

Discussion Questions

1. What was the missing piece to make CNNs competitive with Transformers?
2. Are the inductive biases of CNNs beneficial or harmful?
3. Do transformers have any advantages over CNNs? In which scenarios would you choose CNNs over Transformers and vice-versa?
4. Many advances in AI are fueled by the data rather than the model design. Does it even matter whether we are using CNNs, Transformers, or some other model?
5. Why are Transformers still arguably dominant over CNNs?
6. What are the next big problems in the context of vision transformers?
7. Are we going to be using Transformers for CV in 2, 5, 10 years? Will there be a unified architecture for all computer vision tasks?

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Takeaways (Transformer)

- Attention is NOT all you need (but it can still be useful).
- Inductive biases of CNNs might not be as harmful as previously claimed (even in big-data regimes), and they might even benefit Transformers (e.g., Swin).
- The flexibility of Transformers is helpful when considering multimodal data.
- The popularity of LLMs makes it difficult to avoid transformers even for CV tasks.
- Having said this, currently, the model choice still largely depends on the task that we want to solve.

Takeaways (General)

- Don't give in to the hype but instead critically evaluate each paper based on the empirical evidence.
- Pay attention to hidden implementation details (e.g., optimization, training schedule, data augmentation, etc.).
- Learn to appreciate simple yet effective ideas.
- Consider the big picture of each paper (e.g., potential future impact of the paper).