

UTD HLTRI at TAC 2019: DDI Track

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- 1. Introduction**
2. The Approach
 1. Pipeline Overview
 2. Preprocessing
 3. Multi-Task Transformer
 4. Postprocessing
3. Results
4. Conclusion

Multi-task neural model for:

- Task 1: entity identification
- Task 2: relation identification
- Task 3*: concept normalization
- Task 4: normalized relation identification

Problem

- Sentence-level
- Binary Relation identification

Our Approach

- Multi-task learning
 - Sentence classification
 - Mention boundary detection
 - Relation extraction
 - PK effect classification
- Pre-trained Transformer for **shared representation**

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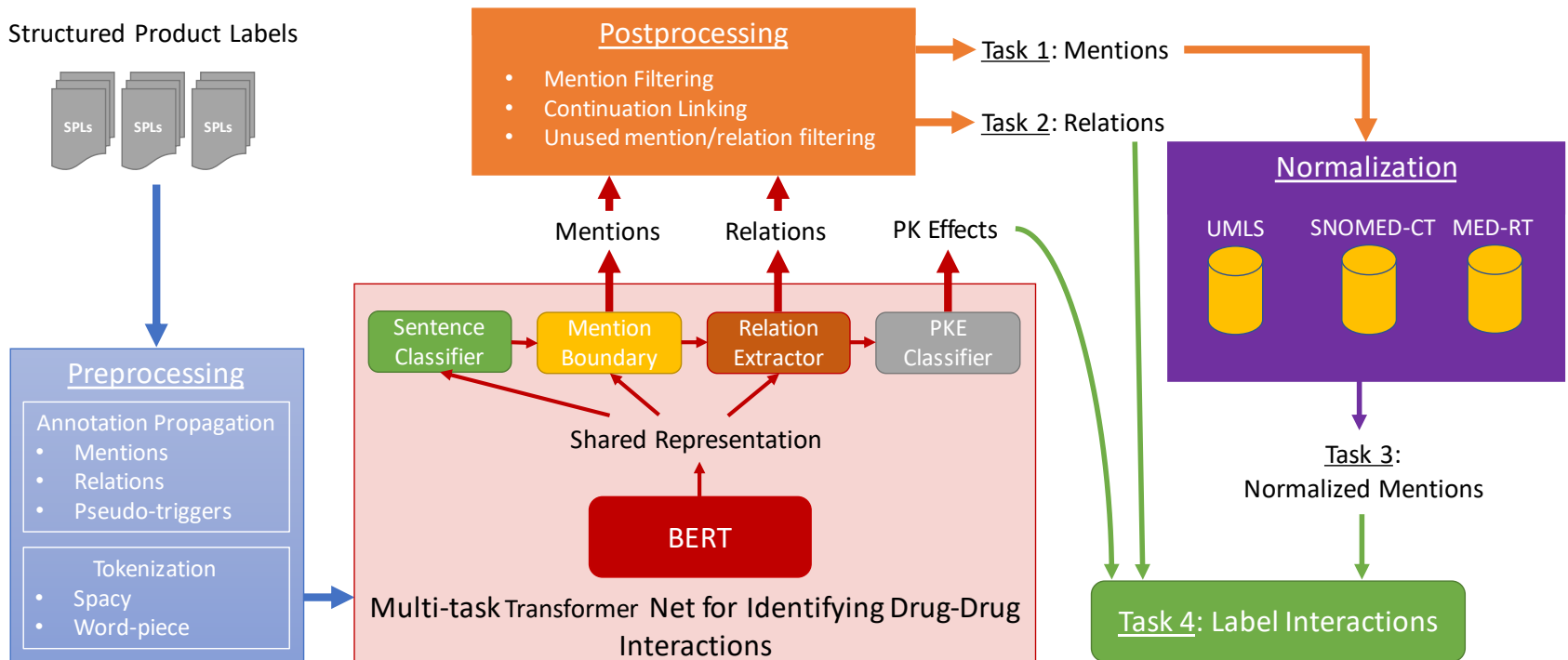
3. Multi-Task Transformer

