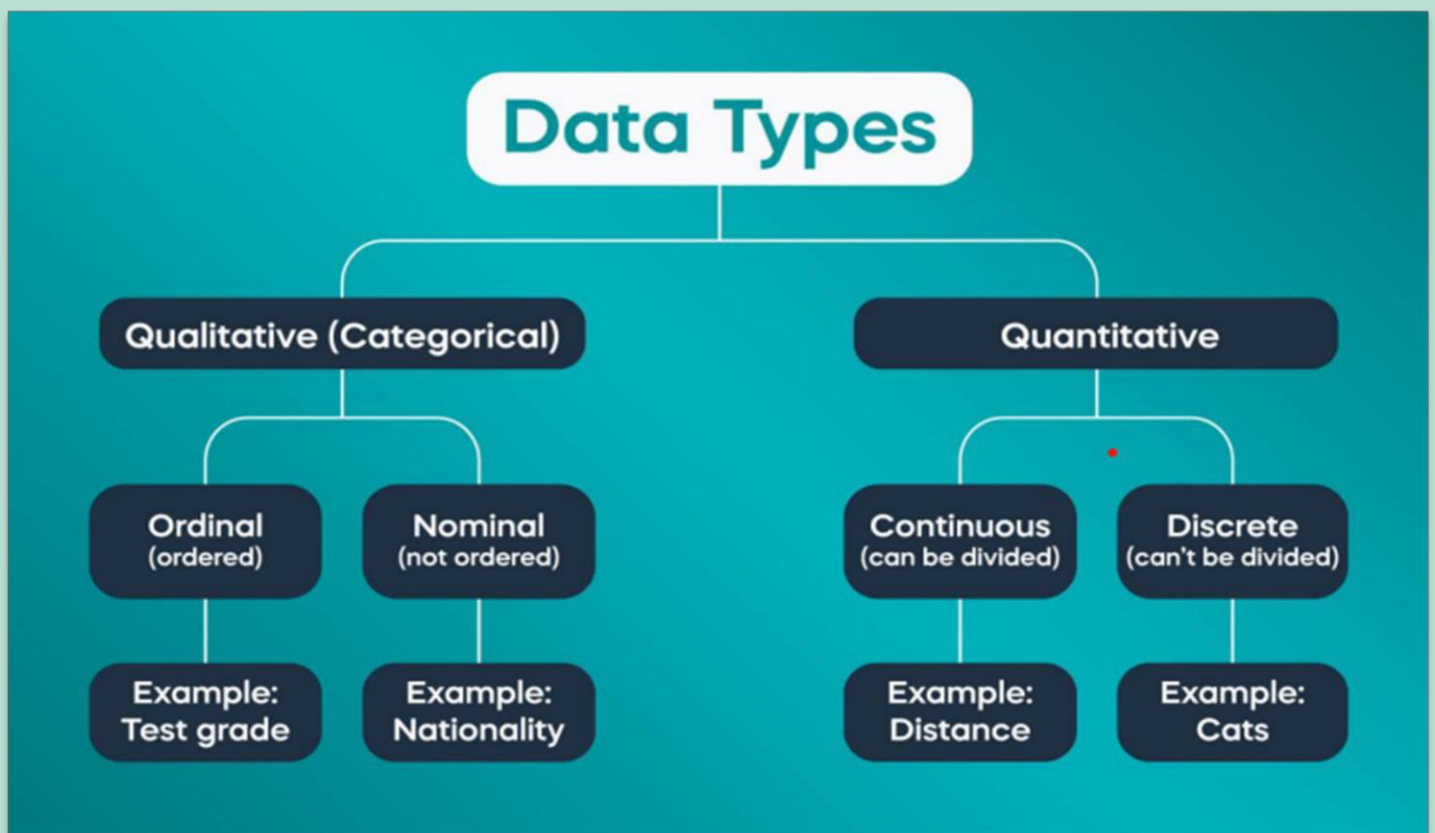
Data:

Data refers to raw facts, figures, or information. It is unprocessed, often in the form of numbers, text, or symbols. Data can represent anything from measurements and observations to text in documents, images, and much more. Data on its own may not hold significant meaning, but when it is organized, analyzed, and interpreted, it can provide valuable insights and knowledge. Data is a fundamental building block for information, knowledge, and decision-making in various fields, including science, business, technology, and research.

