Session 1 & Assignment

Re-submit Assignment

Due May 5 by 11am **Points** 200 **Submitting** a website url
Available after Apr 28 at 1pm

Session 1

> Welcome Everyone!

Preface? Sort of!

1. We have around 350 people in EVA.
2. Around 80% are from the EIP group, a very rich set of people learning, which we are expecting would help non-EIP members learn faster
3. There are 9 batches in total:
    1. M6
    2. W6
    3. F6
    4. S9, S11, S13
    5. R7, R9, R11
    6. You can attend either in case you missed your class.

4. What is TSAI?
    1. Learn
    2. Research
    3. Compete
    4. Repeat
5. EVA is Phase 1. What is Phase 2?

Administrative Stuff:

1. Make sure you have a Google Colab Account
2. Make sure you have a GitHub account. You would be sharing your code through GitHub links.
3. On your LMS, please add your profile details and use it for viewing your content, assignments, and discussions.
4. We would not be posting answers and other course-related knowledge on Telegram. Use LMS forum instead
5. Every session ends with an assignment and an online quiz on the LMS
6. Discussions on the forum are monitored, and those helping others will get additional bonus points.
7. You need to maintain a minimum of 50% score in EVA, failing which you will not get "Graduation Certificate", but only "Participation Certificate". Why?
8. Non-submission of any assignment or not taking part in any quiz is awarded -30% score of that assignment/quiz.
9. Deadline for assignments and quizzes are HARD. Any SOFT deadline would be informed about in advance. The final deadline is as mentioned on the LMS

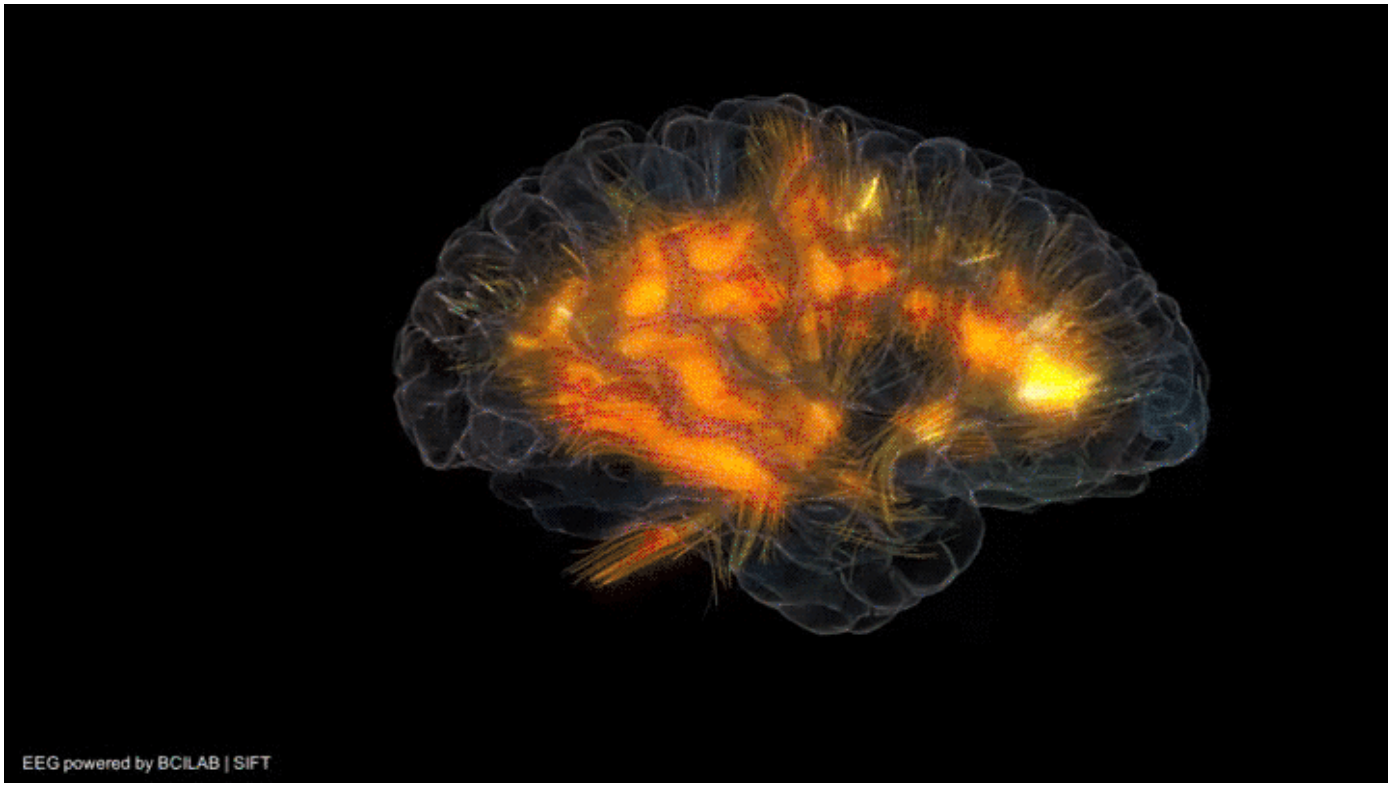
Extensive Vision AI Program

1. Around 40+ sessions, 2 hours per session
2. 5-6 combined review sessions (for tough assignments/projects), can be attended online
3. 4 Industry Expert Sessions (NVIDIA), can be attended online
4. From Mid-May you can come at TSAI and have your own group meetings.
5. We would be covering tons of research papers and their implementations. Your submission (except first few) would be in a Paper format.
6. Your code, as well as your documentation, both are marked. (ReadMe on GitHub)
7. EVA is predominantly Vision, but some Text is also covered. Explain
8. EVA is one of the most extensive programs out there.
9. EVA for the first few sessions might feel familiar (for EIP participants), but would quickly diverge after few sessions. Use this initial time to help non-EIP students, and build up Python Skills.

