

**Deep Learning  
-- Project proposal --**

***Project’s title***

***Team 4***

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**TABLE OF CONTENTS**

[1. Introduction 2](#_Toc136448497)

[2. Problem statement 2](#_Toc136448498)

[3. Challenges 2](#_Toc136448499)

[4. Related works 2](#_Toc136448500)

[5. Data description 2](#_Toc136448501)

[6. Deep Learning Methodology 2](#_Toc136448502)

[7. Expected results 3](#_Toc136448503)

[8. References to data sources 3](#_Toc136448504)

[9. Justification for using existing code 3](#_Toc136448505)

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This is a general-purpose outline for a typical deep learning project proposal. Feel free to update and adapted to your project structure. Each section has a list of items to help you develop and expand upon the corresponding content:

# Introduction

Using a combination of x-ray images and a corresponding dataset of characteristics of the patients, we aim to use a neural network to assist with medical diagnoses. It has long been discussed that while Doctors and Nurses are highly educated individuals and pillars of the community, they are limited to what they know and have experienced in the past when it comes to diagnoses. Where we can improve that is through deep learning techniques that provide diagnosis suggestions with predicted accuracy.

* Briefly introduce the topic of your project and its significance.
* Provide a background context to help readers understand the relevance of your project.

# Problem statement

Pair images with the dataset to train our model to detect diagnoses. The ability to predict diagnoses given chest x-rays will assist medical staff with more data than they have from personal experience at their disposal as well as decrease the time it takes to assess patient x-rays.

* Clearly define the problem your project aims to address.
* Describe the specific issues or limitations that need to be resolved.
* Explain why addressing this problem is important and the potential impact of finding a solution.

# Challenges

* Some x-rays may be done with items of clothing (such as a bra with wiring) that disrupt imaging.
* Potential for inaccurate diagnoses if each category of diagnoses does not have enough data to accurately predict outcomes for patients.
* Identifying the best model for the problem.
* Identify and discuss the major challenges or obstacles you anticipate facing during the project.
* Provide a detailed explanation of each challenge and why it may be difficult to overcome.
* Propose potential a deep learning-based methodology or approaches to mitigate these challenges.

# Related works

* https://keras.io/examples/vision/3D\_image\_classification/
* Review and summarize existing research or projects related to your topic.
* Identify key studies, papers, or projects that have been conducted in the same or similar area.
* Highlight the gaps or limitations in the existing works that your project aims to address.
* Note: this section will be expanded & developed in the Literature Review Assignment in lesson 7.

# Data description

* 12 Categories of images with 4000+ images per set.
  + Images are .png
  + Each image is identified by its corresponding ID.
* Dataset that corresponds to an image ID with patient information.
  + Dataset provided is a CSV with 11 columns with 112,120 unique observations.
* Describe the data that will be used in your project.
* Provide information about the source, format, size, and characteristics of the data.
* Explain how the data will be collected, preprocessed, and utilized in your project.

# Deep Learning Methodology

* Likely needs clustering and a neural network.
* https://keras.io/examples/vision/3D\_image\_classification/
* Identify the type of the ML problem required to cope with your problem:
  + Supervised learning: Binary classification, multi-class classification, multi label classification, prediction/regression, etc. or
  + Unsupervised learning: GAN, clustering, anomality detection, dimension re
* Explain the proposed deep learning-based methodology, techniques, or algorithms that will be employed in your project.
* Describe the steps involved in the deep learning process, including data preprocessing, model training, and evaluation.
* Discuss any specific tools, frameworks, or libraries that will be used for deep learning implementation.

# Expected results

* If the system works like the Keras function listed above, then we should be able to identify a diagnosis with corresponding likelihood of accuracy.
* Outline the expected outcomes or results of your project.
* Discuss the metrics or evaluation criteria that will be used to assess the success of your project.
* Explain the potential impact or significance of the expected results.

# References to data sources

* https://www.kaggle.com/datasets/nih-chest-xrays/data/data

# Justification for using existing code

* Used previously to sort and diagnose patients given MRI scans with corresponding likelihood of accuracy. This may change if we discover a better neural network for our particular dataset.
* Explain the rationale behind using existing code from online sources (Github/GitLab, or paperwithcode) in your project.
* Describe the specific functionalities or components of the existing code that will be utilized and will be refactored.
* Discuss the benefits or advantages of leveraging existing code and how it contributes to the project's objectives.