PROJECT AND FINAL SUBMISSION

Date	**19 May 2023**
Project ID	**PBL-NT-GP--5740-1680799675**
Project Name	**Crime Vision: Advanced Crime Classification with Deep Learning**

1. INTRODUCTION

1.1 Project Overview

The project "Crime Vision in Artificial Intelligence" aims to leverage the power of AI technology to enhance crime prevention, detection, and investigation processes. By harnessing the capabilities of machine learning, computer vision, and data analytics, this project seeks to develop advanced tools and systems that can assist law enforcement agencies in combating criminal activities more effectively.

1.2 Purpose

The concept of "crime vision" in artificial intelligence (AI) is not widely used or recognized. It seems to be a term you are using specifically, so I will provide an explanation based on the term's general meaning.

"Crime vision" could refer to the application of computer vision technology in the field of crime prevention, detection, or investigation. Computer vision involves the use of algorithms and machine learning techniques to extract meaningful information from visual data, such as images or videos. By analysing visual information, AI systems can potentially aid law enforcement agencies and security organizations in various ways.

2. IDEATION AND PROPOSED SOLUTION

2.1 Problem Statement Definition

Problem Statement

Most of the crime activities were increasing due to poverty and unemployment, people were finding ways to earn money, they did not consider whether it is legal or illegal activities. Poverty is not only the reason for crime, also there are many reasons for the crime activities.

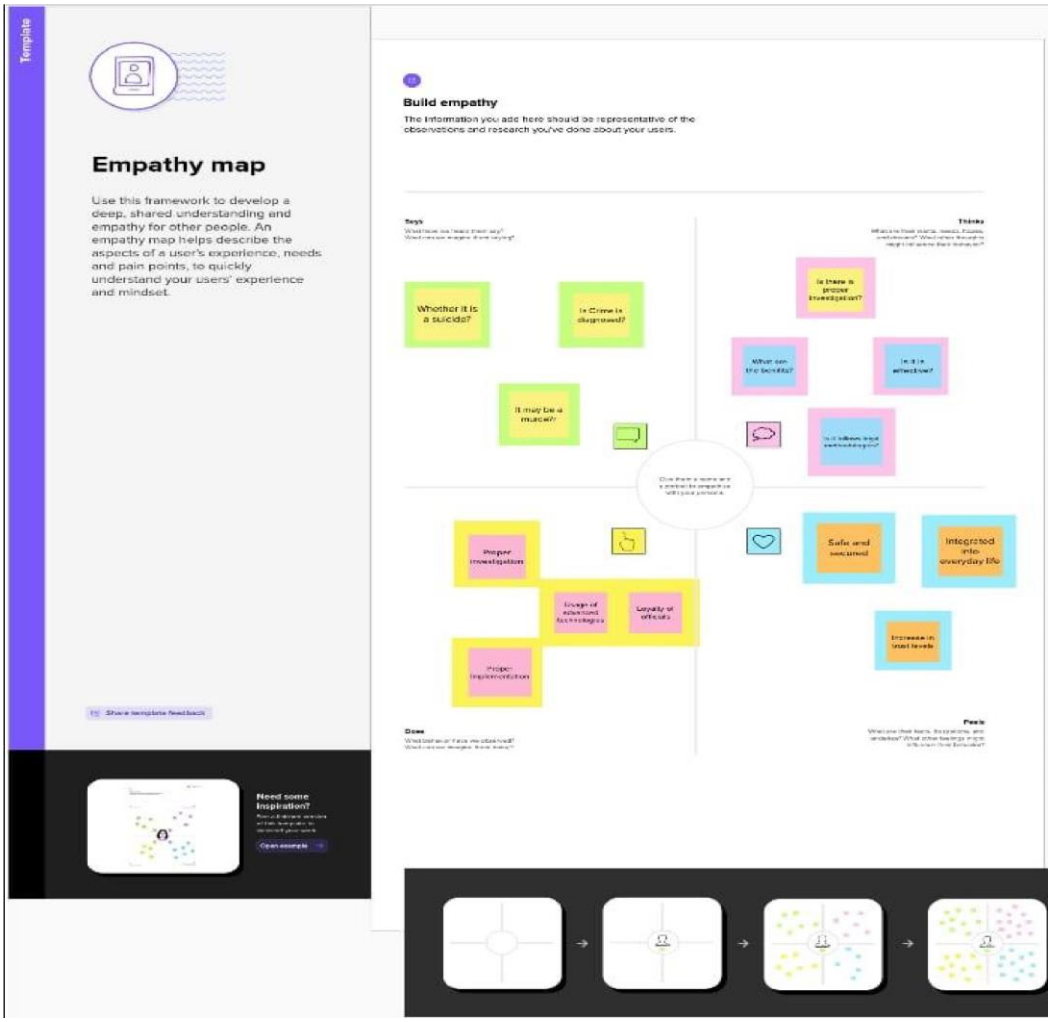
Proposed Model

With deep learning of crime vision, after analysing the data, law enforcement agencies can make predictions about future criminal activities. These predictions, which can take various forms, help agencies allocate resources more effectively and prevent crimes from occurring. The predictions can take various forms, such as: High-crime areas

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	People	Live peace	Interrupt of crimes	Illegal activities	Tensed
PS-2	Doctor	Treat patients	Medical crimes	Illegal medical supplies	Frustrated