Let's get started

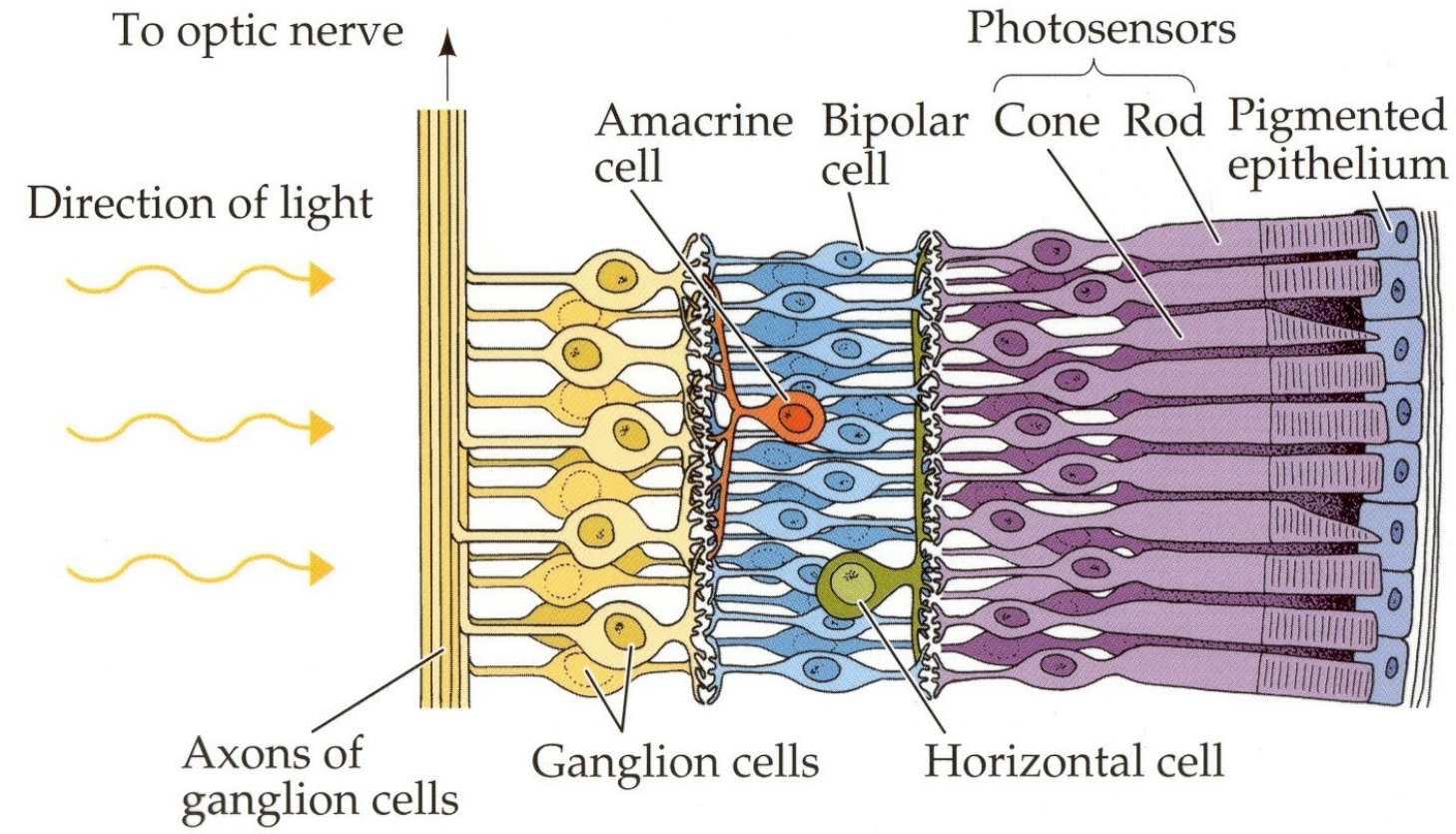
This is how we want you to feel when you think about DNNs

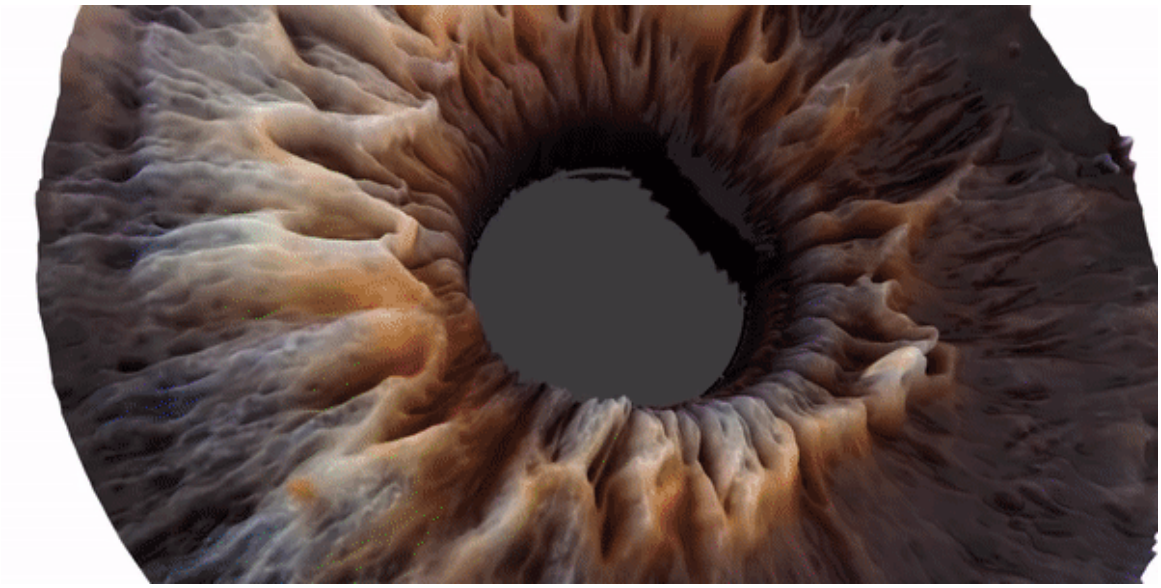
Building the Intuition!



An ultra-dense connected network of flowing information

EYES





THE CONNECTION TO REMEMBER

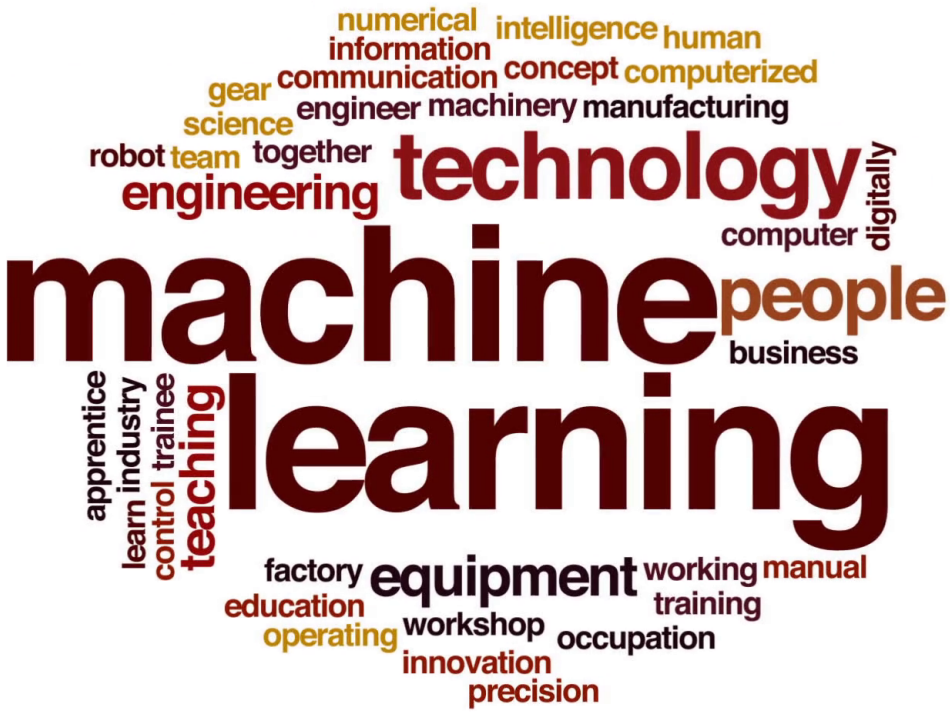
> CHANNELS!!