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FDA Label Drug-Drug Interaction Pipeline



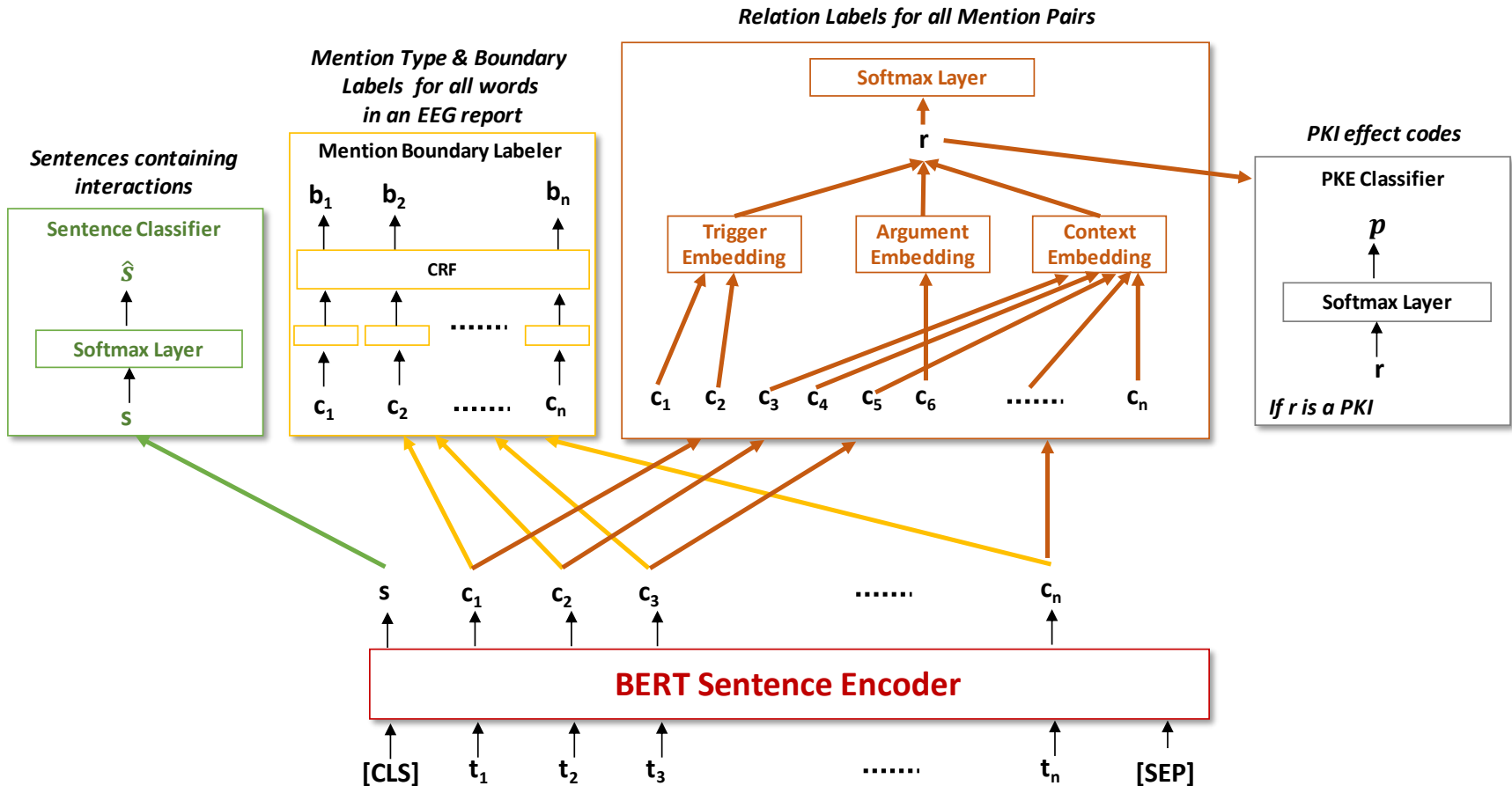
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- Binary Relations
 - (Trigger, Precipitant, Effect) ->
 - (Trigger, Precipitant)
 - (Trigger, Effect)
 - **Pseudo-triggers** for SIs in some PDIs
 - PK effects as **attributes**
- Mention annotation propagation
 - Ease the learning problem

