HOMEWORK 4 REPORT

Introduction and Technique:

Repertory Grid (Rep Grid) is a technique used for identifying how a person construes his or her experience. It is based on two factor analysis and was developed as a personality test by George Kelly. Since then, advances have been applied complementary to contexts such as semantic network and concept mapping.

A rep-grid has four components[1],[4]:

1.) Topic: It is 'some part of the person's experience', such as, 'Choosing a set of ratings for a movie','making a grid', 'being part of a rep-grid experiment', etc.
2.) Elements: These are examples or instances derived from the topic. For example, for a subject, the experience of choosing a set of ratings for movies on Netflix, an element could be the movies like "Forrest Gump", "Lord of the Rings", etc, for example.
3.) Constructs: These can be thought of as attributes one would rate on, for example, "Dramatic" vs "Comedy" are two constructs for an element "Forrest Gump"
4.) Ratings: A subject uses a likert-like scale to rate an element, based on the constructs, which is typically a 5 or 7 point scale. For example, rating a movie on a scale of 1 to 5 based on whether it is more dramatic, or more comedic. This helps map the meaning of a concept by subject to an element, and helps perform statistical analysis between two extremes to model meaning, as it is perceived, by the subject.

Choice for the Four rep-grid components:

For the topic, we aimed to choose something that would have wide reach for subjects that are not necessarily engineers or from a tech-based industry. We chose our topic as "Experience of watching shows and movies on Netflix" for a subject, and in this context, our set of 'Elements' would be a set of movies and tv shows. The 'Constructs', would be the two extremes of a scale, that help us give meaning to the viewing experience of a subject. The subject would then choose a rating for our movie element, and indicate how he perceives it for the given constructs.

Ideal Conditions for Subjects:

Typical conditions for psychological experiments apply, given as:

- The room where the experiment is conducted should be well-lit and comfortable for the subject, for the entire duration of the experiment.
- The subject should be well informed about how the data would be collected and how it would be used, as part of the study.
- The subject should be asked,if they want to quit the experiment at any moment in time, that is, if they don't want to participate any longer.

Specific conditions for our experiment:

- The first subject should be provided clear instructions to choose the 'Elements' for the experiment, that is, the list of Movies/TV shows that they like to view or have viewed on Netflix. These will remain fixed, for the entire duration of the experiment.

- The subjects should be provided clear instructions for choosing constructs after each cycle, such as ‘comedy’ vs ‘action’, etc, and at least a brief overview of how this is related to the experiment, so they have a sense of purpose.

Procedure:

- After deciding on a topic, such as “meaning that a subject gives to his experience of viewing shows on Netflix”, we need to decide on the number of participants we choose. We decided to perform this experiment on a set of three participants.
- Choosing participants requires us to take into consideration the viewers who know something about the subject. This is where our choice of choosing “Netflix viewing” as a topic gives us a wide pool of participants to choose from, since even people who are not necessarily from the tech sectors or tech-savvy necessarily, can be considered as subjects.
- The three subjects are seated separately, such that they have no contact with each other, say in adjacent rooms.
- Subject 1 is asked to choose a set of ten different movies or tv series, based on their viewing experience.
- From the set of these ten movies, subject 1 will pick 3 movies and choose why one of them is different from the other two. Subject one will then choose the construct for describing why they consider it different, and help provide meaning. Two elements from these would be passed on to Subject 2, who will repeat the same and come up with their constructs, and finally, again with Subject 3, who will get two common elements and choose one different one from a pool of 10 shows.
- This cycle would be repeated a total of six times, to come with around 10 constructs or so, that would help assign meaning to a viewer’s experience.
- We would then run the repgrid methods (reprows, repcols and repgrid clustering, to cluster along constructs as well as meanings, using the ratings as weights (after performing normalization).
- We then perform analysis on the extremes defined by constructs, to understand themes or commonalities in constructs subjects relate with elements, as an instance or extension of the given topic.

Analysis:

After running repgrid sessions for multi-factor analysis, using clustering as a method of classification, we observe that some of the common themes that all the subjects agreed upon, when it comes to assigning meaning and potential concept mapping for movie elements, are stated below:

1. Sci-Fi vs Real-Life
2. Educational vs Leisure
3. Romantic vs Non-Romantic

These 3 opposite attribute pairings were the most often curated by our centroid based clustering algorithms, by the participants, with more than 95% probability.

Surprisingly, a lot of movies were rated in quite a similar fashion. Below are some movies that all subjects found to be clustered together, after running the repgrids session:

1. Group 1:
    a. Challenger: The Final Fight
    b. Meltdown: Three Mile Island
2. Group 2:
    a. The Pursuit of Happyness
    b. Forrest Gump
    c. Lord Of The Rings

While we can see some similarities in the clustering patterns, at the same time we have some disagreements too. The movies that were placed far away from each other in the clusters are stated below:

1. You vs Wild
2. Our Planet

These differences seem to be based on difference in perceived meanings and how the subjects differ in mapping these within the context of a common topic instance. One example is how one subject rated ‘Return To Space’ similar to ‘You vs Wild’, while the other had ‘Our Planet’ as the second element in the same pair, meaning different clusters for the same movie element, and hence a difference in perception of the two subjects.

Drawbacks for Technique Used

There are a few limitations with this method of analysis because we are only able to cluster according to data that has been collected from different individuals. We use this data for analysis; however, we still must compare it by hand between individuals. This is a limitation due to each person creating their own attributes. It does create an interesting comparison when people produce the same attributes as the comparisons are able to be more easily compared. Mathematically, for clustering, we use power method, such as clustering by root of distances. For distances, we use a cosine similarity function. Both of these are conventional methods, but there might be room for finding better methods for similarity, such as modified cosines like vector embedding based models that use cosine, used by large corporations such as netflix [2],[3].

Conclusion

Altogether, it seems as if the grids are pretty much in agreement, and the worldview and related concept mapping is similar for the three subjects. Obviously, there are differences due to the nature of having different subjects, some of whom were not familiar with all of the examples, but the results were ultimately pretty comparable considering the wide spread of attributes being used to compare the films. Despite the differences in opinions and in attributes, the films still largely were clustered quite closely to their respective genres.

References:

[1] Wikipedia, Repgrid Method
[2] Netflix Blog, using Knowledge Graphs and TransE algorithms for self supervision
[3] TranseE Algorithm
[4] onGrid,Lua, Prof. Tim Menzies,Github,Spring 23