Importance of Data In New Era:

Growth in the field of technology, specifically in smartphones has led to text, video, and audio is included under data plus the web and log activity records as well. Most of this data is unstructured.

The term Big Data is used in the data definition to describe the data that is in the petabyte range or higher. Big Data is also described as 5Vs: variety, volume, value, veracity, and velocity. Nowadays, web-based eCommerce has spread vastly, business models based on Big Data have evolved, and they treat data as an asset itself. And there are many benefits of Big Data as well, such as reduced costs, enhanced efficiency, enhanced sales, etc. The meaning of data has grown beyond the processing of data in the field of computer applications. Accordingly, finance, demographics, health, and marketing also have different definitions of data, which ultimately results in different answers to the persistent

Types of Data:

Data Extraction :

 In today's data-driven world, the ability to extract meaningful information from a vast sea of data is a skill that can make or break businesses, drive research forward, and empower data-driven decision-making. Data extraction, the process of collecting and transforming data from diverse sources, is the gateway to unlocking valuable insights. This article explores the art and significance of data extraction

Challenges in Data Extraction:

1. Data quality: *Data quality is one of the most important aspects in analytics. Many companies extract data from different sources to get a richer, more accurate picture of what is happening in their business, but this can come at a cost. The benefits of extracting data from multiple sources might not outweigh the risks that come with poor data quality.*

2. Lack of standardization: *Information is everywhere, but it's not always in the format you need. Most companies store their information in a way that only they can read, which means that you'll need to use their software. This can be costly and time-consuming when you're looking for information from different sources and they don't conform to your needs or expectations.*

3. Lack of access: *Finding the right data can be a daunting and costly process. There are many reasons why you might not be able to easily extract data from a source. One reason could be that the sources don't have the required data or it is hidden behind a high paywall.*

4. Incomplete data : *The extraction process is not always perfect. Some data may be missing due to errors or omissions during the extraction process.*

Conclusion :

In a world where data is the lifeblood of progress and decision-making, the importance of understanding, extracting, and harnessing data cannot be overstated. From structured numbers to unstructured text, data comes in many forms, and its diversity is both a challenge and an opportunity.

As technology advances and the demand for data-driven insights continues to grow, the art of data extraction remains a vital pillar of our digital age. With the right tools, techniques, and a commitment to data quality and compliance, we can navigate these challenges and transform raw data into actionable knowledge.

Data is the gold of the new era, and those who master the process of extracting, understanding, and utilizing it are the alchemists of our time, turning raw information into innovation and informed decisions that shape our world. So, as we forge ahead into an ever-more data-centric future, let us recognize the power and potential that data extraction holds in our quest for progress and understandin

"f**AR**niture" – AR room planner

- **Prof. Mandar Joshi**

The Augmented Reality (AR) **Furniture Planner** is a cutting-edge application that leverages the power of augmented reality technology to revolutionize the way individuals and businesses plan and visualize their interior spaces. In today's fast-paced and dynamic world, where the demand for customization and immersive experiences is on the rise, this application offers an innovative solution to streamline the process of selecting, arranging, and visualizing furniture within a given space.

This AR-based Furniture Planner allows users to interact with a digital catalogue of furniture items, providing a seamless and interactive shopping experience. Using a smartphone, users can place virtual furniture models within their real-world environment. They can experiment with various configurations, styles, colours, and sizes, gaining a realistic sense of how each piece of furniture will fit and complement their space.

The Augmented Reality Furniture Planner offers a more engaging and efficient way to furnish spaces, whether it's a living room, office, or commercial establishment. It empowers users to make well-informed decisions, reducing the risk of costly mistakes and ultimately enhancing the overall interior design experience. As AR technology continues to evolve, the potential for innovation in interior design and furniture shopping is limitless, and the AR Furniture Planner is at the forefront of this exciting transformation.