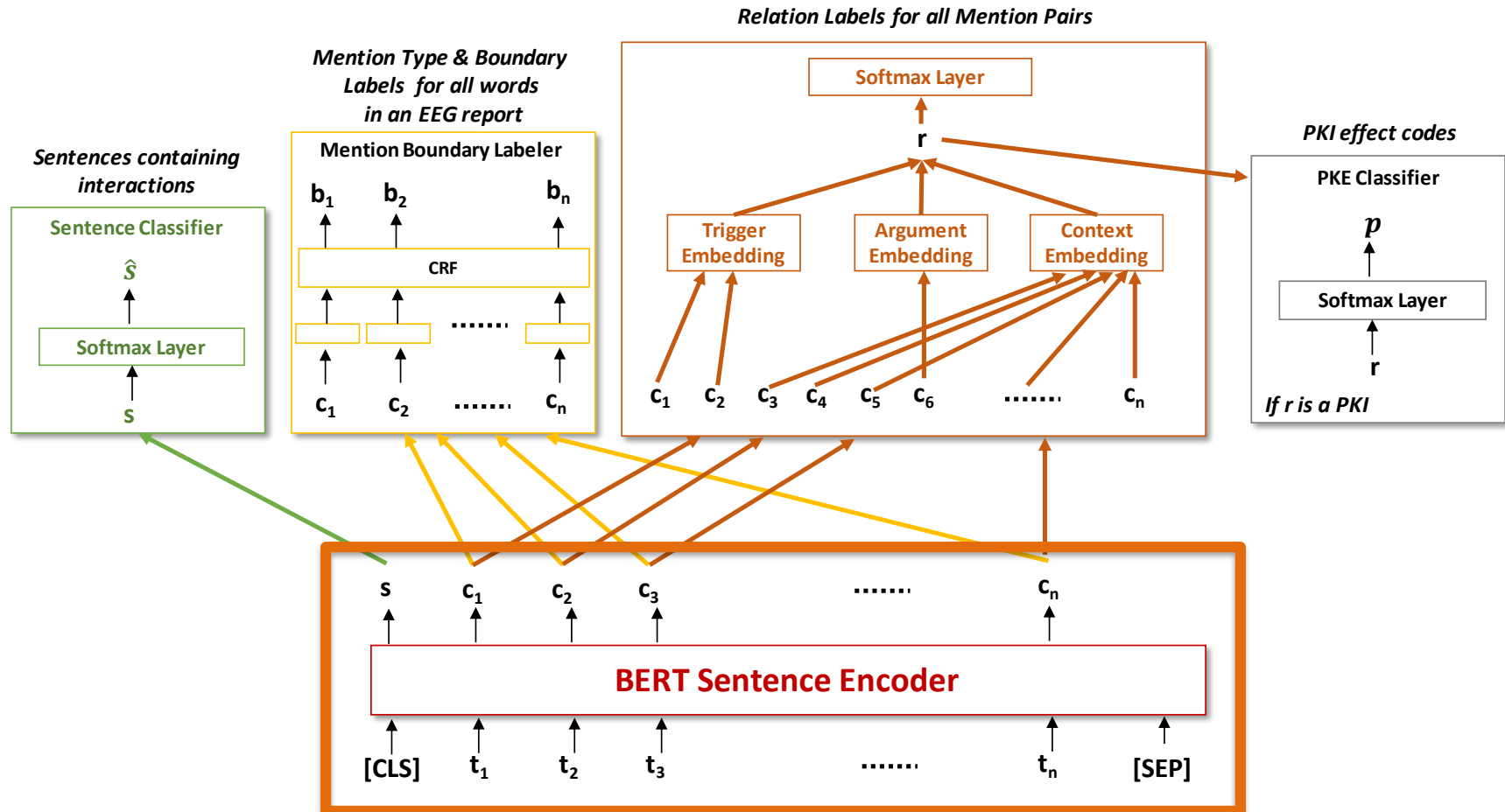
- Tokenization
 - spaCy
 - WordPiece using BERT vocab
- C-IOBES tagging
 - Continuation necessary for disjoint spans

