COGS 9 – Discussion Section A05

Vineeth Chelur (TA) – Tuesdays@5PM (CSB114) (Zoom)

Hao-ting (David) Tso (IA) – Monday@8AM,6PM (Zoom: PW - s43bwa)

Some Logistics

- Master link: https://kshannon.github.io/ucsd-cogs9/
- Discussion section attendance is optional
- These sections are not recorded, however the slides will be uploaded to drive/github and the link will be provided in the master link
- Quizzes and exams to be taken individually
- All assignments and final project as a group
- Please try and reach out to us on discord before emailing

Time to make groups!

The answer to the ultimate question of life, the universe, and everything.

Donoho’s six divisions

- Data Gathering, Preparation, and Exploration
- Data Representation and Transformation
- Computing with Data
- Data Modeling
- Data Visualization and Presentation
- Science about Data Science

Background information

- Let’s go through a data science project from my life (Spent 2 years :))
- You do not need to know anything about the nitty gritties. This is just an example to show you a data science project from the perspective of Donoho’s six divisions
- Problem: Predicting the amino acids of a protein (from sequence information alone) that bind to most drugs

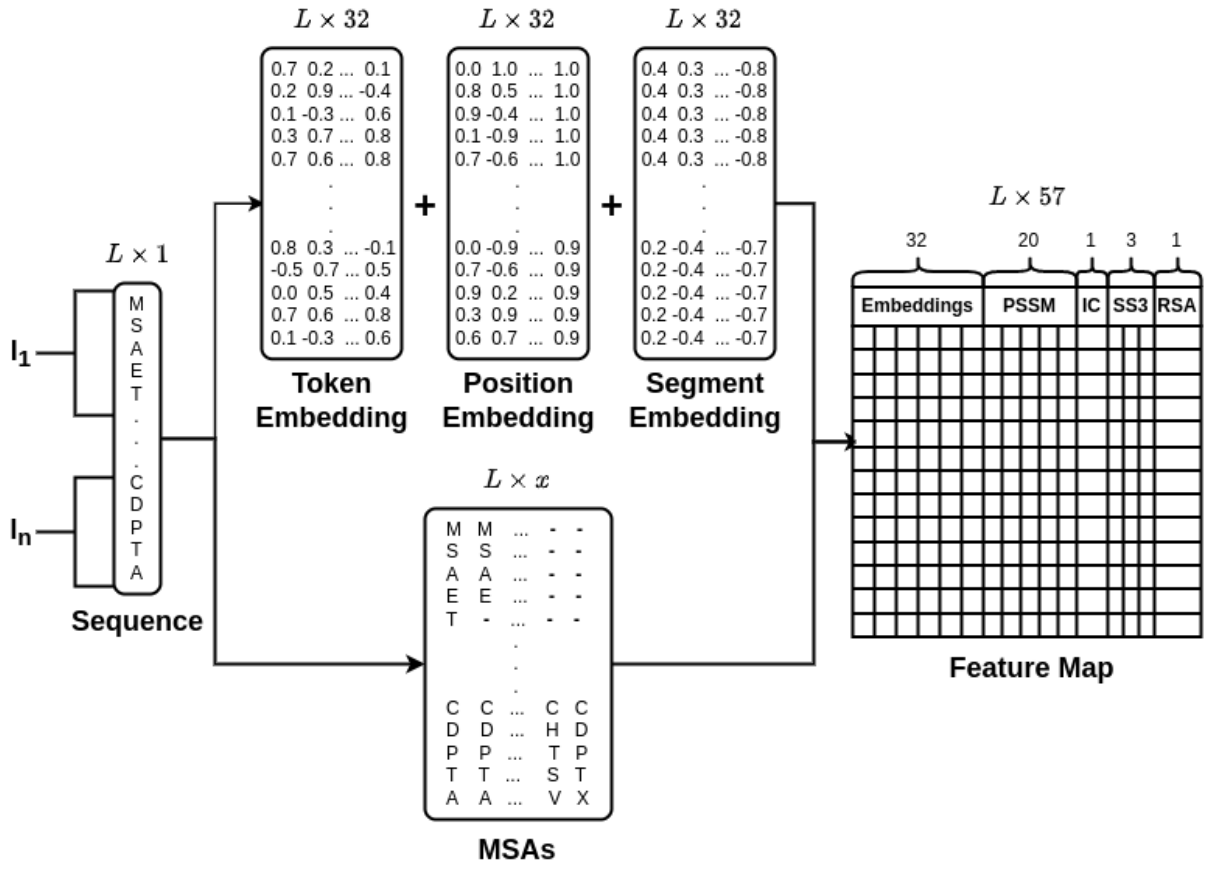
Data Gathering, Preparation and Exploration

