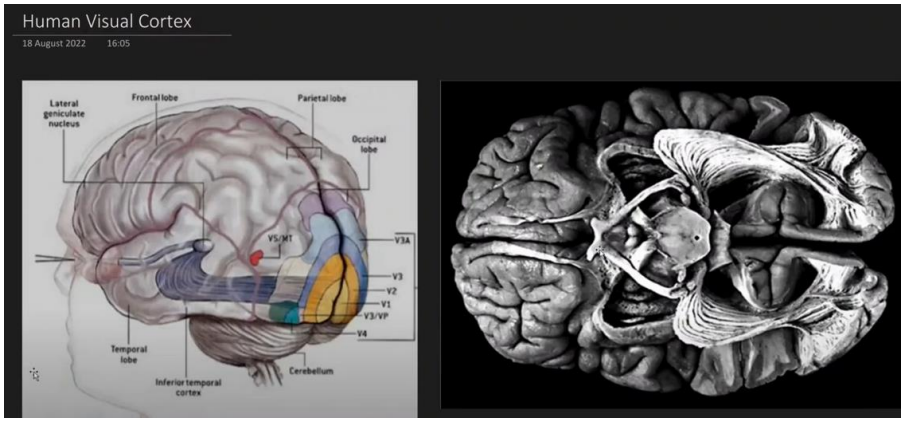
CNN Visual Cortex



A Landmark Experiment

The CNN (Convolutional Neural Network) architecture is inspired by the structure and function of the visual cortex in the brain. One of the seminal experiments that highlighted the parallels between CNNs and the visual cortex is often referred as " Story of Cat " Experiment.

In the 1950s and 1960s, neurophysiologist David Hubel and Torsten Wiesel conducted groundbreaking experiments at Harvard Medical School, where they studied the responses of neurons in visual cortex of cats. They inserted micro electrodes into visual cortex of anthetized cats & showed various visuals stimuli, such as simple lines, edges and eventually more complex patterns like faces.

What they discovered was that certain neurons in the visual cortex were highly selective to specific visual features. For instance, some neurons would respond only when presented with horizontal lines, while others responded to vertical lines or diagonal edges. These neurons seemed to act as specialized detectors for different visual patterns.

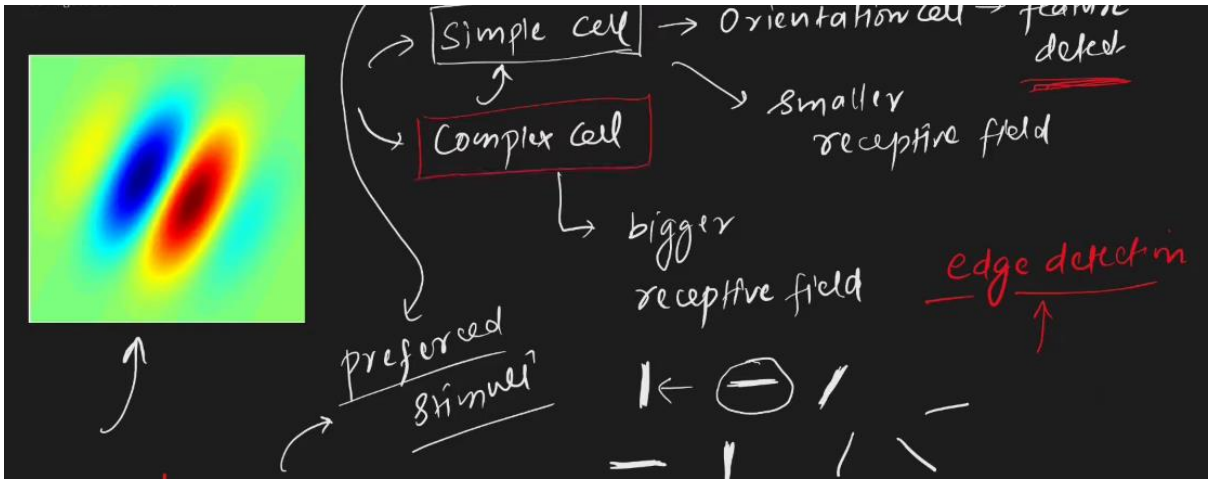
The significance of this experiment lies in demonstrating that the visual cortex processes visual information hierarchically, with simple features detected in lower layers and progressively more complex features detected in higher layers. This hierarchical organization is a fundamental principle of CNNs.

CNNs which are a type of deep neural network, are designed to mimic this hierarchical structure of the visual cortex. They consist of multiple layers of interconnected nodes, where each layer processes the input data at a different level of abstraction.

The early layers detect basic features like edges and textures, while deeper layers combine these features to recognize more complex patterns and objects.

The “Story of Cat” experiment provided crucial insights into how the brain processes visual information and inspired the development of ANN, particularly CNNs, which have revolutionized various fields such as computer vision, image recognition and NLP>

Conclusion:



Simple Cell -> Edges Detect krke →Simple Cell then Complex Cell ko pass krta hai &

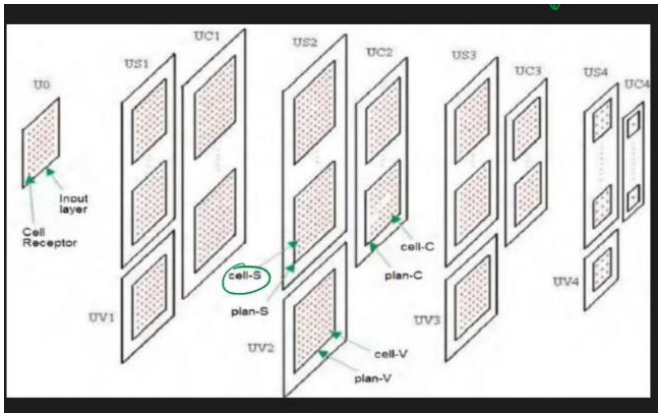
Complex Cell ka kaam hai aageh build krna ispe & aur zyaada complex pattern Detect karna

Yeah dono Cell ke madad se Humara Visual Cortex bannta hai

Ese hum dekh paate hai

Models ->

Neocognition → Fukushima :It is inspiration for CNN, Problem : it was not much optimized & not use to give proper result.



Then came CNN of Yann LeCun

It used Convolutional Layer, Pooling it started the Early CNN. From Here Serious Research Work got started in CNN

In 2012 -> ALEXNET Model came

& it won the ImageNet Competition.