Idea Behind this Article

The idea behind the "Augmented Reality Furniture Planner" Article is to harness the capabilities of augmented reality technology to address challenges and enhance the overall experience of interior design and furniture shopping. The primary motivations and goals of this Article include:

1. **Enhanced Visualization:** Traditional furniture shopping often involves selecting items based on images in catalogs or online, which may not accurately represent how the pieces will look and fit in a real-world space. Augmented reality allows users to visualize furniture in their own homes, helping them make more informed decisions.

2. **Reduced Risk and Mistakes:** Buying furniture is a significant investment, and making the wrong choices can be costly and frustrating. The AR Furniture Planner aims to minimize these risks by providing a realistic preview of how furniture items will look in a specific space, thus reducing the likelihood of mismatched or ill-fitting furniture.

3. **Personalization and Customization:** Offering customization options within the application allows users to tailor furniture to their individual preferences, ensuring that the furniture they choose aligns with their unique style and spatial requirements.

METHODOLOGY

Developing an Augmented Reality (AR) Furniture Planner app involves a multi-faceted approach that encompasses design, development, and testing. Here's a comprehensive methodology for creating such an app:

1. Conceptualization and Planning:

  - Define the app's purpose, target audience, and core features.

  - Conduct market research to identify user needs and assess competition.

  - Create a project plan with milestones, timelines, and budget considerations.

2. User Experience (UX) and Interface Design:

  - Design user-friendly interfaces for selecting furniture items, customizing them, and arranging them in AR.

  - Develop wireframes and mockups to visualize the app's layout and flow.

  - Focus on creating an intuitive and visually appealing AR experience.

3. Technology Stack Selection:

  - Choose the development platform or framework for AR (e.g., ARKit, ARCore, Unity with Vuforia, or WebAR).

  - Determine the programming languages and tools to use (e.g., Swift, Kotlin, Unity3D, or JavaScript).

4. Content Creation:

  - Create or source 3D models of furniture items and room environments.

  - Optimize 3D models for performance in AR.

  - Design 2D assets for the user interface.

**5. Furniture Catalog and Database:**

  - Set up a database to store information about the furniture catalog, including item details, prices, and availability.

  - Implement a content management system for easy catalog updates.

6. AR Development:

  - Implement markerless AR tracking to allow users to place furniture in the real world.

  - Develop features for precise scaling, positioning, and rotation of virtual furniture items.

  - Integrate interactive controls for user manipulation of objects.

Technology Used

Developing an Augmented Reality (AR) Furniture Planner app requires the integration of various technologies to create a seamless and immersive user experience. The specific technologies and tools you can use may vary depending on your project's goals, platforms, and development preferences. However, here are the key technologies commonly used in building AR applications:
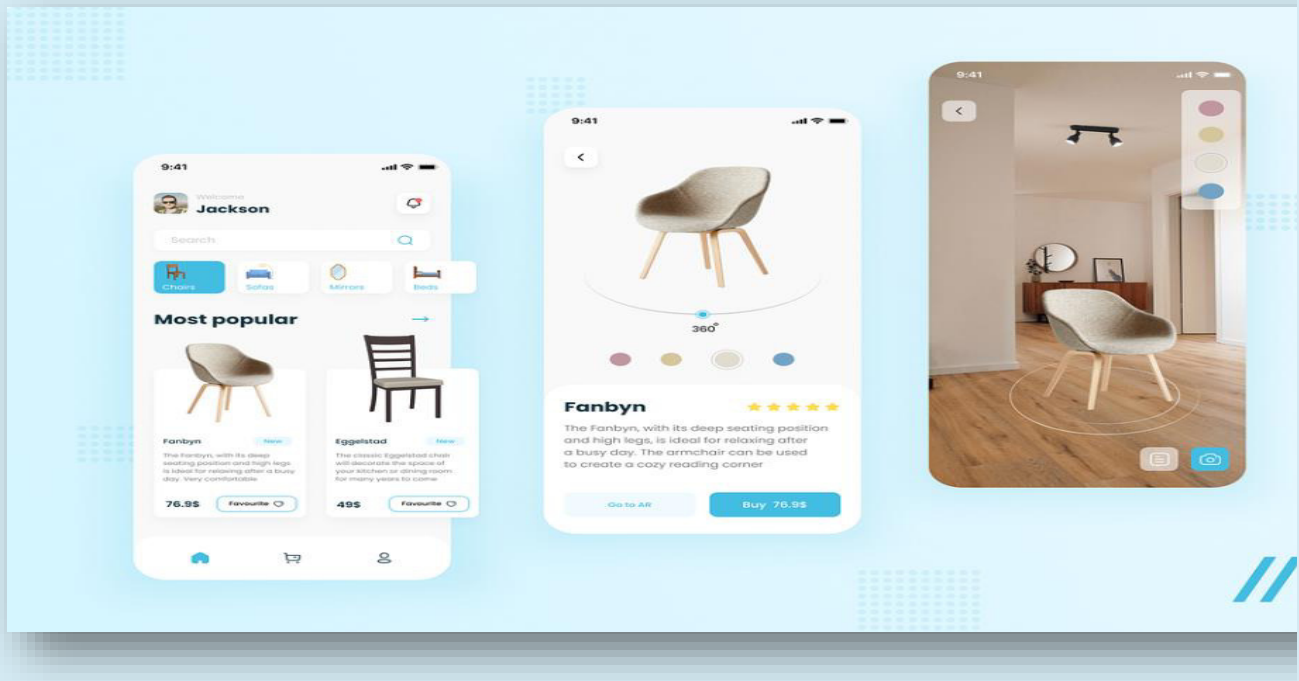
1. AR Development Platforms:

