**🚀 Curriculum (Abstract)**

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|  | * **BSc Level**: Basics of image processing, intro to machine learning, OpenCV tutorials, simple CNNs. * **MSc Level**: Deep learning architectures, transfer learning, optimization methods, model evaluation. * **PhD Level**: Advanced topics like GANs, vision transformers, multimodal learning, novel research directions. |

**🎓 Curriculum: Computer Vision with ML & DL (Comprehensive)**

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|  | 📘 **BSc Level – Foundations**   |  |  | | --- | --- | |  | Focus: Intuition and practical basics Topics:   * Introduction to Computer Vision and image types (RGB, grayscale, etc.) * Image manipulation with OpenCV (resize, crop, filters) * Basic statistics and data visualization for vision datasets * Fundamentals of supervised machine learning (linear regression, decision trees) * Beginner CNNs: architecture and use cases Projects: * Build a simple photo filter app * Classify handwritten digits using MNIST | |

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|  | 📗 **MSc Level – Deepening Skills**   |  |  | | --- | --- | |  | Focus: Model architecture, evaluation, and optimization Topics:   * Advanced CNN architectures: ResNet, MobileNet, etc. * Transfer learning and fine-tuning on custom datasets * Object detection: YOLO, SSD, Faster R-CNN * Semantic segmentation with U-Net * Loss functions, metrics, and hyperparameter tuning Projects: * Train a pet breed classifier from scratch * Segment road lanes for autonomous driving | |

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|  | 📕 **PhD Level – Research and Innovation**   |  |  | | --- | --- | |  | Focus: Novel techniques, hybrid models, and real-world impact Topics:   * Generative models: GANs, VAEs for vision synthesis * Vision Transformers and attention mechanisms * Multimodal learning: combining vision with text/audio * Ethical AI, fairness, and bias mitigation in computer vision * Writing and publishing research in top-tier journals Projects: * Create a synthetic image dataset using GANs * Develop a visual question answering (VQA) system | |