# Assignment 4 Language Models



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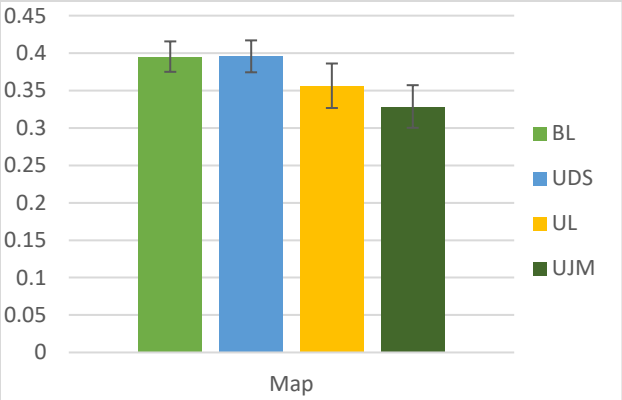
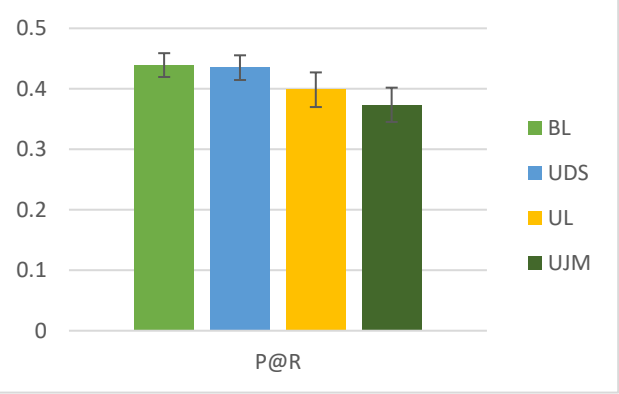
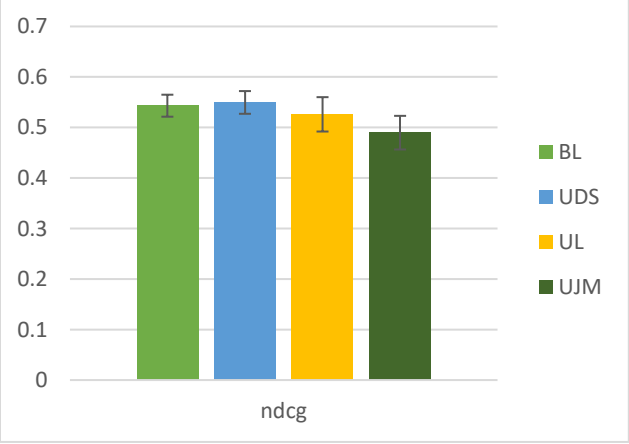
## Evaluation Values

| | MAP | Precision@R | NDCG@20 |
|---|---|---|---|
| **U-L** | 0.3589 (0.029736) | 0.4013 (0.028638) | 0.2194 (0.034025) |
| **U-JM** | 0.3310 (0.028449) | 0.3762 (0.028348) | 0.2043 (0.033294) |
| **U-DS** | 0.3978 (0.020331) | 0.4392 (0.01969) | 0.5384 (0.021091) |
| **B-L** | 0.3917 (0.021324) | 0.4306 (0.020408) | 0.5441 (0.022484) |



## Which language model variant performs best?

According to all evaluation methods, the BL and UDS variants appear to perform the best. They are not significantly different from one another because there error bars overlap. UL is a close second, and is not significantly different from BL and UDS, but is still lower so we count it as second in this case. UJM is significantly different from BL and UDS, but not from UL. It falls short in all three evaluation methods.

## Which ranking variant performs best overall?

When compared to TF-IDF, the it appears that the Language Model ranking methods perform somewhat better. Specifically the BL and UDS models perform better than the TF-IDF models, but the UJM and UL methods are much closer to the TF-IDF methods.

## Do the evaluation measures agree on "the best" method?

The evaluation measure do appear to agree on which method is the best, all of them pointing towards UDS and BL at the top. NDCG is the only method that ranks BL slightly lower than UDS, but in MAP and P@R BL is ranked slightly higher than UDS.

## Top ranked paragraphs for `Brush%20rabbit`

### UL

The brush rabbit feeds mainly on grasses and Forbs, especially green Clover, though it will also take Berry and browse from bushes.

### UJM

The brush rabbit feeds mainly on grasses and Forbs, especially green Clover, though it will also take Berry and browse from bushes.

### UDS

The brush rabbit inhabits dense, brushy cover, most commonly in Chaparral Vegetation. It also occurs in oak and conifer habitats and it will live in brush or grassland, and form networks of runways through the vegetation. The brush rabbit does not dig its own Burrow or den, but uses the burrow of other Species, brush piles, or forms. In the San%20Francisco%20Bay%20Area, it was found that the brush rabbit concentrates its activities at the edge of brush and exhibits much less use of grassy areas. It uses the interior brush of the wilderness and it was also found that this may be a better environment for it than the chaparral one. Studies done on the brush rabbit in Oregon also showed that it rarely left the brushy areas it inhabits. Brush may be used more in the drier Seasons while Grasses are used in the wetter seasons in relation to growth of annual vegetation. Use of Habitat%20(ecology) also probably is related to the Reproduction season.

### BL

The brush rabbit inhabits dense, brushy cover, most commonly in Chaparral Vegetation. It also occurs in oak and conifer habitats and it will live in brush or grassland, and form networks of runways through the vegetation. The brush rabbit does not dig its own Burrow or den, but uses the burrow of other Species, brush piles, or forms. In the San%20Francisco%20Bay%20Area, it was found that the brush rabbit concentrates its activities at the edge of brush and exhibits much less use of grassy areas. It uses the

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Each method returns a document that is relevant to the topic, but the BL and UDS methods returned much more in depth documents. If I had searched for brush rabbit, I would have preferred to get the longer document with more information, so I would say that each method returns relevant information, but the BL and UDS methods return the most relevant information.