Smart City

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Definition of Smart City : According to us, the smart city comprises of solutions, methods, to increase the efficiency in day to day activities and providing luxurious and better lifestyle. The smart city must ~~have~~ be facilitate clean and sustainable environment and decent quality of life to the people by incorporating the Internet of things to the core infrastructure.

The technologies are exploited in a smart city such a way that proper waste, disposal management proposals, water harvesting & conserving majors measures, smart public transport systems, better healthcare solutions, technoinduced agricultural equipments, enhanced security are implemented.

It also includes making use of sensors and other intelligent devices & cloud, machine learning technologies to provides services such as home automation, smart learning in schools, universities & other academic areas, reuse and recycling waste from daily activities,

reducing the labor, improving the production in industrial applications.

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Characteristics:

Incorporation of the following:-

- Less consumption of Energy resources yet better services

- More data generation & availability thereby more analysis for proactive solutions

- Smart transport system therefore proper traffic management and less health hazards.

- Intelligent medical devices and procedures for better healthcare solutions.

- Connection over wifi throughout the city, so better availability of resources.

Problem Statement:

In the recent time, crime rates have been rapidly increased. the various security threats like theft, damage to public properties, historical monuments, kidnapping, stalking and other malicious activities. If we had a system to monitor, save/log, track these events & could provide a reliable evidence, and also help to providing proactive measures and trace back in case of suspicious events.

Objectives:

To enhance security through a reliable resource. such as CCTV footages.

Design and implementation of Intelligent Monitoring & tracking system which is associated with location mapping.

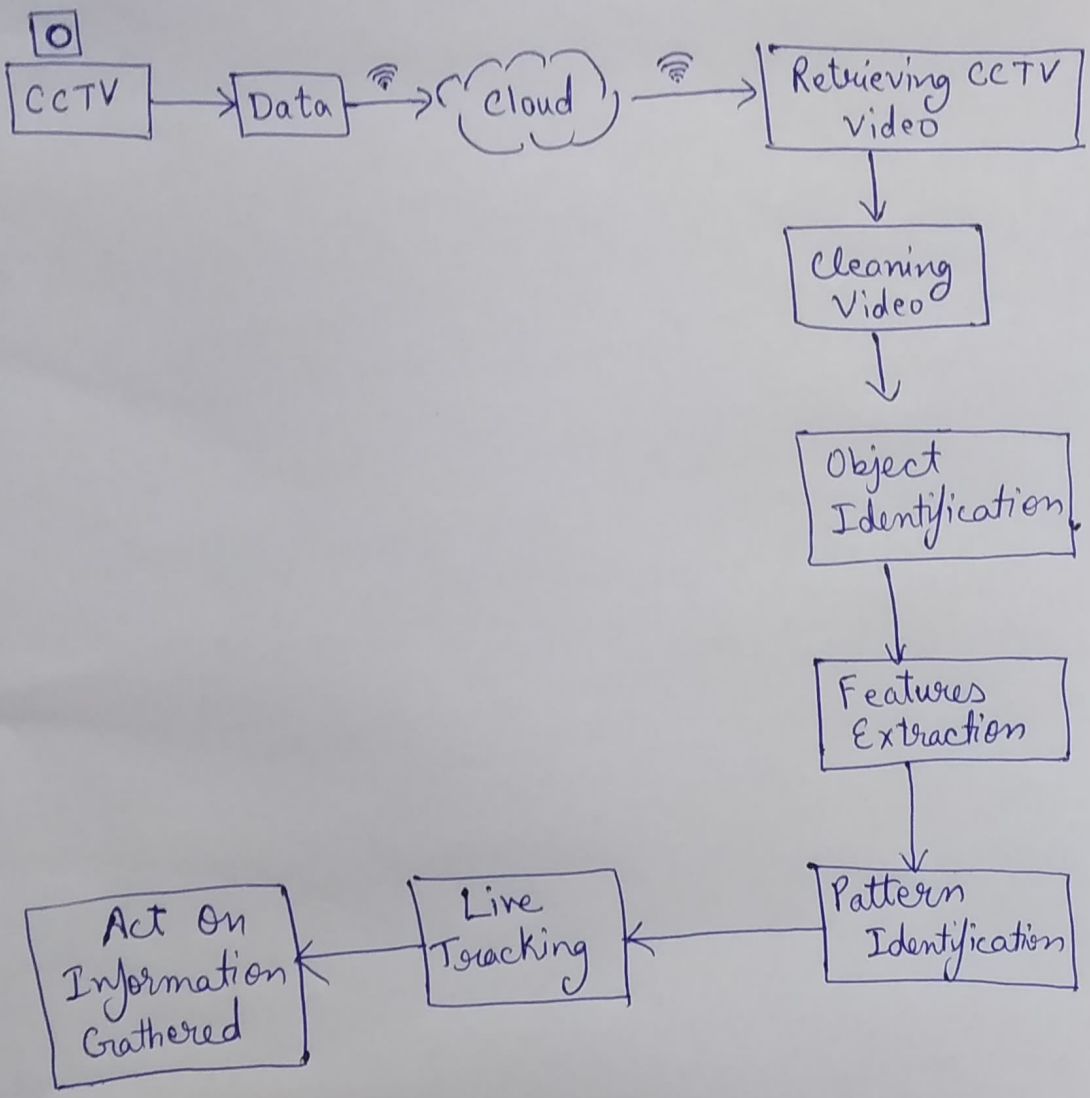
Solutions:

