


# Palash Yuvraj Ingle, Ph.D.


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## Education

- 2020 – 2023     **Ph.D., Double Major, Security Engineering Lab.** Sejong University, South Korea.  
Dept. ( *Computer and Information Security, Convergence Engineering for Intelligent Drone* )  
Thesis title: *Abnormal Object Video Synopsis in Multiview Cameras.*
- 2017 – 2019     **M.Tech. Computer Science and engineering,** YMCA University, India.  
Thesis title: *Using Hand Gesture for Solving Mute Deaf Problem and Control 3D Printed Prosthetic Hand Model Using IoT.*
- 2014 – 2016     **M.Sc. Information Technology,** Mumbai University, India.  
Thesis title: *UGCV-Unmanned Ground Counter-IED Vehicle.*
- 2011 – 2014     **B.Sc. Information Technology,** Mumbai University, India.  
Project title: *Live online examination system.*




## Additional Qualification

- 2023 – 2024     **CVDL Master Program,** Opencv University (Online).
- 2021 – 2022     **P.G.D in Artificial Intelligence and Machine Learning,** NIT Warangal (Online), India.

## Employment History

- 2023 – till date     **Postdoctoral Researcher,** Security Engineering Lab, Sejong University, Seoul, South Korea.
- 2020 – 2023     **Research Scholar,** Security Engineering Lab, Sejong University, Seoul, South Korea.
- 2017 – 2020     **Assistant Professor (fixed)** Information Technology Department, K.J Somaiya College, mumbai, India.

## Research Interests

-  **Unmanned Aerial Vehicles,** Sensor Fusion, Object tracking and segmentation, LiDAR and Robotics.
-  **Autonomous driving vehicle,** Three-dimensional object detection in the point cloud, Panoramic view of multiple cameras.
-  **Video Synopsis,** Detection and extraction of abnormal objects in time and domain space, Stitching of foreground to background.

## Projects

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Postdoctoral 2023 – till date

■ **Development of artificial intelligence based video security technology and systems for public infrastructure safety:**

The objective is to develop a video synopsis framework for detecting abnormal objects.

**Technology:** Python, Deep learning frameworks and library, Qt and Robot operating system, LiDAR, Drones, Depth Cameras, Raspberry Pi, Nano jetson, USB accelerator (Intel neural stick, Google coral).

■ **TriConVNet: Video Synopsis Implementation for Panoramic Multiview Video Camera only for Detecting Abnormal Behavior of Human.**

Objective:

The proposed TriConVNet-based synopsis framework. A TriConVNet is a multitasking learning model which stitches the images to create a panoramic view, segments the abnormal objects, and gives the depth of that objects. Later, these abnormal object tubes are stitched with the extracted background, creating a smooth abnormal behavior synopsis for multiple cameras.

**Funded by:** Institute of Information and Communications Technology Planning and Evaluation (IITP) grant funded by the Korea government (MSIT) (No.2019-0-00231)

**Technology:** Python, C++ Framework: TensorFlow and Keras, OpenCV, PyTorch Hardware: Surveillance cameras.

■ **3DVSAv: 3D Video Synopsis in Autonomous Vehicle on Panoramic Camera View.**

Objective:

We proposed a 3D video synopsis of the autonomous vehicle framework (3DVSAv), in which we first created a panoramic view of multiple cameras. From the panoramic view, we detect, extract, and shift only the specific foreground objects to create a shorter 3D video for analysis.

**Funded by:** Institute of Information and Communications Technology Planning and Evaluation (IITP) grant funded by the Korea government (MSIT) (No.2019-0-00231)

**Technology:** Python, C++ and MATLAB, Framework: TensorFlow and Keras, OpenCV, Hardware: Autonomous vehicle with 8 attached cameras and LiDAR.

■ **Abnormal Object Segmentation and Synopsis on Sensory Fused Data in Drone Surveillance.**

Objective:

We proposed a synopsis framework that extracts crucial information from the sensory data and creates a short video for analysis. The heart of this framework is the dual-task learning model, which segments and estimates the depth of the abnormal object that is shifted in the time and space domain to construct a synopsis.

**Funded by:** Institute of Information and Communications Technology Planning and Evaluation (IITP) grant funded by the Korea government (MSIT) (No.2019-0-00231)

**Technology:** Python, C++ Framework: TensorFlow and Keras, gazebo, Depth AI, OpenCV, ROS, Mavproxy Hardware: Depth AI Camera, gimbal camera, Velodyne Puck LITE, Tello, Parrot, DJI matrice.

