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Abstract

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EE239 Project 1

Collaborative Filtering

# Introduction

In this report we study a matrix representation of a Recommendation System that utilizes Collaborative Filtering. There is much industry interest in such systems; for example the Netflix suggestion system for its users may use a scheme similar to that presented here. The problem we will study in detail is the following: based on feedback data from users indicating a rating of items, we construct a matrix,where the element corresponds to the rating given by user on item*.*

We would like to extrapolate this matrix to infer which unrated items that a user will likely enjoy. Therefore, we adopt the following construction: where the rows of are vectors that characterize a particular users, the columns of characterize a particular item, and represents the error, parameterized by a factor.

The factorization algorithm used throughout this report is the *Alternating Least Squares Method* which seeks to minimize the following cost function:

(Equation 1)

We will build the recommendation system based on a dataset consisting of 100K movie ratings collected by GroupLens1.

# Part 1