

Convolutional Neural Networks: Epic Fails

Laura E. Boucheron

College of Engineering

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Computer Engineering



BE BOLD. Shape the Future.

Nguyen, A., Yosinski, J., & Clune, J. (2015). Deep neural networks are easily fooled: High confidence predictions for unrecognizable images. In *Proceedings of the IEEE conference on computer vision and pattern recognition* (pp. 427-436).



Penguin (99.99%)

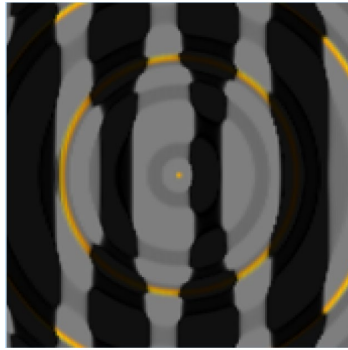


Electric Guitar
(98.90%)

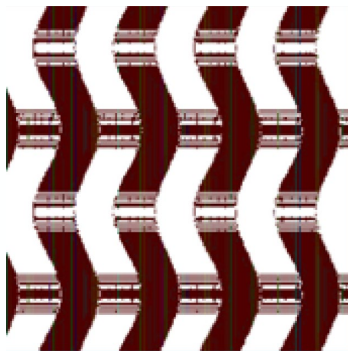
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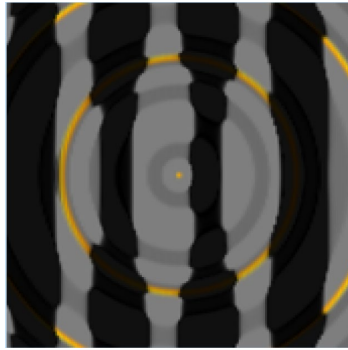
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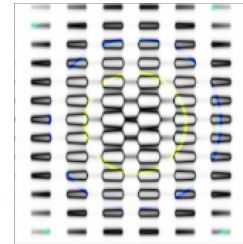


Penguin (99.99%)

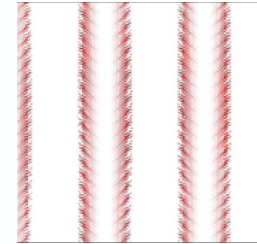


Penguin (99.99%)

Other >99.5% confidence predictions:



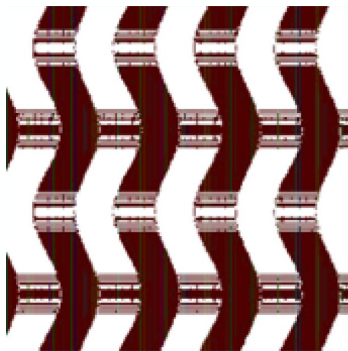
Remote control



Baseball



Electric Guitar
(98.90%)

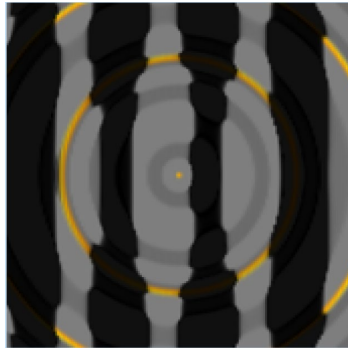


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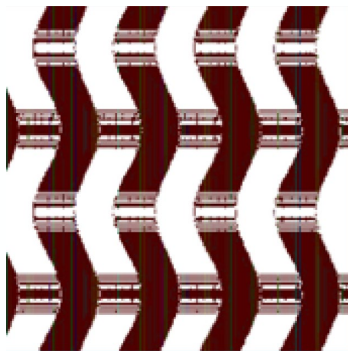
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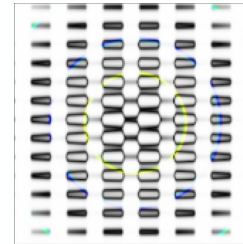


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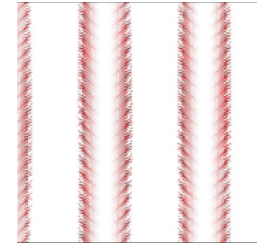


