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MAIS Deliverable 1 - COVID 19 CAT Scan Predictor

For the final project, I plan on designing an application that will detect COVID 19 from a CAT scan image.

1. Dataset: https://www.kaggle.com/bachrr/covid-chest-xray
   This dataset contains labelled images of CAT scans of COVID 19 and other pneumonias.
   Additionally, it gives information based on days since symptoms/hospitalization; gender; age; survival status; intubation status; and ICU status.
   The dataset also has a usability of 9.4.
2. Methodology:
   a. Data Preprocessing:
      Most of the data preprocessing will most likely be feature selection, there are a few useless ones such as the ID of a patient, date image was required, DOI and URL of the research/website, and the credit.
      The images will likely need to be separated by their views and modality (PA, AP, L for X-ray scans; Axial or Coronal for CT scans)
   b. Machine Learning Model:
      There's a lot of interesting target variables to select, but I mostly want to focus on identifying the disease using computer vision based on the scan image.
      If this task is too difficult, I could also attempt a regression using the features in the CSV files.
   c. Evaluation Metrics:
      Planning on using precision, recall, and accuracy as evaluation metrics, with an emphasis on recall. In a healthcare scenario, a false negative is a lot more impactful than a false positive, so recall will be focused on. This is especially true in pandemic times, where patients can potentially spread diseases if there is a false negative.
   d. Final Conceptualization:
      Will be developed with Flask. An image will be able to be uploaded on the front-end side, and this will be run through the model.
3. Application:
   The application will be a single-page web app developed with Flask. There will be a description section, a horizontal slideshow of examples (so users can download and test for themselves), a place to upload images through drag-and-drop, and then a description of the evaluation metrics and my choices.