DSCI 558 HW7 Report

Task 2: Knowledge Graph Embeddings

Task 2.1

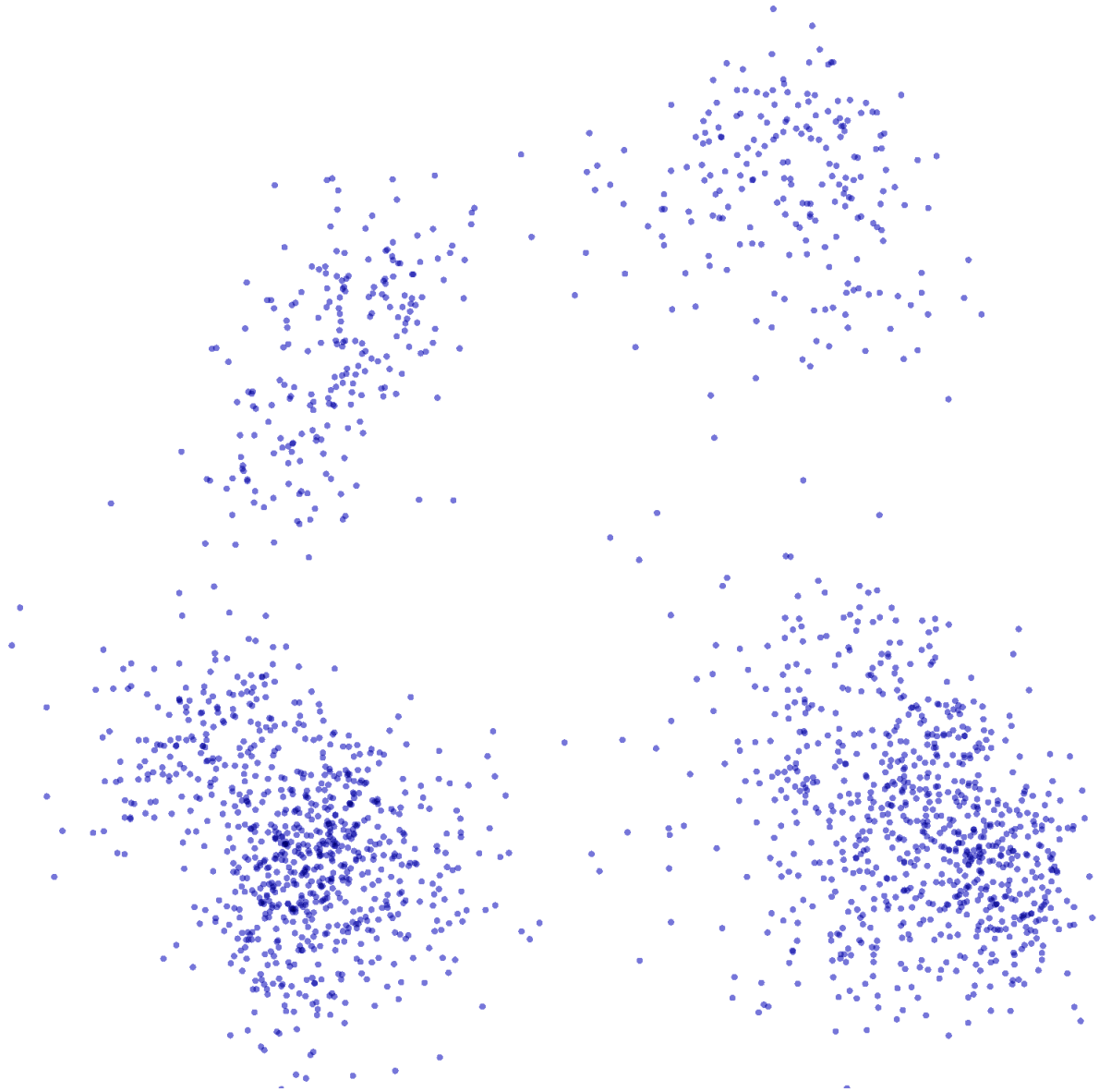
TransE

```
from ampligraph.evaluation import mr_score, mrr_score, hits_at_n_score

mrr = mrr_score(ranks)
print("MRR: %.2f" % (mrr))

hits_10 = hits_at_n_score(ranks, n=10)
print("Hits@10: %.2f" % (hits_10))
hits_3 = hits_at_n_score(ranks, n=3)
print("Hits@3: %.2f" % (hits_3))
hits_1 = hits_at_n_score(ranks, n=1)
print("Hits@1: %.2f" % (hits_1))
```

```
MRR: 0.18
Hits@10: 0.30
Hits@3: 0.21
Hits@1: 0.11
```



