

Introduction :

The development renaissance that the Kingdom of Saudi Arabia is witnessing in terms of technical developments, urban development, and the humanization of cities that compete with the countries of the world. The Kingdom of Saudi Arabia has been keen to apply artificial intelligence and Internet of Things technologies to achieve the concept of smart cities, in order to achieve the Programs goals of the Quality of Life , National Transformation , Guests of Rahman, and all the goals of ambitious national programs that contribute to achieving the goals of Vision 2030.

The Kingdom of Saudi Arabia has been keen to raise the efficiency of cities and achieve the highest standards for the city. Visual Pollution is one of the most important elements to be eliminated. Visual Pollution leads to psychological problems, including tension, stress and anxiety, and also leads to physical problems that harm human health, up to colon disease and age-related diseases (hypertension, diabetes and heart).

Visual Pollution is one of the causes of human vision disturbance and discomfort, and the loss of the aesthetic sense of the city. Several Visual Pollution detection techniques have been used. Among the most important of these technologies are artificial intelligence, machine learning, and computer vision technologies that helped detect Visual Pollution by distinguishing images, video cameras, and surveillance cameras, in addition to laser sensors and ultrasound waves. The Internet of Things and drones have contributed to providing tangible support for artificial intelligence technologies in detecting Visual Pollution.

Project Overview:

The purpose of the project is to facilitate the research procedures for observers and specialists in visual pollution. Artificial intelligence, computer vision, and neural network technologies were used to assist officials in making decisions to remove visual pollution. The machine was trained with a set of visual pollution data, classified and then predicted. The EfficientNet-B0 algorithm was used, and it is considered one of the fastest algorithms that have achieved high accuracy in recent scientific research. The data was a set of images related to visual pollution, and it was taken into account in the training for horizontal and vertical imaging, and that the machine is trained on regular photography and drone photography, in addition to the training was done for the images according to the time of day and night and according to the weather condition (clouds, rain, dust , sunny) so that the machine is trained according to the type of camera, meaning that the camera is not required to have high specifications.

Challenges In Preparing The Data:

- Unavailability of data since the beginning of the competition
- Data was used from a variety of sources:
 - Kaggle.com
 - Photos from Flickr.com
 - Pictures from Google searches
 - my own photography
 - Data provided by the contest.

Expandability Of Work:

- Develop a strategy that helps make the system smart and integrated without human intervention.
- Possibility to use the program with:
 - Pictures.
 - Video.
 - Surveillance Cameras.
 - Drones.
 - Search cars for visual pollution.
 - Live broadcast from TV channels.

- Mobile camera.
- Training the machine for more visual pollution cases such as:
 - Damaged cars.
 - Gatherings for discounts.
 - Broken sidewalks.
 - Damaged facilities.
 - Damaged lighting.
 - Broken trees.
 - Trees obscuring the view of the road or landmarks.
 - Construction ruins.
 - Random camps.
 - Food truck.
 - Violating billboards.
 - Hawkers.
 - Umbrellas and hangers.
 - Damaged gardens.
- Training the machine in Crowd management.
- Training the machine in rationing the entry of trucks.
- Training the machine in monitoring mobile refrigerators during the Hajj season.
- Training the machine in detecting fires.
- Training the machine to detect unusual behavior or anomalies in gatherings such as (theft, carrying weapons, obstructing traffic, kidnappings, killings, drug sales).
- Training the machine to search for problems through social media platforms.
- Electronic connection with:
 - Control systems.
 - Internet of Things systems.
 - Asset management systems.
 - Complaints systems (940).
 - Field monitoring systems.
 - Fossil systems.
 - Contract systems.
 - Project systems.
 - E-Ticketing systems.
 - GIS systems.

Open Source Software That Was Used For Work:

Google Colab.

I Want To Try If I Have More Time/Resources/Data To Solve The Problem.

The Time:

Using the algorithm and its work in an integrated system.

Improving the algorithm and adding the YOLO algorithm to make the video detection better.

The experience of the project in the city of Riyadh, Makkah Al-Mukarramah and Dammam, due to the importance of these cities, and also because images were taken and built in the algorithm for these cities.

The actual experience of the project during the season of Hajj and Umrah, through the entrances and exits of the city of Makkah Al-Mukarramah and the holy sites. And it produces for us the enrichment of the customer's experience, and through their observations, it becomes clear to us the success of the algorithm by reducing the manifestations of visual pollution, achieving the goals of the Quality of Life Program and the Guests of Rahman Program, and achieving a distinguished spiritual experience for the Hajj and Umrah performers in the city of Makkah Al-Mukarramah.

Resource Possibility:

Adoption of the idea by investors and building the system for the algorithm and activating it at the level of the secretariats of the Kingdom of Saudi Arabia and the royal commissions.

Data to Solve the Problem:

Increasing the data, as the current images of activating the algorithm reached more than 35 thousand images of visual pollution manifestations, and the more images and data, the greater the percentage of prediction and experience of the machine.

Adding crowd management data to make the project smarter, as there is a direct relationship between congestion, visual pollution, and proper crowd management, as it will rely on crowd management data in previous work in Hajj and Umrah and the Riyadh season, in addition to obtaining data on international Arab success stories such as crowd management in FIFA 2023 and Dubai Expo 2020 Crowd Management This achieves a safe pilgrimage with intelligent crowd management.