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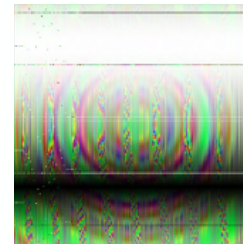
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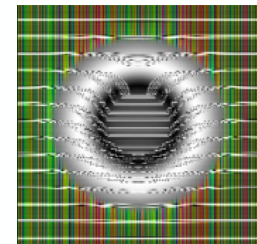
Remote control



Baseball



Freight car

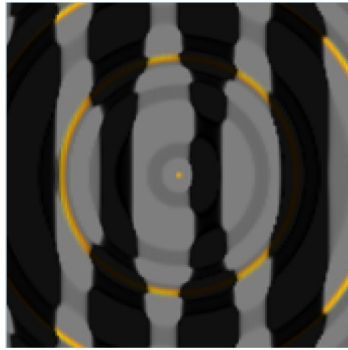


African grey

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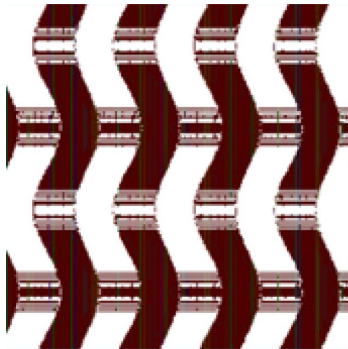
Penguin (99.99%)



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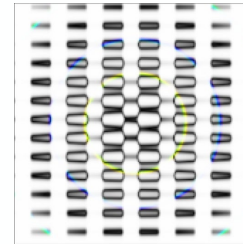


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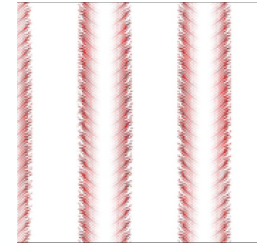


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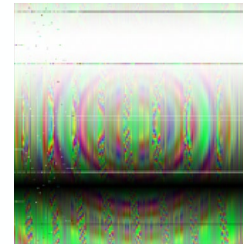
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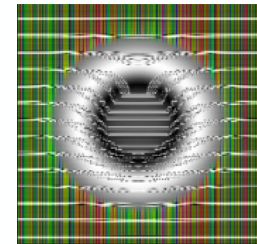
Remote control



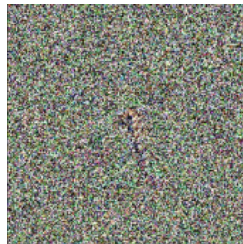
Baseball



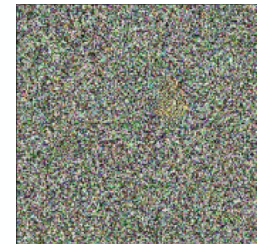
Freight car



African grey



Cheetah

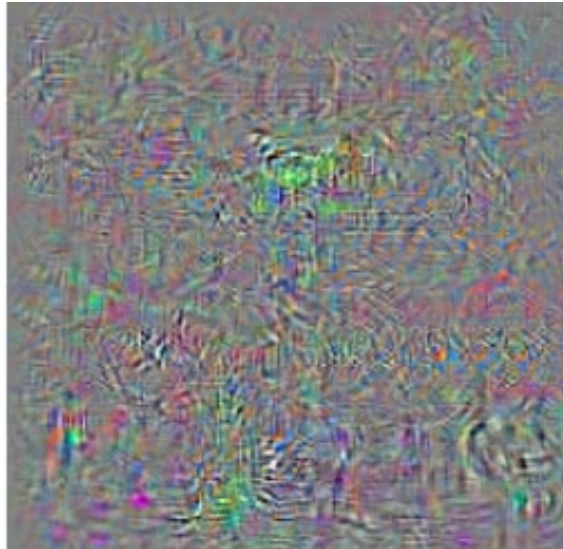


Jackfruit

Szegedy, C., Zaremba, W., Sutskever, I., Bruna, J., Erhan, D., Goodfellow, I., & Fergus, R. (2013). Intriguing properties of neural networks. *arXiv preprint arXiv:1312.6199*.