Think Cuisines (what are you seeing here?)

Listening to Songs?

You should be imagining this:

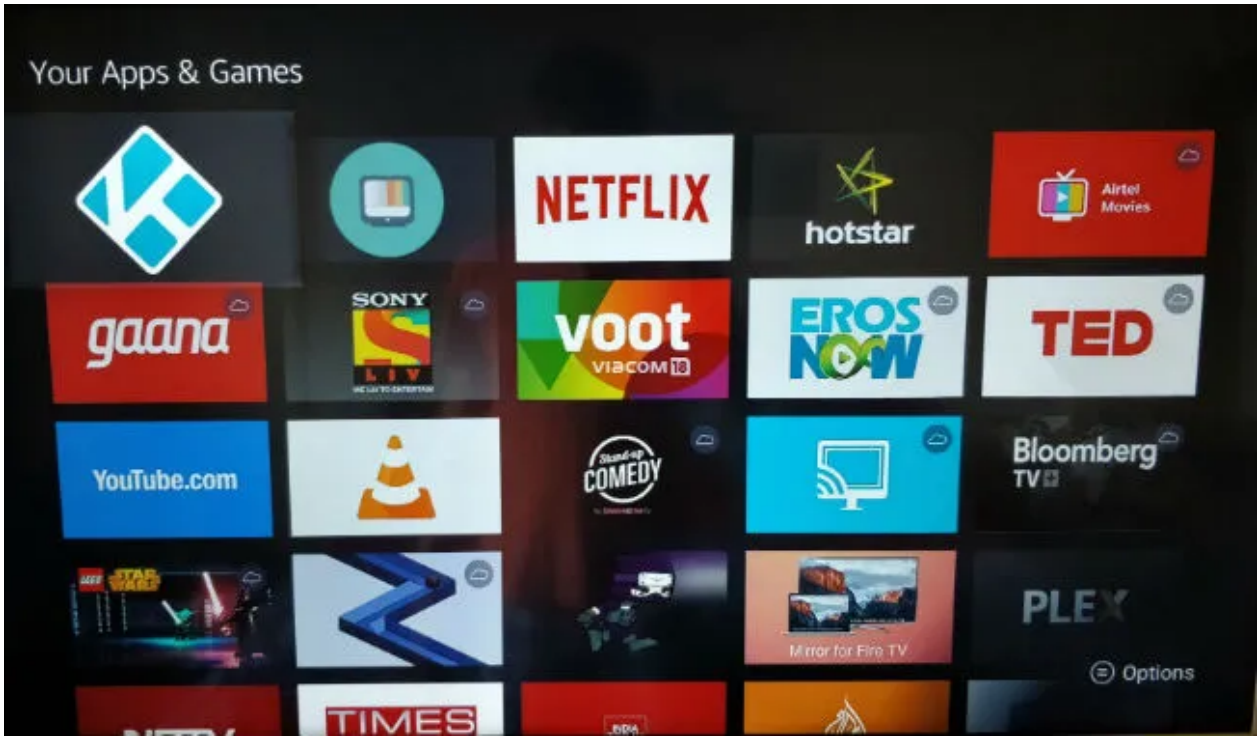
Seeing Text?



You should be imagining each character?

Seeing TV?

You should be imaging this:



What do we take out from this?

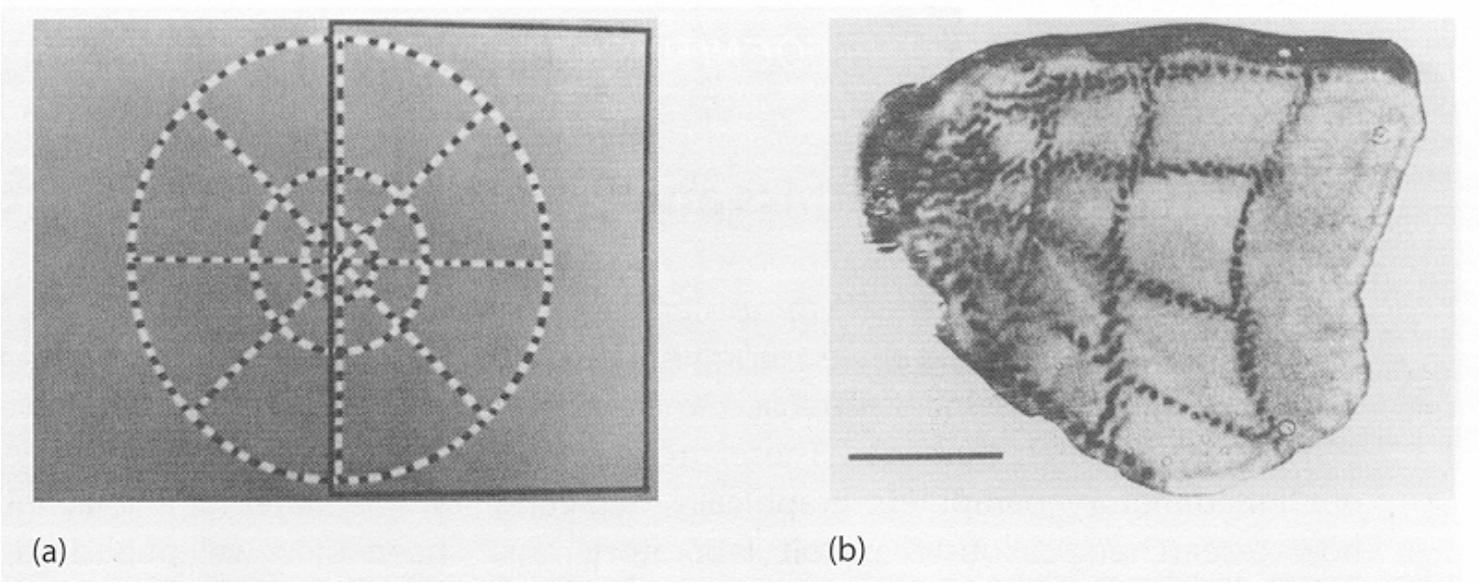
(in our context), when we are seeing an image, we are essentially seeing lots of distinguishable features together.

