Movie Recommendation

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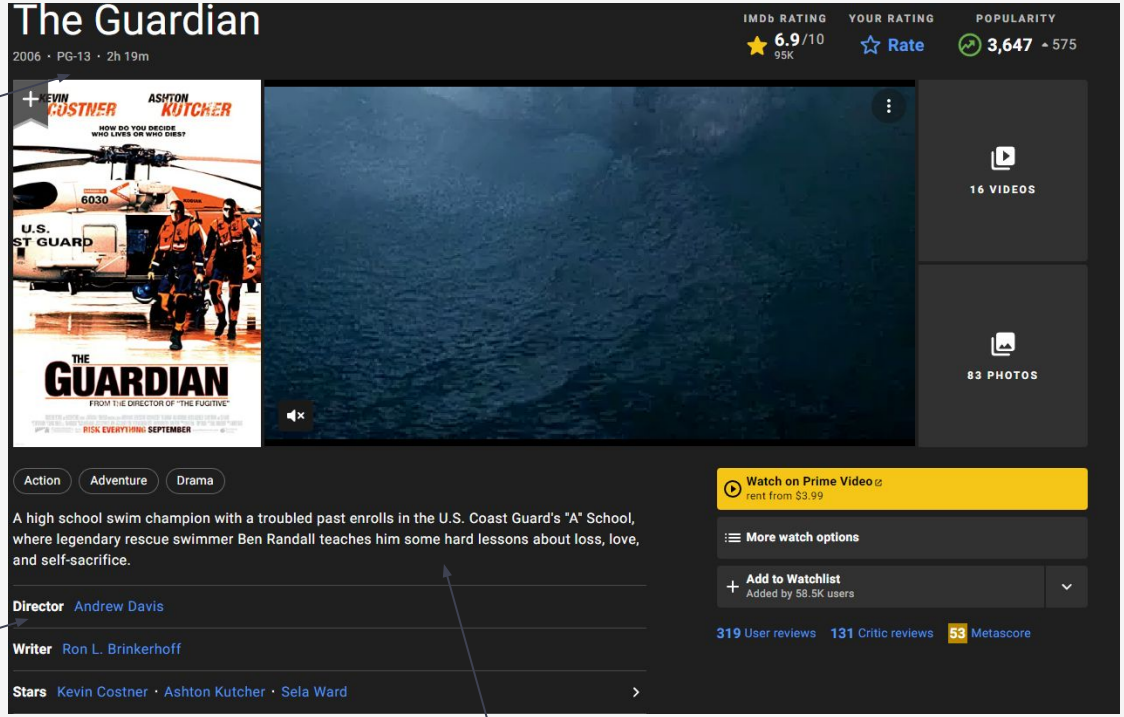
Data Processing - movie data scrape



rated

genre

director

synopsis

movie_synopsis1

A high school swim champion with a troubled past enrolls in the U.S. Coast Guard's "A" School, where legendary rescue swimmer Ben Randall teaches him some hard lessons about loss, love, and self-sacrifice.

similar?

An imprisoned drug kingpin offers a huge cash reward to anyone that can break him out of police custody, and only the L.A.P.D.'s Special Weapons and Tactics team can prevent it.

