

Abstract: Recently multi-domain recommender systems have received much attention from researchers because they can solve cold-start problem as well as support for cross-selling. However, when applying into multi-domain items, although algorithms specifically addressing a single domain have many difficulties in capturing the specific characteristics of each domain, multi-domain algorithms have less opportunity to obtain similar features among domains. Because both similarities and differences exist among domains, multi-domain models must capture both to achieve good performance. Other studies of multi-domain systems merely transfer knowledge from the source domain to the target domain, so the source domain usually comes from external factors such as the search query or social network, which is sometimes impossible to obtain. To handle the two problems, we propose a model that can extract both homogeneous and divergent features among domains and extract data in a domain can support for other domain equally: a so-called Domain-to-Domain Translation Model (D2D-TM). It is based on generative adversarial networks (GANs), Variational Autoencoders (VAEs), and Cycle-Consistency (CC) for weight-sharing. We use the user interaction history of each domain as input and extract latent features through a VAE-GAN-CC network. Experiments underscore the effectiveness of the proposed system over state-of-the-art methods by a large margin.