

Cv assignment Q1

Application-1: Medical Image Analysis

- **Brief Description:** Computer vision aids in detecting diseases from medical scans like MRI, CT, and X-rays.
 - **Reference:** Litjens, G., Kooi, T., Bejnordi, B. E., et al. (2017). A survey on deep learning in medical image analysis. *Medical Image Analysis*, 42, 60–88.
 - **Summary:** This paper comprehensively surveys deep learning applications in medical image analysis, including disease diagnosis, segmentation, and classification, emphasizing CNN-based models and their clinical impact.
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Application-2: Autonomous Vehicles

- **Brief Description:** CV enables self-driving cars to detect lanes, pedestrians, and traffic signs.
 - **Reference:** Grigorescu, S., Trasnea, B., Cocias, T., & Macesanu, G. (2020). A survey of deep learning techniques for autonomous driving. *Journal of Field Robotics*, 37(3), 362–386.
 - **Summary:** The paper surveys deep learning models for vision tasks in autonomous vehicles such as semantic segmentation, object detection, and sensor fusion, detailing real-world deployment challenges and safety constraints.
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Application-3: Face Recognition and Verification

- **Brief Description:** Facial recognition systems identify or verify a person based on their facial features.
- **Reference:** Schroff, F., Kalenichenko, D., & Philbin, J. (2015). FaceNet: A unified embedding for face recognition and clustering. *CVPR*.
- **Summary:** This work introduces FaceNet, a system that maps facial images to compact Euclidean space embeddings using deep convolutional networks for highly

accurate recognition and clustering.

Application-4: Retail and Checkout Automation

- **Brief Description:** Vision-based systems allow automated checkouts and smart inventory management.
 - **Reference:** Ren, Y., Zhang, Y., et al. (2020). Deep learning-based automatic checkout system: Challenges and solutions. *Pattern Recognition*, 109, 107511.
 - **Summary:** The authors present deep learning approaches for object recognition in automatic retail checkout systems, emphasizing dataset preparation, occlusion handling, and real-time inference.
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Application-5: Agricultural Monitoring

- **Brief Description:** Computer vision monitors crop health, plant growth, and pest detection using drone imagery.
 - **Reference:** Kamilaris, A., & Prenafeta-Boldú, F. X. (2018). Deep learning in agriculture: A survey. *Computers and Electronics in Agriculture*, 147, 70–90.
 - **Summary:** The paper explores the use of CNNs and RNNs for agricultural tasks such as disease recognition and yield prediction, leveraging satellite and drone imagery for precision farming.
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Application-6: Real-Time Sign Language Recognition

- **Brief Description:** CV systems interpret sign language gestures into readable text or speech.
 - **Reference:** Cui, R., Liu, H., & Zhang, C. (2017). Recurrent convolutional neural networks for continuous sign language recognition. *IEEE Transactions on Multimedia*, 20(5), 1211–1221.
 - **Summary:** This paper proposes a combination of CNNs and RNNs to effectively capture both spatial and temporal dynamics in continuous sign language videos, showing strong results across multiple datasets.
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