BOOK OF ABSTRACTS

COMPSPEX-22

**Computer Science Senior Project Exhibition
Spring 2022**

10th February, 2023

14th February, 2023

Organized by the

Department of Computer Science
in collaboration with the
**Office of Research, Innovation, and
Commercialization (ORIC).**

Forman Christian College (A Chartered University)

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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External Evaluators	Internal Evaluators
- Mr. Mazhar Javed - Dr. Faiza Iqbal - Ms. Rabia Sirhindi - Dr. Muhammad Tayyab Chaudhary - Dr. Ayesha Altaf	- Dr. Saba Toor - Mr. Zeeshan Butt - Mr. Akheem Yousaf - Mr. Anique Atique - Dr. Saad bin Saleem - Mr. Ali Faheem - Mr. Fakhir Shaheen - Dr. Ayesha Khan - Mr. Rauf Butt - Dr. Maria Taimoor - Dr. Haroon Shakeel - Akheem Yousaf - Sharoon Naseem - Umber Nisar - Dr. Sidra Minhas

PROJECT EXHIBITION DETAILS

Time	Project No	Roll Numbers	Names	Primary Advisor	Project Title	Project Domain	External Evaluator	Internal Evaluator	Internal Evaluator
					S320 - 9:00 to 12:00				
9:00 - 10:00	1	221437659	Abdullah Qureshi	Muhammad Salman Chaudhary	Qur'an Tutor AI	Mobile App Dev + NLP + ASR + MLS + HCI	Mazhar Javed Awan	Ali Faheem	Dr. Ayesha
		22-11006	Muhammad Saad Khan						
		22-11004	Waqas Rasheed						
10:00 - 11:00	13	22-11063	Bilal Saddique	Muhammad Salman Chaudhary	Evergreen Surveillance	AI + Web Development + Cloud Computing		Ali Faheem	Dr. Ayesha
		22-11108	Mahad Rashid Khurshid						
		22-10293	Bareera Malik						
11:00-12:00	9	231454590	Muqaddas Aman	Muhammad Salman Chaudhary	Implementation of 4th vector in game development (Research Based)	Game Development+ AI+ Human computer Interaction		Ali Faheem	Dr. Ayesha
		221436198	Ayesha Ajmal						
		221441560	Iqra Amin						
					S319 - 9:00 to 12:00				
9:00 - 10:00	2	22-10279	Muhammad Taha Bin Nauman	Rabranea Bqa	Crowdfunding app based on blockchain	Blockchain + WebDev	Dr. Muhammad Tayyab Chaudhary	Dr. Saba	Dr. Saad
		221440873	Awais Akram						
		22-11172	Muhammad Abubakar Chaudhry						
10:00 - 11:00	5	221436819	Chand Saleem	Samia Asloob Qureshi	Blockchain based electricity bill tempring detection	Web, Blockchain		Dr. Saba	Dr. Saad
		221440255	Muhammad Tayyab						
		23-10903	Muzafar Arshad						
11:00-12:00	18	221441380	Noor Ullah Khalid	Samia Asloob Qureshi	Secure Voting System	Web Dev + Blockchian		Zeeshan	Dr. Saad
		22-11123	Abdul Mannan Abbasi						
		21-11254	Sheheryar Yousaf						
12:00 - 1:00	7	22-10671	Akash Nazir	Dr Mubashar	Property Management Using Blockchain	Block chain + web dev		Zeeshan	Dr. Saad
		231469279	Nouman Javed						
					S219 - 9:00 to 12:00				
9:00 - 10:00	10	21-10445	Zohaib Javed	Samia Asloob	Smart Irrigation System (prototype + webapp + software)	AI + Automation + Web App + HCI	Rabia Sirhindi	Dr. Maria	Anique
		22-10287	Mustafa Noor						
10:00 - 11:00	15	221437593	Parkash Singh	Dr Maria	heart failure prediction using cardiac MRIs (Research Based)	Mob App + AI		Rabranea	Anique
		221437804	Moiz Ur Rehman						
		21-11052	Haider Ali						
11:00-12:00	4	221434448	Faizan Ahmad	Dr Maria	Improved Skin Lesion Detection Using Image Processing. (Research Based)	Mobile App Dev+ AI + NLP		Rabranea	Anique
		221440716	Idwah Sajjad						
		22-11140	Hassan Jabran Minhas						
					S218 - 9:00 to 12:00				
9:00 - 10:00	11	21-10325	Shahab Ahmed Khan	Zeeshan Haider	x	Web App Development + AR	Dr. Faiza Iqbal	Dr. Haroon	Rauf Butt
		221438837	Salman Afzaal						
		231452592	Mahrukh khan						
10:00 - 11:00	6	221438858	Vaania	Dr. Sidra Minhas	Online Fuel Delivery Service	Mobile App Development+ AI		Dr. Haroon	Rauf Butt
		221435099	Mina Hayat						
		221438152	Shaharyar Ahmed						
11:00-12:00	3	22-11357	Hafsa Ayaz	Akheem Yousaf	Speech Therapist for Speech Challenged Children of Pakistan	Mobile App Dev + AI + Game Dev		Dr Sidra Minhas	Rauf Butt
		221523598	Aleena Khalid						
		22-11235	Basit Islam						
					S216 - 9:00 to 1:00				
9:00 - 10:00	8	22-10440	Humza Waqar	Asma Basharat	Grading Fruit Ripeness Condition Using AI	Web App+Cloud Computing+AI	Dr. Ayesha Altaf	Akheem Yousaf	Umber Nisar
		221433856	Izaan Ud Din						
		22-11225	Muhammad Furqan						
10:00 - 11:00	12	221434839	Taimoor khalid	Dr Saba Khalil	Digitising ambulance and firebrigade system	Mobile app + AI		Sharoon Nasim	Umber Nisar
		221441046	Syed Muaz Hussain						
		221440263	Ali Shoaib						
11:00-12:00	17	22-10249	Zaid Mustafa	Rauf Butt	Detecting nuisance using computer vision and reinforcement learning	IOT/DL/Cloud-Computing/CV		Sharoon Nasim	Umber Nisar
		22-11085	Hamza Ayub						