movie_synopsis2

Data Processing - review scraping

Webscraping

```
http://www.imdb.com/title/tt0406816/usercomments
http://www.imdb.com/title/tt0406816/usercomments
http://www.imdb.com/title/tt0406816/usercomments
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```

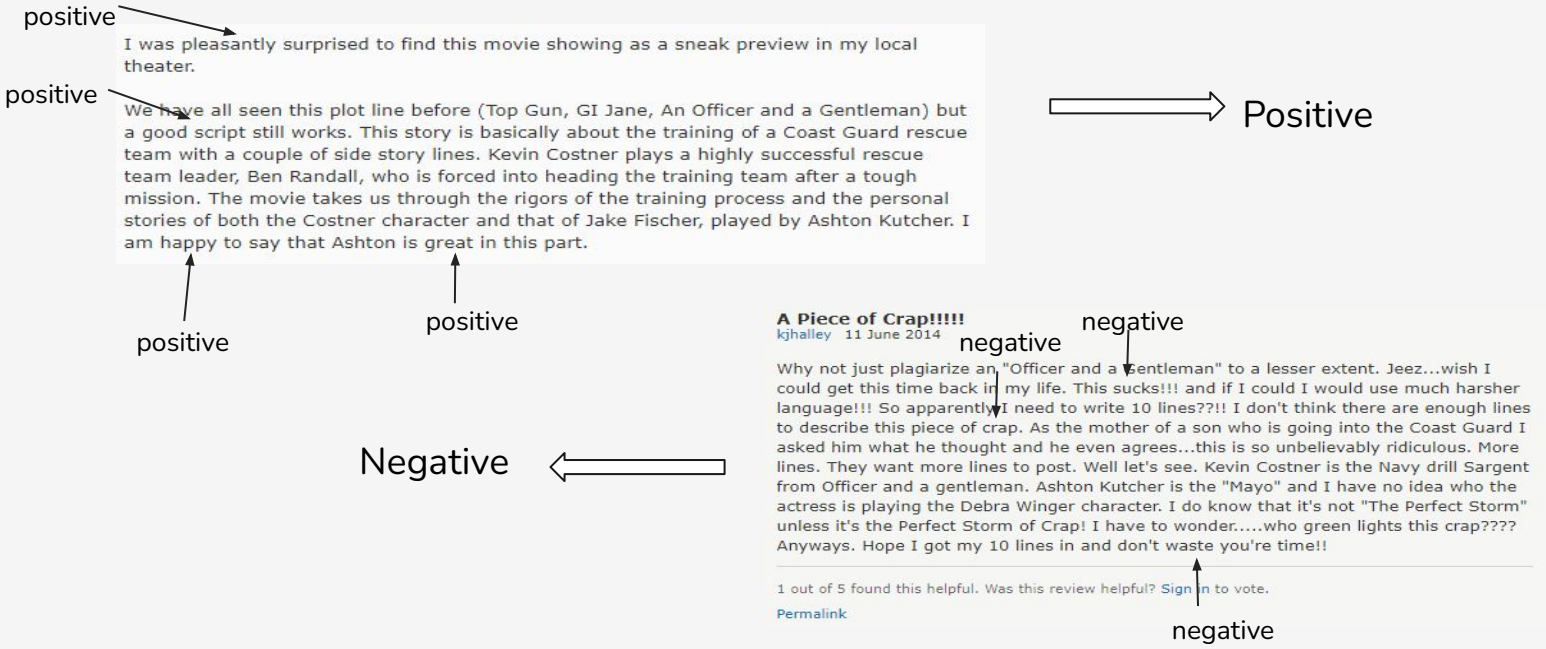
movie_id (unique)

rating

review

helpfulness_rating

Feature Engineering - sentiment analysis

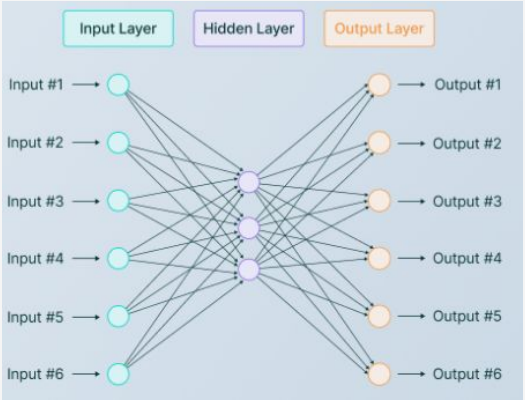


Application of Machine Learning

Two potential neural network architectures:

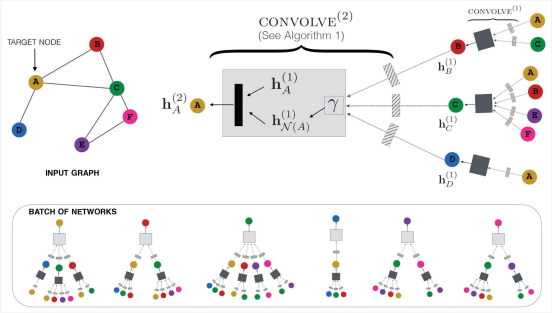
- LSTM/Recurrent Neural Network:
  - Great for natural language processing and speech recognition
  - "Forget gate" filters out unneeded information
  - LSTM rather than RNN due to precedence issue

- Graph Neural Network:
  - Great at modeling relationships
  - Better memory footprint
  - Can model groups/genres of films



Application of Machine Learning - GNN

- Use a Graph Neural Network to learn high-dimensional mappings for movies
  - Large, undirected, unweighted graph
  - Movies are nodes
  - Edges represent similarities
  - Similar movies will be close together



- Use user ratings and/or reviews to check user preferences
  - Check movies most similar to movies the user already likes
  - Check descriptive words in any user reviews provided
  - Combine movie preferences

Evaluation Metric

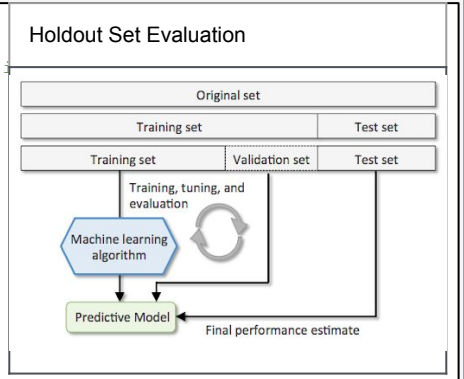
- **Milestone 4:** Holdout Set Evaluation

Capstone Timeline

- Define Problem
- Assess Possible Approaches
- Setting up Environment
- **Phase 1: Classification**
  - **Evaluation Metrics:**
  - **Accuracy**
  - **Precision**
  - **Recall**
  - •
  - •
- Phase 2: Recommendation
  - •
  - •
  - •
- Tweaks to recommender model
- Present and Host Results

Approach 1: Utilizing Sklearn.model & Sklearn.metrics