THE BORED CAT EXPERIMENT

CAT #1

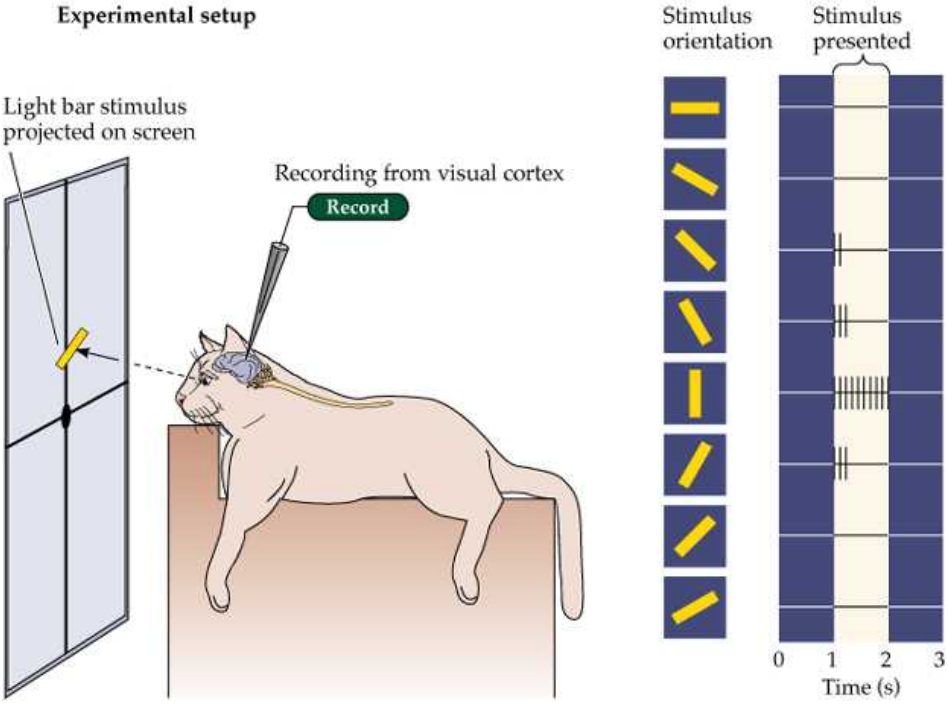
CAT #2

CAT #1 Experiment Results:



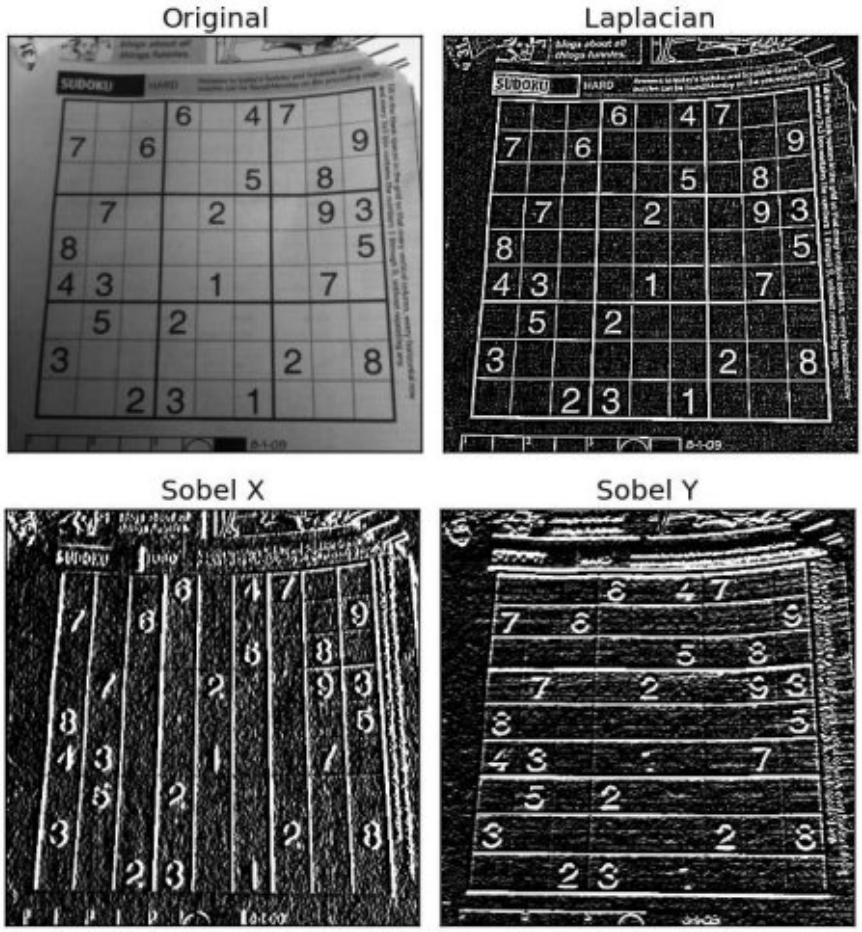
When we see the image on the left, right gets "printed" on our brain!

CAT #2 Experiment Results:



Our brain has several edge detectors (along with many other things)!

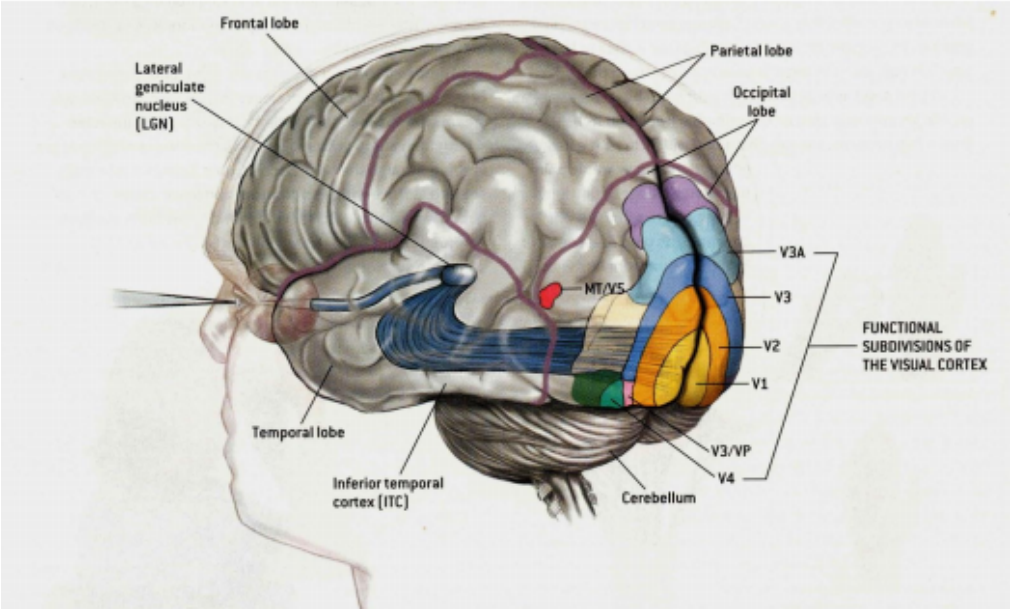
How do we build complex things?