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Crowdfunding App based on Blockchain

Awais Akram Malik, Muhammad Taha Bin Nauman, Muhammad Chaudhary Abubakar, Rabranea Bqa*

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ABSTRACT

Crowdfunding platforms have gained popularity as a means of raising funds for various projects and ideas but it has a lot of shortcomings and issues regarding transparency and third-party intervention that needs to be addressed. Users often think twice before pledging an amount to a project on crowdfunding websites as a lot of people post bogus or fake campaigns for monetary gains. At the moment there exists no platform that is completely decentralized and offers complete end-to-end transparency to users. Our purposed Block Funding application will fill this void as it is the first crowdfunding platform that will be completely decentralized and transparent. Block Funding is based upon Ethereum Blockchain and uses Solidity based smart contracts to ensure funds are only released to campaigns once more than half of the funders are satisfied with the project. Additionally, all payments are made using Ether, no third-party payment processors or banks are involved eliminating the need for escrow accounts and bank charges. This platform will be free of cost for everyone over the age of 18 to use and has the potential for any project to be fully funded regardless of the user's geolocation as any user with a crypto wallet can engage with the website.

Keywords: Blockchain; Ethereum; Smart Contracts; Solidity.

AI-SPEECH THERAPIST (FOR SPEECH CHALLENGED CHILDREN OF PAKISTAN)