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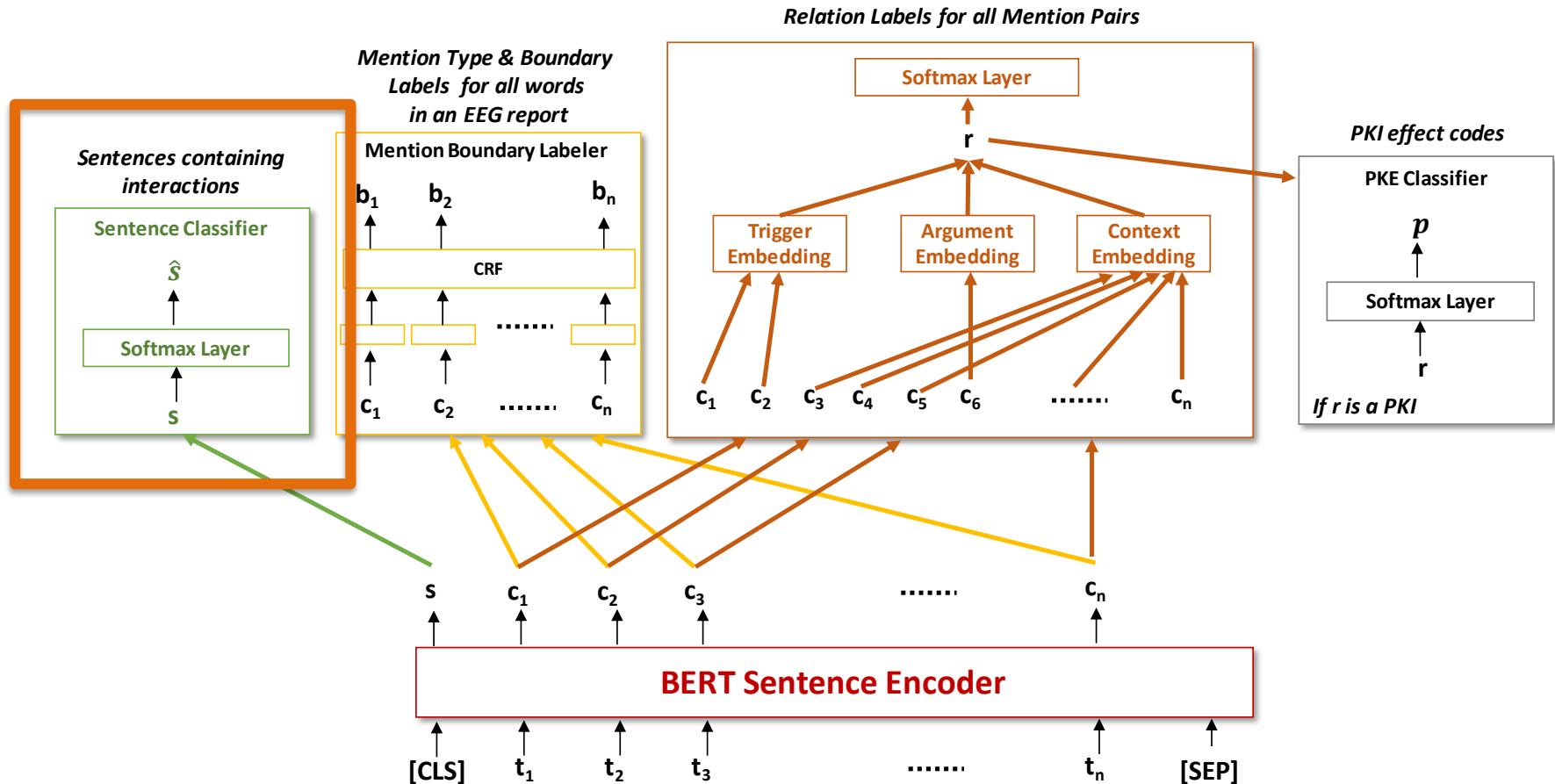
Multi-Task Transformer network for Identifying Drug-Drug Interactions (MTTDDI)