- Explanation of the dataset
- How to convert to our required format
- What can we get from sequence information?

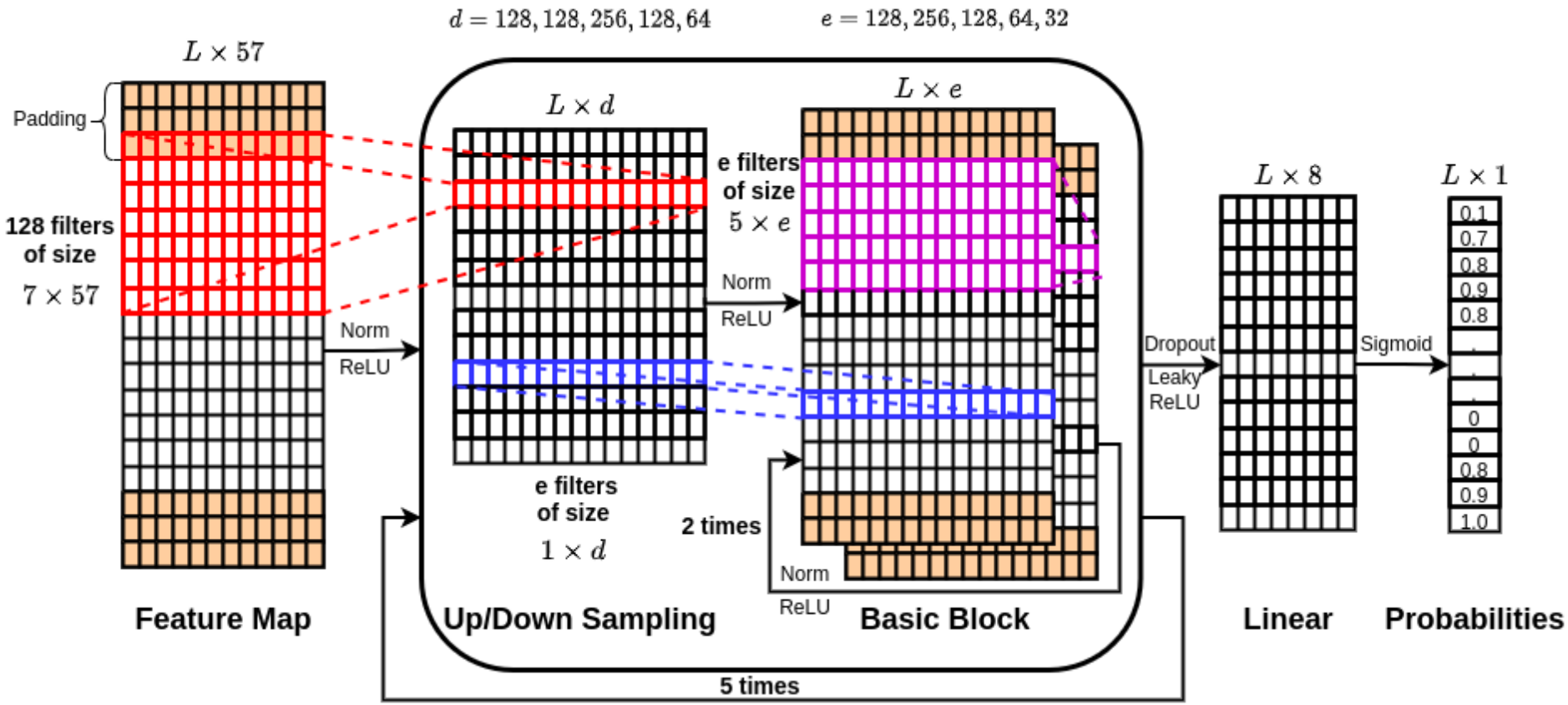
Data Representation and Transformation

- Extracting information from sequences
  - Using some NLP techniques
  - Using sequences similar to current sequence to gather information
  - Using predictions from other predictors
- Storage
  - Numpy arrays
  - Zstd compression