Basit Islam, Hafsa Ayaz, Aleena Khalid, Akheem Yousaf, Dr, Haroon Shakeel

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ABSTRACT

In Pakistan, where Urdu is considered as a National Language and almost 14% of children are born with speech or vocal issues in 2010. Cases of Speech problems in youngsters and adults have expanded complex, however, such therapy is expensive, and many individuals in Pakistan cannot afford it. Recent research has demonstrated that smart applications might serve as a teaching tool for children. So, we developed a mobile application for those who cannot afford these expensive sessions. AI-Speech Therapist app is a software application specially designed to provide speech therapy to people with speech and language impairments. The ideology is to use a variety of entertaining and stimulating activities and games to assist in teaching your child how to pronounce words in the Urdu language. The application is designed using Android Studio and games are designed in Unity. This application would have different activities for the children to learn systematically. It would play a word or a sentence, children would then recurrent the word or a sentence and the application will compare that user spoken word with the stored word and show the accuracy. The precision rate would be set, and the next level would not be unlocked until the children met the accuracy rate. For database storage and functionalities, we have used a cloud database system (Firebase), and then we implemented the backend of the application using Java. The conversion of spoken word into text in Urdu has been done using the Google Speech-to-Text API. For accuracy rate NLP (Cosine Similarity algorithm) has been used. The code for cosine similarity is written in Python and then integrated into Android Studio. If two words are same, Cosine Similarity provides 100% accuracy rate. At the end of every activity a game will be played that will enhance the learning of the user. This application is not only for children but also for adults who are suffering from speech and language disorders..

Keywords: Speech therapy, Mobile Application, Speech disorder, Natural Language Processing.

Skin Cancer Classification using Convolutional Neural Network

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Abstract

Skin cancer is one of the most common types of cancer worldwide, and early detection is crucial for successful treatment. In this research, we propose a deep learning-based model for the detection of melanoma, the most dangerous type of skin cancer. Our model is based on TensorFlow, an open-source machine learning framework, and uses a convolutional neural network (CNN) to analyze images of skin lesions. We trained our model on an ISIC 2019 dataset of over 25,331 images and achieved an accuracy of 84% in classifying benign and malignant skin lesions. Our model also provides an interpretation of its predictions by highlighting the regions of the image that were used in making the diagnosis. We evaluate the performance of our model on a test set of images and compare it with the performance of traditional machine learning algorithms and human dermatologists. The results of this research demonstrate the potential of deep learning-based models to improve the accuracy and efficiency of melanoma detection and to assist medical professionals in making a diagnosis.

Keywords:

ELECTRIC LEDGER - A Blockchain Based Electricity Billing System

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ABSTRACT

Electricity has become a significant issue in Pakistan, and we are all affected by power outages. Some of the grounds for this are that some consumers do not pay their actual power bill, but instead modify their bill data with some influence or payment. Meter readers, database administrators, and higher-ranking personnel are responsible for the majority of tampering. To combat fraud, we will develop a transparent system based on Blockchain technology. The meter reading of the consumer meter, will be captured on random intervals and will then automatically transferred to the server end, where the power cost will be computed and saved on Blockchain with a unique transaction ID that cannot be altered. If the meter readings are altered then these will be easily detected, it will be simple to identify the fraud. This system will include a web interface / a web application, and a Blockchain-based database to store bills. Hence, the blockchain based electricity will help to play a role in the betterment of electricity outages in Pakistan. Hence, the Blockchain based Electric Ledger will help us to tackle the electricity tampering problem to some extent.

Keywords: Blockchain; Hyperledger; Chaincode; Solidity

An Intelligent Application for Fuel Delivery in Urban Areas

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ABSTRACT

A total of 7,560 petrol pumps are presently working in the country to facilitate consumers providing online fuel delivery services to people whereas the number of registered cars in Pakistan is reported to be at 6,209,626 as of the latest survey. On account of the major difference between the number of petrol stations and the number of cars in Pakistan, keeping the convenience and feasibility of people in mind with a genuinely progressive methodology, the portable fuel conveyance industry is set for consistent development. Though the system of online delivery of fuel is becoming quite common in different countries, to date there is not a single efficient app for this purpose in Pakistan. In this work, we tend to propose a system of online delivery of fuel in the urban areas of Pakistan. In the last ten years, according to a survey the size of the built-up area in Lahore increased from 11,518 hectares to 35,018 hectares i.e. by a factor of 3. In this outward expansion of big cities, unfortunately, there are not enough petrol stations in those areas catering to the need for refuelling vehicles and generators of the people living there. Hence, to avoid the hassle that these people face on a daily basis we are building an app that would help people refuel their tanks and save their time by bringing fuel to them. Moreover, our app would be artificially intelligent enabling more efficient delivery and services through high-level insights. By integrating methods of regression analysis our app will find out the pattern of fuel consumption by different users. That would be further used to send them notifications or promotional messages accordingly. More features such as making suggestions for filter changes and engine oil changes will be made according to the car's make and model as the app is developed.