THE CONNECTION TO REMEMBER

> COMPLEX THINGS ARE BUILT FROM SMALL FEATURES!!

Cortex Processing



Happens at the back of our brain. We have 4 core layers.

THE CONNECTION TO REMEMBER

> MORE FEATURES, DIVIDED INTO MULTIPLE CHANNELS!!

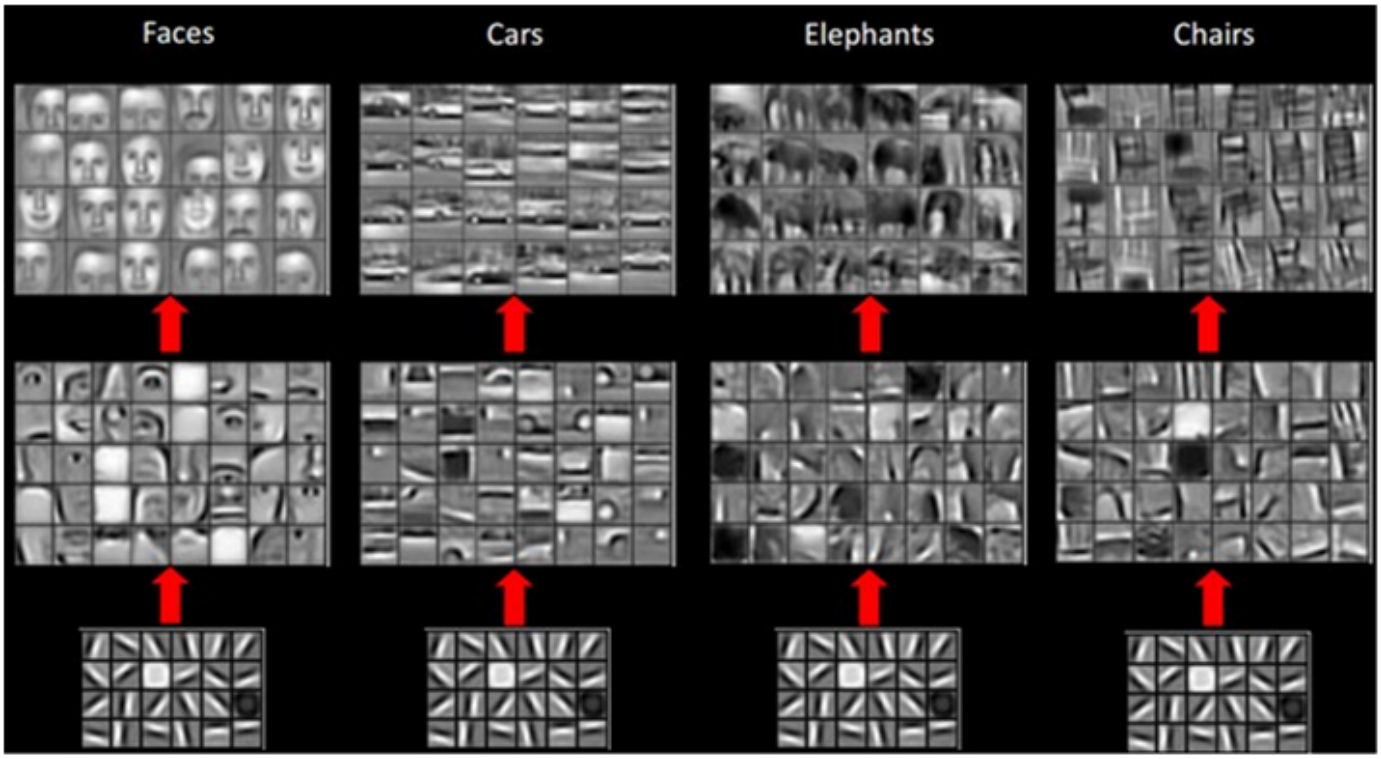
