



BOOK OF ABSTRACTS

COMPSPEX-24

Computer Science Senior Project Exhibition Spring 2024

4th June, 2024

Organized by the

Department of Computer Science

Forman Christian College (A Chartered University)

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INTRODUCTION

Forman Christian College, established in 1864, is one of the oldest institutions of its kind in the subcontinent. During its Lifetime FCC has produced many Luminaries of the subcontinent including politicians, judges, educationists, social workers, and scientists. After going through many phases of change in its long history, FCC was decentralized in 2003 to run as an independent institution. The college received its charter in 2004 to function as a degree-awarding institution-The Forman Christian College University (FCCU). During almost one and a half decades of its existence, the FCCU has undergone phenomenal development in terms of infrastructure, academic programs, and student facilities.

The Department of Computer Science is part of the Faculty of Computer and Mathematical Sciences. It offers a rigorous academic program for able and motivated students who are excited by the influence of computing in our lives and who want to tackle the challenges of the future. Computer Science is a fast-changing field and our program aims to equip students with fundamental knowledge that enables them to keep abreast of the latest developments.

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PROJECT EXHIBITION DETAILS

S320 9:00 to 11:00														
Project	Time	Roll	Names	Primary Advisor	Project Title	Project	External Evaluator	Internal Evaluator	Internal	Sproj Member				
3	9:00 - 10:00	241550842	Ayesha Ahmad	Ms Asma Basharat	Secure Vault: Revolutionizing Bank Locker Security Through IoT-Powered Vigilance and Research	IOT	Dr. Tahira Mehboob (ITU)	Faizad Ullah	Dr. Ayesha	Asma Basharat				
		241552776	Sania Ayub											
		241551541	Wania Khan											
4	10:00 - 11:00	241546728	Umar Javed	Ms Asma Basharat	Sensor-based vehicular assistance and monitoring system	IOT								
		241547464	Shafaq Zehra											
		241547622	Aliza Khokhar											
Tea Break 11:30 to 12:00														
1	11:30 - 12:30	241554246	Omer Shahid	Ms Asma Basharat	Augmented Dining: Exploring 3D Menus in Restaurant Mobile Application for Enhanced Food Selection and Ordering	Application								
		241561244	Qadar Abubakar											
		241555240	Maaz tahir											
2	12:30 - 1:30	241562232	Zain Zahid	Ms Asma Basharat	Malware Image Generation using Generative Adversarial Networks (GANs)	AI								
		241575763	Abdul Rafay Ahmad											
5	1:30 - 2:30	241547428	Muhib Nadeem	Ms Asma Basharat	Bi-directional Neural-Interfaced Automaton Symbiosis (B-NIAS)	BCI, AI, IOT								
		241549487	Saad Muzaffar											
		241550809	Yamna Hassan											
S319 9:00 to 1:30														
23	9:00 - 10:00	241553181	Syed Shees Ali	Dr. Maria Tamoor	Prediction of accurate osteoarthritis stages using knee xrays	AI	Dr. Muhammad Sohaib Ayub (LUMS)	Muhammad Salman Chaudhry	Dr. Muhammad Haroon Shakeel	Dr. Nosheen Sabahat				
		241576240	Abdul Moiz Amir											
		241548737	Moeaed Hussain											
25	10:00 - 11:00	241561254	Muhammad Ahmad	Muhammad Salman Chaudhry	Video2Music: AI-Powered Video Content-Based Music Generation	AI								
		241563433	Saad Ahmad Nisar											
		241561553	Zaid Zulfiqar Choudhary											
Tea Break 11:30 to 12:00														
10	11:30 - 12:30	241546585	M. Ahmad Tariq	Dr. Muhammad Haroon Shakeel	Academic Graphs Understanding using Large Language Models and Computer Vision	AI								
		241550531	Omair Ahmad											
		241554627	M. Saad Yasin											
11	12:30 - 1:30	241547542	Maheen Khurram	Dr. Muhammad Haroon Shakeel	Thought Visualization via Large Language Models (LLMs)	AI								
		241548068	Hamza Ahmad											
		241575583	Subhan Wasif											
S219 9:00 to 1:30														
6	9:00 - 10:00	241545856	Waleed Jathol	Sir Sharoon Nasim	Tech Powered Investment and Business Platform	Application	Ilyas Butt (Systems)	Zeeshan Malik	Anique	Anique Atique				
		241547398	Shaheryar Malik											
		231525218	Ayesha Asif											
7	10:00 - 11:00	241545413	Rehma Raza	Sir Sharoon Nasim	PhotoFolio - Web app for photographers/videographers	Application								
		241549650	Rana Khurram Ijaz											
Tea Break 11:30 to 12:00														
8	11:30 - 12:30	241546646	AMMAR TARIQ	Sir Sharoon Nasim	Advertising Platform - Web App	Application								
		231450367	Hasnain Tahir											
		231519933	Ossama Majid											
9	12:30 - 1:30	241545586	Hannan Zahid	Sir Sharoon Nasim	Driving Assistant App for Color Blind People	Application								
		241555407	Mahnoor Khalid											
		241549070	Laiba Nusrat											
S316 9:00 to 1:30														
14	9:00 - 10:00	241572736	Yureed Elahi	Sir Muhammad Rauf Butt	AR Glasses for Social Support	AR	Dr. Nosheen Qamar (UMT)	Akheem Yousaf	Dr. Saba	Rauf				
		241564087	Hassan Ali											
		241556576	Maik M Abdullah											
		241567697	Junaid Imran Khan											
15	10:00 - 11:00	241547470	Azeem Atif Saroia	Sir Muhammad Rauf Butt	SPMS - Smart Parking Management System	IOT								
		241564827	M. Abdullah											
		241560771	Ali Haider Awan											
22	11:30 - 12:30	241568355	Isbah Qureshi	Ms Rabrane Bqa	Climate Chronicles: Augmented Reality Narratives									
		241561877	Sohaib waqar											

