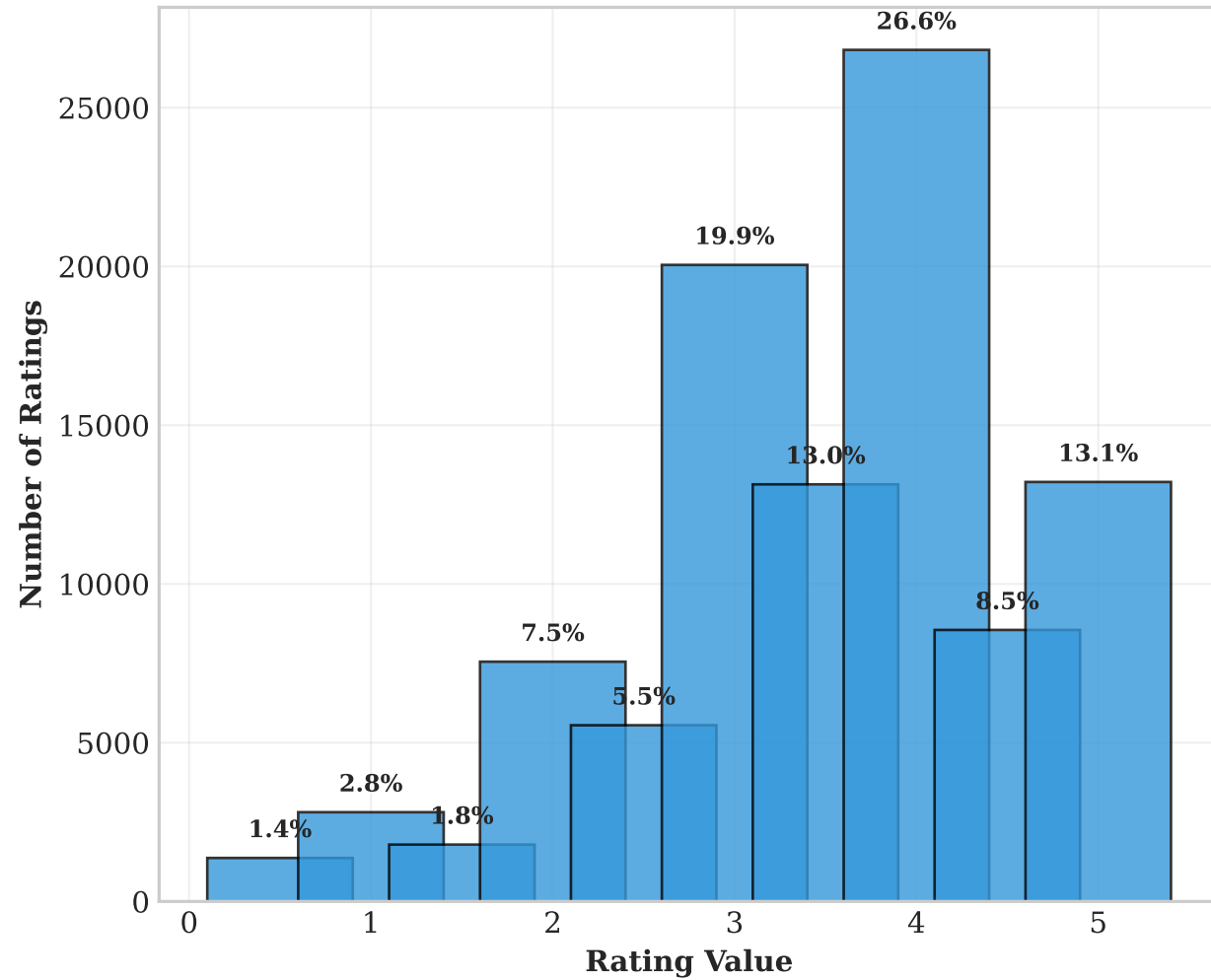


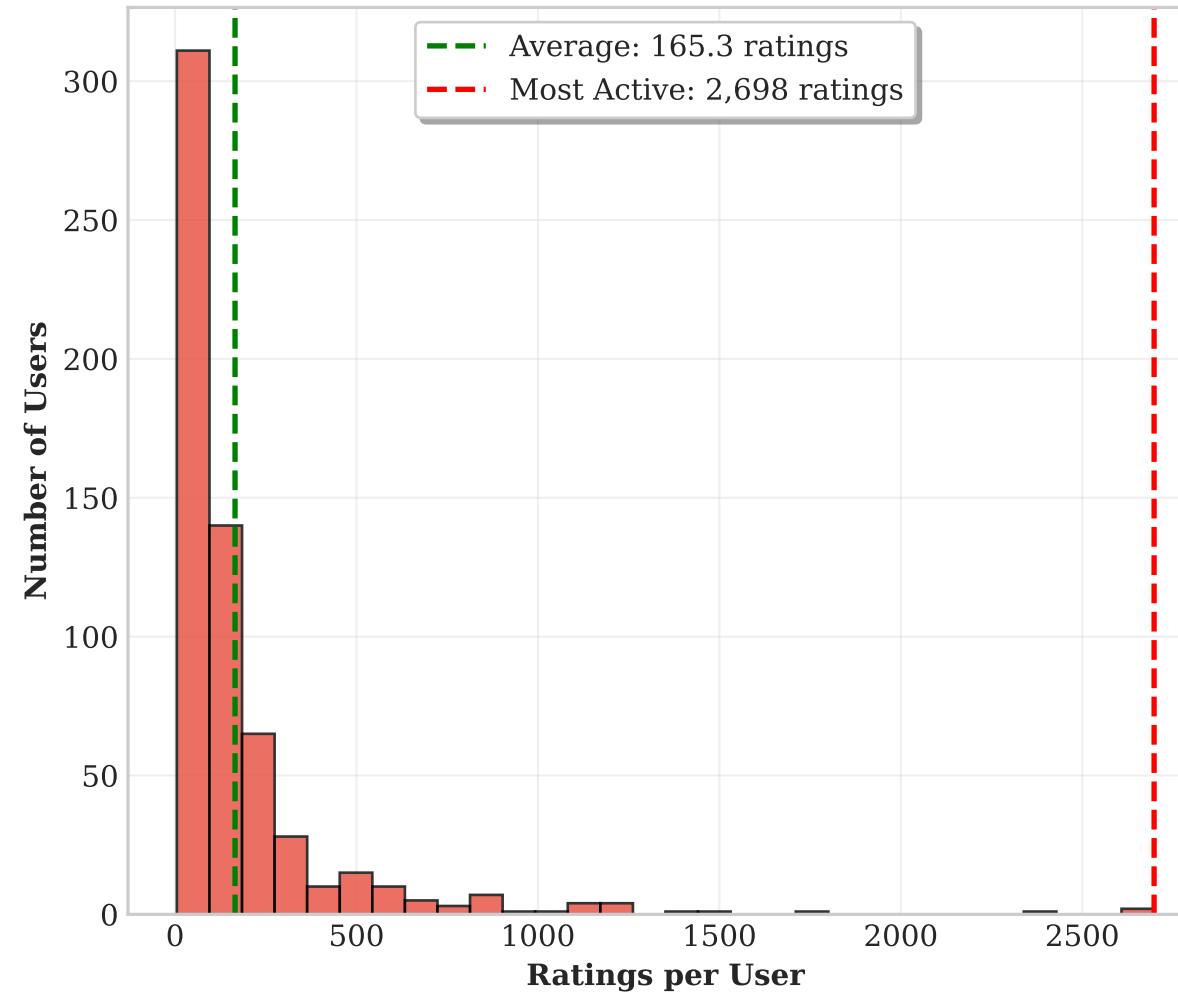
# MovieLens Dataset Characteristics Analysis