School Bus



Perturbation



Ostrich

Szegedy, C., Zaremba, W., Sutskever, I., Bruna, J., Erhan, D., Goodfellow, I., & Fergus, R. (2013). Intriguing properties of neural networks. *arXiv preprint arXiv:1312.6199*.



School Bus



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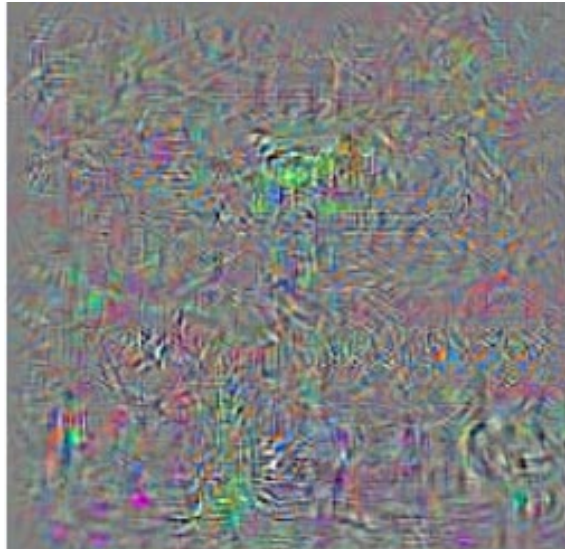


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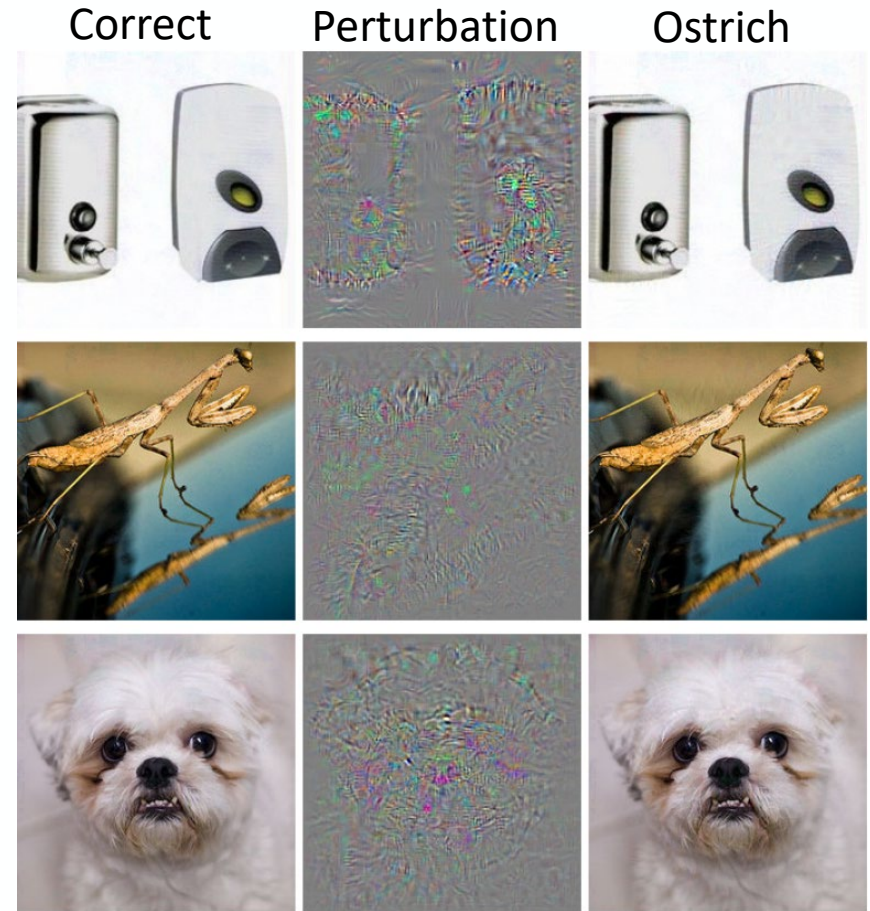
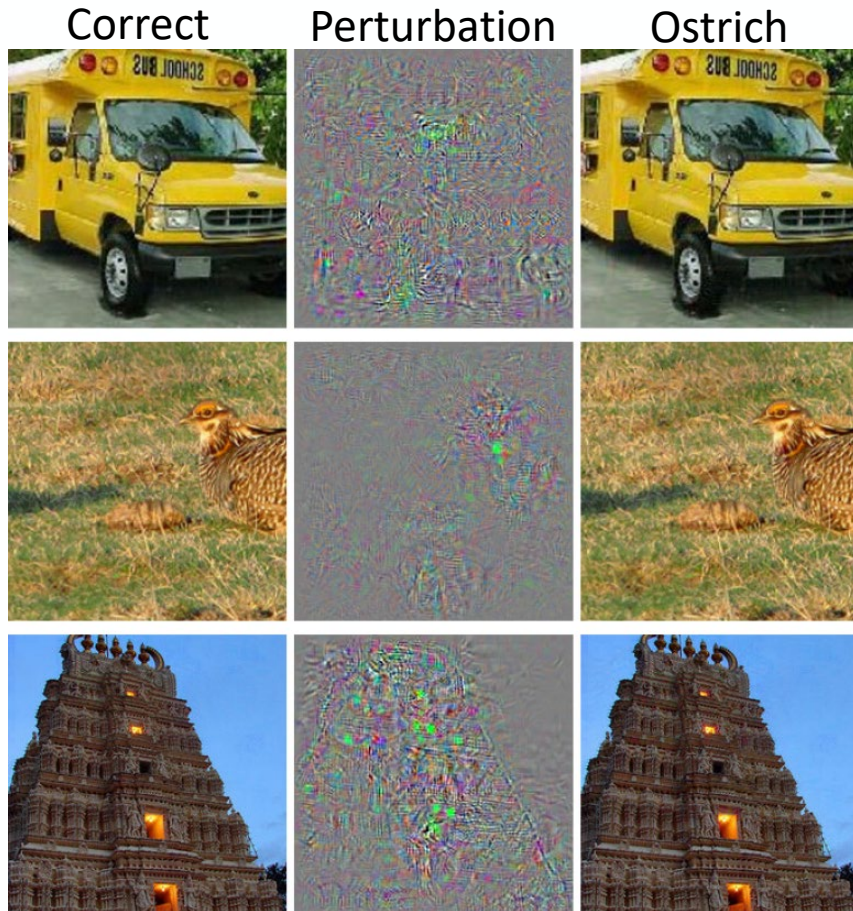