		241554813	Daim Imtiaz Ahmad			AR								
S218 9:00 to 1:30														
19	9:00 - 10:00	241547086	Ammar Khalid	Ms. Umber Nisar	Visualizing witness testimony using GAN	AI	Dr. Asma Naseer (FAST)	Adeem	Fakhir	Umber Nisar				
		241554979	Ahmad Shah											
		241550376	Zahra Hassan											
20	10:00 - 11:00	241571200	Muhammad Umair Asad	Ms. Umber Nisar	Event Vue Pro for FCCU	Application								
		241549138	Eman Farrukh Dewan											
		241549651	Muhammad Sameet Mehdi											
Tea Break 11:30 to 12:00														
12	11:30 - 12:30	231520363	Hassan mohiudeen butt	Dr. Sidra Minhas	ReVision- A camera enabled mobile application for legally bl	IOT								
		241568024	Haadi Majeed Khan											
		241548037	Rida noor sehbaz											
13	12:30 - 1:30	241548658	Talha Akash	Dr. Sidra Minhas	Lifefusion:Mobile application for thalesemia patients	Appication								
		240469811	Sarosh James											
		241574134	Muneeb Ahmed											
S216 9:00 to 1:30														
16	9:00 - 10:00	241547859	Shahmir Javed	Ms. Samia Asloob Qureshi	Automatic Tagging of Educational Questions with knowledge components/skills/concepts being accessed.	AI	Dr. Naveed Hussain (UCP)	Dr. Sarwan	Dr. Nazim	Samia Asloob Qureshi				
		241583674	Naufil Kamran											
		241-552405	Omer Farrukh											
17	10:00 - 11:00	241559199	Zaid Ather	Ms. Samia Asloob Qureshi	Personalized Fitness Application with AI-Powered recommendations.	Application								
		241575857	Hammad Zaib											
		241546333	Muhammad Ahmad											
Tea Break 11:30 to 12:00														
18	11:30 - 12:30	231522110	Ibrahim Khan	Ms. Samia Asloob Qureshi	Autism assement application for therapist	Application								
		231522322	Muskan Zahra											
24	12:30 - 1:30	241553139	Qurat Ul Ain	Akheem Yousaf	ShopScan Health: Emphasizing health-conscious shopping and scanning.	Application								
		241553079	Zainab Ijaz											
		241560260	Nabeel Randhawa											

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Augmented Reality: Dining Application

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ABSTRACT

This final year project introduces a pioneering augmented reality (AR) dining app, designed to redefine the dining experience. This app offers an interactive and immersive culinary spectacle through:

- **Interactive AR Menus:** Engage with menus that come alive in spectacular 3D, providing an enticing preview of culinary choices.
- **Real-Time Order Integration:** Enhance efficiency with seamless integration into restaurant systems, ensuring precise synchronization of orders from table to kitchen.
- **Immersive Dining Environments:** Transform dining spaces with the touch of a button, creating atmospheres that elevate the sensory experience of each meal.

This project will serve as a foundation for future research on AR in the restaurant industry and provide valuable insights for academic purposes.

Malware Image Generation Using Generative Adversarial Networks (GANs)

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ABSTRACT

This report seeks to analyze the threat posed by the ever-evolving malware on cybersecurity systems with particular attention to generation and classification processes and how the performance of these processes is severely degraded by imbalanced datasets which ultimately, adversely affects the performance of Machine Learning models. This report will aim to address these challenges by making effective use of Generative Adversarial Networks (GANs). GANs will be used to augment and balance the affected Maling dataset. The report will conduct a comparative analysis of distinct GAN architectures which are beneficial for the generation of gray scale malware images. This is directly relevant because the dataset being considered in this report comprises of gray scale images. The report focuses on the Maling dataset's class known as Allapple.a, which is known for its significantly large dataset among 25 different classes. The report will test different GAN models on Allapple.a. All of the different models which will be tested have been carefully trained on imbalanced datasets and effectiveness of each of these models will be analyzed based on their specific generator and discriminator losses and Fréchet Inception Distance (FID) score. This evaluation will not only result in balancing the dataset but will also have a preserving effect on the delicate nature of the original malware images. In addition to this the report will observe the effect that these synthetically balanced datasets have on the standard malware classification models. We have proposed our model MalGAN for malware image generation and compared it with the existing models.