  - ARKit (iOS): Apple's ARKit is a powerful framework for building AR apps on iOS devices, such as iPhones and iPads.

  - ARCore (Android): Google's ARCore is the counterpart for Android devices, providing AR capabilities on a wide range of Android smartphones and tablets.

2. Cross-Platform AR Development:

  - Unity3D with Vuforia: Unity3D is a popular game development engine that can be used with the Vuforia plugin for cross-platform AR development.

  - AR.js and Three.js: These web-based frameworks allow you to create AR experiences that run directly in web browsers.

3. 3D Modeling and Graphics:

  - 3D Modeling Software: Tools like Blender, Maya, or 3ds Max are used to create 3D models of furniture items and room environments.

  - Graphics Software: Tools like Adobe Photoshop and Adobe Illustrator are used to design 2D assets for the user interface.

4. Backend Development

  - Web Development Technologies: For building a backend system, you can use technologies like Node.js, Ruby on Rails, or Python with frameworks like Flask or Django.

  - Database Consider using relational databases (e.g., MySQL or PostgreSQL) or NoSQL databases (e.g., MongoDB) for storing catalog data and user information.

Image Inpainting Using Deep learning

- **Divya Sanjay Pawar**

Abstract

* This final year Article on "Image Inpainting using Deep Learning" leverages cutting-edge deep learning techniques to restore missing or corrupted portions of images. It encompasses a comprehensive review of existing literature, dataset preparation, the exploration of deep learning architectures, extensive training and evaluation, and the development of a user-friendly system for practical use. The project not only achieves impressive results in terms of image inpainting quality, but it also delves into the theoretical and practical aspects of deep learning for image restoration, shedding light on its potential and limitations. This research contributes to the broader field of computer vision and opens doors to applications beyond inpainting, such as image editing and content creation, by harnessing the power of neural networks.

Idea Behind this Article

* The core idea of the design is to harness the power of deep literacy models to address a critical problem in computer vision, videlicet, image inpainting. This design is motivated by the adding demand for effective and automated image restoration ways across colorful disciplines. It recognizes that traditional styles frequently fall suddenly in generating coherent and visually pleasing inpainted regions, while deep literacy models have shown significant pledge in prostrating these limitations. By exercising convolutional neural networks and generative inimical networks, the design delves into the complications of deep literacy to give a result that goes further simple pixel stuffing. It aims to induce inpainted regions that seamlessly blend with the girding environment, performing in images that are nearly indistinguishable from their original counterparts. The exploration conducted within the design contributes to the ongoing advancement of image inpainting styles, pushing the boundaries of what's attainable with deep literacy. likewise, the design aligns with the broader trend of robotization and improvement in digital media manipulation. As technology evolves, there's a growing need for tools that can intelligently and artistically edit and restore images. By developing an effective and stoner-friendly system, this design has the implicit to offer precious tools to shutterbugs, contrivers, and artists, eventually serving as a stepping gravestone for further sophisticated content creation and manipulation ways in the field of computer vision.