We are planning to design & develop Intelligent tracking and monitoring system which will take CCTV footages as input and identifies the objects in the videos (person, vehicle, etc) depending on unique feature sets. Based on the

type of object, the system will understand what features to extract (for example if person → watch, shirt, dress, spectacle, shoes etc vehicle → license plate, color, brand etc animal → edges). After identification, pattern matching is done to check whether the identified object with similar feature set is appeared before or log. If then, the new feature set is added to the existing one, or the new object is saved. Where ever the object moves within the specified range, the system will map it with the location. So that the tracking & monitoring will be done efficiently.

Simulation Used:

- Dataset → CCTV video footages
- Techniques → Video processing, Image processing, Object recognition
- Mathematical Models → Edge detection
- Color Models



Architecture Diagram

Conclusion:

Therefore the Intelligent system can designed and developed and implemented by using of all video processing and object identification techniques, which will enable us to take proactive, preventive and precautionary measures in cases of critic and suspicious measures.

Smart Tracking on CCTV footages

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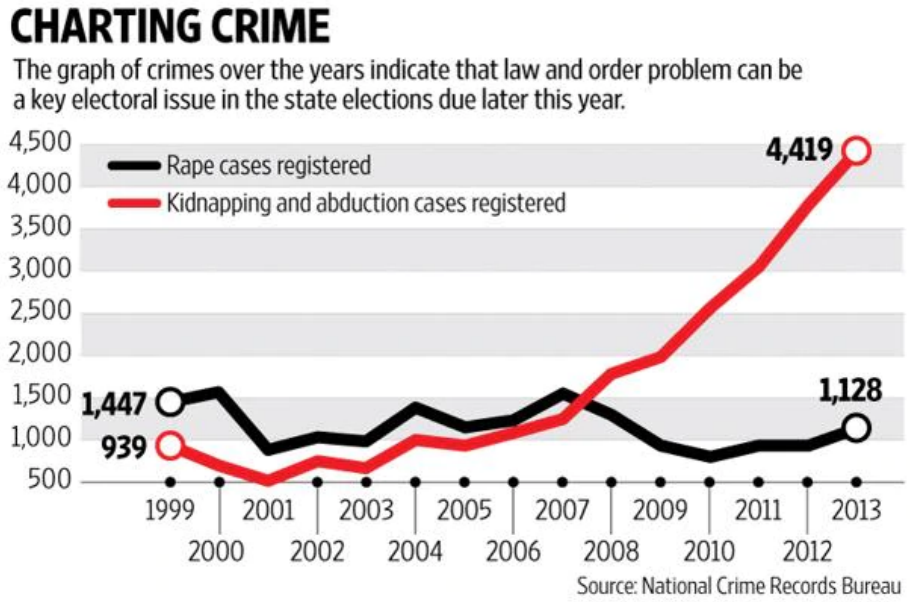
Introduction :



- Enforcing security in smart cities.
- Need for Security and enhanced measures.
- Why CCTV tracking ?
- Why it should be smart?