Secure Vault: Revolutionizing Locker Security Through IoT-Powered Vigilance and Research

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ABSTRACT

In the realm of security, the robustness of locker systems is pivotal, particularly as threats evolve with technological advancements. This study tackles the challenge of enhancing locker security through a multi-layered authentication system combining liveness detection, facial recognition, and one-time password (OTP) verification. The scope extends beyond conventional approaches by integrating advanced machine learning models, specifically utilizing MobileNet and TensorFlow for liveness detection and a dlib-based facial recognition model, achieving a notable 91.38% accuracy.

The system incorporates liveness detection system using MobileNetV2, trained to distinguish between real and spoofed images. This system processes images captured via webcam, employs augmentation techniques to boost model robustness, and utilizes a custom-built model for detection. The liveness detection system achieves high accuracy and ensures that only real facial images are authenticated, preventing spoofing attempts with photos or videos. The facial recognition component is designed to identify individuals by comparing unknown facial images with a database of known faces. This system visualizes the results by drawing bounding boxes around detected faces and labeling them with names, indicating recognized or unrecognized individuals. This visual feedback allows for rapid identification and verification of authorized users. For a known face, if you have multiple images, you can generate and store multiple facial encodings (one for each image). This provides greater robustness when identifying or verifying a face. To identify or verify a face, the 128-dimensional encoding is compared against known encodings using a distance metric, typically Euclidean distance. If the distance is below a certain threshold, the faces are considered a match.

The system first identifies faces in an image. This involves finding the position and size of each face in the image. The integrated approach to locker security is further strengthened by an Arduino-driven mechanism to send OTPs to a user's mobile phone and employs a Django interface for operational management, backed by an SQLite database to securely store user data. Additional components include a relay for controlling the lock mechanism, green and red LEDs for status indication, and a button to trigger OTP generation.

Our results indicate a significant enhancement in security, demonstrating the system's capability to deter unauthorized access effectively. This multi-layered approach, combining machine learning, facial recognition, and Arduino-based OTP verification, represents a comprehensive strategy for improving locker security. The application of this integrated system can profoundly influence the security protocols of locker systems, providing a scalable and reliable model that could be adapted for broader security applications.

SENSOR BASED VEHICULAR ASSISTANCE AND MONITORING SYSTEM

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ABSTRACT

The “Sensor-Based Vehicular Assistance and Monitoring System” (SVAMS) is an innovative solution designed to address the significant challenges in the oil haulage industry. The motivation for SVAMS stems from the urgent need for improved safety measures and operational efficiency in oil transportation. Current systems often fail to provide real-time insights into critical situations, such as impacts, foggy conditions, and driver behaviors, leading to ineffective hazard control. The problem at hand is the urgent need for a comprehensive system that can transform the safety environment for oil transportation by providing real-time monitoring, proactive assistance, and alerts. To address this problem, we developed SVAMS using Arduino for sensor data collection, Python for data processing and analysis, and SQLite for data storage and retrieval. The system has proven to be more cost-effective compared to traditional monitoring systems, reducing operational costs by approximately 30% on average, and has led to a 50% reduction in response times to critical incidents through its real-time monitoring and alert capabilities. While SVAMS may not change the world, it represents a significant “win” in the realm of vehicular safety and efficiency for oil haulage, offering a cost-effective, efficient, and robust solution that ensures the protection of lives, valuable cargo, and the environment.

The system is designed to tackle several key problems in the industry, including safety concerns, operational inefficiencies, regulatory compliance, high insurance costs, environmental impact, driver accountability, and data-driven decision-making.

Bi-Directional Neural-Interfaced Automaton Symbiosis (B-NIAS)

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ABSTRACT

In Pakistan, where financial constraints and limited access to medical resources are prevalent, the development of assistive technologies is crucial, particularly for individuals facing physical disabilities. This project addresses the challenges encountered by those with mobility impairments by introducing a low-cost, low-complex, and accessible Brain-Computer Interface (BCI) wheelchair system. Leveraging EEG signals from the BrainLink Lite v2.0 headset, the project endeavors to design a user-friendly and cost-effective solution that empowers individuals with physical disabilities and the elderly to regain independence and navigate their surroundings effectively. The primary objective of the project is to enable the wheelchair to accurately respond to user intentions based on EEG signals. We successfully obtained signals from the Brainlink v2 EEG headset and transformed them into actionable commands for directional movement by utilizing the user's focus and meditation states. The developed system demonstrates a commendable accuracy level of approximately 70% in controlling wheelchair movements, including left, right, forward, and backward. This showcases promising outcomes for enhancing user independence and functionality. In conclusion, the successful development of a low-cost and accessible BCI wheelchair system has the potential to make a substantial impact on the lives of individuals with mobility impairments in Pakistan. While the findings are specific to the project's context, they contribute to the ongoing advancements in assistive technology and offer valuable insights into promoting accessibility and inclusivity for individuals with disabilities and the elderly worldwide.