Computing with Data



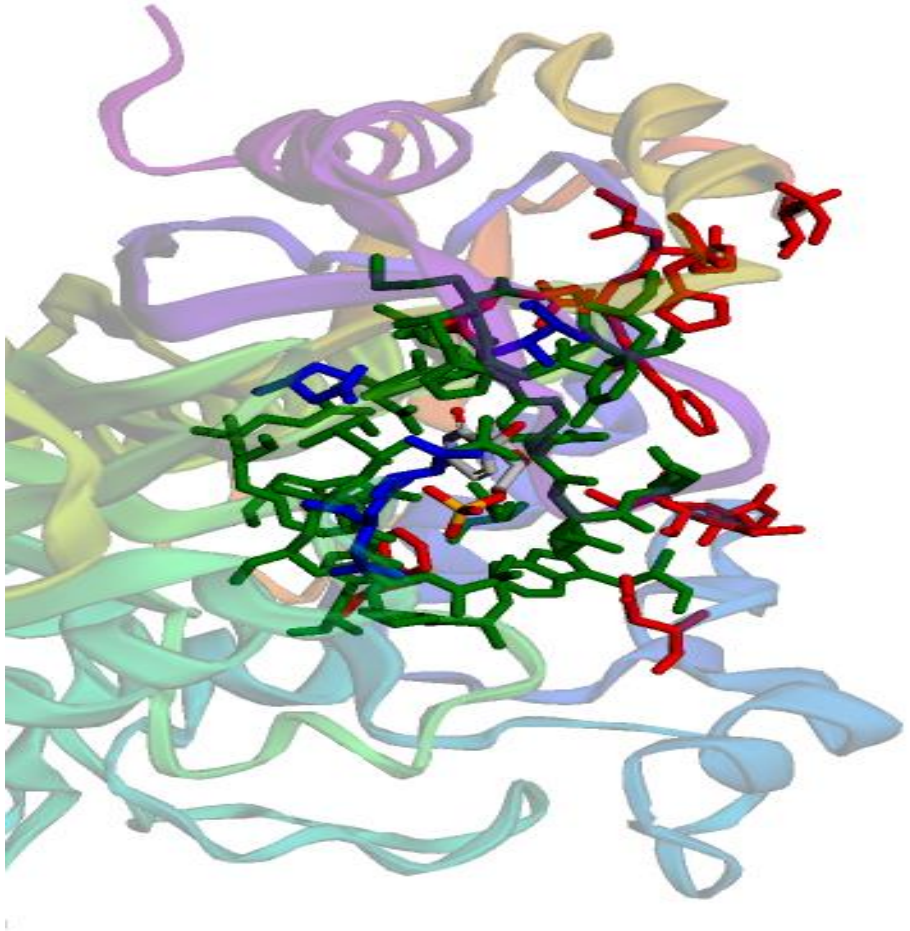
Data Modeling



Data Visualization and Presentation

Table 1: Validation and test results

Dataset	MCC	ACC	F1	IoU	PPV	TPR
Fold 1	0.354	0.920	0.394	0.582	0.359	0.437
Fold 2	0.606	0.931	0.633	0.695	0.545	0.755
Fold 3	0.521	0.896	0.565	0.641	0.474	0.700
Fold 4	0.270	0.898	0.323	0.544	0.296	0.355
Fold 5	0.324	0.892	0.367	0.556	0.293	0.490
Fold 6	0.338	0.884	0.373	0.555	0.282	0.550
