Sudha Vijayakumar **SJSU.ID**: 014749488

# Hybrid[ Fastai + AutoSurprise ]: Rating Prediction for Book Recommendation System

**Learning Objective/ Goal**

1) To predict book ratings for the given 'train.csv' using different approaches.

2) To use the book's metadata, learn and build a memory-based recommendation system listed in the article

**Source code**

https://github.com/sudha-vijayakumar/CMPE256-BOOK-RECOMMENDATION-SYSTEM.git

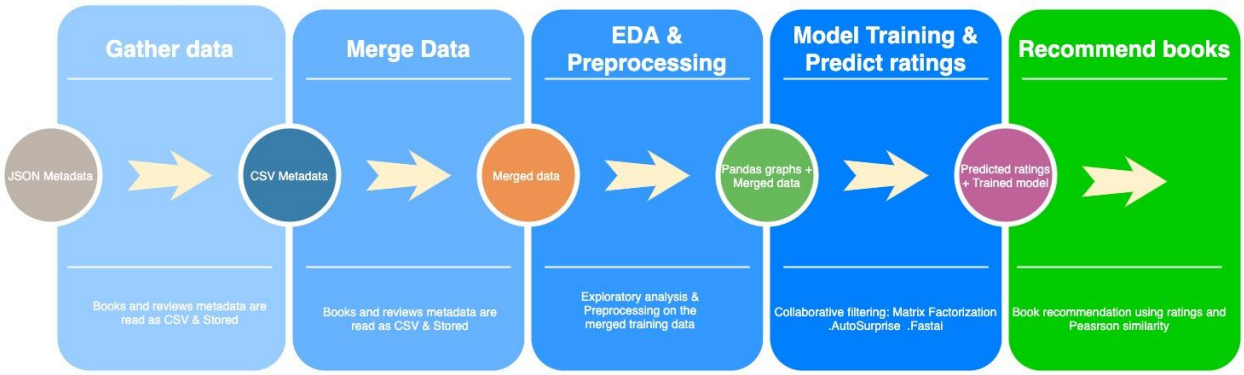
**Input files (7)**

- **input/metadata/**
  - goodreads_books_children.json.gz,
  - goodreads_reviews_children.json.gz
- **input/**
  - train.csv
  - test.csv
- **processed_data/**
  - books.csv
  - reviews.csv
  - books_with_review.csv (will be generated at step-1,2)

**Output (5)**

- **output/**
  - predictions-svd-75.csv
  - predictions_Fast_ai.csv
  - Final_submission.csv
  - Book_with_reviews.html
  - User_Ratings.html

**ML Pipeline**



Sudha Vijayakumar **SJSU.ID**: 014749488

## HOW TO RUN (Run the notebooks in the below order)

| No. | STEP | Filename |
|---|---|---|
| 1 | Read metadata as CSV | 1_JSON_To_CSV.ipynb |
| 2 | Merge reviews with books | 2_Merge_reviews_books_user_data.ipynb |
| 3 | EDA | 3_EDA_using_Pandas.ipynb |
| 4 | **Model Training**<br>1) Identifying the best model for the train data<br>a) AutoSurprise - SVD<br>b) Fastai - Matrix Factorization<br>2) Train & make predictions for the test.csv using Surprise - SVD[Matrix Factorization] | 4.0_Auto_Surprise_BestModel.ipynb<br>**Run-time:** limited to 6hours<br><br>4.1_Surprise-SVD_Book_Rating_Prediction.ipynb<br>**Run-time:** 1hour<br><br>4.2_Fastai_Book_Rating_Prediction.ipynb<br>**Run-time:** 50mins<br><br>**Submission**: [ 0.7 * 4.1_(prediction) ] + [ 0.3 * 4.2_(prediction) ]<br><br>6_submission.ipynb |
| 5 | **Recommendation System**<br>Collaborative filter - Memory-based - PearsonR | 5_Recommendation_using_Colab_Filtering.ipynb |

**Learning outcome**

1) Experimented with different approaches on how to predict ratings for the given dataset.

2) Collaborative filtering + Matrix factorization: for 700k dataset,
   a) Surprise is slow and also did not scale well.
   b) fastai is faster and scales well comparatively.

3) Built basic recommendation systems using the practical approaches taught in this course(Collaborative filtering using Pearson similarity).

**Future work**

To try HGN baseline for sequential recommendation (**Rank_1) Source**