## Projects (continued)

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### ■ **Panoramic Video Synopsis on Constrained Devices for Security Surveillance.**

Objective:

We proposed a panoramic multiview video synopsis framework to tackle high computational cost, jitter, and collision artifacts, thus solving the issues of efficient analysis and storage. We embedded a synopsis framework on the end device to reduce storage, networking, and computational costs. A convolutional neural network was used to sew the multiple cameras' views to create a single panoramic view from which only the abnormal object tube is extracted and relocated in the time and space domain to create a condensed video.

**Funded by:** Institute of Information and Communications Technology Planning and Evaluation (IITP) grant funded by the Korea government (MSIT) (No.2019-o-00231)

**Technology:** Python, Framework: TensorFlow and Keras, OpenCV, Hardware: Raspberry Pi, Pi and USB cameras.

Ph.D 2020 – 2023

### ■ **Development of artificial intelligence based video security technology and systems for public infrastructure safety:**

The objective is to develop a video synopsis framework for detecting abnormal objects.

**Technology:** Python, Deep learning frameworks and library, Qt and Robot operating system, LiDAR, Drones, Depth Cameras.

### ■ **Integrated Interoperability Based Panoramic Video Synopsis Framework.**

Objective:

Constructing the interoperability policy for integrating multiple types of cameras to build a panoramic video synopsis.

**Funded by:** Institute of Information and Communications Technology Planning and Evaluation (IITP) grant funded by the Korea government (MSIT) (No.2019-o-00231)

**Technology:** Python, Framework: TensorFlow and Keras, OpenCV, Hardware: IP-Cameras.

### ■ **Multiview abnormal video synopsis in real-time.**

Objective:

Construction of a multiview abnormal video synopsis framework that in real-time detects and extracts abnormal objects from multiple videos to create a smaller video for analysis.

**Funded by:** Institute of Information and Communications Technology Planning and Evaluation (IITP) grant funded by the Korea government (MSIT) (No.2019-o-00231)

**Technology:** Python, C++ and MATLAB, Framework: TensorFlow and Keras, OpenCV, Hardware: IP-Cameras.

## Projects (continued)

### ■ **Dvs: A drone video synopsis towards storing and analyzing drone surveillance data in smart cities.**

Objective:

Synchronization of multiple drones on the fly to conduct aerial surveillance for detecting and tracking abnormal objects by fusing LiDAR and camera data. Sensory UAV setup design, acquisition of point cloud data using LiDAR mounted on UAV using an onboard computer.

**Funded by:** Institute of Information and Communications Technology Planning and Evaluation (IITP) grant funded by the Korea government (MSIT) (No.2019-o-00231)

**Technology:** Python, C++, Framework: TensorFlow and Keras, Pytorch, OpenCV, ROS, Hardware: Depth AI Camera, gimbal camera, Velodyne Puck LITE, Tello, Parrot, DJI matrice.

### ■ **Real-time abnormal object detection for video surveillance in smart cities.**

Objective:

Development of the object detection model which detects smaller abnormal objects and performs better than the state-of-the-art detection model.

**Funded by:** Institute of Information and Communications Technology Planning and Evaluation (IITP) grant funded by the Korea government (MSIT) (No.2019-o-00231)

**Technology:** Python, C++, Framework: TensorFlow and Keras, OpenCV.

2017 – 2020

### ■ **Development of Hand Gesture Model for mute deaf and construction of a 3D printed prosthetic hand model.**

The objective is to develop a sensory-based hand gesture model that sends an instruction to an application that will speak. Construction of a 3D-printed hand to depict the hand gesture based on an impulsive sensor.

**Technology:** Python, C++, Deep learning frameworks and library, MIT App Inventor, 3D printer, Flex sensor, Arduino Uno, Raspberry pi.

2014 – 2017




### ■ **Development of prototype: Unmanned Ground Counter-IED Vehicles (UGCV)**

The objective is to create a prototype that will autonomously detect and defuse the IED explosive, the UGCV can work autonomously and can be controlled remotely. A 360-degree movement robotic arm was constructed to suit the scenarios which was mounted on a driving vehicle.

## Research Publications

### Journal Articles









- 1 **P. Y. Ingle** and Y.-G. Kim, "Multiview abnormal video synopsis in real-time," *Engineering Applications of Artificial Intelligence*, SCIE, Impact Factor in JCR 2023: 8 JCR Ranking: 4.89%, vol. 123, p. 106-108, 2023. [URL: https://doi.org/10.1016/j.engappai.2023.106406](https://doi.org/10.1016/j.engappai.2023.106406).
- 2 **P. Y. Ingle** and Y.-G. Kim, "Video synopsis algorithms and framework: A survey and comparative evaluation," *Systems*, SSCI, Impact Factor in JCR 2021: 2.895 JCR Ranking: 28.12%, vol. 11, no. 2, p. 108, 2023. [URL: https://doi.org/10.3390/systems11020108](https://doi.org/10.3390/systems11020108).

