Project Topic: Cervical Cancer Prediction Tool

Summary: The project aims to develop a web application with a simple graphical interface using Streamlit, Dash, or other similar frameworks. The application will have two buttons that provide different functionalities related to cervical cancer.

1. **Cervical Cancer Risk Prediction**: Upon selecting the first button, a page will be loaded, prompting the user to fill in specific fields. This functionality allows users to predict their probability of developing cervical cancer based on the input values. The application will utilize a predictive model trained on relevant data to provide this probability. Additionally, the application could incorporate visualizations to compare the predicted probability with an optimal health condition through various charts and graphs.

2. **Tumor Detection from Images**: Selecting the second button will load a page that allows users to upload one or more images. In this case, the application will employ a trained model to analyze the images and determine if they contain cervical cancer cells or not. The model's output will provide insights into the presence or absence of tumor cells, assisting in early detection and diagnosis.

   Furthermore, to enhance the interpretability of the results obtained from both models, the project will incorporate **Explainable Artificial Intelligence (XAI)** techniques. Specifically, an Explainable AI component will be utilized to identify which parts of the image were crucial in determining the outcome of the tumor detection.

3. **Textual Explanation of Results**: As an additional feature, the project could incorporate a text generator that explains the results obtained from both the Cervical Cancer Risk Prediction and Tumor Detection models. This generator will provide detailed explanations in natural language, highlighting the factors or image characteristics that contributed to the predictions. By generating informative and interpretable explanations, users will have a better understanding of the underlying reasons behind the model's decisions, promoting trust and transparency in the application. (*The text generator will be incorporated into the application once the main components of the project are completed, provided there is sufficient time.*)

Overall, this project aims to provide a user-friendly web application that empowers users to assess the risk of cervical cancer and offers the ability to analyze images for potential tumor presence. By leveraging machine learning techniques and incorporating XAI and text generation, the application can contribute to early detection, promote timely medical intervention, and improve outcomes for individuals at risk of cervical cancer.

The models will be trained and validated using at least the following datasets, along with other freely available datasets if applicable:

- Dataset 1: https://archive.ics.uci.edu/dataset/383/cervical+cancer+risk+factors
- Dataset 2: https://www.cs.uoi.gr/~marina/sipakmed.html