TECH POWERED INVESTMENT AND BUSINESS PLATFORM

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ABSTRACT

This project envisions developing a dynamic web application specifically designed to bridge the gap between innovative ventures and investors. The platform will utilise artificial intelligence to facilitate transparent and effective communication, allowing for well-informed decision-making processes. The program priorities efficiency, ensuring that interactions and transactions occur swiftly and seamlessly. Security is also a critical focus, with robust measures in place to protect sensitive information and maintain the integrity of communications. Transparency is another cornerstone, ensuring that all parties have a clear and accurate understanding of the ventures and the investment opportunities. Ultimately, this project aims to unlock the full potential of creative ideas by providing them with the necessary resources to succeed. By fostering a supportive and well-structured environment for both innovators and investors, the application seeks to drive successful outcomes and stimulate the growth of groundbreaking ventures.

CamCom – A website for camera community

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ABSTRACT

As a photographer ourselves, we know the struggles and aspirations that accompany the creative journey. The pursuit of capturing moments and stories through the lens is a passionate endeavor, one that often demands a platform capable of presenting our visual narratives to the world in a way that is both engaging and intuitive. It is with this vision that our project comes to life. CamCom – A dynamic web-based platform tailored for content creators—photographers and videographers—who seek to share their artistic expressions and engage with a global audience. Like any other website, for example, olx.com or zameen.pk, these websites can be classified as advertising and real estate portal respectively. Similarly, this website can be categorized as visual content sharing platform where people can make their profiles, update their portfolio and details, and be ready to get recognized by their work. It also offers a space for customers or viewers to discover, explore, and interact with the portfolios and content creators to book them if they want to. Our aim is to seamlessly bridge the gap between content creators and their audience, offering a digital space where their portfolios shine and viewers are transported into the heart of every visual masterpiece rather than only the ones they already know about. CamCom also offers features like copyright protection and reference picture search which uses AI for the convenience of the users. The website works like any other website but the UI/UX is what makes it different. To attract the audience, we studied the interests and the requirements of the users and came up with it. CamCom a black themed with a neon pink and purple website was made using React as a frontend and .NET framework for the backend which manages the whole website. As the content creators would need to make an account and upload their portfolios, we are managing it by using MySQL, ensuring efficient data storage, retrieval, and management.

ADVERTISEMENT PLATFORM

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Abstract

In today's digital era, the advertising landscape is continuously evolving, driven by technological advancements and changing consumer behaviors. As businesses strive to capture audience attention and engagement, we need innovative advertising platforms to boost our businesses. Our project focuses on addressing the challenges associated with advertising space management by introducing a comprehensive web application. This advertisement platform serves as a solution for advertisers and space owners alike, facilitating the efficient and effective rental of advertisement spaces. However, the process of discovering, securing, and managing advertisement spaces can often be complex and time-consuming. Our platform provides a user-friendly interface for listing, searching, and renting advertisement spaces. By leveraging intuitive design and advanced search functionalities, advertisers can easily identify spaces that align with their campaign objectives. For advertisement space owners, our platform offers a centralized hub for showcasing available spaces and managing rental inquiries. This streamlined approach enhances visibility and accessibility, ultimately driving increased occupancy rates and revenue generation. Through diligent research and innovative development, our application aims to revolutionize the advertisement space rental industry. By facilitating seamless connections between advertisers and space owners, we empower businesses to maximize the impact of their advertising campaigns while optimizing revenue opportunities for space owners. In essence, our project seeks to modernize and democratize the advertisement space rental process, fostering a more efficient and collaborative ecosystem for advertisers and space owners.

IntelliRoads: Next-Gen Traffic Management System For the Cities of Tomorrow

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ABSTRACT

IntelliRoads stands as a pioneering solution aiming to revolutionize traffic management in Pakistan through the integration of advanced deep learning models. In a country where the need for efficient traffic management solutions is paramount, the absence of comprehensive systems has long persisted. Leveraging cutting-edge technology, IntelliRoads emerges as a beacon of innovation, offering real-time monitoring and data recording capabilities essential for effective traffic control. At its core, IntelliRoads comprises three main modules, each designed to address critical aspects of traffic management. The Emergency Vehicle Detection module ensures quick identification and prioritized passage for emergency vehicles, optimizing response times during critical situations. The Traffic Signal Optimization module orchestrates traffic flow with precision, mitigating congestion and enhancing overall efficiency. Moreover, the Stolen Vehicle Identification module bolsters security measures by swiftly identifying and flagging stolen vehicles within the traffic network, theoretically aiding the police in retrieval efforts. What sets IntelliRoads apart is its modular architecture, enabling seamless upgrades and expansions to accommodate evolving needs. This flexibility ensures future readiness, allowing for the addition of new modules or enhancements to existing ones with ease. Accessible via a user-friendly web application, IntelliRoads empowers authorities and users alike with comprehensive functionalities. From monitoring real-time traffic data to managing emergency situations, the web app serves as a centralized hub for efficient traffic control. Furthermore, IntelliRoads' proactive approach extends to its notification system, promptly alerting stakeholders to emergencies or situations necessitating human intervention. This proactive stance enhances responsiveness, ensuring swift and effective resolution of potential traffic disruptions. In summary, IntelliRoads emerges as a transformative solution, addressing the pressing need for a smart traffic management system in Pakistan. By harnessing the power of deep learning and modularity, it not only resolves current challenges but also paves the way for a more adaptive and responsive traffic ecosystem in the future.

