a.Design workflow for chimpanzee monitoring problem:

Preprocessing to create an Machine Learning Algorithm

```
┌─────────────────┐     ┌─────────────────┐     ┌─────────────────┐
│                 │     │ Body features to│     │                 │
│ Chimpanzees     │ ──> │ identify        │ ──> │ Preprocessing   │
│ Images          │     │ different       │     │                 │
│                 │     │ chimpanzees     │     │                 │
└─────────────────┘     └─────────────────┘     └─────────────────┘
                                                         │
                                                         v
                        ┌─────────────────┐     ┌─────────────────┐
                        │ Training, test  │ ──> │ Machine Learning│
                        │ and validation  │     │ Algorithm       │
                        │ sets            │     │                 │
                        └─────────────────┘     └─────────────────┘
```

Actual workflow

```
┌─────────────────┐     ┌─────────────────┐     ┌─────────────────┐
│                 │     │ Computer Vision │     │                 │
│ video           │ ──> │ Algorithm with  │ ──> │ Images from     │
│ surveillance    │     │ OpenCV          │     │ videos          │
│                 │     │                 │     │                 │
└─────────────────┘     └─────────────────┘     └─────────────────┘
                                                         │
                                                         v
                                                ┌─────────────────┐
                                                │ Machine Learning│
                                                │ Algorithm       │
                                                │                 │
                                                └─────────────────┘
                                                         │
                                                         v
                                                ┌─────────────────┐
                                                │ Results stored  │
                                                │ in database     │
                                                │                 │
                                                └─────────────────┘
```
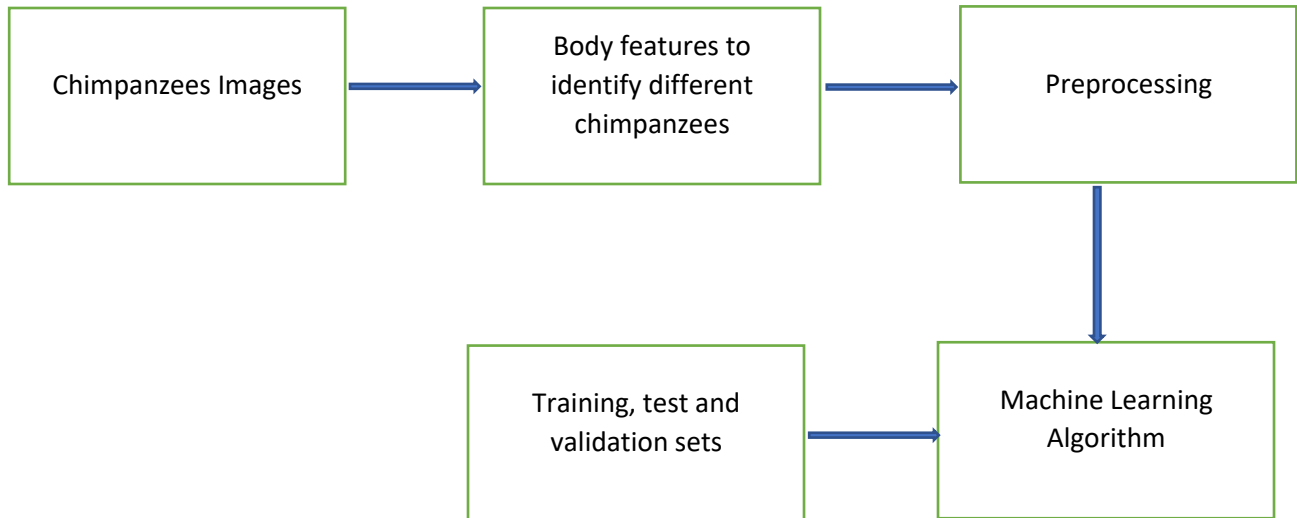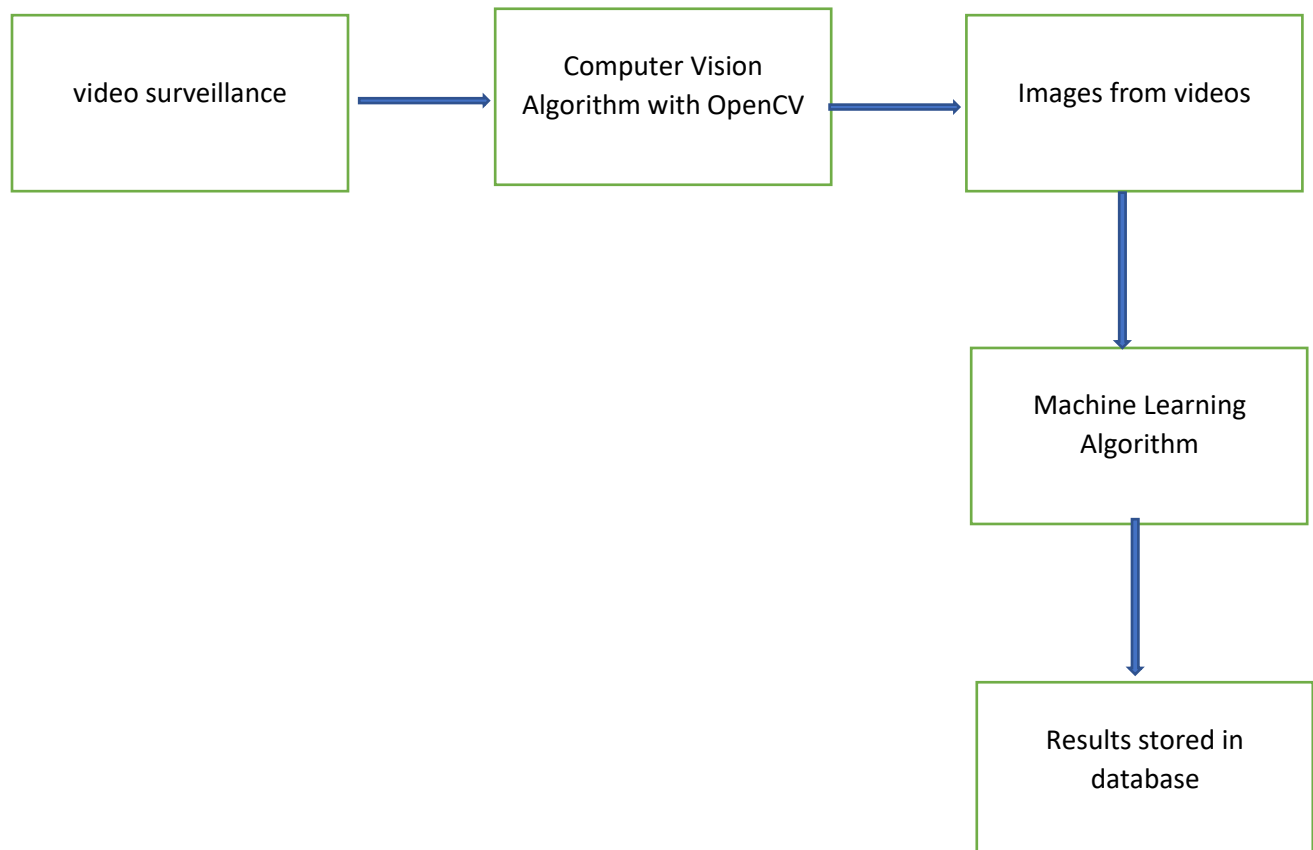
Architecture Diagram of chimpanzee monitoring problem

Cameras

Cam 1

Cam 2

Cam 3

System

Computer Vision
algorithm using
OpenCV

video surveillance

System

Machine Learning
Algorithm

Images

Sytem
Database

Create
entries in
database for
saved image
for each
chimpanzee