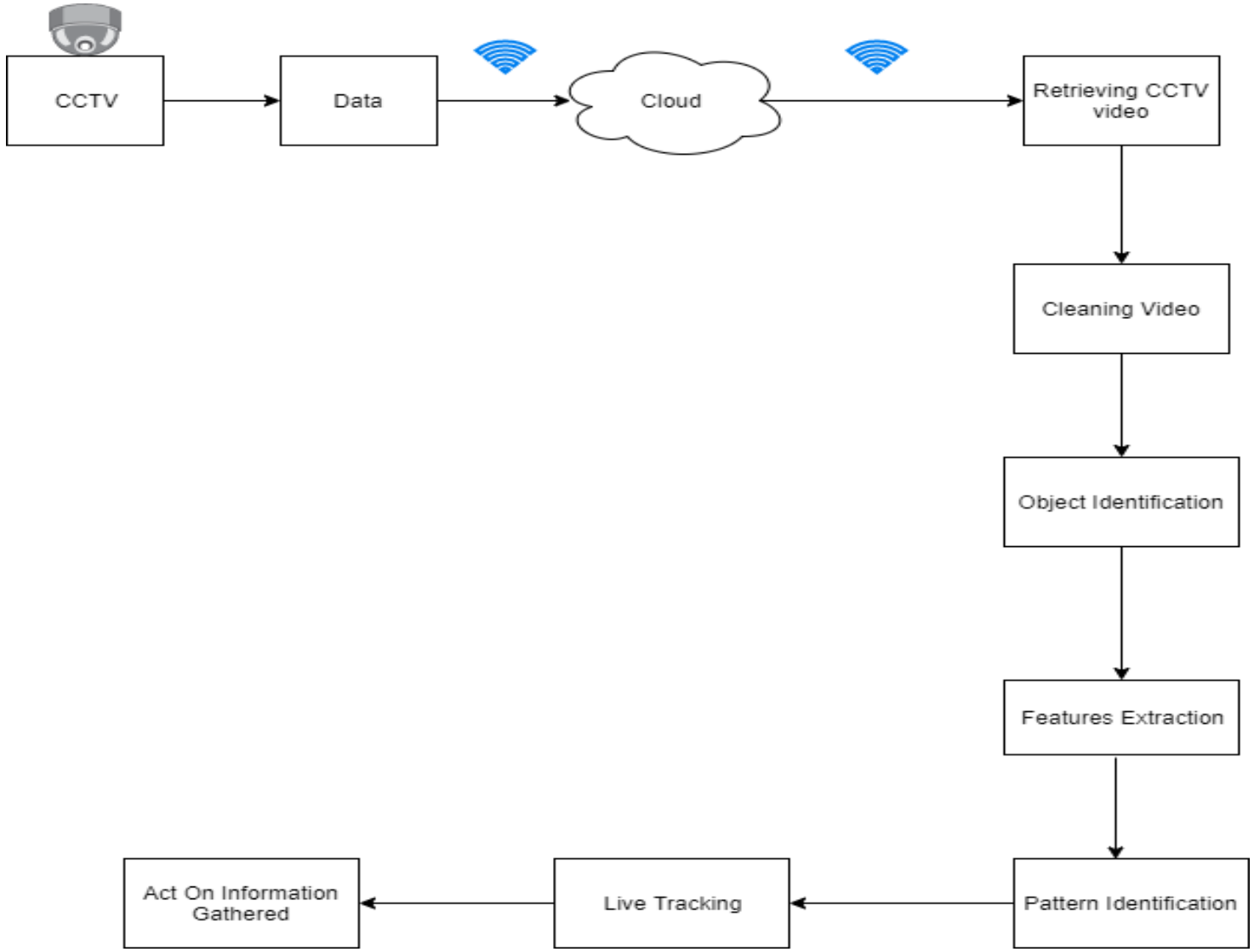
Objectives :

- Design and development of an enhanced tracking system using CCTV footages.
- Incorporation of location mapping to provide more attributes to the tracking.
- Enabling unique smart identification of entities by making use of pattern matching techniques.

Literature survey

Research paper	Insights extracted
Feature Selection for multi-camera tracking (2014) [1]	A novel approach for extracting the features by using colour, edge and text is proposed. The authors have successfully identified the human in CCTV footages by using certain mathematical model and colour model such as Gaussian Mixture model, HSV model. The distance function is also incorporated for the identified entities. Edge features are obtained using Canny detector and Local binary patterns are also computed for accurate object tracking.
A Review of Recent Advancements in Appearance-based Object Recognition (2019) [2]	The paper includes all the recent technique's adapted for objected recognition. A comparative study is done for deep learning and feature extraction based methods. From the results, its shown that in case of multi view processing deep learning works better and in case of single view , feature extraction works better. Mostly CNN has been used since it provides better accuracy.

Architecture proposed :



Conclusion :

- ❑ We intend to facilitate the PPP measures through this system
- ✓P – prevention
- ✓P- proactive
- ✓P-precautionary

- ❑ It will provide a better security for buildings installed with surveillance cameras.

References

[1]. N. N. A. Aziz, Y. M. Mustafah, A. W. Azman, N. A. Zainuddin and M. A. Rashidan, "Features Selection for Multi-camera Tracking," *2014 International Conference on Computer and Communication Engineering*, Kuala Lumpur, 2014, pp. 243-246. doi: 10.1109/ICCCE.2014.76

[2] Gede Putra Kusuma, Evan Kristia Wigati, Edward Chandra,A Review of Recent Advancements in Appearance-based Object Recognition*,Procedia Computer Science*,Volume 157,2019,Pages 613-620,ISSN 1877-0509, https://doi.org/10.1016/j.procs.2019.08.227.