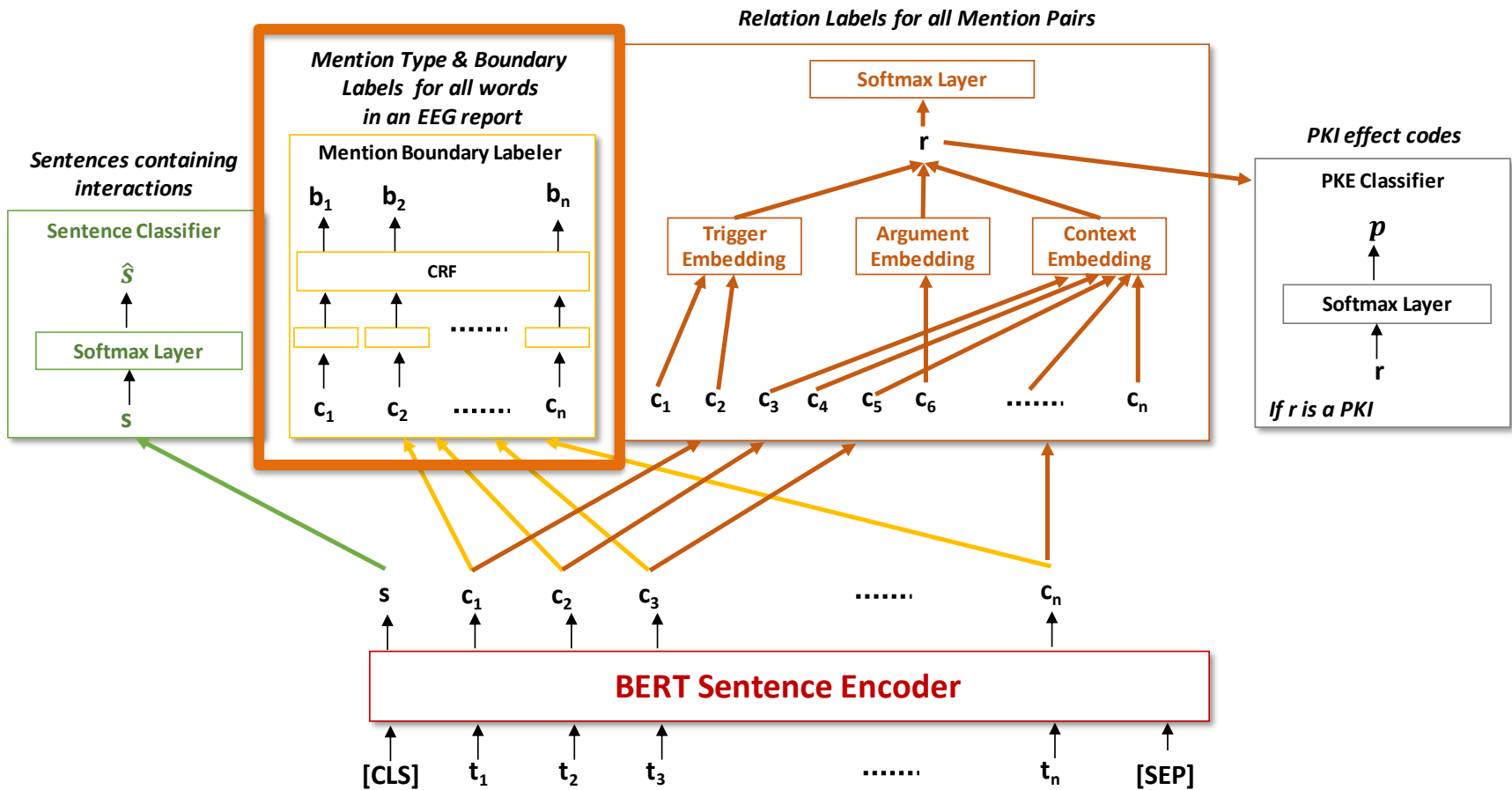
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