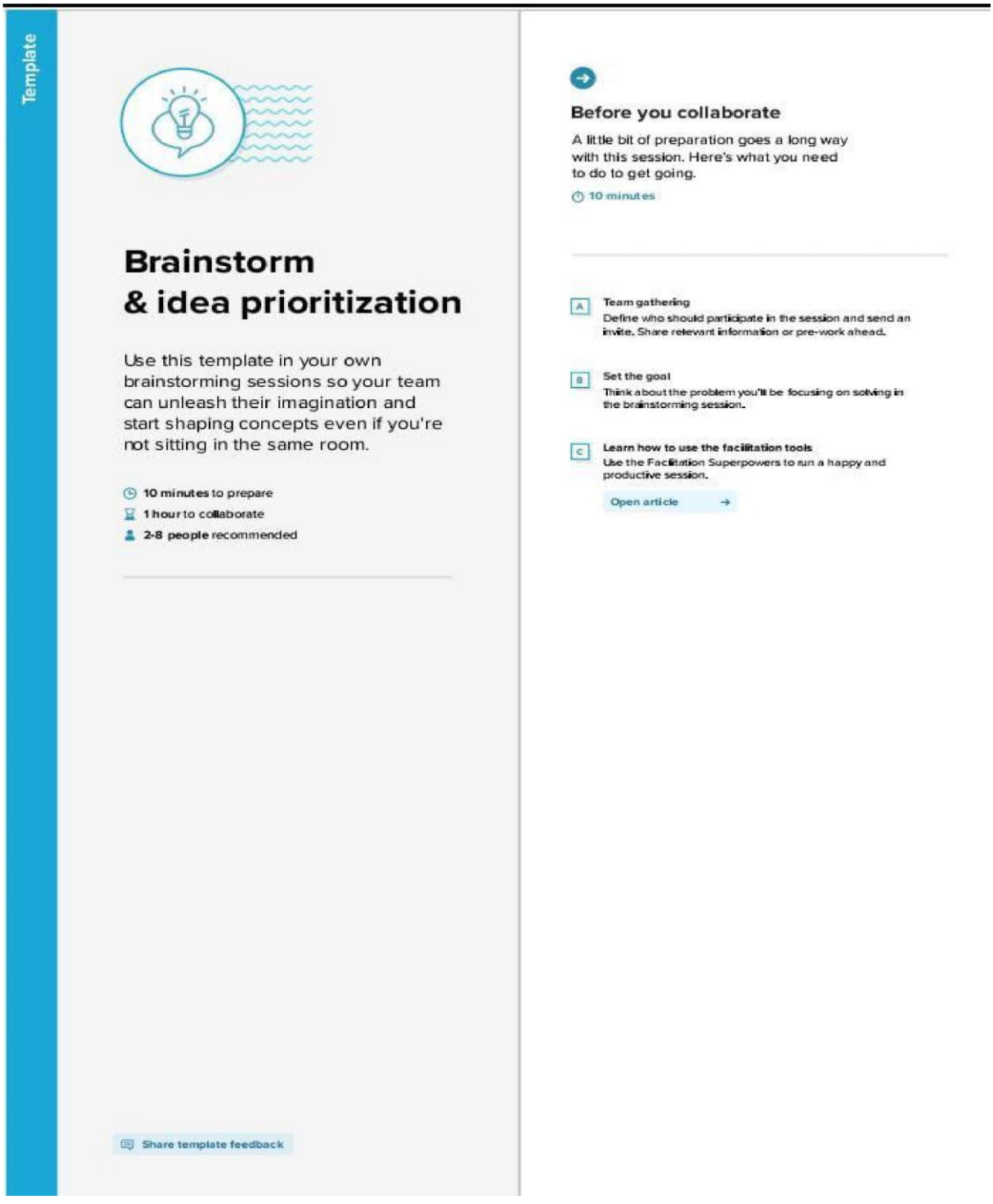
2.2 Empathy Map Canvas

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes. It is a useful tool to helps teams better understand their users Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.



2.3 Ideation and Brainstroming

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.



1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

5 minutes

PROBLEM

To identify either likely places of future crime scenes or past crime perpetrators, by applying statistical predictions .As a crime typically involves a perpetrator and a target and occurs at a certain place and time, techniques of predictive policing.

Key rules of brainstorming

To run an smooth and productive session

- Stay in topic.
- Encourage wild ideas.
- Defer judgment.
- Listen to others.
- Go for volume.
- If possible, be visual.

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

TIP

You can select a sticky note and hit the pencil (switch to sketch) icon to start drawing!

Person 1

Each cell is marked as a hotspot, if at least one incident occurred in the following month, otherwise a cold spot. After the crime categories are merged, for the training time period, the average number of hotspots per day is presented for every crime type

Person 2

A detailed presentation of the classes of each dataset and the homogeneous approach should be followed

Person 3

Person 4

Person 5

Person 6

Person 7

Person 8

3

Group Ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes

TIP

Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

We examine the effectiveness of deep learning algorithms on this domain and provide recommendations for designing and training deep learning systems for predicting crime areas, using open data from reports

4

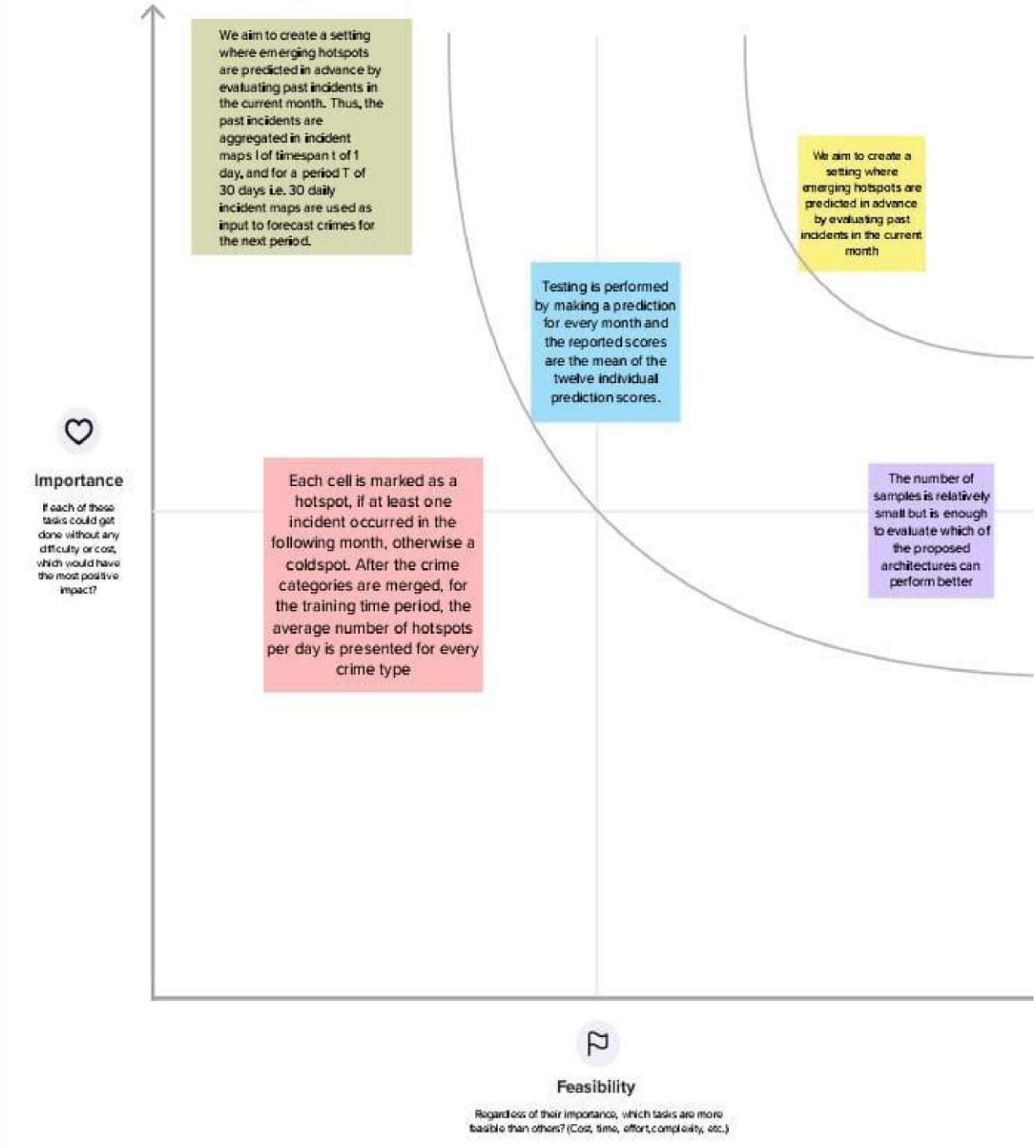
Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

TIP

Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the H key on the keyboard.