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Keywords:

Property Management Using BlockChain

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ABSTRACT

The Blockchain Based Property Registration project aims to improve the process of property registration by eliminating the need for middlemen and providing a secure and tamper-proof ledger for recording property ownership. The project makes use of Ethereum Blockchain, Polygon/Matic, Web3Dart, IPFS, Flutter, and Metamask to create a decentralized and efficient system for property registration. The current process of property registration is often costly, time-consuming and prone to fraud due to the involvement of intermediaries. The proposed system aims to address these issues by providing a secure and tamper-proof ledger for recording property ownership, eliminating the need for intermediaries, and making the process less expensive and more efficient. The problem addressed by this project is the inefficiency and vulnerability to fraud in the current process of property registration. The proposed system is aimed at providing a secure, tamper-proof and efficient system for property registration, eliminating the need for intermediaries and making the process less expensive and more efficient. The project uses a decentralized architecture based on Ethereum Blockchain and Polygon/Matic, which is accessible through a web interface built using Flutter and Web3Dart. The system utilizes smart contracts to automate the process of property registration and transfer of ownership. Additionally, the system makes use of IPFS to securely store property registration papers, and is compatible with Metamask for easy and secure transactions. The system has been tested for its functionality, performance, security and compliance with requirements and regulations. Test results have shown that the system is able to meet all the functional and non-functional requirements. Additionally, the system is found to be secure and compliant with relevant regulations and laws. The Blockchain Based Property Registration project presents a promising solution for improving the process of property registration by eliminating the need for intermediaries and providing a secure and tamper- proof ledger for recording property ownership. The proposed system is efficient, cost-effective and compliant with relevant regulations and laws. In future, the system can be implemented in other countries to improve their property registration process.

Keywords: Blockchain; Ethereum; Smart Contracts; Solidity.

Implementation of 4th vector in game

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ABSTRACT

Progression in video games has always been bound to the player's actions, which in turn changes the world and progress the narrative in a predefined manner. This approach, while being the industry standard, hurts the overall immersion of a game; something that has been the unspoken goal that every developer strives to achieve as it defines the player's satisfaction and how well their product- the game- would perform in the market. To do away with this stale and unchanged method of game design we propose to implement a new dimension - a 4th Vector- that the game world adheres to instead of being bound to the player's actions. To this end, we conducted research to implement this new dimension, Time, in the virtual world of video games in order to reach closer real-life immersion. The implementation of the 4th vector as time can completely evolve the game world by introducing real world linear time in video games. This means that narrative, non player characters, missions and rewards, all morph based on the linear flow of time, making each second a decision that the player has to consider to earn a particular reward. For research, we created a short point and click game with a total run time of 170 in-game hours that showcases the implementation of 4th vector, which was experienced in three iterations by a group of 44 individuals, selected based on a strict criteria. The overwhelmingly positive response to the experiment led us to the final conclusion of recommending 4th vector as not only a viable but reliable option for the video game industry to look forward to, especially with the announcement of Meataverse by Meta that will possibly allow video games to be more detailed and extensive than ever before.

Keywords:

