Problem Statement

- The primary challenge lies in effectively managing vehicular traffic within the college premises.
- This entails monitoring vehicle movement, ensuring orderly parking, and verifying vehicles against an approved database.
- Traditional methods of manual surveillance are not only labor-intensive but also prone to errors and delays.
- Thus, there arises a pressing need for an automated system capable of real-time analysis and decision-making.
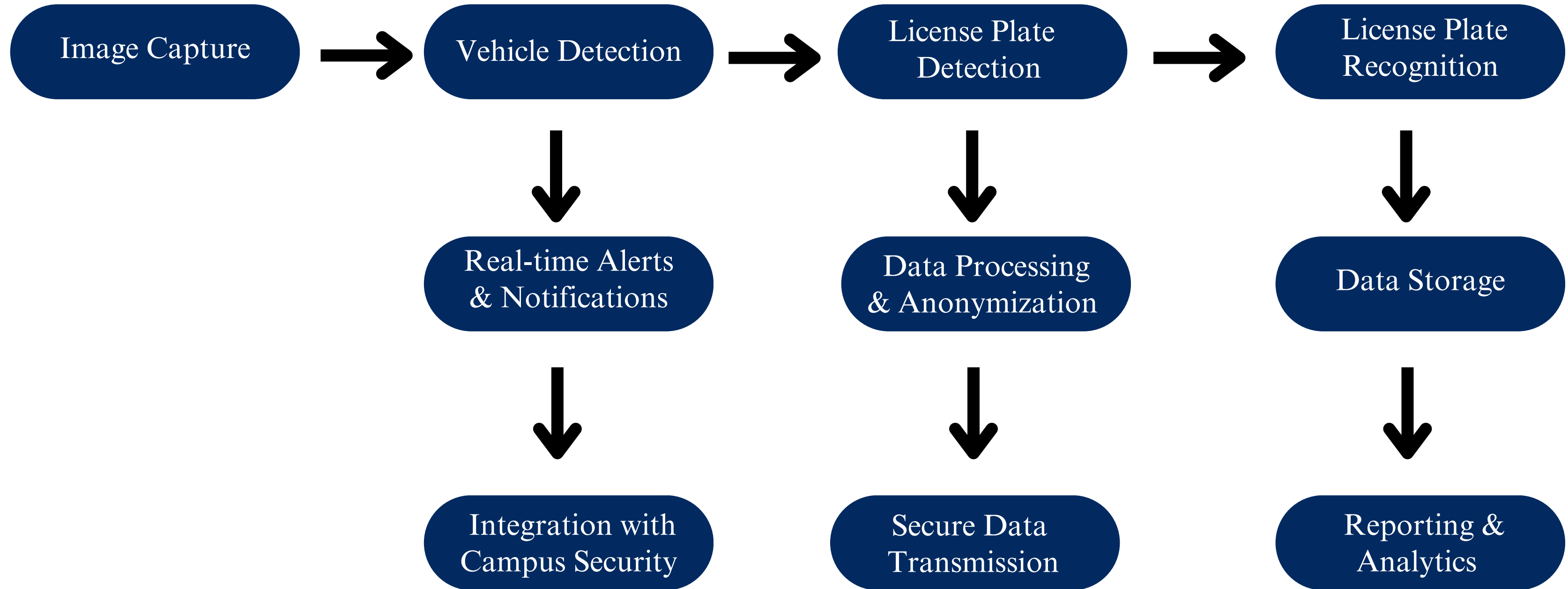
Unique Idea Brief

- **Vehicle Movement Analysis:** Develop algorithms to track and analyze the movement of vehicles throughout the campus, including entry and exit points, as well as internal routes.

- **Parking Monitoring:** Implement a system to monitor parking spaces in real-time, enabling efficient utilization and management of available parking areas.

