Machine learning for breast cancer diagnosis in developing countries

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Propositions belonging to the Dissertation

Machine Learning for Breast Cancer Diagnosis in Developing Countries

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1. Machine learning can help in automating different steps involved in analyzing breast thermal images. (Thesis)

2. Deep learning is more suitable for breast segmentation and view tagging than traditional image processing and machine learning (ML) approaches when the dataset size is large. On the contrary, traditional image processing and ML approaches are better suited for hotspot segmentation where the size of the dataset is small. (Thesis)

3. An automated detection of hormonal receptor status from breast imaging might help in the immediate estimation of prognosis and treatment planning for breast cancer patients. (Thesis)

4. A neural network based risk estimation from breast cancer risk factors provides better results compared to traditional classifiers even when the input data is incomplete or inaccurate. (Thesis)

5. A personalized risk score can help in better stratification of high-risk individuals as compared to an age-wise risk stratification. (Thesis)

6. "Different strokes for different folks"—An expensive and skill dependent breast imaging solution that is effective in developed countries poses challenges for implementing in developing and underdeveloped countries.

7. A simple 'yes' or 'no' output from an AI tool about a person's condition is not sufficient for a physician. Domain knowledge based features will enable physicians to understand the machine learning prediction and take better informed decisions.

8. Traditional image processing approaches come in handy at the beginning of a new solution when the size of the dataset is small and can bootstrap labeling of large datasets that can then be used to train machine learning algorithms for better accuracy.

9. Most of the ML solutions proposed in this thesis are molded into an easy to use, online and on-demand web-service called SMILE to enable automated interpretation of breast thermography at scale. (Valorization)

10. Success is the result of perfection, hard work, learning from failure, loyalty, and persistence. -- Colin Powell