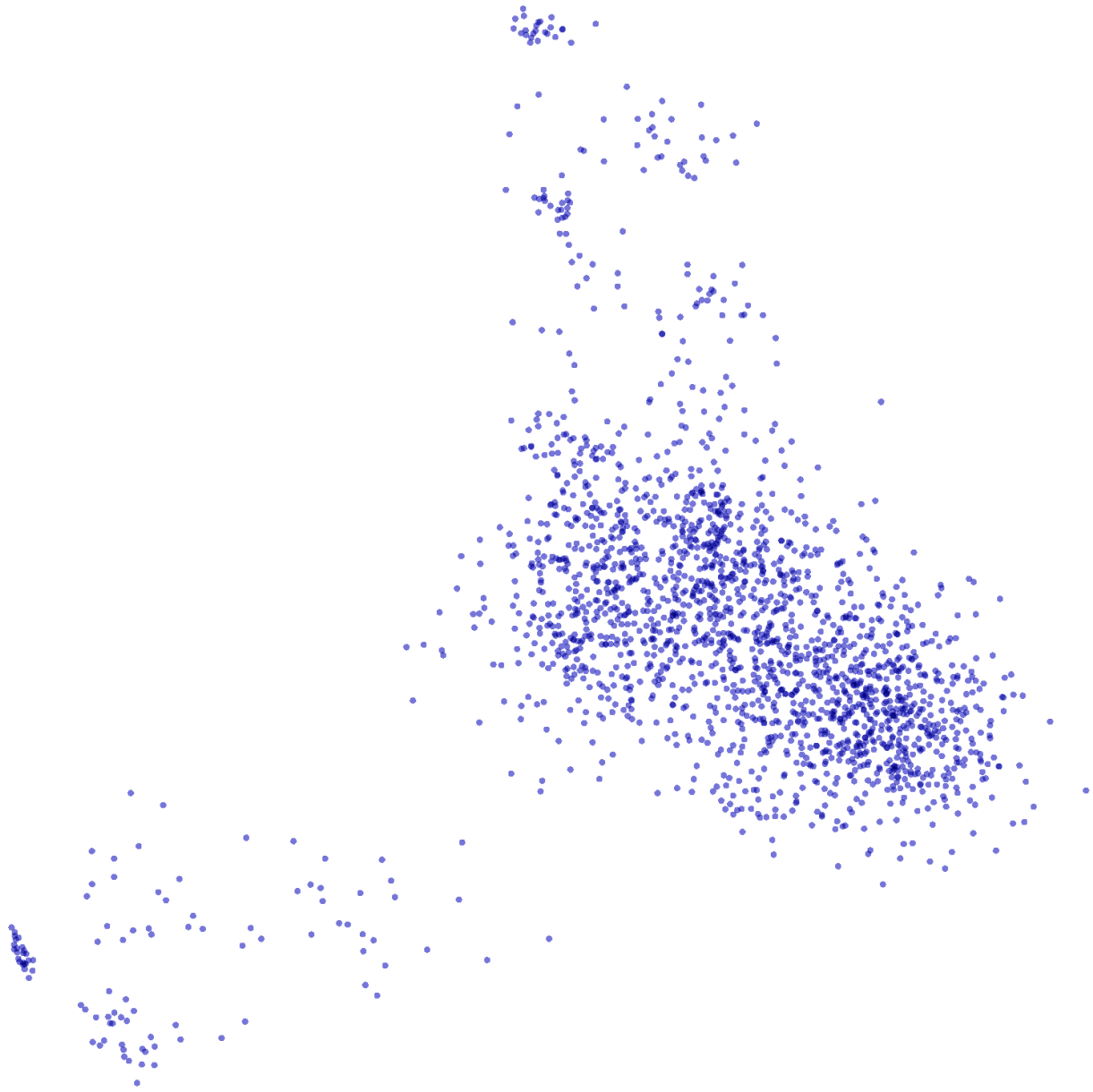
DistMult

```
from ampligraph.evaluation import mr_score, mrr_score, hits_at_n_score

mrr = mrr_score(ranks)
print("MRR: %.2f" % (mrr))

hits_10 = hits_at_n_score(ranks, n=10)
print("Hits@10: %.2f" % (hits_10))
hits_3 = hits_at_n_score(ranks, n=3)
print("Hits@3: %.2f" % (hits_3))
hits_1 = hits_at_n_score(ranks, n=1)
print("Hits@1: %.2f" % (hits_1))
```

```
MRR: 0.32
Hits@10: 0.45
Hits@3: 0.36
Hits@1: 0.25
```