Perturbation



Ostrich

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Engstrom, L., Tran, B., Tsipras, D., Schmidt, L., & Madry, A. (2017). A rotation and a translation suffice: Fooling cnns with simple transformations. *arXiv preprint arXiv:1712.02779*.



revolver

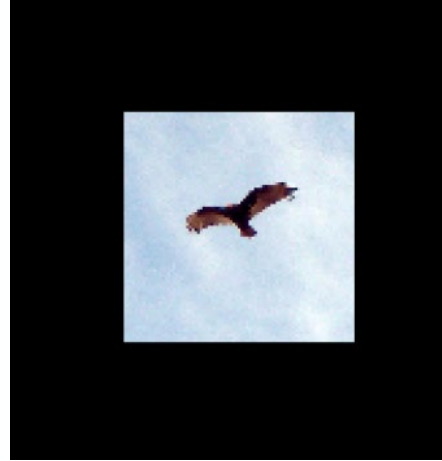


vulture

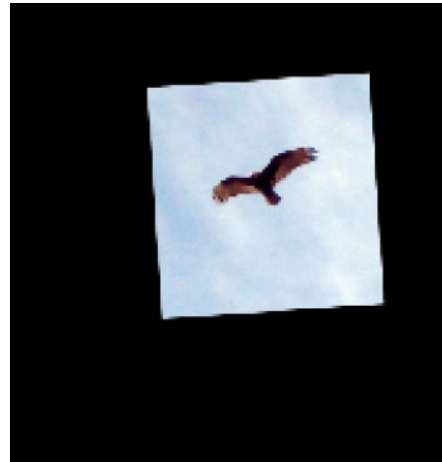
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revolver



