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CheXpert: Radiology Image Classification via Machine Learning

Stanford researchers have developed CheXpert which can reduce noise and identify several pathologies on x-rays with very high accuracy via machine learning. CheXpert can read photos of x-rays from a mobile phone and is robust to noise. The trained neural network is computationally light enough to run on mobile platforms such as cell phones or low-power computers. This can enable users anywhere, even in remote regions or without access to significant computing resources, to utilize the neural network for the radiology image classification. The dataset is open source and can be a standard benchmark to evaluate performance of chest radiograph interpretation models.

Stage of Development

- **Released dataset to the public** as a standard benchmark to evaluate performance of chest radiograph interpretation models
- Studies have shown that this method can be more accurate than individual radiologists

Applications

- **Radiologist assistance** on chest x-rays
- Can be used as an **app** on a mobile phone

Advantages

- **High accuracy**- better than individual radiologists
- **Automated** radiology image classification
- Trained neural networks are **robust to noise**
- **Reduced noise** improves accuracy of machine learning systems

- **Computationally light** – can be used on mobile phones and can be deployed anywhere in the world
- **Flexible** – used neural network for training data but other machine learning methods can be used
- **Novel** – currently no automated method to reduce noise on mobile x-ray images

Publications

- Irvin, Jeremy, Pranav Rajpurkar, Michael Ko, Yifan Yu, Silviana Ciurea-Ilcus, Chris Chute, Henrik Marklund et al. "Chexpert: A large chest radiograph dataset with uncertainty labels and expert comparison." *In Proceedings of the AAAI Conference on Artificial Intelligence,* vol. 33, pp. 590-597. 2019.

Patents

- Published Application: 20210089840
- Issued: 11,798,159 (USA)

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