Recommendation System

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Collaborative Filtering

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Implicit: Binging

Explicit: Ratings

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Content-based Filtering

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Explicit Tags: e.g., Genre, Actors

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SVD Latent Factor Model

Singular Value Decomposition

A **"Singular Value"** (the movie rating) can be **"Decomposed"** or determined by a set of hidden (latent) factors (user preferences and movie features).

Ratings

User	Movie 1	Movie 2	Movie 3	Movie 4
Steve	3	2	5	1
Sheryl	2	3	3	4
Jeff	4	5	5	2

Latent Factors

User

f1	f2	f3	bias
.69	.07	-1.99	1.69

Movie

f1	f2	f3	bias
.74	-.09	.09	.90

Latent Factors

User			
f1	**f2**	**f3**	**bias**
.69	.07	-1.99	1.69

Movies			
f1	**f2**	**f3**	**bias**
.74	-.09	.09	.90

Prediction: **(f1*f1) + (f2*f2) + (f3*f3) + bias + bias =**

Latent Factors

User

f1	f2	f3	bias
.69	.07	-1.99	1.69

Movies

f1	f2	f3	bias
.74	-.09	.09	.90

(.69*.74) + (.07*-.09) + (-1.99*.09) + 1.69 + .90 = 2.9

Movie 1

User	Rating	Prediction	Difference	Squared Diff.
Steve	3	2	-1	1
Sheryl	2	3	1	1
Jeff	1	1.25	.25	.0625
			TOTAL	2.0625
			MEAN	.6875
			RMSE	**.8292**

Drama 1

Feminine   Masculine

-1   1

Comedy -1