- 3 M. Parab, A. Bhanushali, **P. Ingle**, and B. Pavan Kumar, "Image enhancement and exposure correction using convolutional neural network," *SN Computer Science, Scopus, Impact Factor in JCR 2023: 3.78 JCR Ranking: 35%*, vol. 4, no. 2, p. 204, 2023.  URL: <https://doi.org/10.1007/s42979-022-01608-w>.
- 4 **P. Y. Ingle** and Y.-G. Kim, "Real-time abnormal object detection for video surveillance in smart cities," *Sensors, SCIE, Impact Factor in JCR 2023: 3.576 JCR Ranking: 21.09%*, vol. 22, no. 10, p. 3862, 2022.  URL: <https://doi.org/10.3390/s22103862>.
- 5 **P. Y. Ingle**, Y. Kim, and Y.-G. Kim, "Dvs: A drone video synopsis towards storing and analyzing drone surveillance data in smart cities," *Systems, SSCI, Impact Factor in JCR 2023: 2.895 JCR Ranking: 28.12%*, vol. 10, no. 5, p. 170, 2022.  URL: <https://doi.org/10.3390/systems10050170>.




## Patent

- 1 **P. Y. Ingle** and D.-H. Y.-G. Kim, "3d video synopsis generation method for abnormal object," in *Korea Institute of patent Information*, kipris, 2023.
- 2 **P. Y. Ingle** and Y.-G. Kim, "Method and system for generating video synopsis based on abnormal object detection," in *Korea Institute of patent Information*, kipris, 2021.

## Seminars and Talks





-  Influence of artificial intelligence technology in human society and why it is not a threat.
-  Real and fake research and its long-term impact on the Economy.
-  The inclusion of CNN in video surveillance and its corresponding applications.
-  Threats of using the internet and measures to safeguard children.
-  Every human has a pattern and how significant it is in designing an artificial brain.
-  How autonomous vehicles and drone technology can drive a country's economy in the next decades.
-  Who is watching you: The danger behind using mobile phones and the internet and how everyone is being flawed.
-  How to accommodate artificial intelligence technology in designing smart cities.

## Skills

Coding	 Python (Preference), Java, C, C++, C#, Matlab, HTML, Swift, Quantum computing language (QCL), JavaScript.
High Level Library	 TensorFlow, PyTorch, Depth AI, OpenCV, DroneKit, Gazebo.
Sensor and Devices	 IoT - NodeMCU, Arduino Uno, Raspberry Pi, Nvidia Jestson, Drones, LiDAR, etc.

## Miscellaneous Experience










### Research Awards and Achievements

- 2023  **Outstanding Research Award**, During Ph.D. at Sejong University.
- 2022  **Best Paper Award**, By Korea Information Processing Society (KIPS).
-  **Bronze Best Paper Award**, IEEE Seoul Section.
-  **Bronze Paper Award**, Korea Information Processing Society (KIPS-AOH).




## Miscellaneous Experience (continued)

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### Technical Certification


- 2009  **MS- CIT.** Awarded by Anubhav computer Insitute.
- 2012  **Certification in Computer Hardware and Networking.** Awarded by IDEMI (Gov of India).
- 2013  **Certification in C language.** Awarded by C-DAC, GIST.
  -  **Certification in C, C++, HTML, Core JAVA programming.** By IDEMI (Gov of India).
  -  **Certification in C.Net and ASP.Net.** Awarded by IDEMI (Gov of India).
- 2014  **Certification in Advance Animation and Film Making.** Awarded by IDEMI (Gov of India).
- 2016  **Master in Python Programming.** Awarded by Mumbai University.
- 2019  **Certified Ethical Hacker .** Awarded by RST.
  -  **CCNA.** Awarded by RST.

### Additional Certification

- 2018  **UGC NET.** Awarded by UGC (Gov. of India)
- 2012  **'C' Certificate Holder.** Awarded by NCC (Gov. of India).
- 2011  **Civil Defence Course.** Gov. of India.

## Personal Information

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-  **Nationality-** Indian.
-  **Languages** - English, Hindi, Marathi, level 1 Mandarin, and level 1 Korean.