GreenHat Technologies -IOT Farming

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Abstract

The use and influence of the Internet of Things (IoT) in agriculture have been the focus of many notable researchers. Applications for Smart Agriculture based on IoT provide several research problems. This research study has shown certain IoT-based smart agriculture difficulties that have emerged. Protection of electronic circuits of devices used in IoT agricultural system from natural environmental situations (Heavy rain, fire, intolerable winds, extreme humidity, high/low temperature, etc.). Reliable energy-efficient network-based setup for the secure transmission of information to respective stakeholders in a secure manner. Selection of suitable IoT end devices, tools, and technologies for implementing smart farming. Design and implementation of highly scalable and reliable security mechanism for each IoT end devices used in Smart Agriculture. Resource utilization in an optimized manner is a big challenge in IoT agriculture. Cost-analysis and mobility are also huge challenges for smart farming. Maintenance of Quality of Service (QoS) efficiently in IoT based Smart Agricultural System is also an unfolded issue. A proper decision- making system to handle the natural disaster with the latest policies is a part of these open challenges in IoT agriculture. Crop residue for a clean environment is still a major problem. The agriculture sector must expand to fulfil demand despite an expanding population, which is currently expected to reach 9.6 billion by 2050. This is true despite environmental problems including bad weather and climate change. The agriculture sector will need to adopt new technology to acquire a much-needed advantage in order to fulfil the demands of that expanding population. IoT-based smart farming and precision farming technologies will help the sector become more operationally efficient, cut costs, decrease waste, and produce higher-quality harvests

Keywords:

Clinical Evaluation of heart patients using Cardiac MRIs

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ABSTRACT

Early detection of heart failure and heart diseases to save one's life is the need of the hour in countries where the death ratio due to heart failure is increasing with each passing day. There are various methods available for doctors to help them in diagnosis of heart related problems. Cardiac MRI is one of the tools to identify heart diseases and heart failure whereas in clinical practice, diagnosis of the MRIs is still done manually using thorough visuals and physical examination by domain experts. This project's aim is to automate diagnoses of heart related problems using cardiac MRIs, specifically the left ventricle region in cardiac MRIs which is an important part of the heart & mainly leads to heart failure. Project contributes to calculating blood flow in the left ventricle region both in diastolic and systolic phase and calculates the value of Ejection Fraction. Subsequently, based on Ejection Fraction value it diagnoses heart diseases and heart failure. Automation of cardiac MRIs will mainly be used by cardiologists in clinical practice.

Keywords:

Secure Online Voting System using Blockchian

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ABSTRACT

This project presents the design and implementation of a blockchain-based voting system for a university. The primary goal of the project is to provide a secure and transparent method for conducting online voting for student elections and other university-related voting processes. The system is built using the Ethereum blockchain, which ensures the integrity and transparency of the voting process, and the web3.js library, which allows for the interaction with the blockchain from a web interface. The system is designed to be user-friendly and accessible to all students of the university, regardless of their technical expertise. The system uses smart contracts written in Solidity to handle the voting process, which is deployed on a local Ethereum blockchain network using Truffle and Ganache. The frontend of the system is built using HTML, JavaScript, and CSS and connects with the blockchain network using web3.js and MetaMask. The project includes a comprehensive requirements analysis, which includes a literature review of existing blockchain-based voting systems, user classes and characteristics, design and implementation constraints, assumptions and dependencies, functional requirements, non-functional requirements, and other requirements. The system architecture is designed to be scalable, secure, and easy to maintain, test and validate. The system also includes a mechanism for voter verification, vote counting, results display, auditing, backups and recovery. In conclusion, this project provides a secure and transparent method for conducting online voting using blockchain technology and web3.js library. The system is designed to be user-friendly, accessible, and scalable and it can be adapted for use in other voting scenarios or systems. The project has demonstrated the feasibility of using blockchain technology and web3.js library for online voting, and has potential for future research and development..

