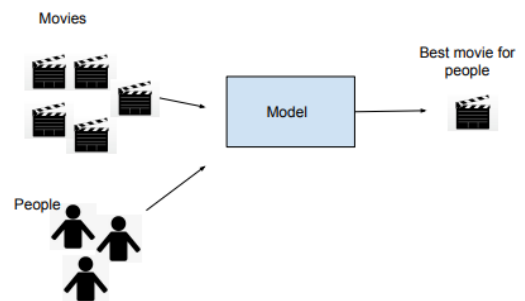


Project Summary



The goal of this project is to assess the best movie choice a group of people could make, using constraints based on factors related to the potential movie choices and the group. The idea demonstrates the use of a model that is similar to those used for watch recommendations made by platforms such as Netflix and YouTube.

For example, if you want to use our model to find the best movie for three given people our model would do the following. The model will take in key information about the people who wish to watch the movie as well as the pool of movies they have to watch. Our model will then choose a movie from the given pool that best fits the wants of the given people



Propositions

We have two types of propositions ones for the people we are choosing the movie for and ones for the potential movies to choose from. Each person had three characteristics: their

movie preference, their age, and how much time they have to watch the movie. The movies also have three characteristics: the genre, the age rating, and the length of the movie.

People propositions

Preference proposition format:

likesRomance_{p1} = Person 1 enjoys romantic movies

¬ likesHorror_{p1} = Person 1 does not enjoy horror

Propositions involving the other people (person 2, person 3 etc.) and other genres (action, comedy, etc.) will be in the same format. The possible genres are action, horror romance, comedy, and documentary.

Age proposition format

A17_{p1} = Person 1 is at least 17 years old (a = “atleast”)

Propositions involving the other people (person 2, person 3 etc.) and other ages (L13, L17, etc.) will be in the same format.

Time proposition format

L1h_{p1} = Person 1 has less than 1 hour to watch something

Propositions involving the other people (person 2, person 3 etc.) and other availability lengths (L2, L3, etc.) will be in the same format.

Movie Propositions

Genre proposition format

isAction_{m1} = the genre for Movie 1 is Action

Propositions involving the different movies (Movie 2, Movie 3, etc.,) and the different genres (action, horror, etc.) will follow the same format. The possible genres are action, horror romance, comedy, and documentary.

Rating proposition format

PG13_{m1} = Movie 1 is rated PG-13

Propositions involving the different movies (Movie 2, Movie 3, etc.,) and the different age ratings will follow the same format.

Length proposition format

ML1_{m1} = Movie 1 is less than 1 hour long

Propositions involving the different movies (Movie 2, Movie 3, etc.,) and the different movie lengths will follow the same format.

Constraints

Determining age range

$L13 \rightarrow L17$ = if someone is less than 13 years old then they are less than 17 also

All similar constraints dealing age ranges will follow the same format.

Determining appropriate rating

$L13 \wedge RatedR \rightarrow \neg AgeAppropriate$ = if someone is less than 13 years old and the movie is rated R then the movie is not appropriate

Propositions involving the different ages and ratings will follow the same format.

Determining appropriate genre

$isAction_{m1} \wedge likesAction_{p1} \rightarrow likeable$ = if a movie's genre is action and a person enjoys action then the movie is enjoyable

Propositions involving the different genres and preferences will follow the same format.

Determining if potential movie is a valid choice:

$likeable \wedge AgeAppropriate \wedge enoughTime \rightarrow valid_movie$

Model Exploration

The first exploration of our model looks to test the functionality of our constraints by creating a basic profile for a person and using them to see if we can find a solution (best movie match) from 2 hypothetical movies.

Person:

age: 17

likes: "romance"

availability: 3 hours

Movies:

Movie 1:

"name": "movie1"

"rating": "PG13"

"genre": "romance"

"length": 120

Movie 2:

"name": "movie2"

"rating": "R"

"genre": "horror"

"length": 85

The Idea in this model is that given a person and a list of movies, we are able to select which movie is the best fit. The Model iterates through the persons likes, adding propositions to represent them. The model then iterates through the movies, adding propositions to represent the situation. The model then looks through the propositions that have been made and uses constraints in order to come up with a suitable movie.

Jape Proof Ideas

A represents is_L13

B represents is_L17

1: **A, A \rightarrow B** premises

2: **B** \rightarrow elim 1.2,1.1

A represents is_L13

B represents is rated_R

C age_appropriate

1: **A, B, A \wedge B \rightarrow \neg C** premises

2: **A \wedge B** \wedge intro 1.1,1.2

3: **\neg C** \rightarrow elim 1.3,2

A represents is_action m1

B represents enjoys_action p1

C represents enjoyable

1: **A, B, $A \wedge B, A \wedge B \rightarrow C$** premises

2: **$A \wedge B$** \wedge intro 1.1,1.2

3: **C** \rightarrow elim 1.4,2

A represents likeable

B represents age_appropriate

C represents enough_time

D represents valid_movie

1: **A, B, C, $A \wedge B \wedge C, A \wedge B \wedge C \rightarrow D$** premises

2: **$A \wedge B$** \wedge intro 1.1,1.2

3: **$A \wedge B \wedge C$** \wedge intro 2,1.3

4: **D** \rightarrow elim 1.5,3

First-Order Extension

These will mirror closely to the propositions defined above. We have objects in the first-order setting that correspond to people and movies. These objects have predicates describing their characteristics.

Propositions

People propositions

p_1 = Person 1 (Format holds for other people)

Preference propositions

$EA(p_1)$ = Person 1 enjoys action movies

$\neg EH(p_1)$ = Person 1 does not enjoy horror movies

Age proposition format

A17(p₁) = Person 1 is at least 17 years old

Time proposition format

L1h(p₁) = Person 1 has less than 1 hour to watch something

Movie propositions

Genre proposition format

A(m₁) = the genre for Movie 1 is action

Rating proposition format

PG13(m₁) = Movie 1 is rated PG-13

Length proposition format

L1(m₁) = Movie 1 is less than 1 hour long

Constraints

Determining age range

$\forall x (L13(x) \rightarrow L17(x))$ = if anyone is less than 13 years old then they are also less than 17 years old

Determining appropriate rating

$\forall x \forall y (L13(x) \wedge R(y) \rightarrow \neg AA(y))$ = if anyone is less than 13 and any movie is rated R then the movie is not age appropriate

Determining appropriate genre

$\forall y \forall x (A(y) \wedge EA(x) \rightarrow E(x, y))$ = if anyone enjoys action movies and any movie is an action movie then that person will enjoy that movie

Determining Suitable Movie

The last constraint is that if there is a movie that is age appropriate, likeable, and enough time for the movie, it will be considered an appropriate movie to watch.