- **Database Matching:** Integrate a database of approved vehicles to cross-reference and validate incoming vehicles, ensuring compliance with campus regulations and security protocols.
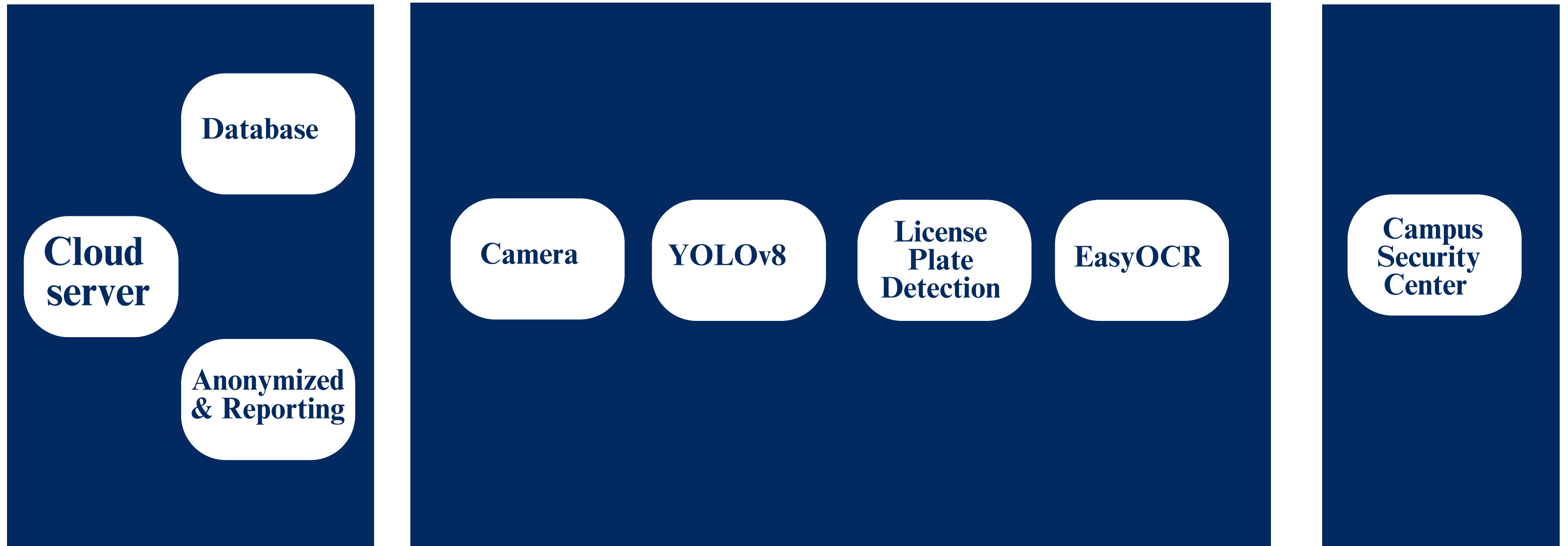
Features Offered

- Image Processing and Recognition

- Integration and Real-time Monitoring

- Privacy and Data Security

- Resource Optimization

- Alerts and Notifications

- User Interface

Process Flow

Architecture Diagram

Technologies Used

Object Detection

- **YOLOv8 (You Only Look Once version 8):**
- Framework: PyTorch or TensorFlow.
- Task: Real-time vehicle detection and classification.

Optical Character Recognition (OCR):

- **EasyOCR:**
- Framework: PyTorch.
- Task: Recognizing alphanumeric characters from cropped license plate images.

Data Processing & Anonymization:

- Python for data handling and processing.
- Encryption Libraries: AES, RSA for data anonymization and secure storage.

Conclusion

- **Real-time Vehicle Detection and Recognition**: Leveraging YOLOv8 and EasyOCR, the system accurately identifies vehicles and license plates in real-time, enhancing campus security.

- **Edge Computing and Data Privacy**: Deploying AI models on edge devices ensures efficient local processing, while robust encryption and anonymization techniques safeguard personal data.

- **Comprehensive Reporting and Analytics**: The solution provides detailed reports and visual analytics on vehicle movements and traffic patterns, aiding in informed decision-making and strategic planning.