Implementing Deep Learning Techniques to Detect Abnormal Cells

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Diseases that cause visually abnormal cells affect millions of individuals around the world. In developing countries, these diseases are traditionally diagnosed by having a trained scientist spot those abnormal cells in a blood smear. However, this process is expensive because scientists trained to detect these diseases are scarce. The process is tedious as well, allowing room for error or misdiagnosis. Automating this process can bring the level of work from the scientist level to the technician level. This will not require a scientist to analyze blood smears by hand, and it can be implemented in places where access to sophisticated medical facilities is limited. A solution is a computer application that uses Java and Python to identify abnormal cells in blood smear images using deep learning technology. The application uses a deep learning technique called transfer learning to utilize the best generic deep learning model available and retrain it with Tensorflow to detect abnormal cells. The technician can input a blood smear image and have the application scan the blood smear for cells and extract them as individual images. The retrained deep learning model then classifies these individual images, and the application outputs relevant results and an image of the blood smear with the cells identified whether they are healthy or unhealthy. It is planned to expand on this concept to detect other diseases and to karyotype chromosomes. The ultimate goal is to make diagnosing abnormal cell diseases more accessible in the developing world.

Awards Won:

Oracle Academy: Award of $5,000 for outstanding project in the systems software category.