Methodology

The methodology for an "Image Inpainting using Deep Learning" project typically involves a series of well-defined steps and procedures. Here's an outline of a common methodology for such a project:

1. Problem Definition and Scope: - Clearly define the problem you aim to address with image inpainting and specify the scope of your project. Determine the types of inpainting tasks you want to tackle (e.g., object removal, scratch or watermark removal, content generation).

2. Literature Review: - Conduct a comprehensive review of existing literature on image inpainting, deep learning techniques, and related technologies. This step helps you understand the state-of-the-art methods and gain insights into the field.

3. Data Collection and Preparation: - Gather a dataset of images relevant to your project. Clean and preprocess the data, including resizing, cropping, and augmentation. Ensure the dataset includes images with missing or corrupted regions.

4. Model Selection: - Choose the appropriate deep learning architecture for your image inpainting task. Common choices include CNNs, GANs, or variants designed for inpainting, like Partial Convolutional Networks (PCN) or Context Encoders (CE).

5. Model Training: - Train your selected model using the prepared dataset. Implement data loading pipelines, define loss functions (e.g., pixel-wise loss, adversarial loss), and optimize hyperparameters. You may consider using transfer learning with pretrained models to improve performance

- **Conclusion and Future Work**

Summarize the key findings, contributions, and limitations of your project. Suggest potential areas for future research or enhancements to your inpainting system. This methodology provides a structured approach to developing an image inpainting system using deep learning. It ensures that your project is welldocumented, thoroughly tested, and capable of addressing the defined problem effectively. Additionally, it encourages iterative development, allowing for continuous improvement

Sign Language Recognition and Translation

-Durvesh Pokade

Idea Behind this Project

*The Sign Language Recognition and Translation Application holds immense importance in addressing a critical need for the Deaf and hearing-impaired community in India. Communication is a fundamental human right, and this project aims to bridge the substantial communication gap that has historically isolated these individuals from the hearing world. By enabling real-time sign gesture recognition and translation into text and audio, the application empowers Deaf and hearing-impaired individuals to engage in meaningful conversations, access information, and participate in various aspects of life that others often take for granted. This project not only enhances the quality of life for those with hearing impairments but also fosters greater social inclusion and integration, ultimately promoting empathy and understanding between different linguistic and cultural communities. Furthermore, the project has the potential for broader adoption, serving as a model for the development of similar applications for other sign languages worldwide, making it a pivotal step towards a more inclusive and equitable social.

METHODOLOGY

1. Problem Statement: - Objective: The primary objective is to develop a real-time sign language recognition and translation application for Indian Sign Language (ISL).

2. Data Source: - Indian Sign Language Dataset: An existing Indian Sign Language dataset will be used for training and generating results. This dataset contains annotated images of ISL hand gestures.

3. Data Preprocessing: - Image Preprocessing: Images from the ISL dataset will be preprocessed to standardize their dimensions, enhance contrast, and remove noise. This step ensures that the dataset is well-prepared for feature extraction and model training.

4. Real-Time Video Processing: - Video Input: The application will continuously capture video input through a camera-enabled device. The video stream will be divided into frames to create a raw image sequence. - Boundaries Detection: The frames will be processed to identify boundaries and segment the different body parts captured by the camera, with a focus on the signer's head and hands.

5. Feature Extraction: - Feature Extraction from Hand Gestures: Feature extraction techniques, such as Histogram of Oriented Gradients (HOG) or Convolutional Neural Networks (CNNs), will be applied to the images of hand gestures. These features will be used to encode important characteristics of the hand gestures.