Keywords: Blockchain; Incubator; Solidity; Ethereum; FYP

Automated Ambulance Service System

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ABSTRACT

An ambulance application, also known as an e-ambulance system, is a digital tool designed to streamline the process of requesting and dispatching emergency medical services (EMS). This application allows users to quickly and easily request an ambulance in case of an emergency by providing their location, contact information, and details about their medical condition. The application then sends this information to the nearest EMS dispatch center, which dispatches an ambulance to the patient's location. One of the key benefits of an ambulance application is the ability to reduce response times for emergency medical services. By providing real-time information about the patient's location and condition, the application can help dispatchers quickly determine the best course of action and dispatch the appropriate resources. This can lead to faster response times and improved outcomes for patients. Another benefit of this ambulance application is the ability to improve communication between patients, EMS personnel, and hospitals. The application allows patients to provide detailed information about their condition and symptoms, which can help paramedics and emergency room staff make more informed decisions about treatment. In addition, the application can also provide real-time updates on the status of the ambulance and estimated arrival time, helping to reduce anxiety and uncertainty for patients and their loved ones. The ambulance application can also help to improve the efficiency of the emergency medical system as a whole. By providing real-time data on ambulance availability, response times, and patient outcomes, the application can help to identify and address bottlenecks in the system. This can lead to improved resource allocation and better overall performance of the emergency medical system. An ambulance application can be accessed via the smartphone, tablets and computer. The user interface is designed in such a way that it is user-friendly, simple and easy to use. This will help in reducing the time taken to request for an ambulance and for the ambulance to reach the patient. In other words, this respective ambulance application tends to act as a powerful tool for improving the speed and quality of emergency medical services. By providing real-time information about patients, reducing response times, and improving communication and coordination between patients, EMS personnel, and hospitals, the application can help to save lives and improve outcomes for patients.

 Keywords:

Mango Grading and Classification

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Abstract

Mango Grading and Classification is an application that grades and classifies mangoes according to various characteristics like size, colour, and quality. The traditional grading procedure is manual, time-consuming and can result in inconsistencies and errors. This application will be automating the process making it quicker, precise, and reliable. We aim to revolutionize the mango industry in Pakistan making the supply chain management system more effective and efficient. It will also improve communication and collaboration between farmers, distributors, and consumers. Modern machine learning algorithms and computer vision techniques are used to evaluate the mangoes and categorise them according to different level of ripening which offers important insights into the quality and worth of the mangoes. Additionally, we record details about each mango, such as its variety, the region where it was grown, and its grade. Since this information is available to all users, producers, wholesalers, and customers may work together and communicate more effectively. Our application will increase the grading process' precision and uniformity, lowering the likelihood of mistakes and discrepancies. This will have a very positive impact on Pakistan's export. Mango Grading and Classification App is a state-of-the-art solution that combines computer vision and machine learning to completely transform how mangoes are graded and delivered across the supply chain. The app will deliver accurate and consistent grading information, increase the performance and efficiency of the supply chain, and offer insightful data on the quality and worth of mangoes thanks to its sophisticated algorithms and procedures.

Evergreen Surveillance

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Abstract

Trees are crucial for countless human services and it won't be wrong to label them as the life support systems for the planet. It is an undoubted fact that urban areas experience higher levels of air pollution due to the "human impact" which involves releasing of harmful gases and urban sprawling. Many pollutants, such as SO_2, NO_2, CO_2, NO, CO, NO_x, PM2.5, and PM10 can be found in the atmosphere. Trees are much crucial assets than we imagine them to be against the harmful air quality which propose threatening diseases for us humans. As essential as they are for us and the environment we breathe in, it is equally important for us to be aware of the trees we live with or the urban forest that surrounds us. From individually standing street trees, greenspaces, and groves to suburban forest all put together make up the green infrastructure of our community. In order to ensure an excellently breathable Air Quality Index, tracking tree count and regularly monitoring them is the main step to achieving the goal. After going through a number of researches, facts and figures, we found that presence of trees is directly proportional to the improvement in AQI given the kind of area targeted is a constant factor. To serve the purpose, this paper "Evergreen Surveillance" presents a "tree detection monitoring system to predict AQI" using google maps API. The approach of our system is such that it works by comparing satellite images of a targeted area where trees or any green area is detected and the green covered area (sqkm) is constantly recorded in the data log. The data log is regularly being updated as a newer image comes in and is compared with the previous image in account of the green covered area. And thus by comparing the value of green covered area over a certain period of time, we can derive where plantation needs to be done in order to improve the AQI eventually. The next part of our project involves predicting the Air Quality Index for which we have used the prediction model of python essentially by collecting and analyzing past data. We have trained a model that will detect patterns in order to predict the final outcome. The results of our project will highlight the importance of trees/greenery in the improvement of Air Quality Index and is a specific solution for all the organizations and institutes who need to be aware of the vegetation, trees or the green area condition in order to improve and maintain the air quality.