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Human-Centered AI through Scalable Visual Data Analytics

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Abstract: While artificial intelligence (AI) has led to major breakthroughs in many domains, understanding machine learning models remains a fundamental challenge. They are often used as "black boxes," which could be detrimental. How can we help people understand complex machine learning models, so that they can learn them more easily and use them more effectively? In this talk, I present my research that makes AI more accessible and interpretable, through a novel human-centered approach, by creating novel data visualization tools that are scalable, interactive, and easy to learn and to use. I present my work in two interrelated topics. (1) Visualization for Industry-scale Models: I present how to scale up interactive visualization tools for industry-scale deep learning models that use large datasets. I describe how the ActiVis system helps Facebook data scientists interpret deep neural network models by visually exploring activation flows. ActiVis is patent-pending, and has been deployed on Facebook's ML platform. (2) Interactive Understanding of Complex Models: I show how visualization helps novices interactively learn complex concepts of deep learning models. I describe how I developed GAN Lab, a visual education system for Generative Adversarial Networks (GANs), one of the most popular, but hard-to-understand models. GAN Lab has been open-sourced in collaboration with Google Brain and used by over 30,000 people from 140 countries. I conclude with my vision to make AI more human-centered, to promote actionability for AI, stimulate a stronger ethical AI workforce, and foster healthy impacts of AI on broader society.

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