We believe that Personalized Recommender Systems should not only produce good recommendations that suit the taste of each user but also provide an explanation that shows why each recommendation would be interesting or useful to the user, to be more effective. In this thesis, we focus on generating recommendations and explanations using knowledge graphs as well as neural networks. Knowledge graphs (KG) show how the content associated with users and items are interlinked to each other. In the first part of this thesis, we show how recommendation accuracy can be improved using a logic programming approach on KGs. Additionally, we propose how explanations could be produced in such a setting by jointly ranking KG entities and items.

KGs however operate in the domain of discrete entities. Free form text such as reviews, are a good source of information. In the second part of this thesis, we shift our focus to neural models that are more amenable to natural language inputs, and we show how a teacher-student like architecture could be used to transform latent representations of user and item into that of their joint review to improve recommendation performance. We also show how such a framework could be used to predict a candidate review that would be most similar to the joint review.

Different users are interested in different aspects of the same item. Therefore, most times, it is impossible to find a single review that would reflect all the interests of a user. A succinct explanation shown to a user for an item is ideally a personalized summary of all relevant reviews for that item. In the final part of this thesis, we propose a neural model that can generate a personalized abstractive summary as explanation and describe how such a model could be evaluated.

http://www.cs.cmu.edu/~rkanjira/thesis/rose_proposal