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| Capstone Project Proposal |  |

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**Business Goals**

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| **Project Overview and Goal**  What is the industry problem you are trying to solve? Why use ML/AI in solving this task? Be as specific as you can when describing how ML/AI can provide value. For example, if you’re labeling images, how will this help the business? | To be consistent with the previous projects a project about COVID-19 pneumonia detection has been selected.  It is known that the False Negative ratio for COVID-19 PCR tests is very high2. As a result, doctors rely on other tools such as known symptoms or chest x-ray images to detect COVID-19. However, doctors don't have the means to determine a pneumonia image is regular pneumonia or COVID-19 pneumonia. As a result, the treatment process is performed assuming the patient is COVID-19. On the other hand, COVID-19 treatment is so stiff and has severe side effects. Differentiating normal pneumonia from COVID-19 pneumonia may change medication used and, normal pneumonia patients may get a lighter treatment and avoid unnecessary side effects.  The goal of this project is to make a product (free WEB app) that distinguishes between healthy, pneumonia, and COVID-19 pneumonia chest x-ray images. The feasibility of such a work has been studied in various articles1.  The AI product, which will be free, will be accessed from WEB and have a simple user interface. The user will be able to upload her/his chest x-ray image and receive an output indicating the diagnosis such as COVID-19 pneumonia, normal pneumonia, or no pneumonia. The user may also get some basic advice about her/his medical status.  In the previous projects, we have seen that differentiating pneumonia chest x-ray images from normal chest x-ray images by using AI is possible. What's more, we have seen that this can  - Help flag serious cases,  - Quickly identify healthy cases,  - And, generally, act as a diagnostic aid for doctors.  In addition, from other studies, we know COVID-19 chest x-ray images can also be differentiated3. As a result, such a project can help doctors conduct the right treatment, improving patient’s happiness and doctor's (customer) credibility.  Furthermore, by means of the free WEB app described above, patients, along with the doctors, may also learn their medical status independently.  1<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7436068/>  2<https://www.healthline.com/health/how-accurate-are-rapid-covid-tests#how-accurate-is-it>  3<https://www.nature.com/articles/s41598-020-74539-2> |
| **Business Case**  Why is this an important problem to solve? Make a case for building this product in terms of its impact on recurring revenue, market share, customer happiness and/or other drivers of business success. |  |
| **Application of ML/AI**  What precise task will you use ML/AI to accomplish? What business outcome or objective will you achieve? |  |

**Success Metrics**

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| **Success Metrics**  What business metrics will you apply to determine the success of your product? Good metrics are clearly defined and easily measurable. Specify how you will establish a baseline value to provide a point of comparison. |  |

**Data**

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| **Data Acquisition**  Where will you source your data from? What is the cost to acquire these data? Are there any personally identifying information (PII) or data sensitivity issues you will need to overcome? Will data become available on an ongoing basis, or will you acquire a large batch of data that will need to be refreshed? |  |
| **Data Source**  Consider the size and source of your data; what biases are built into the data and how might the data be improved? |  |
| **Choice of Data Labels**  What labels did you decide to add to your data? And why did you decide on these labels versus any other option? |  |

**Model**

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| **Model Building**  How will you resource building the model that you need? Will you outsource model training and/or hosting to an external platform, or will you build the model using an in-house team, and why? |  |
| **Evaluating Results**  Which model performance metrics are appropriate to measure the success of your model? What level of performance is required? |  |

**Minimum Viable Product (MVP)**

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| **Design**  What does your minimum viable product look like? Include sketches of your product. |  |
| **Use Cases**  What persona are you designing for? Can you describe the major epic-level use cases your product addresses? How will users access this product? |  |
| **Roll-out**  How will this be adopted? What does the go-to-market plan look like? |  |

**Post-MVP-Deployment**

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| **Designing for Longevity**  How might you improve your product in the long-term? How might real-world data be different from the training data? How will your product learn from new data? How might you employ A/B testing to improve your product? |  |
| **Monitor Bias**  How do you plan to monitor or mitigate unwanted bias in your model? |  |