```
# Loading the dataset ...
# Splitting data into training and testing sets, splitting training data i
training and validation sets
X_trainval, X_test, y_trainval, y_test =
train_test_split(X, y, test_size=0.2, random_state=42)
X_train, X_val, y_train, y_val =
train_test_split(X_trainval, y_trainval, test_size=0.25, random_state=42)
# Preprocessing ...
# LTSM model ...
model = Sequential()
model.add(..........)
# ... LTSM Model building cont'd
# Training the model
model.fit(X_train, train_data['rating'], epochs=10, batch_size=32, validation_data=(X_val, val_data['rating']))
# Evaluating the model
y_pred = model.predict(X_test)
y_pred = np.round(y_pred).astype(int)
accuracy = accuracy_score(test_data['rating'], y_pred)
precision = precision_score(test_data['rating'], y_pred)
recall = recall_score(test_data['rating'], y_pred)
```



Discussion

Any Questions?

References

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4. Sunilkumar, Chaurasia Neha. “A Review of Movie Recommendation System: Limitations, Survey and Challenges.” ELCVIA Electronic Letters on Computer Vision and Image Analysis, vol. 19, no. 3, 2020, p. 18., https://doi.org/10.5565/rev/elcvia.1232.

5. Steffan Rendle, Li Zhang ,and Yehunda Koran. “On the Difficulty of Evaluating Baselines: A Study on Recommender Systems.” Cornell University. https://doi.org/10.5565/rev/elcvia.1232.