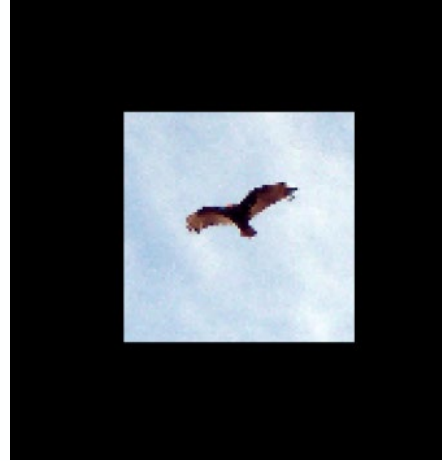
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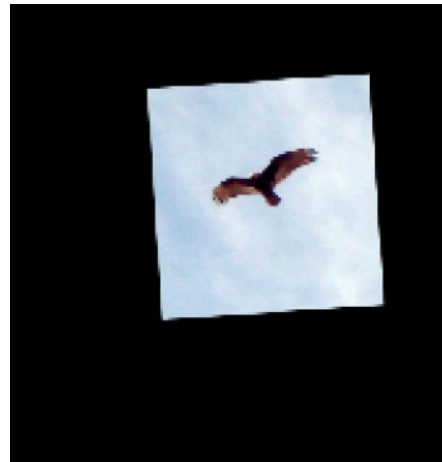
revolver