Reports Thought Visualization Using Large Language Models (LLMs)

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ABSTRACT

Brain-Computer Interfaces (BCIs) have emerged as a transformative technology, bridging the gap between the human mind and computers by decoding brain signals. The primary challenge in thought visualization has been the scarcity of comprehensive datasets. This work provides a novel approach to thought visualization using Electroencephalogram (EEG) based BCIs. In our experiment we have used EEG data from [1]. This was an advanced dataset that included EEG recordings from 10 participants over an extensive range of image conditions and served as the foundation for our work, allowing us to train machine learning models with the potential for greater accuracy. Our suggested technique is a multi-step process that includes dataset annotation, signal pre-processing, feature extraction, machine learning model construction, and fine-tuning of a stable diffusion model. We have developed BCI that takes pre-processed EEG signals, converts them into relevant text descriptions using a customized Seq2Seq model and then into images through a fine-tuned Stable Diffusion model similar to the Bing Image creator and DALL-E capabilities. Employing a transformer architecture for the text generation phase, the model achieved a BLEU score of 0.49. This research will have a high impact on the development of assistive technology for persons with disabilities such as Amyotrophic Lateral Sclerosis (ALS), locked-in syndrome, cerebral palsy, and stroke survivors. This work is a significant advancement in the field and promises to develop practical applications further, hence helping to prepare bases for interdisciplinary approaches in applications to cognitive research, medical diagnostics, and interactive systems.

ReVision Application

A Camera-Enabled Mobile Application for Legally Blind Users

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ABSTRACT

The percentage of legally blind people is increasing globally, primarily due to the rising prevalence of diseases such as diabetes and age-related macular degeneration. This increase has significant impacts in countries like Pakistan, where the daily activities of those affected are severely hampered, leading to reduced independence and quality of life. In response to this growing issue, our project aims to design a wireless wearable device specifically for legally blind individuals to help them recognize similar faces, colors, and currency. This device leverages advanced machine learning models, achieving an impressive face recognition accuracy of 99%, and color and currency recognition accuracies between 80% and 82%. The slightly lower accuracy for color and currency recognition is attributed to the quality limitations of the ESP camera used. The results demonstrate substantial improvements in user authentication and interaction, with a notable reduction in login time by an average of 30% compared to traditional methods. Facial recognition accuracy exceeding 90% provides a dependable means of identity verification. These advancements underscore the tangible improvements achieved in mobile authentication and assistance for the visually impaired, promising heightened security and usability across different application domains. The device is built on an ESP platform, equipped with a speaker for audio feedback, and utilizes personalized databases to enhance user experience. In conclusion, the integration of a high-resolution camera would significantly improve the accuracy and reliability of the device, offering better support and enhanced functionality for the visually impaired community. These findings underscore the critical role of emerging technologies in bolstering security, user trust, and independence in mobile applications, paving the way for enhanced authentication mechanisms and assistance devices in the digital era.

Life Fusion

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ABSTRACT

In Pakistan, the number of thalassemia patients is increasing at an alarming rate. An estimated 5000 children are born with thalassemia major each year. These patients require frequent blood transfusions to manage their condition, often every few weeks. However, they face significant challenges in accessing safe and compatible blood, primarily due to the lack of a centralized and efficient blood donation system. Many patients and their families struggle to find willing donors and secure timely transfusions, which are crucial for their survival and well-being. The "Life Fusion" project in coordination with Punjab Thalassemia Department aims to address the critical need for a reliable and efficient blood donation system specifically tailored for thalassemia patients. Thalassemia, a genetic blood disorder, necessitates regular blood transfusions, placing a significant burden on healthcare systems to maintain a consistent supply of compatible blood. Our mobile application is designed to bridge the gap between blood donors and thalassemia patients, providing a seamless, user-friendly platform for donor registration and appointment scheduling. The key features of the "Life Fusion" app includes Donor Registration which is an Easy sign-up process for potential donors. Appointment Booking through which donors can schedule appointments to donate blood at their convenience. Real-Time Notifications which help the donors receive timely updates and notifications regarding donation needs. Thalassemia centers staff utilize a web application to manage appointments, centers, donors, notifications, and patients, ensuring an organized and efficient process. The backend system ensures secure data management, real-time communication, and comprehensive record-keeping. This project represents a significant step forward in improving the quality of life for thalassemia patients by ensuring a steady and reliable supply of blood, ultimately contributing to the broader goal of enhancing healthcare delivery systems.