2.4 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	The current methods of crime prevention and detection are limited in their ability to effectively analyse large volumes of data and identify patterns of criminal behaviour. Law enforcement agencies face significant challenges in gathering and analysing data from various sources to detect and prevent crime. There is a need for an intelligent system that can process large amounts of data and provide actionable insights to law enforcement agencies, thereby improving their ability to prevent and detect crime. The use of artificial intelligence (AI) and machine learning (ML) algorithms can help in the development of such a system.
2.	Idea / Solution description	One solution for implementing crime vision under AI is to use computer vision algorithms to analyse surveillance camera footage. This can involve using object detection algorithms to detect and track individuals or vehicles in real-time, and then using machine learning algorithms to identify patterns in their behaviour that may indicate criminal activity. Another solution is to use natural language processing algorithms to analyse police reports and other crime-related data. This can help to identify common patterns in crime, such as certain types of crimes being more likely to occur in certain areas or at certain

		times of day. This information can be used to inform policing strategies and allocate resources more effectively. Overall, the use of AI for crime vision has the potential to significantly improve public safety and reduce crime rates.
3.	Novelty / Uniqueness	The use of artificial intelligence (AI) in crime prevention and law enforcement is a relatively new development and holds great potential for improving public safety. AI systems can analyse vast amounts of data from various sources, including CCTV cameras, social media, and other digital sources, to detect patterns, identify anomalies, and predict criminal activity. One unique aspect of AI-based crime prevention is the ability to detect and analyse patterns that may be difficult for humans to discern. AI can also help law enforcement agencies analyse video footage and other forms of data more efficiently. Another unique aspect of AI-based crime prevention is the potential for predictive policing. AI systems can analyse crime data and other relevant data sources to identify high-risk areas and individuals. This information can then be used to allocate law enforcement resources more effectively and prevent crimes from occurring in the first place.

4.	Social Impact / Customer Satisfaction	Potential social impact is the erosion of privacy. The use of AI in crime vision may involve the use of facial recognition or other biometric data, which could be used to track individuals' movements and activities without their knowledge or consent. This could raise concerns about civil liberties and human rights. Customer satisfaction with AI-powered crime vision is also an important consideration. Law enforcement agencies and other organizations may adopt AI systems to improve their crime detection and prevention capabilities, but they must also consider the impact on the public's trust and confidence in these systems. If the public perceives that the AI systems are invasive or biased, they may be less likely to cooperate with law enforcement or support the use of these systems.
5.	Business Model (Revenue Model)	The business model for Artificial Intelligence (AI) in crime vision can vary depending on the specific application and market. However, some common revenue models include: Subscription-based model: In this model, customers pay a recurring fee for access to an AI-powered crime vision system. This model is often used by software-as-a-service (SaaS) providers and can offer predictable revenue streams. Pay-per-use model: In this model, customers pay for each use or transaction on the AI-

		powered crime vision system. This model is often used by cloud-based services and can offer flexibility for customers who may have variable usage patterns. Licensing model: In this model, customers pay a one-time fee for access to an AI-powered crime vision system. This model is often used by enterprise software vendors and can provide a significant upfront revenue stream. Consulting model: In this model, customers pay for consulting services to help them integrate an AI-powered crime vision system into their existing infrastructure. This model is often used by technology consulting firms and can offer high-margin revenue streams. Value-based model: In this model, the revenue is based on the value created by the AI-powered crime vision system. For example, a company may charge a percentage of the savings generated by using the system to reduce crime or increase public safety.
6.	Scalability of the Solution	The scalability of a solution for crime vision in artificial intelligence (AI) depends on a variety of factors, such as the size of the dataset, the complexity of the algorithms used, and the computational resources available. If the dataset is small, the solution may not be scalable as it may not be able to handle larger datasets. However, if the dataset is large, the solution can be made more scalable

		by using distributed computing and parallel processing techniques. This allows the solution to scale horizontally by distributing the workload across multiple machines. The complexity of the algorithms used also affects scalability. Simple algorithms may not be able to handle complex datasets or provide accurate results, whereas more complex algorithms may require more computational resources and be more difficult to scale. To make the solution more scalable, it's important to strike a balance between the complexity of the algorithms and the available computational resources.

3. REQUIREMENT ANALYSIS

3.1 Functional Requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Register user login	The registered user name and password will be provided after the registered user registration is confirmed. Password should be hidden from others while typing it in the field.
FR-2	Register new user	System must be able to verify and validate information. Online Crime reporting system must encrypt the password of the customer to provide security.
FR-3	Complain History	The registered user can add the desired complain into his cart by clicking add to cart option on the product.

		He can view his cart by clicking on the cart button. All products added by cart can be viewed in the cart.
FR-4	Manage the registered User	The administrator can add the registered user, delete the registered user, view the registered user.
FR-5	Manage Updation	The administrator can view orders and update complaint status. Online Crime Reporting System must identify the login of the admin.

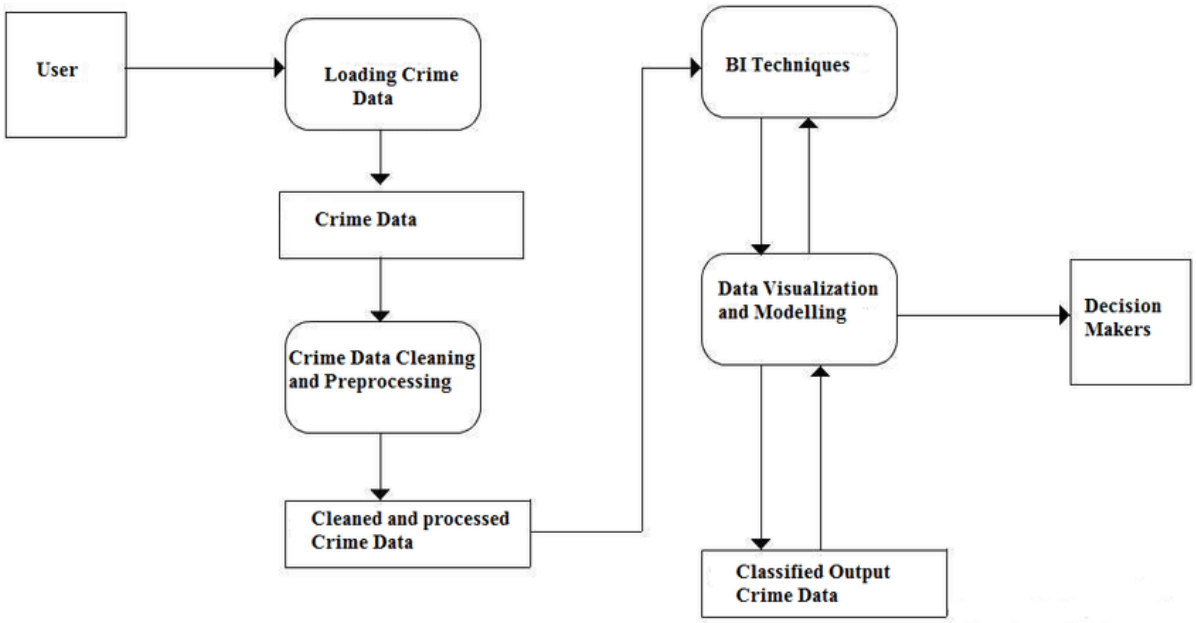
3.2 Non-Functional Requirements

FR No.	**Non-Functional Requirement**	**Description**
NFR-1	Efficiency	When an online Crime Reporting System of Police Station implemented the registered user can create complaint in an efficient manner.
NFR-2	Reliability	Online Crime Reporting System should provide a reliable environment to both the registered users and administrator. All complaint should be reaching at the admin end without any errors.
NFR-3	Usability	Online Crime Reporting System is designed for the registered users are friendly environment and ease of user.
NFR-4	Implementation	Implementation of ONLINE CRIME REPORTING SYSTEM using CSS, AJAX and html in front end with PHP as back end and it will be used for database connectivity. And the database part is developed by Xampp.
NFR-5	Database Security	Unauthorized person cannot access the panel and database, do not read and write the information.

