

# Digital Border Surveillance System(DBSS)

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## INTRODUCTION

Border security significantly impacts a nation's global security and sovereignty. Intrusions across borders pose a direct threat to independence, with human and illegal item trafficking being major concerns. In Bangladesh, smuggling and human trafficking have become domestic threats, worsened by the Rohingya crisis. However, with a 4155km border and limited manpower, manual border security is impractical. To address this, a digital border surveillance system is proposed to enhance command and control of the borders, aiding the existing security forces. This solution aims to combat issues like avoiding tariff duties and illegal goods while securing the country's fragile borders.

## OBJECTIVES

- Secure the unprotected area with Artificial intelligence.
- Automating the guarding process.
- Create a security system free from the effect of external factor.
- Ensure optimum security free from human error.

## METHODOLOGY

Design a module to detect movement with sonar sensor and a microcontroller(esp)

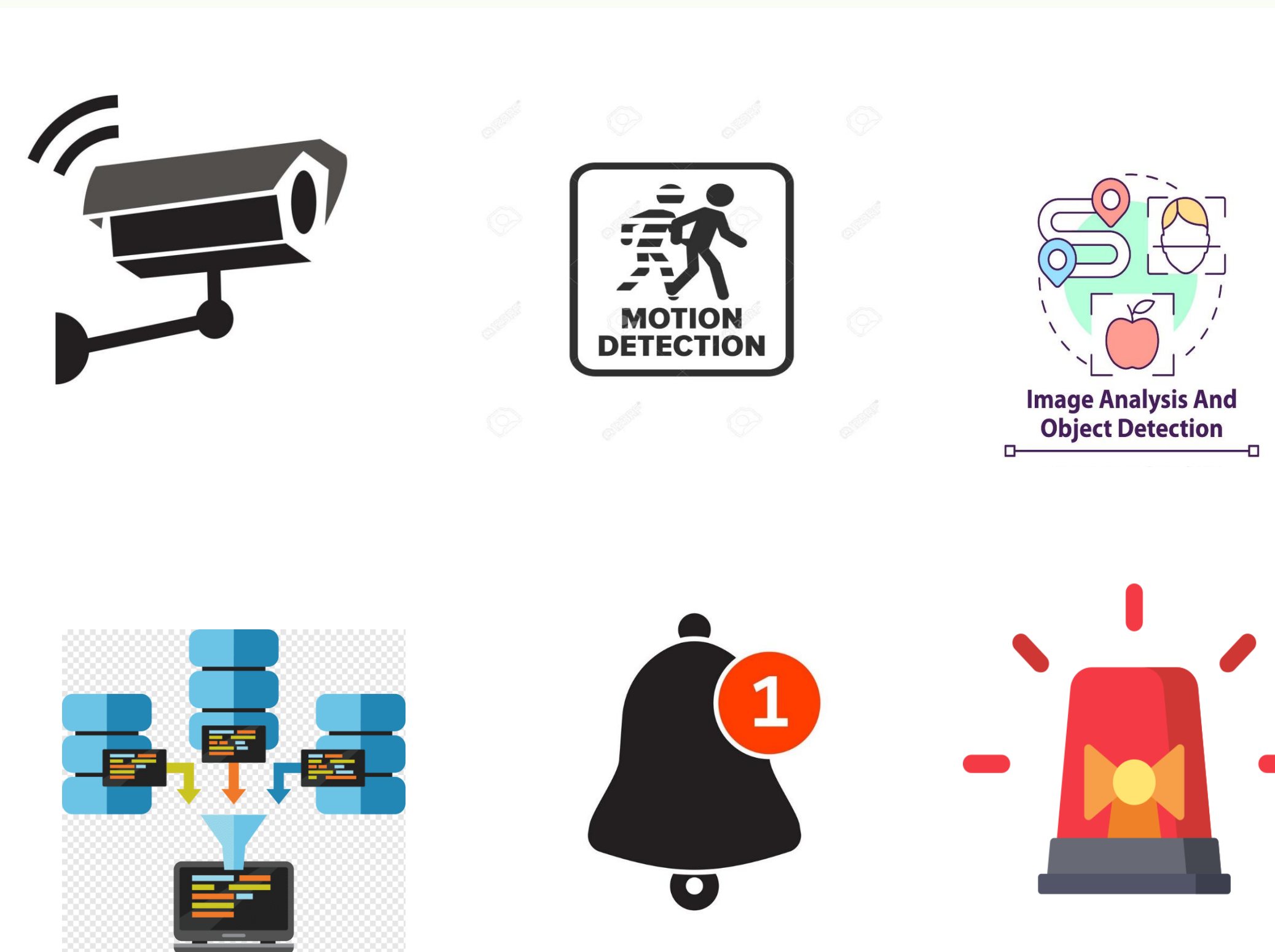
Capture frame after detecting any movement with IP camera