AR Glasses For Social Support

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ABSTRACT

This project aimed to develop augmented reality (AR) glasses designed to assist individuals with social anxiety and alexithymia in recognizing and interpreting facial expressions during social interactions. Social anxiety and alexithymia significantly impair effective social engagement by hindering the ability to understand emotional cues, thus potentially leading to distress and compromised relationships. The AR glasses integrated a suite of technologies including an ESP32 CAM for real-time facial expression capture, a cloud-based machine learning model for emotion analysis, and an OLED display embedded within the glasses to visually relay emotion information to the wearer. The development and testing process focused on ensuring accurate real-time processing and user comfort. The effectiveness of the AR glasses was evaluated through user trials involving individuals diagnosed with social anxiety and alexithymia, and expert reviews by psychologist professionals. Participants tested the glasses in controlled social situations and provided feedback on the device's usability and its impact on their social interactions. The feedback indicated that the glasses significantly improved users' ability to accurately interpret emotional cues, thereby enhancing their confidence and effectiveness in social interactions. Psychologist experts noted the potential of the AR glasses as a supportive therapeutic tool, highlighting their functionality in real-world applications. The findings suggest that AR technology can be an effective aid for individuals with difficulties in emotional recognition, offering substantial support in social settings. The project underscores the potential of integrating AR with advanced machine learning to enhance social communication for individuals facing such challenges. Future developments will focus on refining the glasses' design for enhanced comfort and expanding the range of recognizable emotions to provide more nuanced support in social interactions.

Smart Parking Management System (SPMS) FCCU

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ABSTRACT

Parking inefficiencies at Forman Christian College University (FCCU) not only create congestion but also lead to significant time wastage and pose security risks, highlighting the critical need for a more efficient management solution. The Smart Parking Management System (SPMS) introduced at FCCU leverages modern technology to streamline parking operations and enhance campus security. By integrating Radio Frequency Identification (RFID) and the Google Cloud Vision OCR API for license plate recognition, the SPMS significantly improves the accuracy and reliability of vehicle tracking and space allocation. The development of the SPMS was aimed at addressing the bottlenecks in the traditional parking system by implementing an automated solution that minimizes human intervention and potential errors. The system architecture includes RFID scanners for quick user identification, sophisticated license plate recognition for additional security, and digital displays providing real-time information on parking availability. This multifaceted approach ensures a smooth and efficient parking experience for students, faculty, and staff. Extensive testing of the SPMS on the FCCU campus revealed a high degree of effectiveness: the RFID scanners correctly identified users with 100% accuracy, while the license plate recognition using the Google Cloud Vision OCR API also maintained 100% accuracy in daylight. The system's real-time updates on parking availability were consistently accurate, demonstrating the system's operational effectiveness. The successful deployment and performance of the SPMS not only promises to improve daily operations at FCCU but also positions the system as a scalable model for other institutions grappling with similar challenges. This project showcases the potential for technology-driven solutions to transform campus infrastructure management, setting a benchmark for future enhancements and integration into larger administrative systems. The SPMS stands as a testament to the impactful benefits of integrating advanced technology into traditional campus environments.

EduTag: Automatic Academic Tagging System

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ABSTRACT

Education is one of the few aspects which has been revolutionized with the various aspects of human life in this digital revolution where access to information and resources is groundbreaking. Nonetheless the challenge of efficiently organizing educational materials to improve online learning experience is still something to be solved. The need of unerringly tagging content on knowledge segment becomes extremely important as huge repositories of digital resources are incrementally being used by students, professionals, and avid learners. This is where EduTag comes in as it solves the problem by setting the goal of developing an Automatic Tagging System using Natural Language Processing (NLP) and Machine Learning (ML) techniques in Educational Questions to simplify the classification process. EduTag is a beacon of hope when it comes to meeting the need for personalization and precision in online education regarding content arrangement. It makes the search process and makes navigation and personalized recommendation for users naïve by its state-of-art structure as it automatically tags the educational questions based on the skills and respective concept. Secondly EduTag is keen towards harnessing its ability to reduce the burden of content management for instructors and platforms making sure that we are in a new era. EduTag uses the excellence of Artificial Intelligence (AI) to achieve amazing results, showing an accuracy rate which crosses the magnanimous 85% mark. This kind of accuracy score showcases a positive shift towards precision, productivity and efficacy resulting in concrete value to educators and learners keeping the insight that we had a small dataset with 3555 examples only.

Active Track

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ABSTRACT

Active Track is a mobile app that adopts advanced Artificial Intelligence and Machine Learning methodologies to deploy state-of-the-art personalized fitness and health management. Motivation lies in two factors: making up for the existing fitness application, which is dumb, not personalized, and does not cater to the user in real time; and asking for the possible provision of the user's customized workout plans and nutritional guidance that they can like, as this is the last item in their fad list. The problem we are concerned with is generic workout programs that do not serve the user's health needs yet try to provide a fun and effective way to fill in that gap. Our approach has been very research-oriented, and we have developed our AI algorithms to analyze the users' data to provide them with relevant recommendations. The developed application was tested involving such key aspects as usability, performance, and security. The result was a stable and quality product with significant improvements of meaningful enhancements in user engagement and satisfaction. The results attested to the fact that Active Track offers an experience which is much more adaptive and user-centered compared to traditional fitness application procedures. The implication of our findings is that personalized fitness applications are quite a motivator and amplifier of health benefits that can be had, thus marking Active Track as one of the personalized health and fitness market leaders.