Fold 7	0.324	0.902	0.368	0.562	0.309	0.456
Fold 8	0.340	0.924	0.380	0.578	0.355	0.407
Fold 9	0.380	0.918	0.421	0.591	0.378	0.475
Fold 10	0.355	0.917	0.391	0.579	0.332	0.476
Test (Full)	0.568	0.940	0.589	0.677	0.502	0.713
Test (Reduced)	0.440	0.951	0.464	0.626	0.497	0.436



Science about Data Science

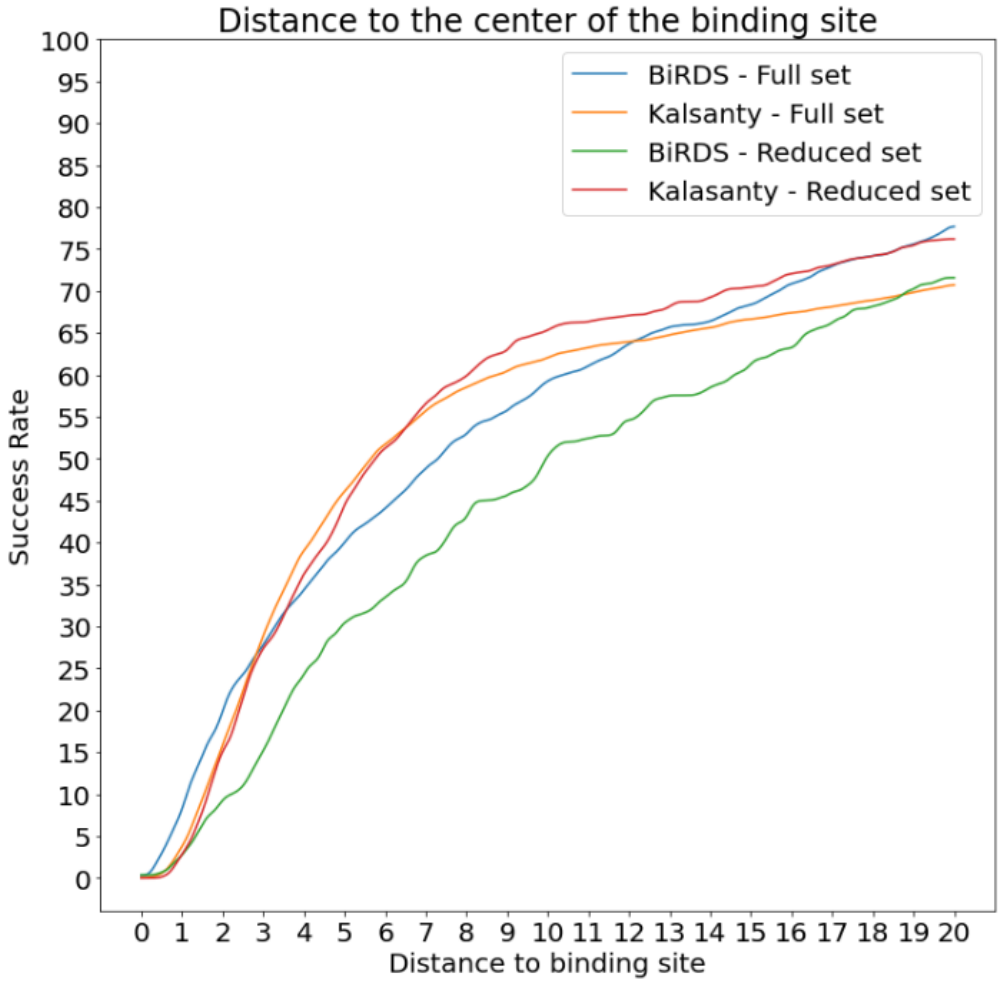


Figure 6: Success rate plot for various DCC thresholds on the test set after averaging the predictions of the 10 models