

Matrix completion from any given set of observables

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Matrix Completion Problem

Movie Matrix

Finding Nemo



Pulp Fiction



Gravity



Alice



Bob

	Finding Nemo	Pulp Fiction	Gravity
Alice	8	4	?
Bob	3	9	?

Basic Algorithm

Find matrix of minimum complexity that agrees with the observed entries.

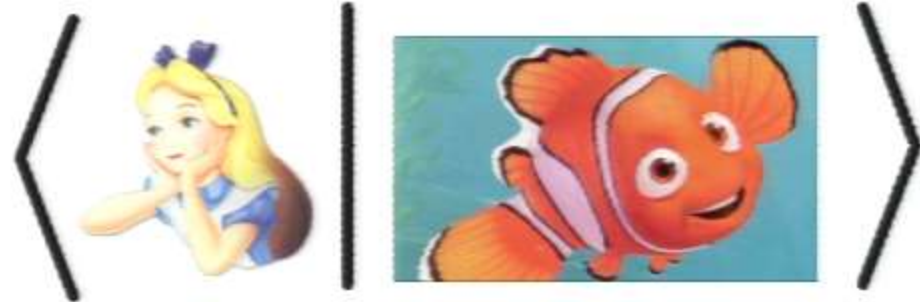
What complexity measure? Proxy for matrix rank

e.g. trace norm



	Action	Dark	Fish	...
Action	-.5	1	8.1	
Dark				
Fish				
...				

	Action	Dark	Fish	...
Action	2	.1	9	
Dark				
Fish				
...				



Movie Rating

Our Contribution

The performance of the trace norm algorithm is well-studied for observations made **uniformly at random**.

In practice observations can be **highly correlated**.

For **any given set** of observed entries, we bound the mean squared error of the algorithm with respect to a given probability distribution.

We tie the performance of the algorithm to the **complexity** of the set of observations.