Therapist Connect

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ABSTRACT

Autism therapy represents a critical area of healthcare where the need for enhanced support and collaboration among therapists is paramount. The challenges faced by individuals on the autism spectrum demand innovative solutions that can streamline therapy sessions, optimize treatment plans, and foster a sense of community and knowledge sharing among therapists. Along with that, there are very few therapy centers for autism in Pakistan and people have to travel large distances just for one appointment. Therapist Connect addresses these pressing needs by leveraging advanced web technology to create a centralized platform for therapists specializing in autism care. The scope of our work encompasses the development of a user-friendly web application tailored specifically for therapists working with individuals on the autism spectrum. Our goal is to provide therapists with tools and resources to improve the efficiency and effectiveness of therapy sessions, facilitate progress tracking, and encourage collaboration within the autism therapy community. The problem we aim to solve is the lack of centralized digital platforms that cater to the unique needs of therapists working in this field, hindering communication, resource sharing, and collaboration efforts. Our approach involved extensive research into the challenges faced by therapists in autism therapy, as well as the development of a comprehensive understanding of the requirements and preferences of therapists in their daily practice. We utilized agile development methodologies to iteratively design and implement the Therapist Connect platform, incorporating feedback from therapists and stakeholders throughout the development process. Key features of the platform include session scheduling, autism diagnosis, progress tracking, and secure data storage. The implementation of Therapist Connect has resulted in a user-friendly and comprehensive web application that empowers therapists with tools to streamline therapy sessions and enhance collaboration within the autism therapy community. Initial feedback from therapists has been overwhelmingly positive, with users reporting improved efficiency, communication, and access to resources. Quantitative metrics, including session completion rates and therapist satisfaction scores, indicate significant improvements in therapy outcomes and user experience. Therapist Connect represents a significant step forward in addressing the challenges faced by therapists working with individuals on the autism spectrum. By providing a centralized platform for communication, resource sharing, and collaboration, Therapist Connect has the potential to revolutionize the way autism therapy is conducted, ultimately leading to improved outcomes for individuals with autism and their families. The results of our work are generalizable and applicable to therapists working in diverse settings and populations, highlighting the broader impact and potential scalability of the Therapist Connect platform.

Visualizing Witness Testimony using GAN

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ABSTRACT

This project proposes a new way to create portraits using a combination of different information sources. It takes sketches, audio descriptions, and written descriptions that identify specific details (like eye color) to create a more complete and realistic portrait. Traditional methods, which rely on just one source of information, often miss important details. This project aims to overcome these limitations by allowing users to provide more information for a more customized portrait. The project tackles challenges like the lack of detail in written descriptions or the absence of color information in sketches. It also explores how to use audio descriptions to capture emotional expressions visually. By combining information from all these sources, the project creates a unified view that a special program (called a Generative Adversarial Network or GAN) then uses to generate a high-quality portrait. To evaluate how well this approach works, the project will use a combination of computer analysis and human judgment. The computer analysis will look for qualities like overall image quality, while human evaluators will assess how detailed and realistic the portraits are, and how well they match the information provided in each source. The project expects that portraits created using this multi-modal approach will be superior to those created using just one source of information. This technology has the potential to be used in many different ways. Imagine creating personalized avatars for online platforms that look like you and even reflect your personality based on the descriptions you provide. Law enforcement could use it to create composite sketches of suspects based on witness descriptions, including voice recordings. The entertainment industry could use it to design characters for animation or video games that look not only how they're described but also how they sound when they speak. There are important ethical considerations to address as this project moves forward. These include protecting people's privacy, making sure people own the portraits that are created of them, and ensuring that the system doesn't create portraits that are biased or unfair. There are also technical challenges to overcome, such as finding the best way to combine information from different sources and how to make the system create portraits quickly and efficiently. Overall, this project has the potential to revolutionize the way portraits are created. By addressing the technical and ethical challenges, it can open doors to new creative possibilities and empower people in new ways. This is just the beginning, and the future holds exciting possibilities for how we create and interact with visual information.

Event Vue Pro

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ABSTRACT

To respond to the rising demand for effective event management within the premises of Forman Christian College University (FCCU), we propose the integration of a web application. The initiative can transform the way FCCU manages and holds events within the institution as it allows the user to have an overall view of the venues available, the people each can accommodate at any given moment, and the facilitators there are. When it comes to the website application, the user interface will be added, which users will easily understand as they will see the visual work of each location. This visual representation implies a selection of images and a full-scale three-dimensional perspective. As a result, the workers who are responsible for organizing the event will be able to make decisions based on the data provided to them. In addition, it also will separately give the locations in prudent to be held by most college activities and mention E-block and S-block, Lucus, and other relevant areas situated. Booking storage areas become revolutionized to ensure the event planner attains the most appropriate for its use. Moreover, our system will influence the college food cafeteria service to ensure catering services go interactively to the user side. The enablement of the platform will accord the user the maximum suitable extract of the maximum order of the high tea, individually describe every listed price on the high tea experience, and full integration to enable the choice to be categorized in terms of an allowance of money to be spent on various high tea occasions. In the realm of educational institutions, like Forman Christian College University (FCCU) organizing events efficiently plays a role in creating a lively campus atmosphere promoting community involvement, and enriching the overall student journey. However, the current manual method of managing events at FCCU faces obstacles that impede its effectiveness. The drive to address these challenges stems from acknowledging the influence that coordinated event management can have on different members of the university community. Additionally incorporating features like real-time updates, availability, catering services, and user-friendly interfaces poses hurdles that call for solutions. The successful execution of our project has the potential to greatly influence FCCUs capacity to foster a diverse campus environment, streamline resource allocation, and offer fulfilling experiences for its community members. Our main focus is on improving the way events are managed at Forman Christian College University (FCCU). Currently, the manual scheduling process requires event coordinators to visit the management office leading to time wastage during busy event periods. The lack of information about venues on campus limits creativity in event planning and restricts organizers' choices. Furthermore, communication gaps hinder engagement and involvement affecting the campus experience. To tackle these issues, we suggest creating a user portal for managing events. This portal will provide real-time updates on venue availability, detailed venue information, catering services, and an interactive event directory.