Understanding Features through music

THE CONNECTION TO REMEMBER

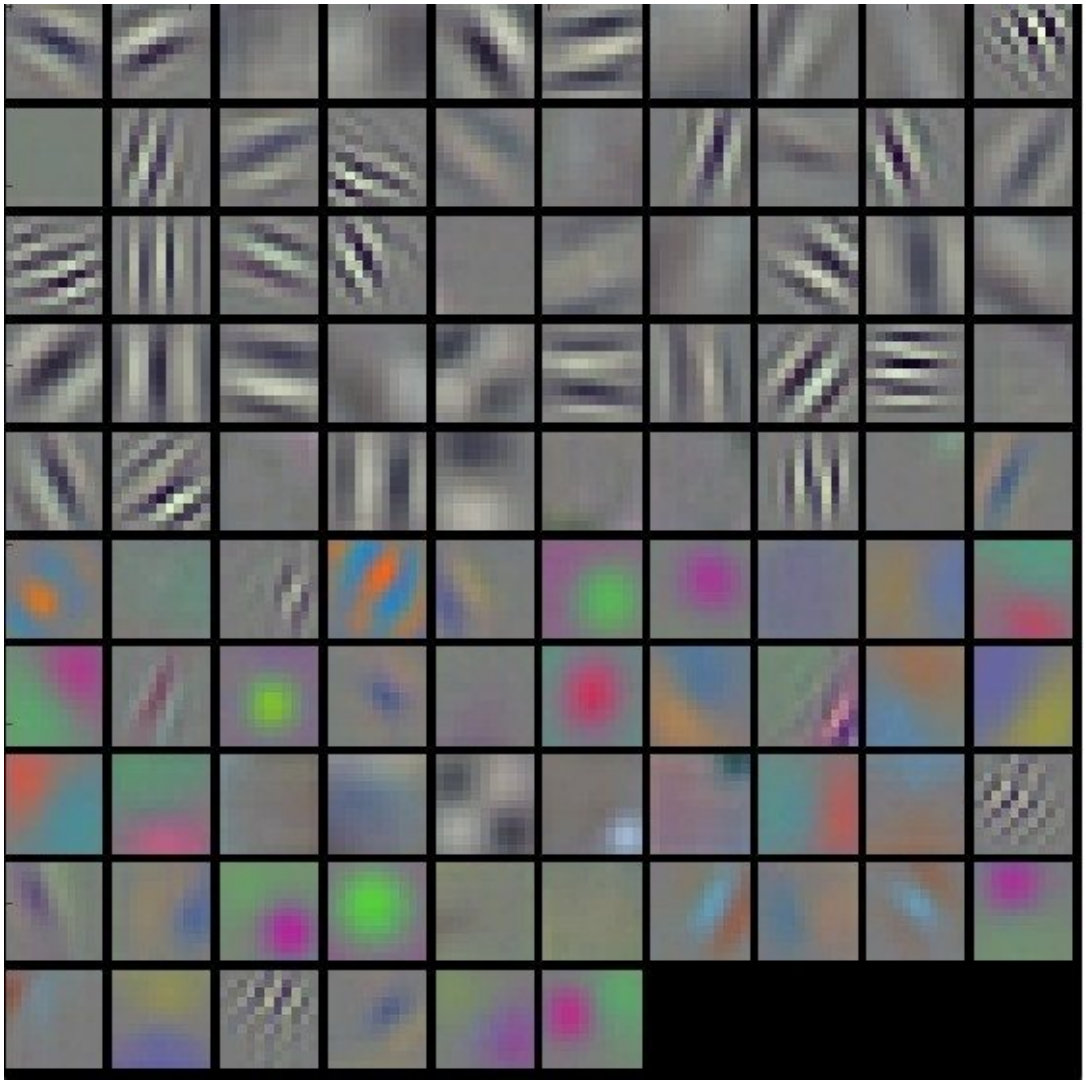
> KERNELS = FEATURE_EXTRACTOR
>
> CHANNELS = SIMILAR_FEATURE_BAGS

Back to Neural Computing

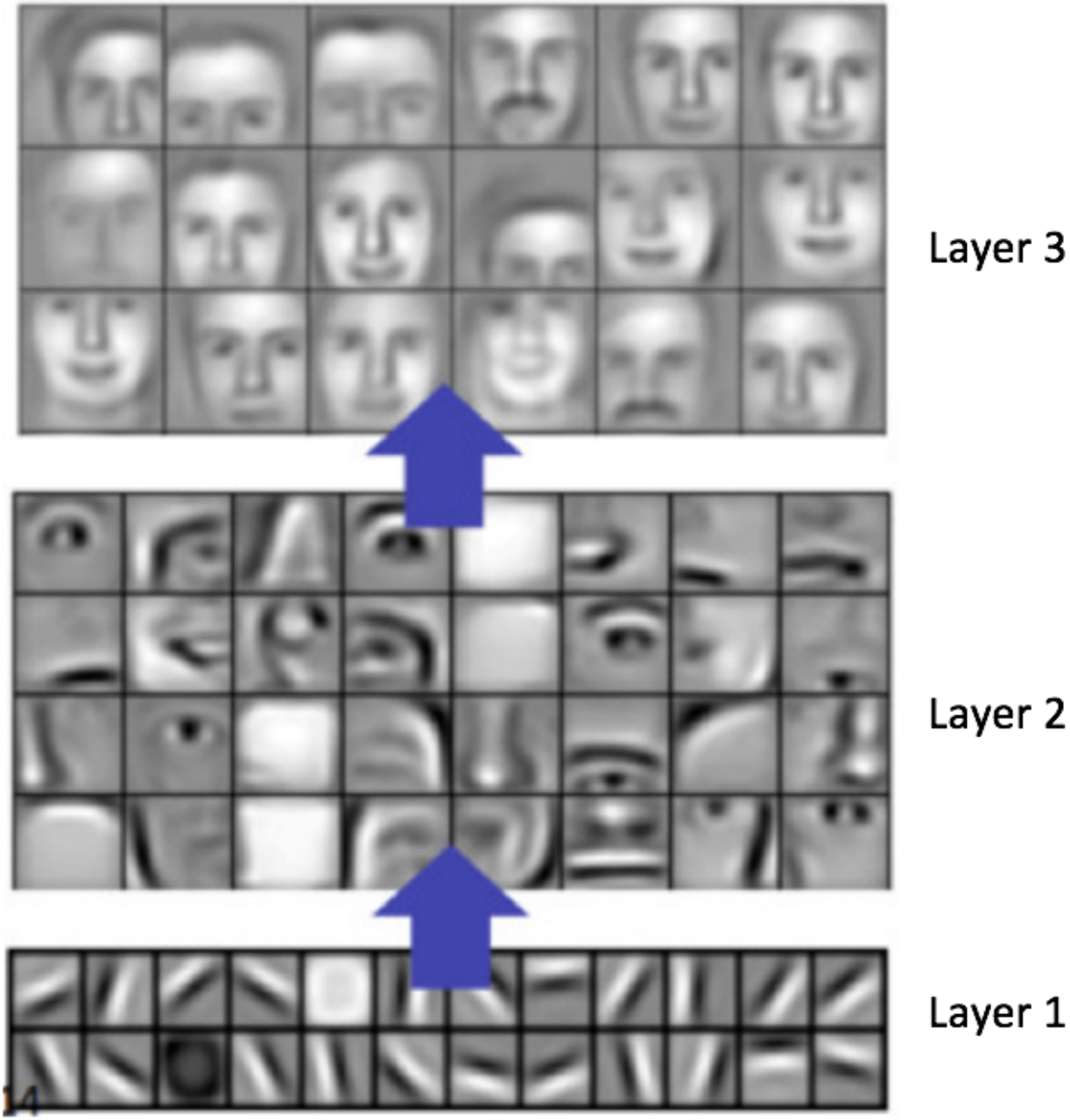
We need feature extraction methods and then combining methods