4. PROJECT DESIGN

4.1 Data Flow Diagram

The crime detection component uses machine learning algorithms to identify criminal activity, such as theft, assault, or vandalism, in the video stream. Once a suspect has been identified, their data is searched for in the Suspect Data Storage, and if found, the Suspect ID component retrieves their data.



4.2 Solution & technical architecture

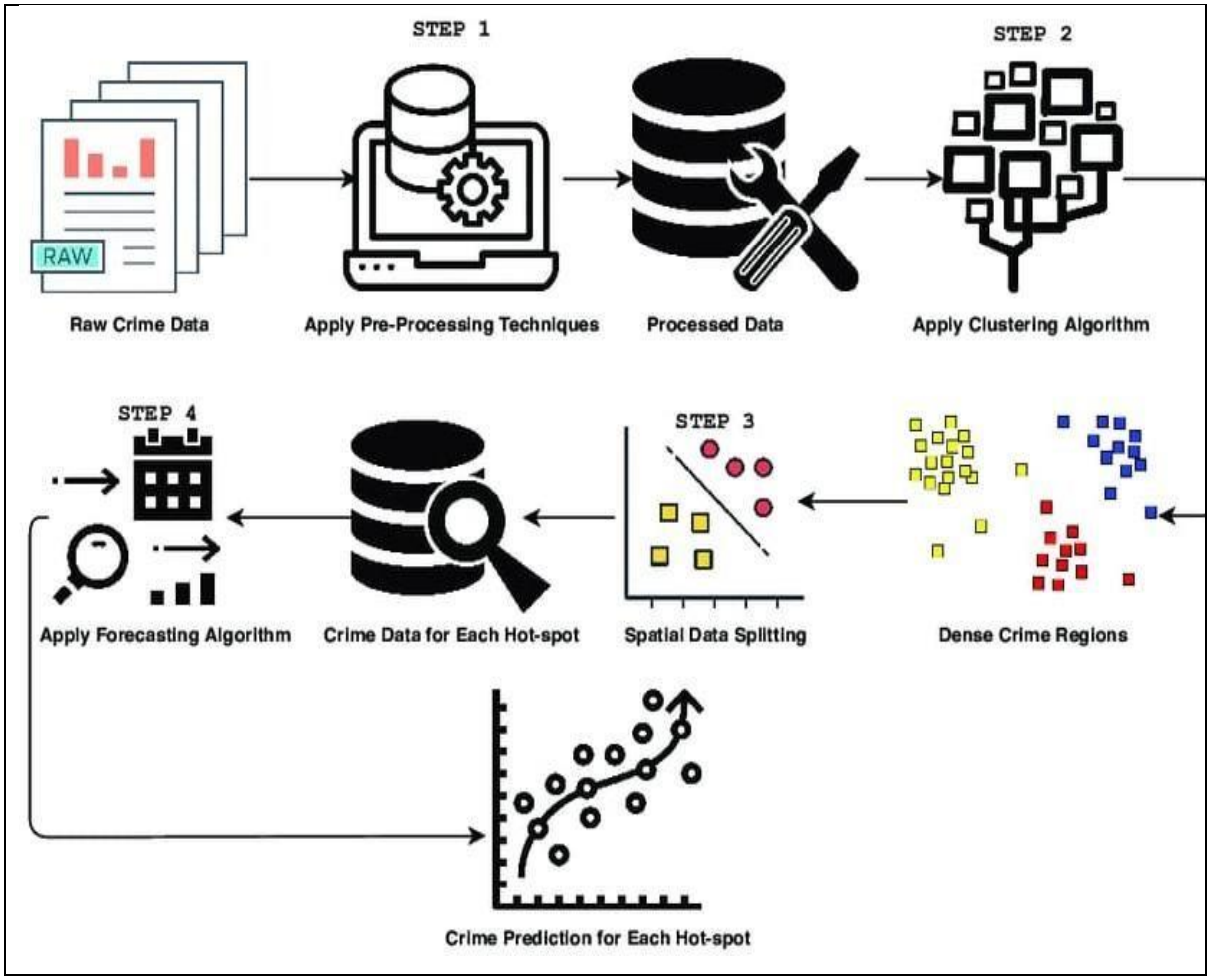
The development of a solution architecture for crime vision under artificial intelligence would involve several components and considerations. Below is a high-level overview of some of the key elements that would be involved in such an architecture.

1. Data Collection and Management: The first step in any AI-based solution is to collect and manage relevant data. In the case of crime vision, such as surveillance cameras, police reports, and social media platforms. The data would need to be stored in a secure and accessible manner, and data privacy laws and regulations must be taken into account.

2. Data Processing: Once the data has been collected, it needs to be processed to extract relevant features and patterns. This involves using machine learning algorithms to analyse the data and identify relevant patterns and trends. This step is critical in enabling the AI system to recognize potential criminal activity and identify individuals who may be involved.

3. AI Model Development: The next step is to develop the AI models that will be used to analyse the data and identify potential criminal activity. This involves selecting the appropriate machine learning algorithms and fine-tuning them to ensure that they are accurate and effective.

4. Real-time Monitoring and Alerting: Once the AI models have been developed, they need to be integrated into a real-time monitoring system that can alert law enforcement personnel to potential criminal activity. This requires developing a user interface that is easy to use and can provide real- time alerts and notifications to relevant personnel.



4.3 User-Stories

User Type	User Story Number	User Story / Task	Acceptance criteria	Priority
Law enforcement agent	USN-1	As a law enforcement agent, I want to use AI powered facial recognition technology to quickly identify suspects in real-time surveillance footage, so that I can apprehend them before they can escape.	It involves using computer vision feeds from camera in public spaces and matching the faces of people captured in those feeds against a database of known criminals.	High
Forensic Analyst	USN-2	As a forensic analyst, I want to use AI powered image enhancement tools to enhance low-quality surveillance footage or images from crime scenes, so that I can identify key details that may be crucial to solving a case.	This involves using machine learning algorithms to identify and enhance specific features in images, such as license plates, tattoos, or other identifying marks. The AI system would need to be trained on a wide variety of image types and able to handle noisy or low-quality data.	High
Police Department Manager	USN-3	As a police department manager, I want to use predictive analytics to forecast crime trends and allocate resources more efficiently, so that we can prevent crimes before they occur and respond	This user story involves using statistical modelling and machine learning algorithms to analyse historical crime data, demographic data, and other relevant factors, in order to identify patterns and make	High

		more quickly to incidents.	predictions about where and when crimes are likely to occur.	
Criminal defence attorney	USN-4	As a criminal defence attorney, I want to use AI-powered natural language processing (NLP) tools to analyse large volumes of legal documents and identify relevant case law or precedent, so that I can build stronger arguments and mount more effective defences for my clients	This user story involves using NLP algorithms to parse and analyse legal documents, such as court transcripts, briefs, or case law, in order to identify relevant information and draw connections between different cases.	High
Crime victim Advocate	USN-5	As a crime victim advocate, I want to use AI powered chatbots or virtual assistants to provide 24/7 support to victims of crime, so that they can access resources and get help whenever they need it.	The AI system would need to be able to recognize and respond appropriately to a wide range of user inputs, and provide personalized recommendations based on each user's needs.	High

Citizen	USN-6	As a citizen, I want the AI system to be able to provide me with information about crime trends in my neighbourhood, so that I can make informed decisions about where to live and how to stay safe.	The AI system should be able to provide crime statistics for the citizen's neighbourhood, including the types of crimes that have occurred, the frequency of those crimes, and the time of day or day of the week when they are most likely to occur.	Medium
Judge	USN-7	As a judge or prosecutor, I want the AI system to be able to provide me with insights into the likelihood of a defendant reoffending, so that I can make informed decisions about sentencing and parole.	The AI system must be able to analyse data related to the defendant's personal and demographic characteristics, such as age, gender, education, employment history, and family background.	Low

