## A) Predicting Bacteria Property

In this dataset there are 150 columns and 20000 data points and the data is tabular so implementing tree based model would be highly efficient and would provide good results than throwing a neural network.
We can implement catboost on this dataset
This paper shows that tree based models perform well on tabular data than Neural networks.
If we have a GPU cluster then we can train an ensemble of random forests.
https://arxiv.org/pdf/2207.08815.pdf

## B) Predicting number of people on the beach

In this data set there are only 10 columns and it is a regression problem so we can use Linear regression models with regularisation to prevent overfitting. We can also use tree based models but with limit to depth and pruning to prevent overfitting. The paper shows tree based models perform better on tabular data.
https://arxiv.org/pdf/2207.08815.pdf

## C) Text-Image Search Engine

For converting text to image we can use DCGANs can be used for converting text to image. For converting image to text we can use a combination of ResNet and LSTMs to generate the caption of the image.

## D) Matrix Multiplication

For faster method we can use SVD, we can approximate lower rank matrices by SVD which gives the best lower rank approximation. We can also perform matrix factorisation for speed.
If we want to optimise for accuracy we can generate a large number of data and implement a neural network on it, the NN will give good accuracy.  If we have a GPU we can implement more complex neural network.