CellMap: Interactive Tissue Analysis

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Repository link: <https://github.com/sukrut-shishupal/Vis_for_data_science>

1. **Background and Motivation**

The intersection of data visualization and medical imaging presents unique challenges and opportunities that our team is eager to explore. With advancing digital pathology, there is a need for tools that can enhance the interpretability of complex biomedical datasets for clinical and research purposes. We are drawn towards learning the power of technology to solve real-world problems, particularly data visualization to transform how medical data is analyzed and understood.

Histopathological analysis used to rely heavily on manual inspection, which is time-consuming and subject to variability based on multiple observations. We aim to create a visualization tool that assists in the objective analysis of tissue samples and enhance diagnostic accuracy. Our project aims to improve the visualization tools that can lead to better clinical outcomes by enabling precise and faster diagnosis.

Through this project, we leverage our background in computer science and improve our skills in D3.js to contribute to the field of digital pathology by creating a tool that bridges the gap between technical data analysis and practical medical application.

1. **Primary Objectives**

The primary objective of our project is to enhance the analysis of histopathological images through an interactive visualization tool designed to improve diagnostic precision, by enabling users to import their model into our tool (optional feature) [enabling users to somehow import their prediction into our tool], such that users canvisualize their model with more control. Using the tool, pathologists, and researchers can interact with the data, adjusting parameters, zooming, and filtering to examine specific features. It helps in receiving immediate visual feedback, which helps in fostering a learning environment.

We will be using advanced image processing techniques, as it will enhance image quality and feature extraction, revealing patterns and details that are not easily visible in raw images.

1. **Data**

We will be using the Kaggle Breast cancer histopathological image dataset (<https://www.kaggle.com/datasets/paultimothymooney/breast-histopathology-images/data>). Since the data is on Kaggle, it is publicly available.

1. **Data Processing**
2. **Visualization Design**
3. **Prediction over the original imaging**
4. **Preditionc for Mixcodified parameters**
5. **Must-have Features**
6. **Optional Features**
   1. Self-adjust to different dataset/training target
   2. Api to enableusers with different parameters
7. **Project Schedule**