5. CODING AND SOLUTIONING

5.1 Features

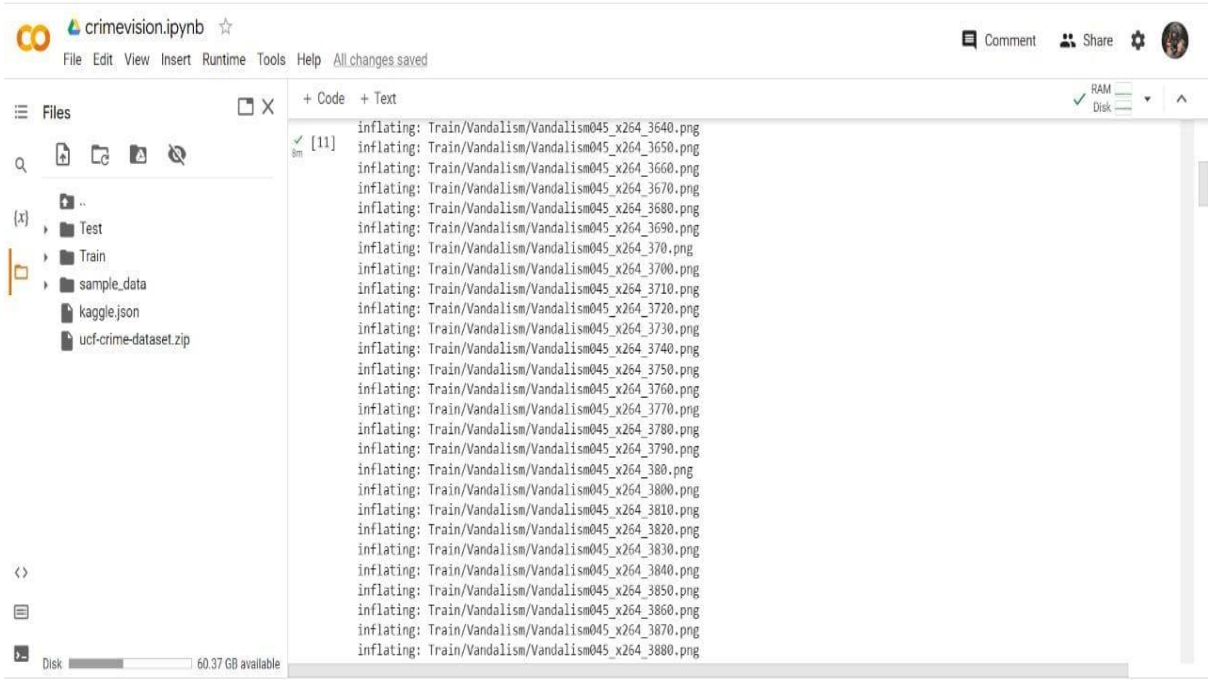
Crime vision in AI refers to the application of artificial intelligence (AI) technologies in the field of crime detection, prevention, and investigation. It utilizes computer vision, machine learning, and data analysis techniques to analyse visual data and extract relevant information for identifying and solving crimes.

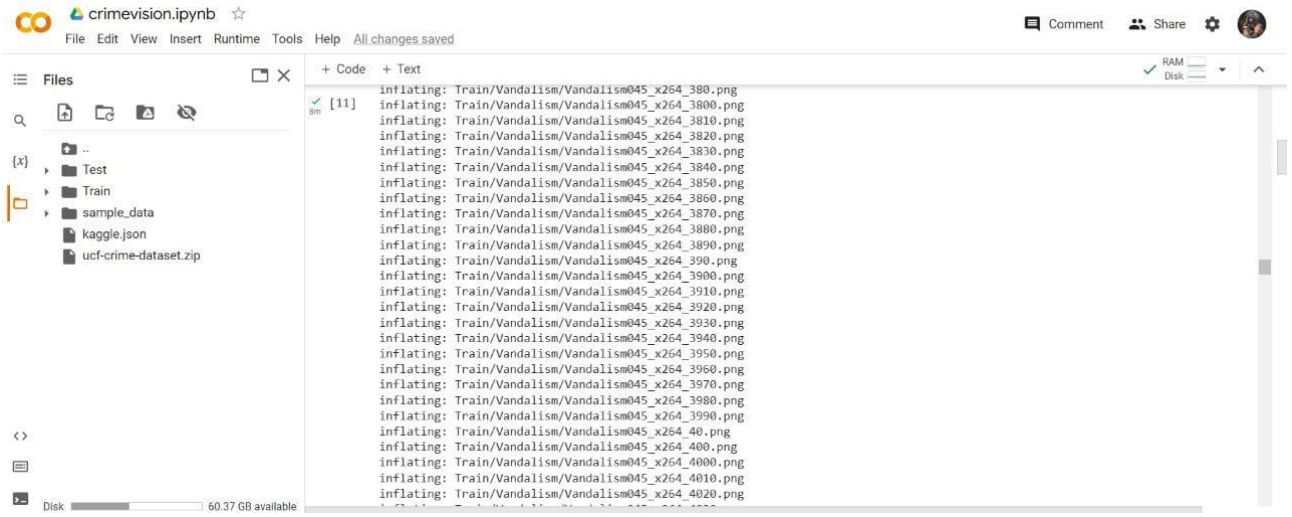
1.Object Recognition: AI-powered crime vision systems can accurately identify and classify objects captured in images or video footage. This includes recognizing weapons, stolen goods, suspicious packages, and other objects that may be related to criminal activities.

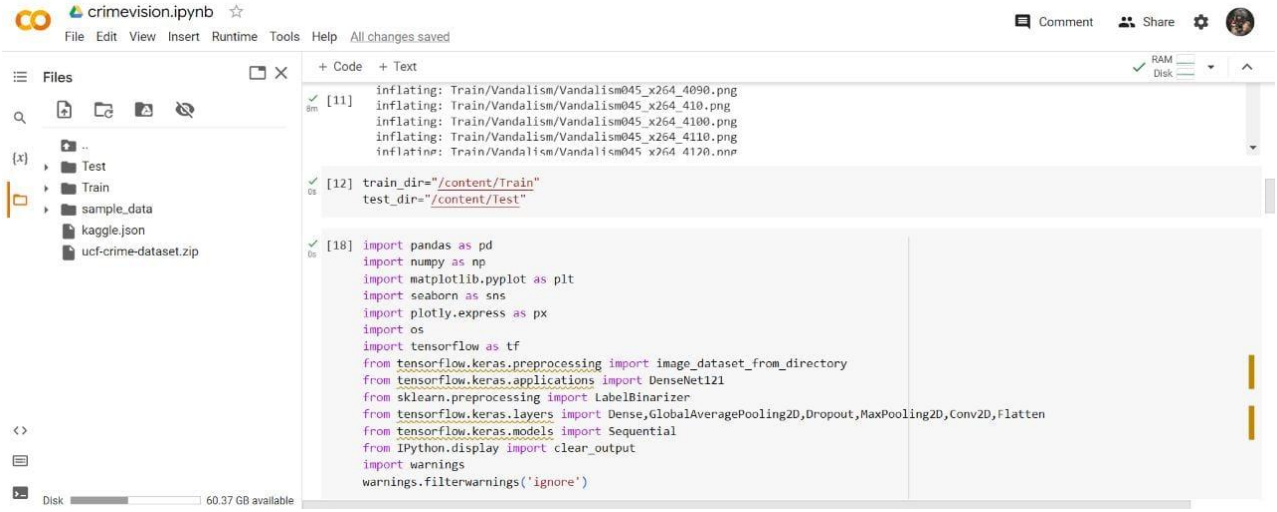
2.Facial Recognition: AI algorithms can analyse faces in images or videos and compare them against a database of known individuals to identify potential suspects or persons of interest. Facial recognition technology can be used for identifying criminals, missing persons, or individuals with outstanding warrants.

