

SIFT & CNN

SIFT and CNN slides for the project contribution in relation to the
HEp-2 Cells Dataset

SIFT (Scale-Invariant Feature Transform)

- **SIFT** detects keypoints invariant to scale, rotation, and lighting.
 - **Keypoints**
 - Typically corners and edges.
 - Composed of:
 - A pixel.
 - Scale, such as a 4x4 area around the pixel.
 - Orientation, which is Gradient related.
 - **Descriptors**
 - Vector representation summarizing the information around the keypoint.

Keypoint: < cv2.KeyPoint 0x30f7b4ab0>

Descriptor: [0. 0. 0. 1. 34. 52. 7. 3. 0. 0. 0. 0. 4. 22.

```
44. 14. 1. 3. 1. 0. 3. 35. 22. 0. 1. 5. 1. 0.
 2. 9. 1. 0. 39. 1. 1. 43. 74. 12. 2. 21. 132. 5.
 0. 2. 11. 56. 135. 139. 6. 1. 0. 5. 115. 139. 89. 13.
 0. 3. 3. 2. 29. 27. 0. 0. 92. 19. 11. 28. 5. 0.
 0. 3. 139. 57. 17. 40. 36. 11. 8. 33. 20. 8. 9. 135.
139. 49. 6. 4. 0. 0. 0. 16. 65. 17. 0. 0. 28. 38.
 8. 3. 0. 0. 0. 0. 68. 119. 112. 50. 6. 0. 0. 2.
 2. 6. 63. 139. 43. 0. 0. 0. 0. 0. 4. 30. 10. 0.
 0. 0.]
```

CNN (Convolutional Neural Network)

- Excel at identifying spatial hierarches of features within images.
- Composed of several interconnected layers.
 1. Input Layer
 2. 2D Convolutional Layer
 3. Max Pooling Layer
 4. 2nd 2D Convolutional Layer
 5. 2nd Max Pooling Layer
 6. Flattening Layer
 7. Fully Connected Layer
 8. 2nd Fully Connected Layer