

Divyansh Thakur, Ph.D.

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Employment History

- 2018 – Till Date **Faculty in School of Computing**, Indian Institute of Information Technology Una, Himachal Pradesh, India.
- 2016 – 2018 **Research Assistant**. Jaypee University of Information Technology Wakhnaghat, Shimla,

Education

- 2020 – Till Date **Ph.D., in Computer Science and Engineering** from **Indian Institute of Information Technology Una, Himachal Pradesh, India**
Thesis title: *Precision Agriculture using Embedded Artificial Intelligence and Deep Learning.*
- 2016 – 2018 **M.Tech., in Computer Science and Engineering** from **Jaypee University of Information Technology, Himachal Pradesh, India**
Thesis title: *Precision Agriculture using Wireless Sensor Networks.*
- 2012 – 2016 **B.Tech., in Computer Science and Engineering** from **Atal Bihari Vajpayee Government Institute of Engineering and Technology Shimla, Himachal Pradesh, India**.

Research Publications

Journal Articles

- 1 **D. Thakur** and S. Srinivasan, "Ai-pucmdl: Artificial intelligence assisted plant counting through unmanned aerial vehicles in india's mountainous regions," *Environmental Monitoring and Assessment*, vol. 196, pp. 1–26, 2024, (IF=3).
- 2 **D. Thakur**, "Data transmission utilizing light fidelity for integration into iot systems," *IETE Journal of Research*, pp. 1–9, 2023, (IF=1.8).
- 3 **D. Thakur**, J. K. Saini, and S. Srinivasan, "Deepthink iot: The strength of deep learning in internet of things," *Artificial Intelligence Review*, pp. 1–68, 2023, (IF=12).
- 4 **D. Thakur**, Y. Kumar, A. Kumar, and P. K. Singh, "Applicability of wireless sensor networks in precision agriculture: A review," *Wireless Personal Communications*, vol. 107, pp. 471–512, 2019, (IF=2.2).
- 5 **D. Thakur**, Y. Kumar, A. Kumar, P. Kumar, and V. Singh, "Real time monitoring of valeriana jatamansi plant for growth analysis," *Procedia computer science*, vol. 132, pp. 507–517, 2018.

Conference Proceedings

- 1 **D. Thakur**, J. K. Saini, and S. Srinivasan, "Fine tuned single shot detector for finding disease patches in leaves," in *International Conference on Agriculture-Centric Computation*, Springer, 2023, pp. 1–14.
- 2 **D. Thakur**, Y. Kumar, P. K. Singh, and A. Juneja, "Measuring environmental parameters and irrigation for rose crops using cost effective wsns model," in *2022 3rd International Conference on Issues and Challenges in Intelligent Computing Techniques (ICICT)*, IEEE, 2022, pp. 1–6.

- 3 J. Kapoor and **D. Thakur**, “Analysis of symmetric and asymmetric key algorithms,” in *ICT Analysis and Applications*, Springer, 2022, pp. 133–143.
- 4 P. Pandey, **D. Thakur**, and B. Thakur, “Techniques for behavior lie detection with the aid of physiological signals: A review,” in *Proceedings of the International Conference on Advances in Electronics, Electrical & Computational Intelligence (ICAEEC)*, 2019.

Books and Chapters

- 1 **D. Thakur** and J. K. Saini, “The significance of iot and deep learning in activity recognition,” in *IoT, Big Data and AI for Improving Quality of Everyday Life: Present and Future Challenges: IOT, Data Science and Artificial Intelligence Technologies*, Springer, 2023, pp. 311–329.


Skills

Languages	Strong reading, writing and speaking competencies for English, Hindi.
Coding	Python, C, C++, PHP
Deep Learning	Keras, PyTorch, TensorFlow
Machine Learning	Linear algebra, Calculus, TensorFlow, Probability and statistics
Databases	MySQL.
Web Dev	HTML, CSS, JavaScript, Apache Web Server.



Developed Deep Learning Models

SpudSegNet	SpudSegNet is a neural network architecture designed for the segmentation of potato diseases in leaf images. The architecture is based on the popular U-Net model, but includes several modifications tailored specifically for potato disease segmentation. One of the key modifications in SpudSegNet is the inclusion of a Spatial Pyramid Pooling (SPP) module, which captures information at multiple scales and helps the network better handle objects of different sizes. Another notable feature of SpudSegNet is the use of Squeeze-and-Excitation (SE) blocks, which adaptively weight feature maps based on their relevance to the segmentation task.
PotatoLeafNet	PotatoLeafNet is a novel deep learning model used for the classification of potato leaves into healthy and diseased classes. The model is based on a convolutional neural network architecture that consists of several layers.
PlantSegNet	PlantSegNet is developed by combining the features of VGG16 and UNetTo enhance the precision of plant counting from aerial imagery. has been developed, which integrates the VGG16 network with U-Net architecture.
Improved YOLOv7	A novel dual attention mechanism known as the Global-SE Unified Attention Mechanism (GSEAM) has been introduced in YOLOv7. This mechanism was strategically designed to bolster the accuracy of object detection. the GSEAM’s fusion of spatial and channel-oriented attention mechanisms, which significantly enhances the model’s contextual understanding and object recognition in diverse settings. The incorporation of GSEAM, coupled with the integration of the Gaussian Error Linear Unit activation function, represents a conscious effort to elevate the developed YOLOv7 architecture’s aptitude in capturing intricate contextual details and hierarchical features.

Developed Deep Learning Models (continued)





- GlaciNet**  "GlaciNet: Enhanced Glacier Detection using Modified U-Net" is an innovative deep learning model tailored for the accurate identification of glaciers within satellite imagery. Leveraging a modified U-Net architecture, GlaciNet excels in discerning the complex and dynamic features of glaciers from these images, providing vital insights for climate research and environmental monitoring. Its adaptability and precision make it a valuable tool for scientists and researchers dedicated to understanding the impact of glacial changes on our planet's ecosystems and climate patterns.

Developed Embedded Artificial Intelligence Prototypes



- FruitVision**  A hardware prototype has been created, utilizing the capabilities of the Nvidia Jetson Nano and Depth AI camera, to integrate a custom deep learning model for real-time object counting through edge computing.
- Self-Configured AI-based UAV**  A self-configured UAV integrated with Deep Learning Model has been developed from scratch for detecting objects in real-time during its flight. This innovation has been officially submitted for an Indian Patent.

Miscellaneous Experience

Awards and Achievements

- 2012  **AIEEE**, Qualified All India Engineering Entrance Examination.
- 2016  **GATE**, Qualified Graduate Aptitude Test in Engineering.
- 2018  **UGC-Net**, Qualified University Grants Commission National Eligibility Test for Assistant Professor.
- 2023  **VLDB Grant**, A Grant of USD3000 has been granted from VLDB23, A* Conference of Computer Science and Engineering.

Certification

- 2020  **Computer Vision Basics** University at Buffalo, The State University of New York
- 2021  **Programming for Everybody (Getting Started with Python)** University of Michigan

References

Dr. K. Sivan, Ex Chairman, Indian Space Research Organisation

Prof. Lalit. K. Awasthi, Director, National Institute of Technology Uttarakhand