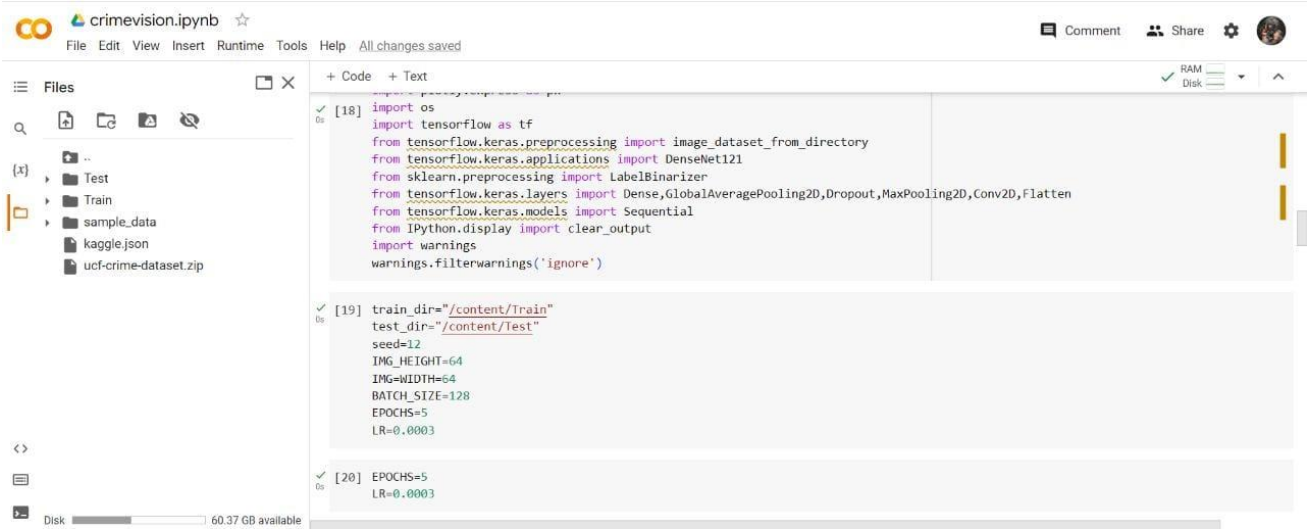
3.Behavior Analysis: AI can analyse patterns of behaviour captured in video footage to detect suspicious or abnormal activities. It can identify actions such as loitering, vandalism, fights, or other potentially criminal behaviours, enabling law enforcement to intervene proactively.

5.2 Coding




crimevision.ipynb
File Edit View Insert Runtime Tools Help All changes saved
Comment
Share
Files
+ Code + Text
RAM
Disk
[11]
inflating: Train/Vandalism/Vandalism045_x264_380.png
inflating: Train/Vandalism/Vandalism045_x264_3800.png
inflating: Train/Vandalism/Vandalism045_x264_3810.png
inflating: Train/Vandalism/Vandalism045_x264_3820.png
inflating: Train/Vandalism/Vandalism045_x264_3830.png
inflating: Train/Vandalism/Vandalism045_x264_3840.png
inflating: Train/Vandalism/Vandalism045_x264_3850.png
inflating: Train/Vandalism/Vandalism045_x264_3860.png
inflating: Train/Vandalism/Vandalism045_x264_3870.png
inflating: Train/Vandalism/Vandalism045_x264_3880.png
inflating: Train/Vandalism/Vandalism045_x264_3890.png
inflating: Train/Vandalism/Vandalism045_x264_390.png
inflating: Train/Vandalism/Vandalism045_x264_3900.png
inflating: Train/Vandalism/Vandalism045_x264_3910.png
inflating: Train/Vandalism/Vandalism045_x264_3920.png
inflating: Train/Vandalism/Vandalism045_x264_3930.png
inflating: Train/Vandalism/Vandalism045_x264_3940.png
inflating: Train/Vandalism/Vandalism045_x264_3950.png
inflating: Train/Vandalism/Vandalism045_x264_3960.png
inflating: Train/Vandalism/Vandalism045_x264_3970.png
inflating: Train/Vandalism/Vandalism045_x264_3980.png
inflating: Train/Vandalism/Vandalism045_x264_3990.png
inflating: Train/Vandalism/Vandalism045_x264_40.png
inflating: Train/Vandalism/Vandalism045_x264_400.png
inflating: Train/Vandalism/Vandalism045_x264_4000.png
inflating: Train/Vandalism/Vandalism045_x264_4010.png
inflating: Train/Vandalism/Vandalism045_x264_4020.png
Test
Train
sample_data
kaggle.json
ucf-crime-dataset.zip
Disk
60.37 GB available


crimevision.ipynb
File Edit View Insert Runtime Tools Help All changes saved
Comment
Share
Files
+ Code + Text
RAM
Disk
[11]
inflating: Train/Vandalism/Vandalism045_x264_4090.png
inflating: Train/Vandalism/Vandalism045_x264_410.png
inflating: Train/Vandalism/Vandalism045_x264_4100.png
inflating: Train/Vandalism/Vandalism045_x264_4110.png
[12] train_dir="/content/Train"
test_dir="/content/Test"
[18] import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
import os
import tensorflow as tf
from tensorflow.keras.preprocessing import image_dataset_from_directory
from tensorflow.keras.applications import DenseNet121
from sklearn.preprocessing import LabelBinarizer
from tensorflow.keras.layers import Dense,GlobalAveragePooling2D,Dropout,MaxPooling2D,Conv2D,Flatten
from tensorflow.keras.models import Sequential
from IPython.display import clear_output
import warnings
warnings.filterwarnings('ignore')
Test
Train
sample_data
kaggle.json
ucf-crime-dataset.zip
Disk
60.37 GB available


crimevision.ipynb
File Edit View Insert Runtime Tools Help All changes saved
Comment
Share
Files
+ Code + Text
RAM
Disk
[18] import os
import tensorflow as tf
from tensorflow.keras.preprocessing import image_dataset_from_directory
from tensorflow.keras.applications import DenseNet121
from sklearn.preprocessing import LabelBinarizer
from tensorflow.keras.layers import Dense,GlobalAveragePooling2D,Dropout,MaxPooling2D,Conv2D,Flatten
from tensorflow.keras.models import Sequential
from IPython.display import clear_output
import warnings
warnings.filterwarnings('ignore')
[19] train_dir="/content/Train"
test_dir="/content/Test"
seed=12
IMG_HEIGHT=64
IMG=WIDTH=64
BATCH_SIZE=128
EPOCHS=5
LR=0.0003
[20] EPOCHS=5
LR=0.0003
Test
Train
sample_data
kaggle.json
ucf-crime-dataset.zip
Disk
60.37 GB available

crimevision.ipynb

File Edit View Insert Runtime Tools Help All changes saved

Comment Share

Files

+ Code + Text

RAM Disk

```
[22] crime_types=os.listdir(train_dir)
     n=len(crime_types)
     print("Number of crime categories:",n)
```

```
Number of crime categories: 14
```

```
[24] crimes={}
     train=test=0
     for clss in crime_types:
       num=len(os.listdir(os.path.join(train_dir,clss)))
       train+=num
       test+=len(os.listdir(os.path.join(test_dir,clss)))
       crimes[clss]=num
```

```
[29] plt.figure(figsize=(8,5))
     plt.pie(x=np.array([train,test]),autopct="%.1f%%",explode=[0.1,0.1],labels=["Training Data","Test Data"],pctdistance=0.5,colors=['t
     plt.title("Train and test images",fontsize=18);
```

