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Leiden

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Using deep learning models in image processing

Xiong, Z.

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Stellingen

Behorende bij het proefschrift

Using Deep Learning Models in Image Processing

1. When studying AI development, it is more revealing to group them by how they process information (e.g., convolution or attention) rather than by application or publication date. (Chapter 2)
2. Treating visual concepts as independent entities can simplify modeling. However, in the real world, these concepts are often interrelated and may exhibit hierarchical structures. (Chapter 3)
3. In Deep Learning, the high computational cost of exact Total Variation is prevented by learning simpler approximations, relying on its expressive capacity to compensate for the precision loss. (Chapter 3)
4. When an AI model shifts from recognizing general categories to specific instances, it translates abstract knowledge into concrete, image-specific decisions. (Chapter 4)
5. In weakly supervised segmentation, the explicit modeling of the background is both challenging and valuable, as in this manner, spatial information is recovered that is otherwise lost due to incomplete supervision. (Chapter 4)
6. In dense segmentation, static queries rely on excessive redundancy in handling the counts of varying objects whereas dynamic queries adaptively activate bases on image content. (Chapter 5)
7. Making models bigger does not automatically make them smarter. The up-scaling shows a diminishment in returns. Therefore, in research a shift towards better algorithms and high-quality data is required. (General)
8. Understanding how AI makes decisions is not just a technical rigor but essential for holding AI systems accountable. Without this transparency, discussions about ethics become mere after-the-fact justifications. (General)
9. AI and human development need not be in competition. If future AI systems are transparent about their reasoning, they could enhance our abilities and help us evolve, rather than replace us. (General)
10. Deep learning has pushed existing mathematical tools to their limits. To reach the next level of AI, we may need new frameworks, just as classical physics required the development of calculus. (General)

Zhan Xiong
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