CUIS Team at TREC 2018 CAR Track

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Task Description

- Given a complex query Q
  - contains several query sections
  - (e.g. "Green sea turtle/Conservation/Threats")

- Return relevant passages or entities for each section
  - (e.g. "Human action presents both intentional and unintentional threats to the species' survival. Intentional threats include continued hunting, poaching and egg harvesting…..")

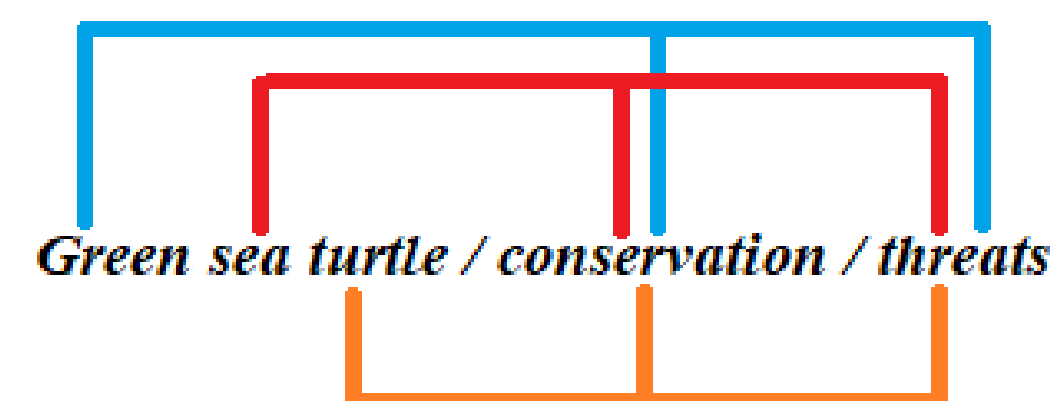## Complex Answer Retrieval Framework

Overall Ranking Function F

$$F(Q,D) = w_{para} f_{para}(Q,D) + w_{wiki} f_{wiki}(Q,H) + w_{elr} f_{elr}(E(Q),E(D))$$

1. MRF-based Passage Ranking Function

$$f_{para}(Q,D) = \lambda_T \sum_{q \in Q} f_T(q,D) + \lambda_O \sum_{q_{i_x},q_{j_y} \in Q} f_O(q_{i_x},q_{j_y},D) + \lambda_U \sum_{q_{i_x},q_{j_y} \in Q} f_U(q_{i_x},q_{j_y},D)$$
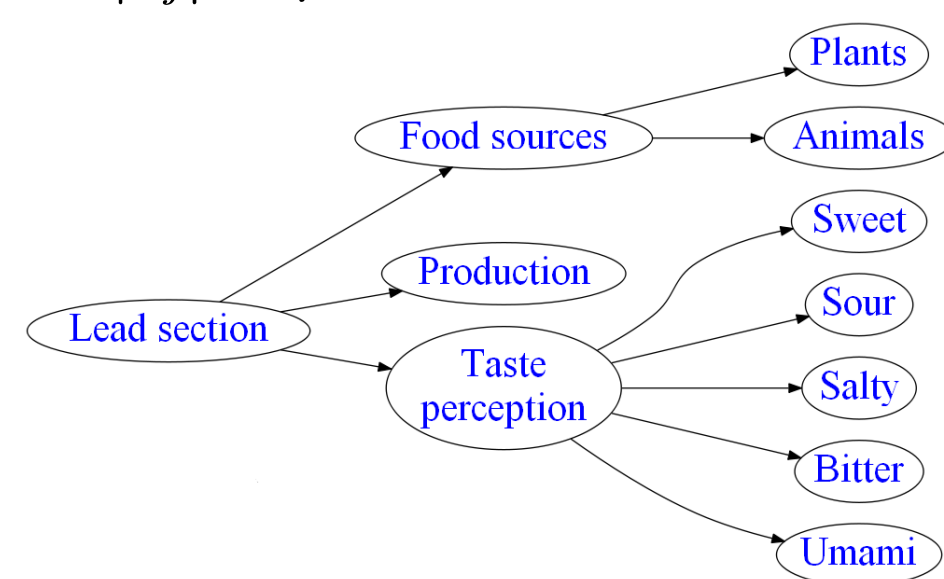
⭐ **Concept Expansion**

q_{i_x}, q_{j_y}: query terms from section i and j satisfying $|i - j| \le k$

Green sea turtle / conservation / threats

2. Incorporating Wikipedia Article

$$f_{wiki}(Q,H) = \max_{p \in H} \sum_{q_i \in Q} \log \frac{\sum_{s_j \in p} \beta^j \cdot tf_{q_i,s_j} + \mu_d \frac{cf_{q_i,C_d}}{|C_d|}}{\sum_{s_j \in p} \beta^j \cdot |s_j| + \mu_d}$$

Consider occurrences of query terms in a path p from lead section to a leaf section

3. Query Entity Language Model f_{elr}

Consider occurrences of query entity mentions in candidate passages

$$f_{elr}(E(Q),E(D)) = \sum_{e \in E(Q)} \log \frac{tf_{e,E(D)} + \mu \frac{cf_e}{|C|}}{|E(D)| + \mu}$$

EXPERIMENTS

Dataset: TREC CAR v2.1 (http://trec-car.cs.unh.edu)
Evaluation Metric: NDCG@5, NDCG, R-Prec, MAP

Passage Ranking Runs

CUIS-F150: MRF+Wikipedia

CUIS-MX5: MRF+Wikipedia+Query Entity

Run name	NDCG@5	NDCG	R-Prec	MAP
CUIS-F150	0.3503	0.3113	0.2094	0.1715
CUIS-MX5	0.3406	0.4218	0.1955	0.1771

Entity Ranking Runs

CUIS-Swift: Transform Passage Ranking into Entity Ranking

CUIS-XTS: Transform Passage Ranking into Entity Ranking

CUIS-dogeDodge: Transform Passage Ranking into Entity Ranking + Retrieve Pages

Table 3: Evaluation results for entity ranking runs based on manual judgments.

run name	Manual			
	NDCG@5	NDCG	R-Prec	MAP
CUIS-Swift	0.1654	0.2287	0.1300	0.1026
CUIS-XTS	0.1654	0.2109	0.1259	0.0988
CUIS-dogeDodge	0.1688	0.2311	0.1309	0.1042

CONTACT

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Github Project:
https://github.com/linxinshi/CUIS_TREC2018_CAR