..
Test
Train
sample_data
kaggle.json
ucf-crime-dataset.zip

Disk 60.37 GB available

crimevision.ipynb

File Edit View Insert Runtime Tools Help All changes saved

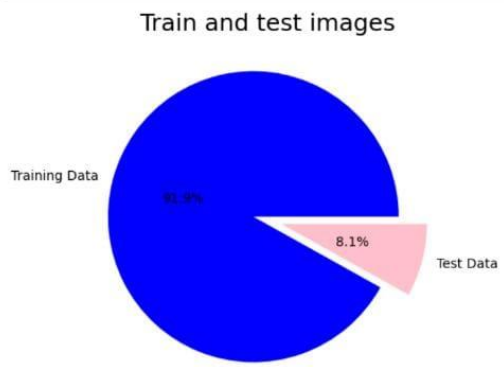
Comment Share

Files

+ Code + Text

RAM Disk

```
[29] plt.figure(figsize=(8,5))
     plt.pie(x=np.array([train,test]),autopct="%.1f%%",explode=[0.1,0.1],labels=["Training Data","Test Data"],pctdistance=0.5,colors=['t
     plt.title("Train and test images",fontsize=18);
```



..
Test
Train
sample_data
kaggle.json
ucf-crime-dataset.zip

Disk 60.37 GB available

crimevision.ipynb

File Edit View Insert Runtime Tools Help All changes saved

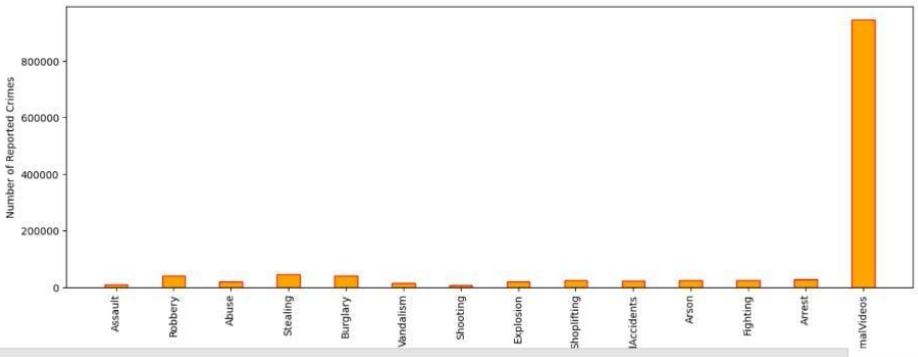
Comment Share

Files

+ Code + Text

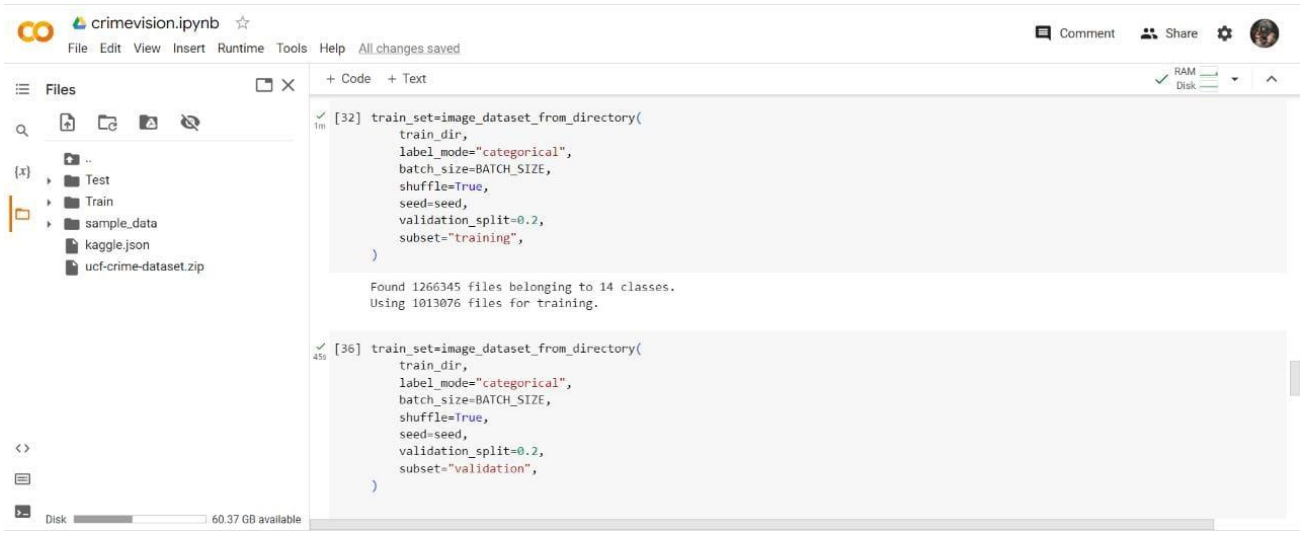
RAM Disk

```
[31] plt.xlabel("Reported Crimes")
     plt.ylabel("Number of Reported Crimes")
     plt.show()
```

