

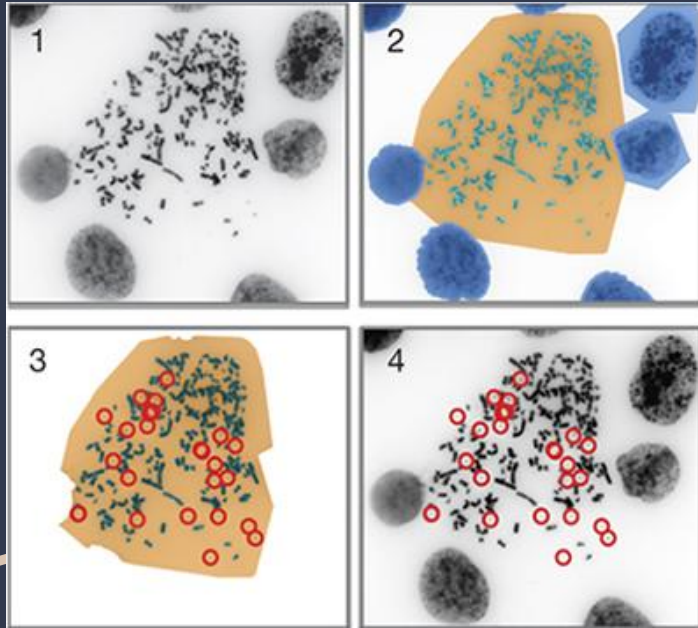
ecSeg Server:

Designing a basic server for counting ecDNA

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The project



- We set out to make a server for ecSeg
- ecSeg is a tool (developed by UCSD PhD Candidate, Utkrisht Rajkumar) which uses neural networks to identify extra-chromosomal DNA in Dapi stained tiff images of cells
- Using ecSeg, biologists can distinguish pieces of ecDNA, which is important in cancer pathogenesis, from other intracellular bodies

Background

Extra chromosomal DNA(ecDNA):

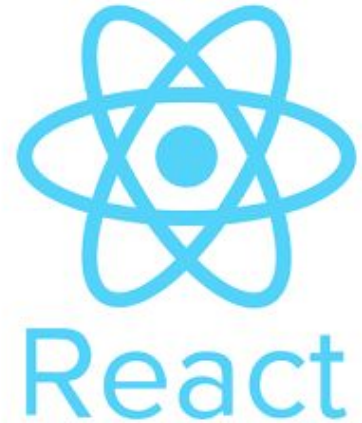
- 2,000 to over 20,000 bp of DNA
- exist outside of the nucleus
- ecDNA is distributed randomly between daughter cells during mitosis
- Large amounts of ecDNA replicates in a cell can be a sign that the ecDNA contains oncogenes (since they allow the cell to outcompete others)

Ecseg tool:

- uses a machine learning model from keras to analyze a stained cell to identify extrachromosomal elements

Frontend

- We decided to use React to create the user environment
- React is a javascript library specifically designed for building UIs



Backend

- We built the back end environment to run ecSeg using Flask
- Flask is a micro web framework running in Python
- It is classified as such because it has not database abstraction layer



Demonstration of the Server

Right now, our app takes in either an absolute path to an input .tiff file or an absolute path to a folder containing tiff files. In the future, we want to add an image selector for convenience.

Please enjoy !

You can request to download the software to run on your own machine at:

<https://github.com/nbavafa/CSE182>