Send capture frame via wireless network to the control room and run detection model on that frame

Upon detecting generate alarm based on the object type

Send notification to the nearest border out post and info the foot patrol also

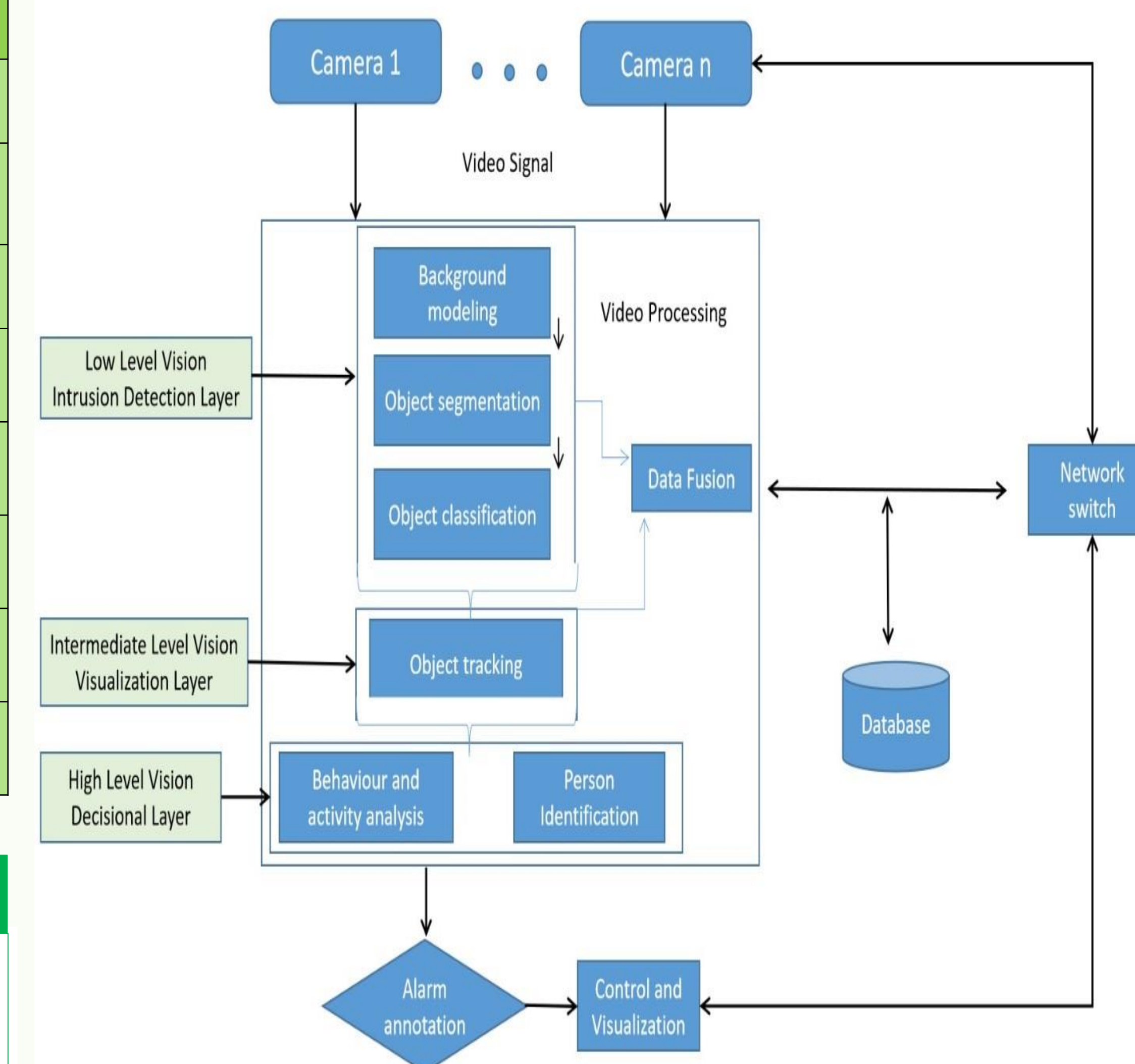
## FEATURES



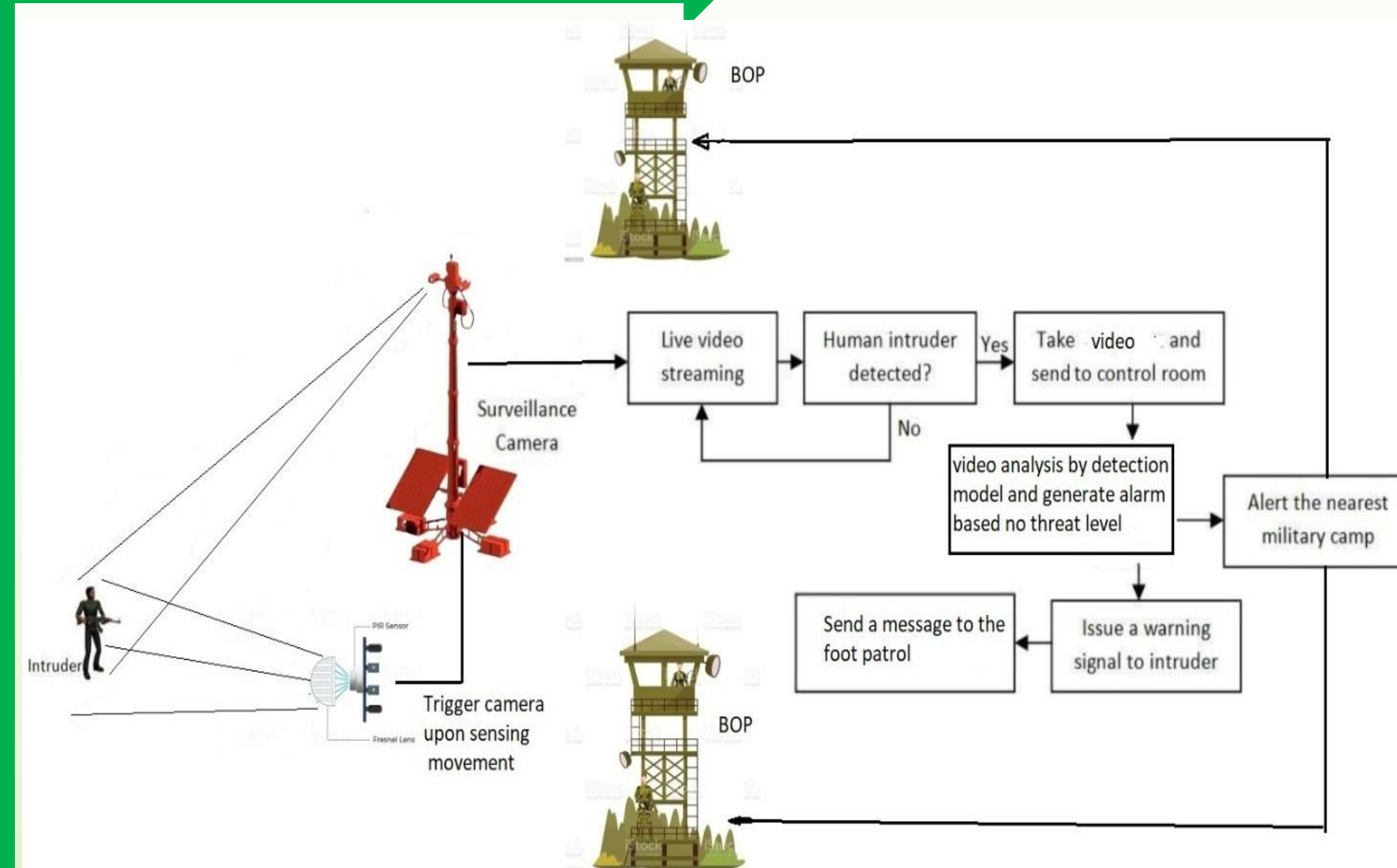
## COST ESTIMATION

NO	EQUIPMENT	COST
1	Battery	10\$
2	Solar	5\$
3	ESP module	10\$
4	Camera	30 \$
5	Sensor	2-3 \$
6	Router	15\$
7	Alarm (buzzer)	2-3 \$
8	Cables	5\$

## SYSTEM ARCHITECTURE



## WORKFLOW



## PROTOTYPE



## TRAINED MODEL



### Average Precision by Class



## FUTUTRE WORK

- Cloud storage can be used to access data from remote place
- Thermal sensor can be used to detect human at night.
- More powerful AI model can be used to detect intruder pattern and give decision.
- Establish a fully separate network for better security

## DISCUSSION AND CONCLUSION

The successful implementation of the "Digital Border Surveillance System" (DBSS) has revolutionized border security by providing real-time intruder detection, seamless communication, and swift response capabilities. The system's centralized database management has streamlined data logging and analysis, enabling informed decision-making. Looking ahead, integrating advanced analytics and machine learning algorithms can enhance the system's ability to detect and predict intruder patterns. The DBSS project holds great promise for further enhancing border security, demonstrating the power of AI-driven technologies in safeguarding national interests and ensuring border integrity.