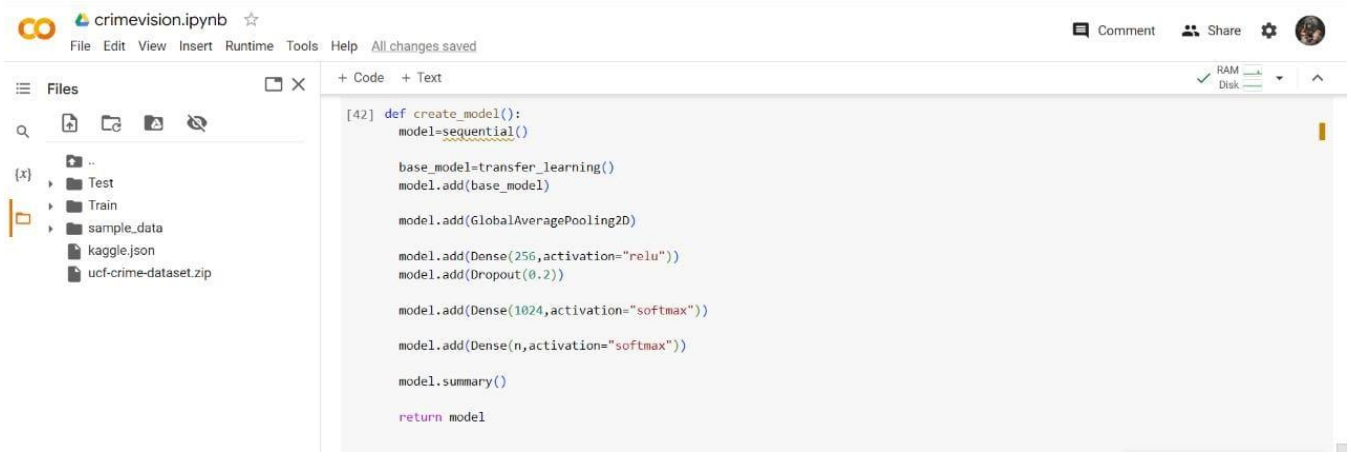


..
Test
Train
sample_data
kaggle.json
ucf-crime-dataset.zip

Disk 60.37 GB available


crimevision.ipynb
File Edit View Insert Runtime Tools Help All changes saved
Comment Share
Files
+ Code + Text
RAM Disk
Test
Train
sample_data
kaggle.json
ucf-crime-dataset.zip
[32] train_set=image_dataset_from_directory(
train_dir,
label_mode="categorical",
batch_size=BATCH_SIZE,
shuffle=True,
seed=seed,
validation_split=0.2,
subset="training",
)
Found 1266345 files belonging to 14 classes.
Using 1013076 files for training.
[36] train_set=image_dataset_from_directory(
train_dir,
label_mode="categorical",
batch_size=BATCH_SIZE,
shuffle=True,
seed=seed,
validation_split=0.2,
subset="validation",
)
Disk 60.37 GB available


crimevision.ipynb
File Edit View Insert Runtime Tools Help All changes saved
Comment Share
Files
+ Code + Text
RAM Disk
Test
Train
sample_data
kaggle.json
ucf-crime-dataset.zip
[36]
Found 1266345 files belonging to 14 classes.
Using 253269 files for validation.
[37] test_set=image_dataset_from_directory(
train_dir,
label_mode="categorical",
class_names=None,
batch_size=BATCH_SIZE,
shuffle=False,
seed=seed,
)
Found 1266345 files belonging to 14 classes.
[39] def transfer_learning():
base_model=DenseNet121(include_top=False,weights="imagenet")
thr=149
for layers in base_model.layers[:thr]:
layers.trainable=False
for layers in base_model.layers[thr:]:
layers.trainable=False
return base_model
Disk 60.37 GB available


crimevision.ipynb
File Edit View Insert Runtime Tools Help All changes saved
Comment Share
Files
+ Code + Text
RAM Disk
Test
Train
sample_data
kaggle.json
ucf-crime-dataset.zip
[42] def create_model():
model=sequential()
base_model=transfer_learning()
model.add(base_model)
model.add(GlobalAveragePooling2D)
model.add(Dense(256,activation="relu"))
model.add(Dropout(0.2))
model.add(Dense(1024,activation="softmax"))
model.add(Dense(n,activation="softmax"))
model.summary()
return model

6. RESULTS

6.1 Performance Metrics

AI-powered crime vision systems have shown significant potential in enhancing various aspects of law enforcement and public safety. These systems utilize advanced computer vision algorithms and machine learning techniques to analyse visual data and detect patterns associated with criminal activities.

7.ADVANTAGES AND DISADVANTAGES

7.1 Advantages

1.Improved Surveillance: Crime vision systems using AI can enhance surveillance capabilities by analyzing large volumes of video footage in real-time. This allows for more effective monitoring of public spaces, critical infrastructure, and high-crime areas, leading to enhanced crime prevention and faster response times.

2.Efficient Object Detection: AI algorithms enable accurate and efficient object detection in video data, allowing for the identification and tracking of suspicious individuals, vehicles, or objects. This capability aids in early threat detection, enabling timely intervention and prevention of criminal activities.

3.Enhanced Investigative Capabilities: AI-powered crime vision systems automate time-consuming tasks involved in investigations, such as video analysis, facial recognition, and evidence processing. This automation speeds up the investigation process, improves accuracy, and enables investigators to focus on more critical aspects of their work.

4.Crime Pattern Analysis: AI techniques enable the analysis of large volumes of crime data, uncovering patterns, trends, and correlations. This supports predictive analytics, enabling law enforcement agencies to identify crime hotspots, understand criminal behavior, and develop targeted strategies for crime prevention.

7.2 Disadvantages

1.Privacy Concerns: The use of AI-powered crime vision systems raises privacy concerns, particularly in relation to the collection and analysis of personal data. Striking a balance between public safety and individual privacy rights is crucial to ensure ethical and responsible use of these technologies.

2.Bias and Discrimination: AI algorithms are susceptible to biases present in training data, which can lead to discriminatory outcomes. Crime vision systems must be carefully designed and regularly monitored to ensure fairness and mitigate the risk of biased decision-making.

3.Technical Limitations: AI systems, including crime vision, are not flawless and can have limitations. False positives or false negatives in object detection, inaccuracies in facial recognition, or processing limitations in real-time video analysis can occur, potentially impacting the effectiveness and reliability of the system.

4.Ethical Challenges: The deployment of AI in crime vision raises ethical challenges, such as appropriate use of facial recognition technology, potential misuse of surveillance capabilities, and the need for transparency and accountability in decision-making processes.

8. CONCLUSION

In conclusion, the integration of AI in crime prevention and law enforcement has the potential to significantly enhance the effectiveness of crime detection, investigation, and prevention efforts. AI technologies can analyse vast amounts of data, identify patterns, and generate valuable insights to assist law enforcement agencies in their mission to maintain public safety and security. However, it is crucial to approach the implementation of AI in crime vision with careful consideration and ethical safeguards to mitigate potential risks and ensure fairness and accountability.

9. FUTURE SCOPE

The future scope for crime vision in AI is vast and holds great potential for improving various aspects of law enforcement and crime prevention. Crime vision refers to the use of artificial intelligence (AI) and computer vision technologies to analyse and interpret visual data for crime-related applications. The future scope for crime vision in AI is vast and holds significant potential for improving law enforcement and public safety.

10.APPENDIX

10.1 Source Code

```
import cv2
import face_recognition
```

```
# Load a sample image and learn how to recognize it
known_image = face_recognition.load_image_file("known_person.jpg")
known_face_encoding = face_recognition.face_encodings(known_image)[0]

# Initialize variables
face_locations = []
face_encodings = []

# Load video file or capture from webcam
video_capture = cv2.VideoCapture(0)

while True:
    # Capture each frame
    ret, frame = video_capture.read()

    # Resize the frame to speed up face recognition
    small_frame = cv2.resize(frame, (0, 0), fx=0.25, fy=0.25)

    # Convert the image from BGR color (OpenCV default) to RGB color
    rgb_small_frame = small_frame[:, :, ::-1]

    # Find all the faces and their encodings in the current frame
    face_locations = face_recognition.face_locations(rgb_small_frame)
    face_encodings = face_recognition.face_encodings(rgb_small_frame, face_locations)

    # Iterate through the faces found in the frame
    for face_encoding in face_encodings:
        # Compare each face found with the known face(s)
        matches = face_recognition.compare_faces([known_face_encoding], face_encoding)
        name = "Unknown"
```

```
if True in matches:
    name = "Known Person"

# Draw a rectangle around the face and display the name
top, right, bottom, left = face_locations[0]
top *= 4
right *= 4
bottom *= 4
left *= 4

cv2.rectangle(frame, (left, top), (right, bottom), (0, 0, 255), 2)
cv2.putText(frame, name, (left + 6, bottom - 6), cv
```

10.2 Github ID

PBL-NT-GP--5740-1680799675

10.3 Demo Link

https://drive.google.com/file/d/1AmwzzLKHj-3hZHmgs1h_VxLwwGbBW6qX/view?usp=drivesdk