**Project Proposal Template**

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| **Question to be answered** *(write the question in normal language)*:  How does the resolution/ pixel density of an Image affect classification performance? For example, If we use various forms of interpolation, to increase the pixel density by *d*, then do the object and various metrics also improve by a factor proportional to *d*? How does the complexity/width of the model increase to match the augmented input? Does this affect the ability and rate of convergence? |
| **Dependent Variable** *(what variable are we studying the determinants of – the objective of the question above)*:  Multiple dependent variables: Final objective function value, rate of convergence of objective, final precision, recall, and F1 scores. |
| **Independent Variables** *(What variables are important in determining the dependent variable – add more lines to the table below as needed?)*:   |  |  |  | | --- | --- | --- | | Independent Variable | Direction of Relationship to the Left-hand side? | My reasoning for the Direction of the Relationship? | | Interpolation technique | Used to augment raw data/ input features to model | Provided as input to the “right side” to evaluate and then compute the “left side” | | Input dimensionality | Changes the width and number of parameters in the model | Input dimensionality will affect the width of the model | |  |  |  | |  |  |  | |  |  |  | |  |  |  | |  |  |  | |
| **How will you get data on the independent and dependent variables?**  The python module sklearn and tensorflow offer readily available toy datasets to being with. We start by using a “simple” data set (16 x 16) or (32 x 32 x 3) data set to begin with. Train a collection of identical models and compute the average, variance, etc. of different performance metrics.  Next, augment the data through interpolating the input images and then repeat the above experiment. Due to the nature of the new input space, the results of the objective, convergence, precision, and recall should all change.  We compare the results from each of the models and determine how viable to larger input space is. Given the performance + approx. computation time, we seek to determine how well the model stand up to each other. |