ComplEx

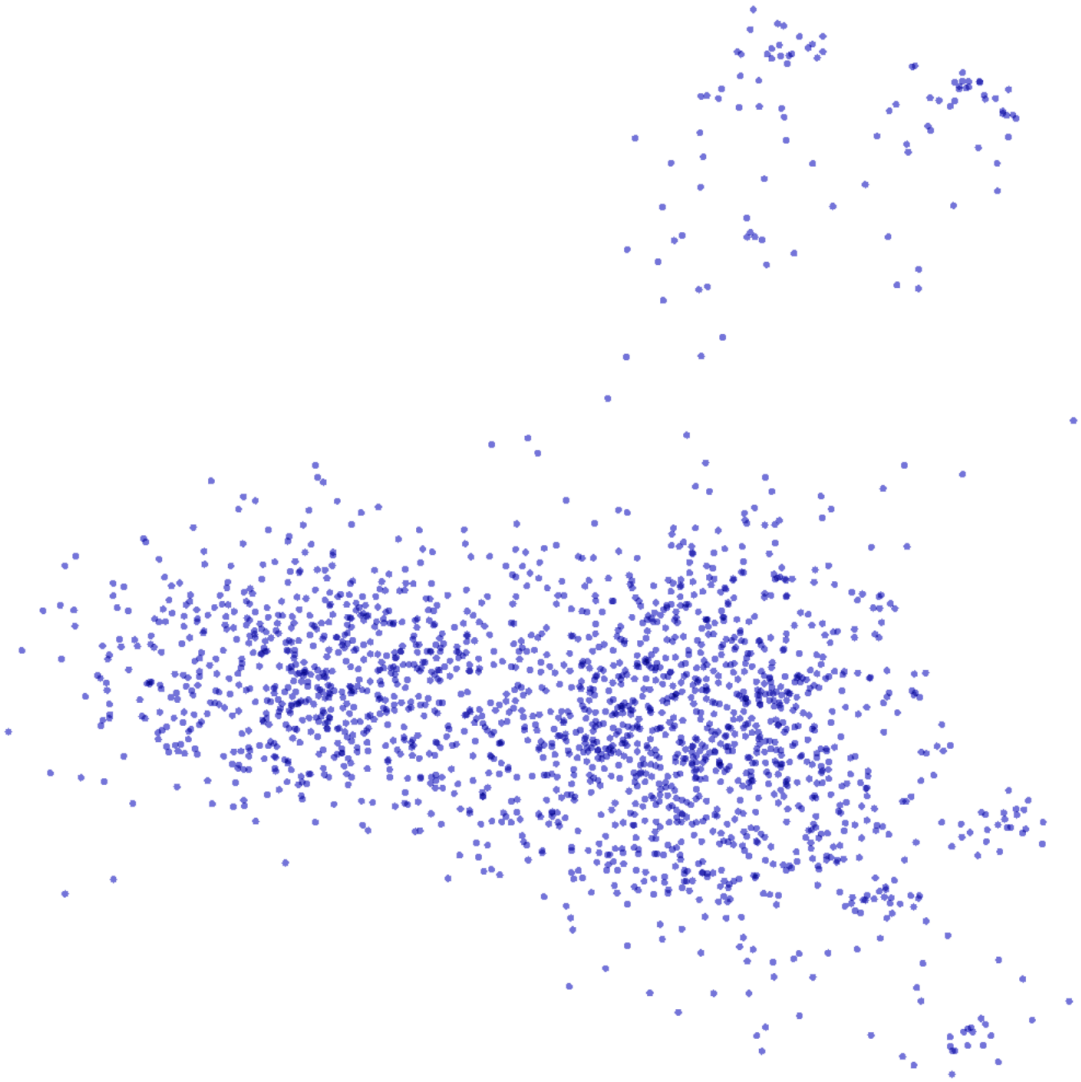
[17]

```
from ampligraph.evaluation import mr_score, mrr_score, hits_at_n_score

mrr = mrr_score(ranks)
print("MRR: %.2f" % (mrr))

hits_10 = hits_at_n_score(ranks, n=10)
print("Hits@10: %.2f" % (hits_10))
hits_3 = hits_at_n_score(ranks, n=3)
print("Hits@3: %.2f" % (hits_3))
hits_1 = hits_at_n_score(ranks, n=1)
print("Hits@1: %.2f" % (hits_1))
```

```
MRR: 0.35
Hits@10: 0.47
Hits@3: 0.38
Hits@1: 0.29
```



Task 2.2

We've already know that TransE cannot represent one-to-many relationship, DistMult cannot model asymmetric relations, and ComplEx allows asymmetry. There are lots of one-to-many relationship in this task. Therefore the overall perfornamce of TransE is not really good.

Those different models yield different embedding vectors, and have different scoring functions.

The plot of DistMult and ComplEx are similar since thee ComplEx model is an extension of the DistMult model, and their scoring functions are similar as well.

Comparing the plot of TransE with DisMult and Complex, its spot are sparser, thus, its MMR goes down.