vulture

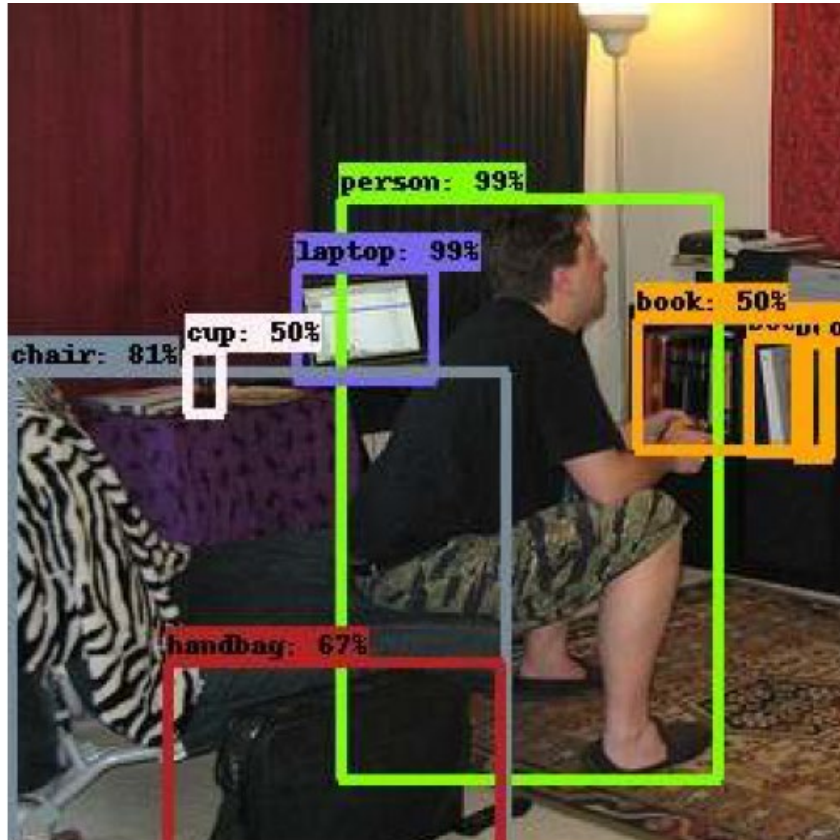


mousetrap

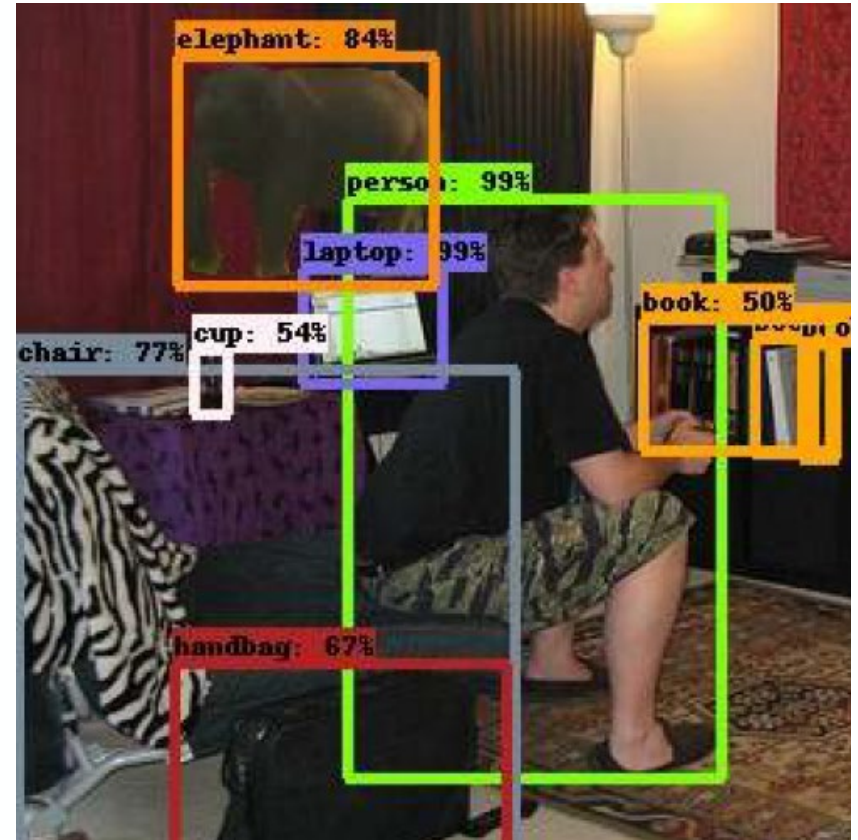
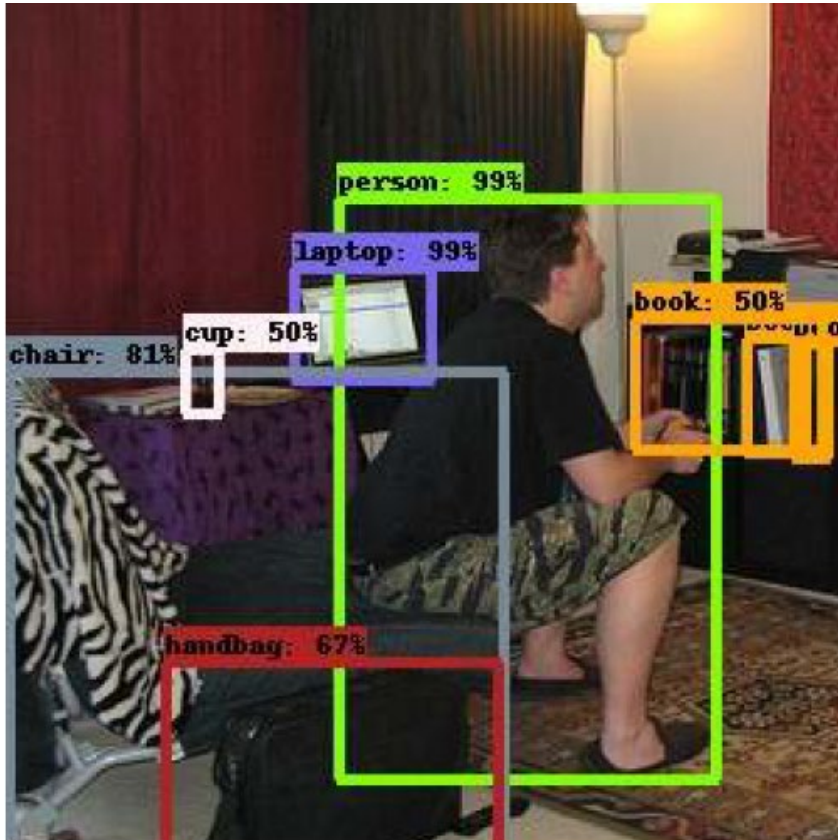


orangutan

Rosenfeld, A., Zemel, R., & Tsotsos, J. K. (2018). The elephant in the room. *arXiv preprint arXiv:1808.03305*.



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