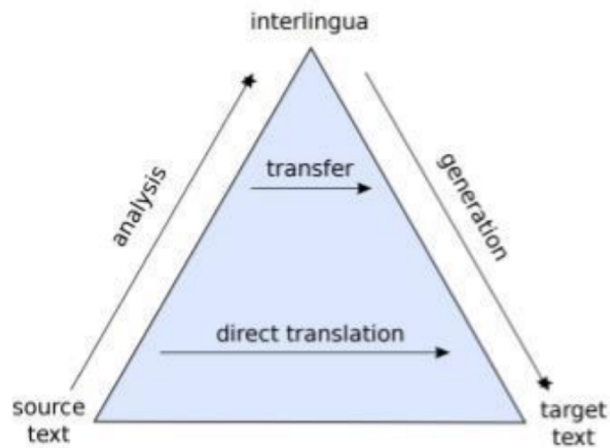# Desiderate for NLP Models

- Sensitivity to a wide range of phenomena and constraints in human language

- Generality across languages, modalities, genres, styles

- Strong formal guarantees (e.g., convergence, statistical efficiency, consistency)

- High accuracy when judged against expert annotations or test data

- Ethical

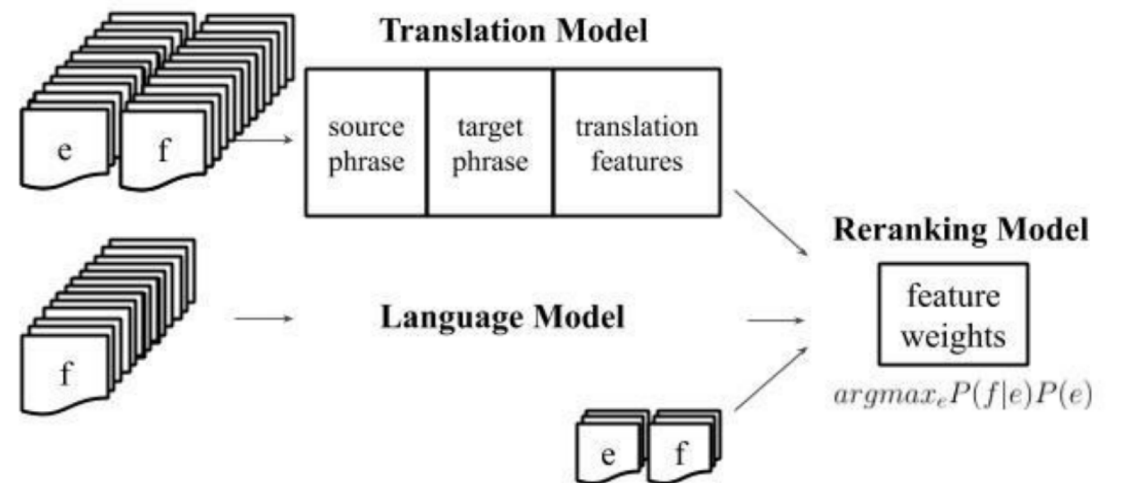# Symbolic and Probabilistic NLP

Logic-based/Rule-based NLP
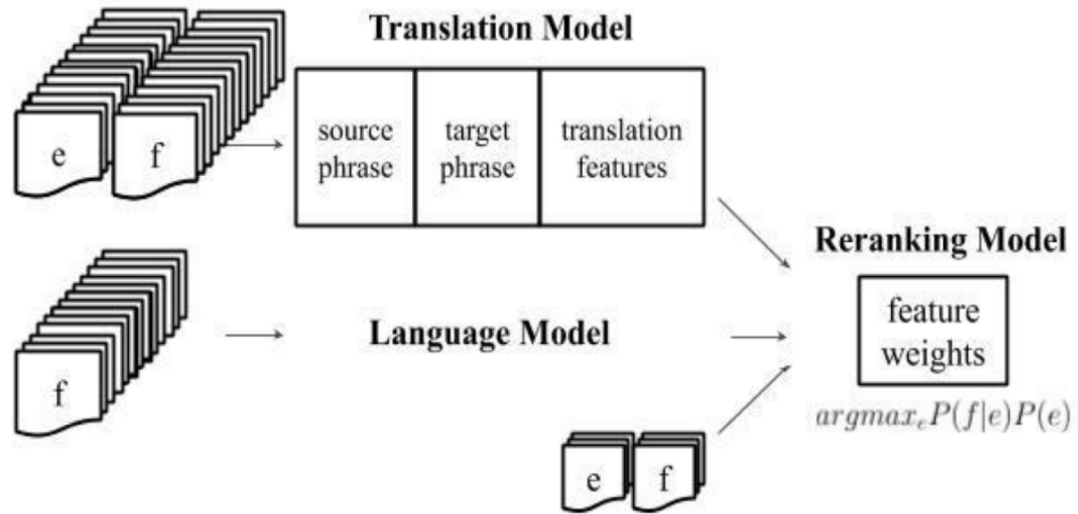
interlingua

analysis

generation

transfer

direct translation

source text

target text

~ 90s

Statistical NLP

Translation Model

| source phrase | target phrase | translation features |

e   f

Language Model

f

Reranking Model

feature weights

$argmax_e P(f|e)P(e)$

e f

Probabilistic and Connectionist NLP

Engineered Features/Representations

Translation Model

| source phrase | target phrase | translation features |

Language Model

Reranking Model

feature weights

$argmax_e P(f|e)P(e)$

~mid 2010s

Learned Features/Representations