



# Group o8: Extending Alpha To AlphaFold

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## Context

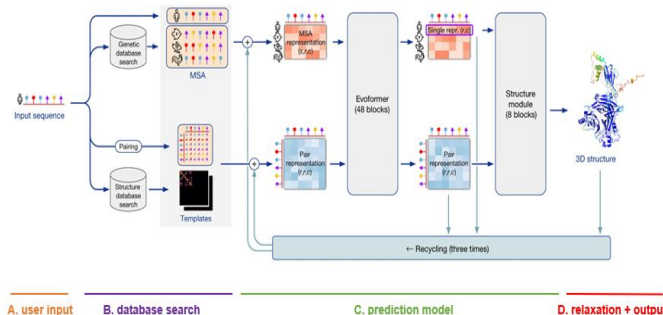
Alpa automates model-parallel training of large deep learning (DL) models by generating execution plans that unify data, operator, and pipeline parallelism by viewing parallelisms as two hierarchical levels: inter-operator and intra-operator parallelisms

## Problem

Currently, Alpa only targets popular deep learning models such as Transformers and ResNet. Ideally, we want Alpa to support other novel neural network architectures. In particular, our project is focused on extending Alpha To AlphaFold, a ML model that predicts a protein's 3D structure from its amino acid sequence

## Proposed Approach

AlphaFold currently uses two types of workloads for end-to-end predictions: MSA construction based on CPUs (bottleneck) and model inference on GPUs. We will be focusing on using multi-threaded parallelism on CPUs and extending Alpa to perform distributed training and evaluation on the Evoformer architecture seen in AlphaFold



## Progress

### Work Completed:

- 1) Evaluated serial AlphaFold on example amino acid sequences
- 2) Finished designing implementation of distributed training on Evoformer architecture using Alpa and Ray

### Work In-Progress:

- 1) Working on implementing multi-threaded parallelism on CPUs for MSA construction
- 2) Working on implementing distributed training on Evoformer architecture using Alpa and Ray