Technologies Used

1. **Convolutional Neural Network (CNN) Algorithm: -**

   We are going to use Convolutional Neural Network (CNN) Algorithm to recognize patterns from our database. CNN algorithm is considered as one of the best algorithms for pattern matching.

2. **Natural Language Preprocessing: -**

   We are going to use Natural Language Preprocessing in order to understand and interpret grammar, syntax and semantics in the signs translated.

3. **Long Short-Term Memory Model: -**

   We will be using Long Short-Term Memory Model in order to maintain the sequence in translated signs. This will be done by tokenizing the signs in order to properly identify the sequence.

4. **Text-To-Speech: -**

   As we will be adding feature of audio output, we will be using TTS algorithm and models in order to convert textual representation into audio format (gTTS library).

5. **Developement Technologies:-**

   For Front end development and web app development we will be using HTML, CSS, JavaScript and ReactJs. -   pattern matching and feature extraction process we will be using Python language
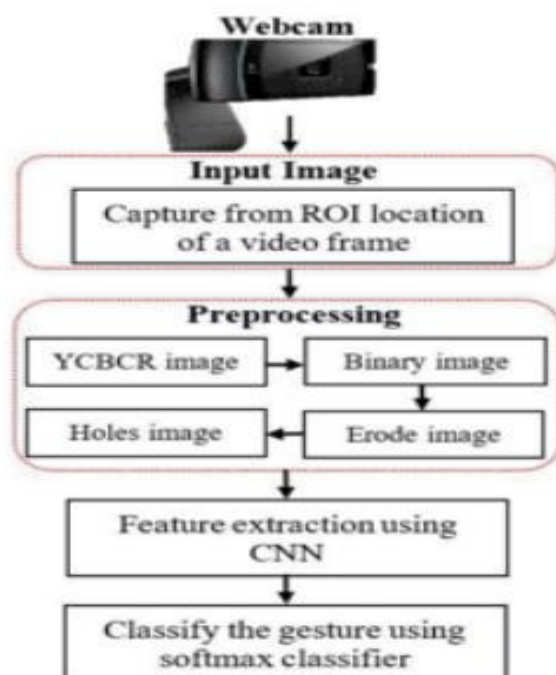

Fig. 1 Overall architecture of sign word recognition system.

पाऊसरात

एका शांत सायंकाळी
मी अशीच निवांत बसले होते
अचानक त्या नभी सारे
तुषार पावसाने दाटले होते

काळ्या-कुट्ट त्या नभांगणी
वरुणराजा विसावले होते
रिमझिम रिमझिम पडूनी धारा
वाळवंटी नंदनवन अवतरले होते

हिरवे हिरवे अंकुर
जमिनीतून डोकावले होते
विहंग सारे हे मिळूनी
पावसाचे गीत गात होते

बळीराजाच्या नयनातले अश्रू
आता आनंदाश्रू बनले होते
अवनीने देखील या हर्षाने
हिरवे मखमली पांघरूण अंथरले होते

ढगांच्या आडून ते
सूर्यनारायण ही सृष्टी न्याहाळत होते
अन् माझे मन स्तब्ध होऊनी
त्या पावसाच्या मातीच्या सुगंधात गुंग होते

-Poorva Anand Palkar

ती चांदणी

ती होती पौर्णिमेची रात

विसावली मी होते अंगणात

आकाशातील ती तेजोमय चांदरात

टिमटिमणाऱ्या चांदण्यांना जणू चंद्राची साथ

शुभ्राहून लख्ख दिव्य ती

जणू ती साजिरी गोजिरी

आकाशात टिमटिमणारी ती चांदणी

त्या चकाकत्या चंद्राची ती राणी

तिला पाहुनी मज चांदणी व्हावेसे वाटले

वाटले मी ही असेच व्हावे

चांदणी होऊन नभ गमन करावे

रात्रसारी तेजाने चमकत रहावे

स्वतः तिमिरात वास करून

इतरांना उजळूनी द्यावे

आपल्या या तेजाने

द्यावे प्रत्येकाला सुखाचे मेवे

-Himali Rajendra Amberkar

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