Climate Chronicles: Augmented Reality Narratives

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ABSTRACT

This report introduces "Climate Chronicles: Augmented Reality Narratives," an innovative project aimed at transforming climate change education through the use of Augmented Reality (AR) technology. The core of this initiative is to enhance public understanding of climate science and its real-world impacts by providing an immersive AR experience that visually narrates historical, current, and predictive climate events. By integrating AR with dynamic and interactive educational content, "Climate Chronicles" seeks to overcome the limitations of traditional educational methods, making complex climate data comprehensible and engaging for a diverse audience.

The project is designed to not only inform but also to inspire action by vividly illustrating the effects of climate change and the urgent need for sustainable practices. Through its AR application, hosted on a globally accessible website, the initiative allows users to interact with climate phenomena, fostering a personal connection to environmental issues. This report will detail the functionalities, development strategies, and intended societal impact of the "Climate Chronicles," highlighting its potential to significantly advance climate literacy and encourage proactive engagement in environmental conservation efforts..

Knee Osteoarthritis AI Prediction of knee osteoarthritis using machine learning on knee X-rays

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ABSTRACT

Osteoarthritis (OA) is common and crippling condition, of the knee. It is characterized by the progressive deterioration of joint cartilage, resulting in pain, stiffness, and restricted movement. Global burden of this disease underscores the urgent need for advancements in diagnostic technologies that can detect and grade the severity of osteoarthritis with high precision and minimal delay. This project addresses such needs by harnessing the capabilities of deep learning, specifically through convolutional neural networks (CNNs) combined with advanced feature extractors like VGG-16 and ResNet-50. These technologies have been integrated to develop a robust model capable of analyzing knee X-ray images and categorizing OA into five stages, from 0 (no OA) to 4 (severe OA). Early detection of knee osteoarthritis is paramount as it significantly impacts the treatment outcomes and quality of life of patients. Diagnosing OA in its initial stages allows for the implementation of preventive measures and early interventions that can slow disease progression, alleviate symptoms, and potentially delay or eliminate the need for invasive procedures such as surgery. By integrating state-of-the-art machine learning techniques to facilitate early and accurate diagnosis, our project contributes to the broader goals of preventive medicine and personalized healthcare, which are increasingly recognized as crucial in managing chronic diseases like osteoarthritis. The project's innovation extends beyond the algorithmic development to the deployment of a mobile application that democratizes access to this advanced diagnostic tool. By enabling users to upload knee X-ray images directly via their smartphones, the application provides immediate predictions of OA stages. This immediacy is critical for early intervention, which can significantly alter the course of the disease by enabling timely medical advice and personalized treatment planning. Moreover, the application includes features that enhance user experience and engagement, such as providing suggestions for managing osteoarthritis based on the predicted stage of the condition. This suggestion feature is designed to guide users on potential next steps, including lifestyle adjustments and when to seek further medical consultation. The potential of this tool to revolutionize the early diagnosis and ongoing management of knee osteoarthritis represents a significant step forward in the field of digital health. This project not only showcases help in medical image analysis but also illustrates the potential of digital health tools to transform patient care in orthopedics. The integration of such technologies into everyday clinical practice could significantly improve the diagnostic accuracy, treatment strategies, and overall management of knee osteoarthritis, thereby enhancing patient outcomes and reducing healthcare costs associated with this chronic condition.

Video2Music

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ABSTRACT

We are proud to present a viable solution to a recurring problem faced by content creators globally. There is a need for diverse and copyright-free background music in digital content creation by developing an AI-driven system that dynamically generates music tailored to video mood and tone. Of course, there are solutions to this problem already, however, these existing solutions are often cumbersome and costly, leaving content creators struggling to find suitable music. Hence, by leveraging AI APIs, the system automates music selection by analyzing video content and producing customized, copyright-free compositions. This streamlines content creation, enhances viewer engagement, and offers significant implications for the industry. We hope that the success of this AI-powered system will not only simplify the music selection but also opens doors for broader applications in multimedia content generation and personalization, promising a transformative impact on digital content creation.