Convolution - Feature Extraction

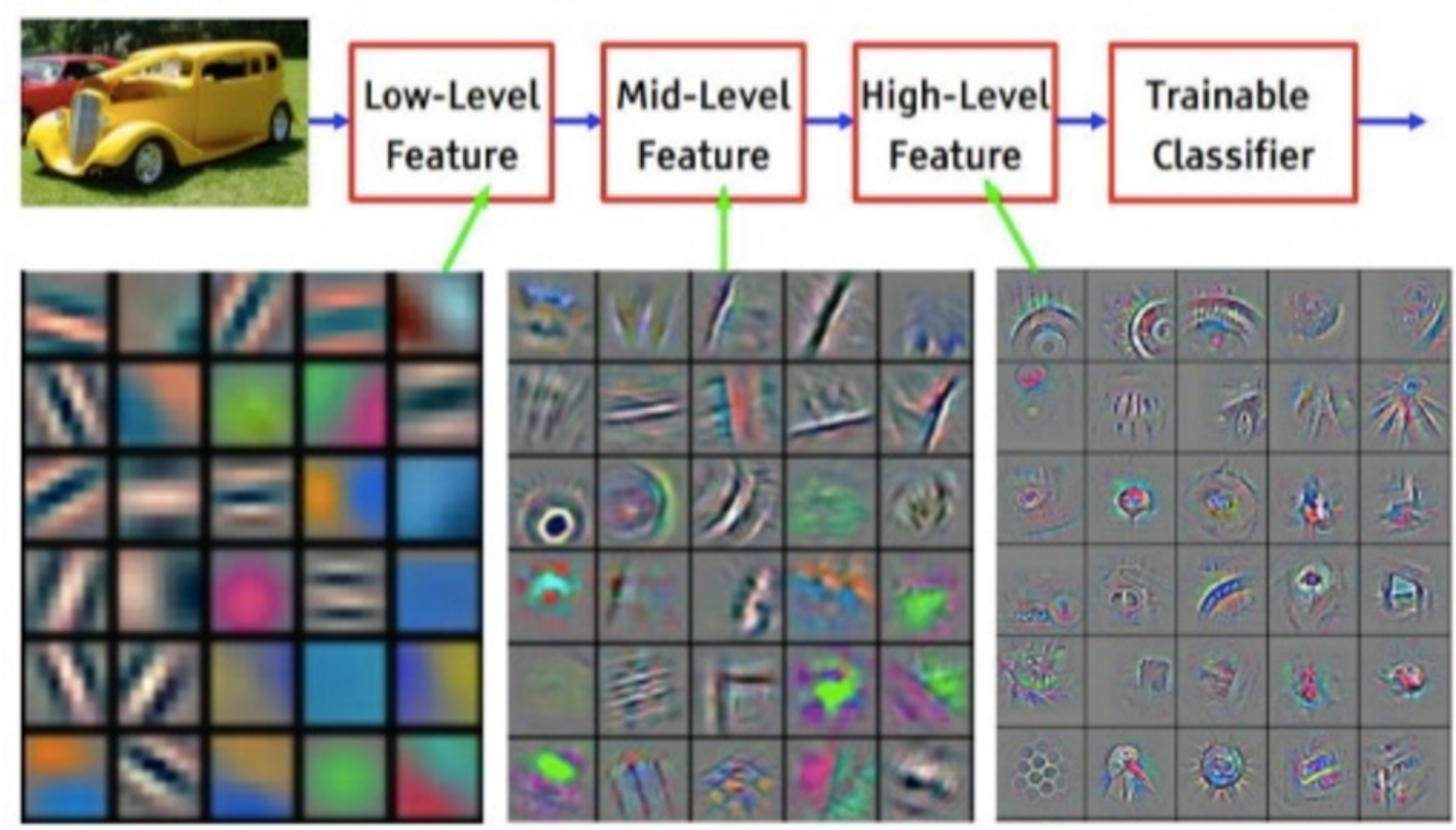


Can you imagine this happening?



Or this?