## Understanding Data Distribution and Sparsity Patterns

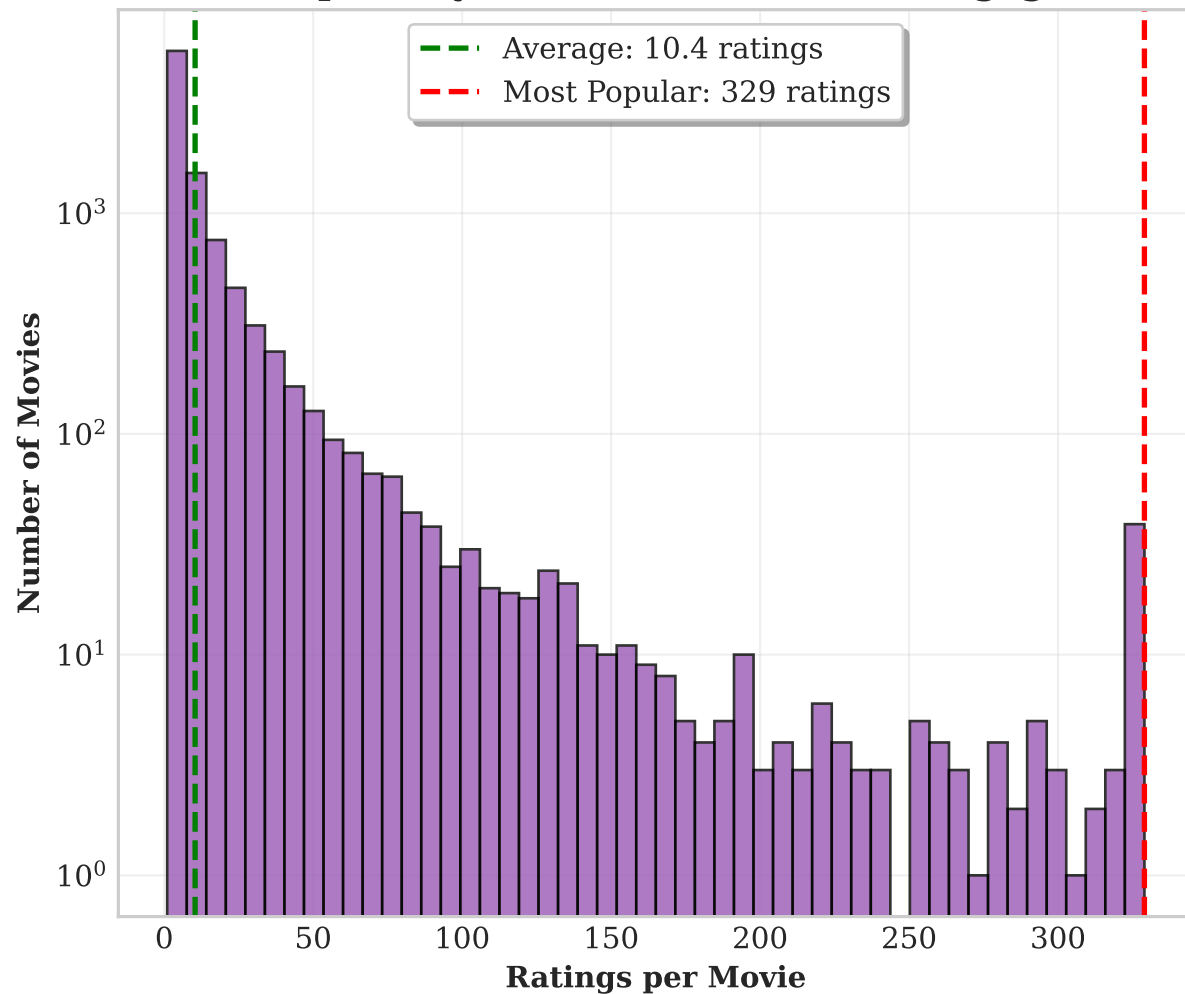
### Rating Distribution: User Preference Patterns



### User Activity Distribution: Engagement Patterns

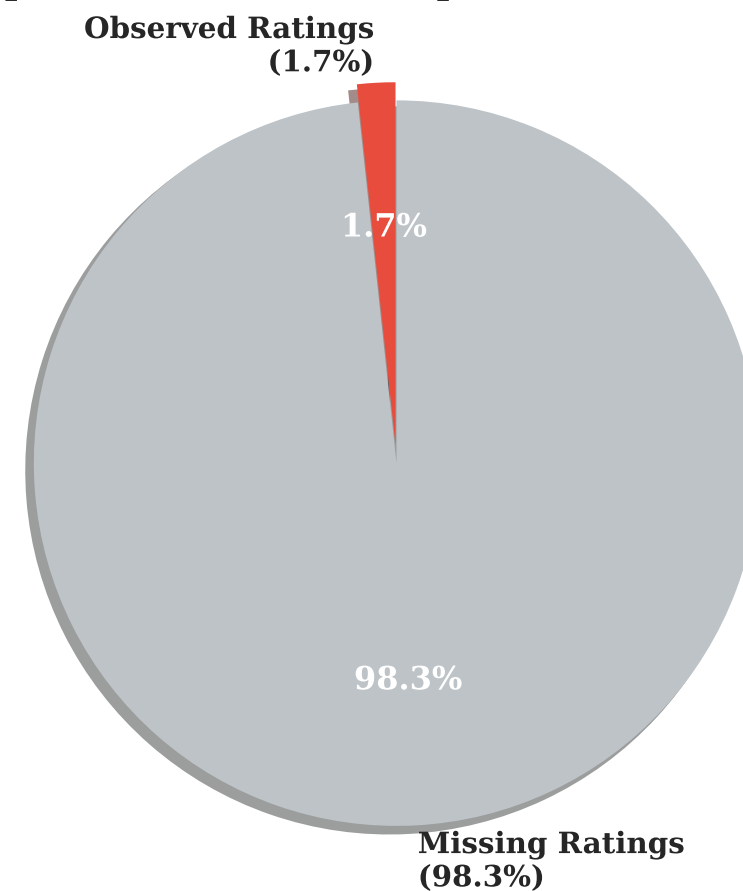


### Movie Popularity Distribution: Content Engagement



### Data Sparsity: The Recommendation Challenge

#### Typical Cold Start and Sparse Data Problem



- Dataset Statistics:**
- Total Users: 610
  - Total Movies: 9,724
  - Total Ratings: 100,836
  - Possible Ratings: 5,931,640
  - Sparsity: 98.3%
  - Avg Rating: 3.50 ± 1.04