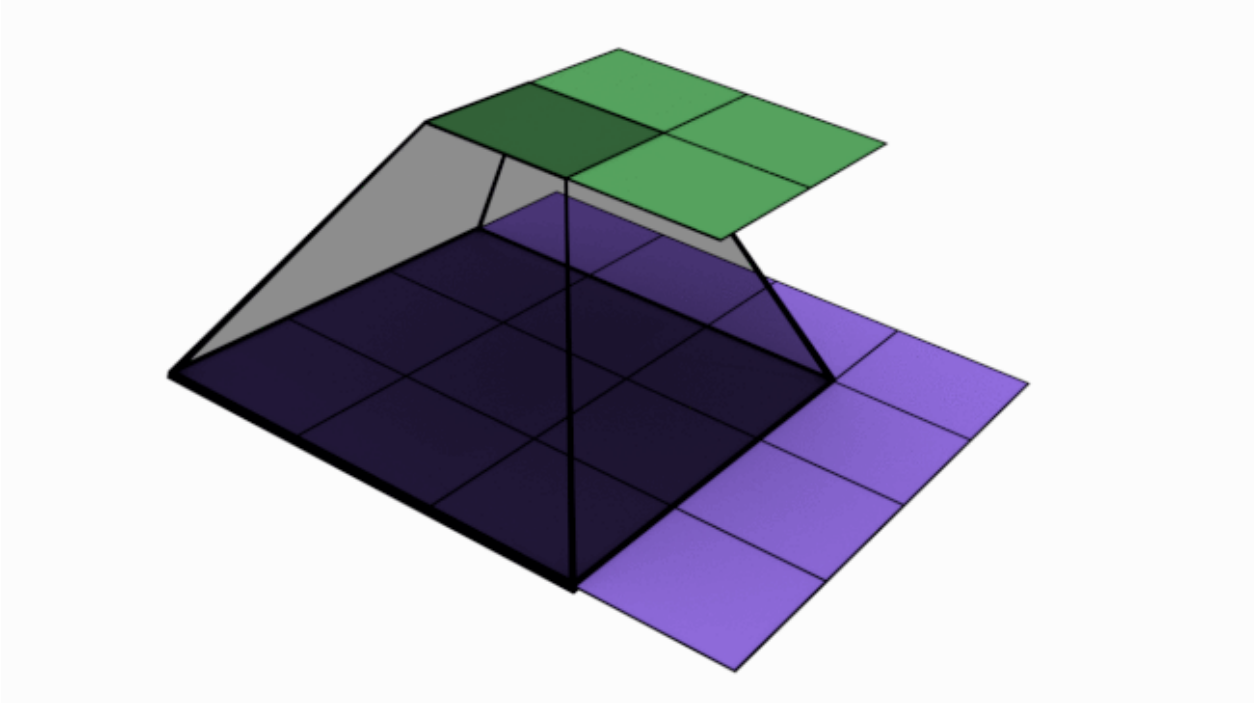
Convolutional Neural Network



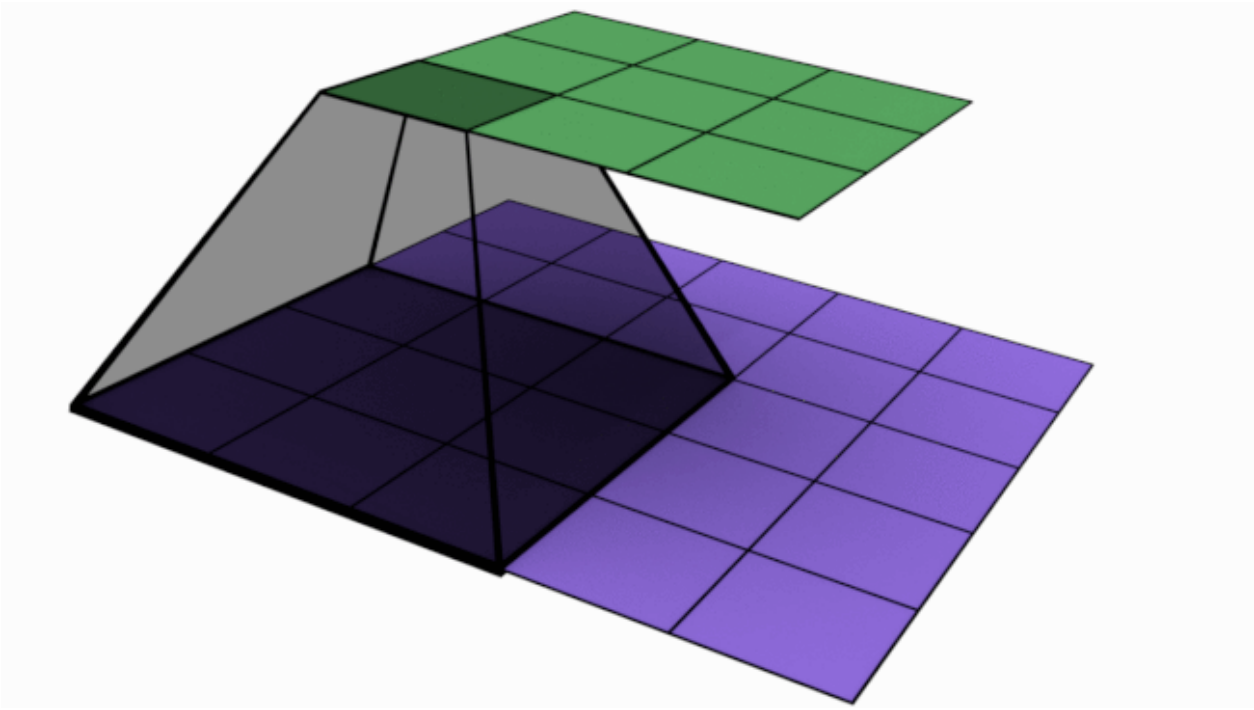
Before we Proceed: http://scs.ryerson.ca/~aharley/vis/conv/flat.html [(http://scs.ryerson.ca/~aharley/vis/conv/flat.html)](http://scs.ryerson.ca/~aharley/vis/conv/flat.html) Play with this

Core Concept

Convolution



3x3 on 5x5

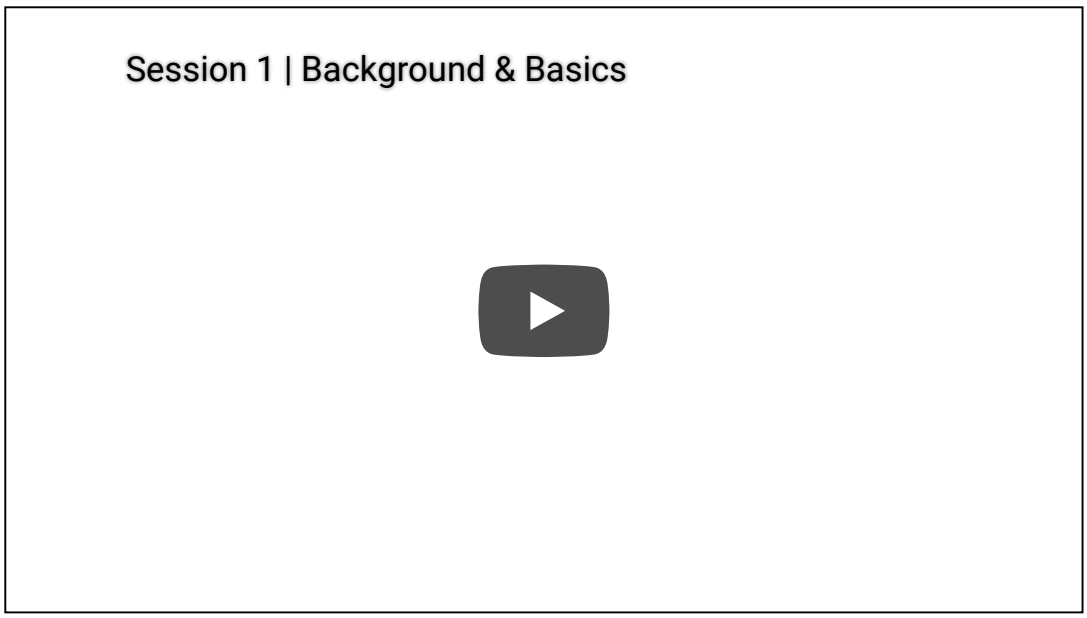


We do we always use 3x3, why?

2 Assignments.

- **Assignment 1A**: Visit this link: **LINK (https://colab.research.google.com/drive/1R7LjkzlyonYjwZj6wNgr8fkmTOJNMSbx)** . Notice the last block. That's a vertical edge detector. The assignment is to find and show (in separate code blocks):
  - Horizontal Edge Detector
  - 45 Degree Angle Detector (either)
  - Blur Kernel
  - Sharpen Kernel
  - Identity function (doesn't do anything)
  - Instructions:
    - Stick to 3x3 kernels only
    - Do this on Colab, but once done upload to your GitHub Project 1.
  - 50 Marks for Correct Code and 50 marks for *great* documentation
- **Assignment 1B**:
  - On your GitHub, add Project 1, and add a readme file (called Assignment 1B). In this readme file, answer the following question:
    - What are Channels and Kernels (according to EVA)?
    - Why should we only (well mostly) use 3x3 Kernels?
    - How many times do we need to perform 3x3 convolution operation to reach 1x1 from 199x199 (show calculations)
  - 50 Marks for your explanation and 50 Marks for your creativity
- Keep your project **Private**, and add "**theschoolofai**" or "admin@theschoolofai.in" as a **collaborator**
- Upload GitHub Project 1 link to LMS (make sure you have added **theschoolofai** as a collaborator)
- Deadline 1 hour before your next session.
- You **MUST** use your own words while writing any of the above, if we find plagiarism, 0 marks would be awarded for that article.

Session 1 Video:


Session 1 | Background & Basics