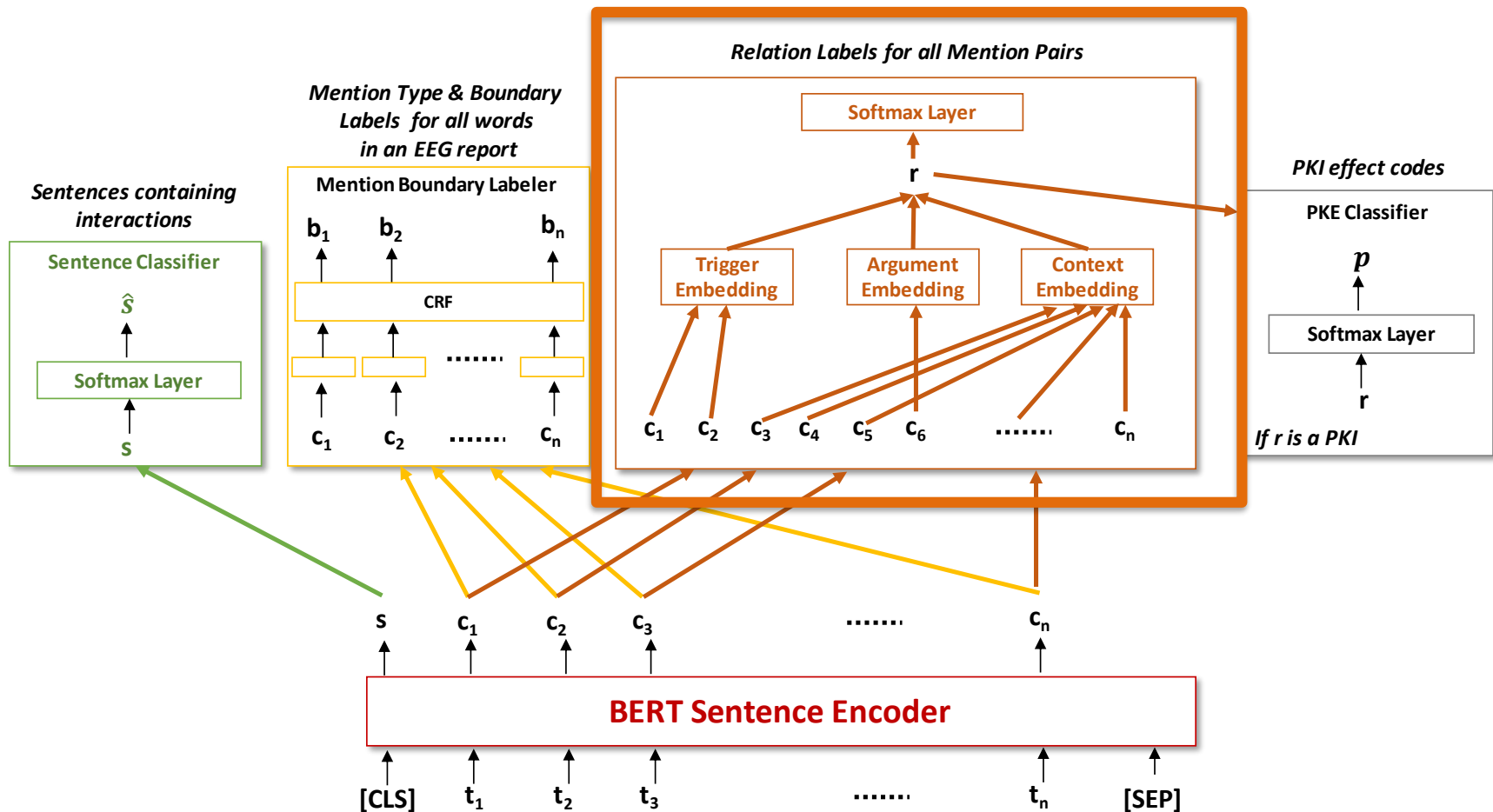
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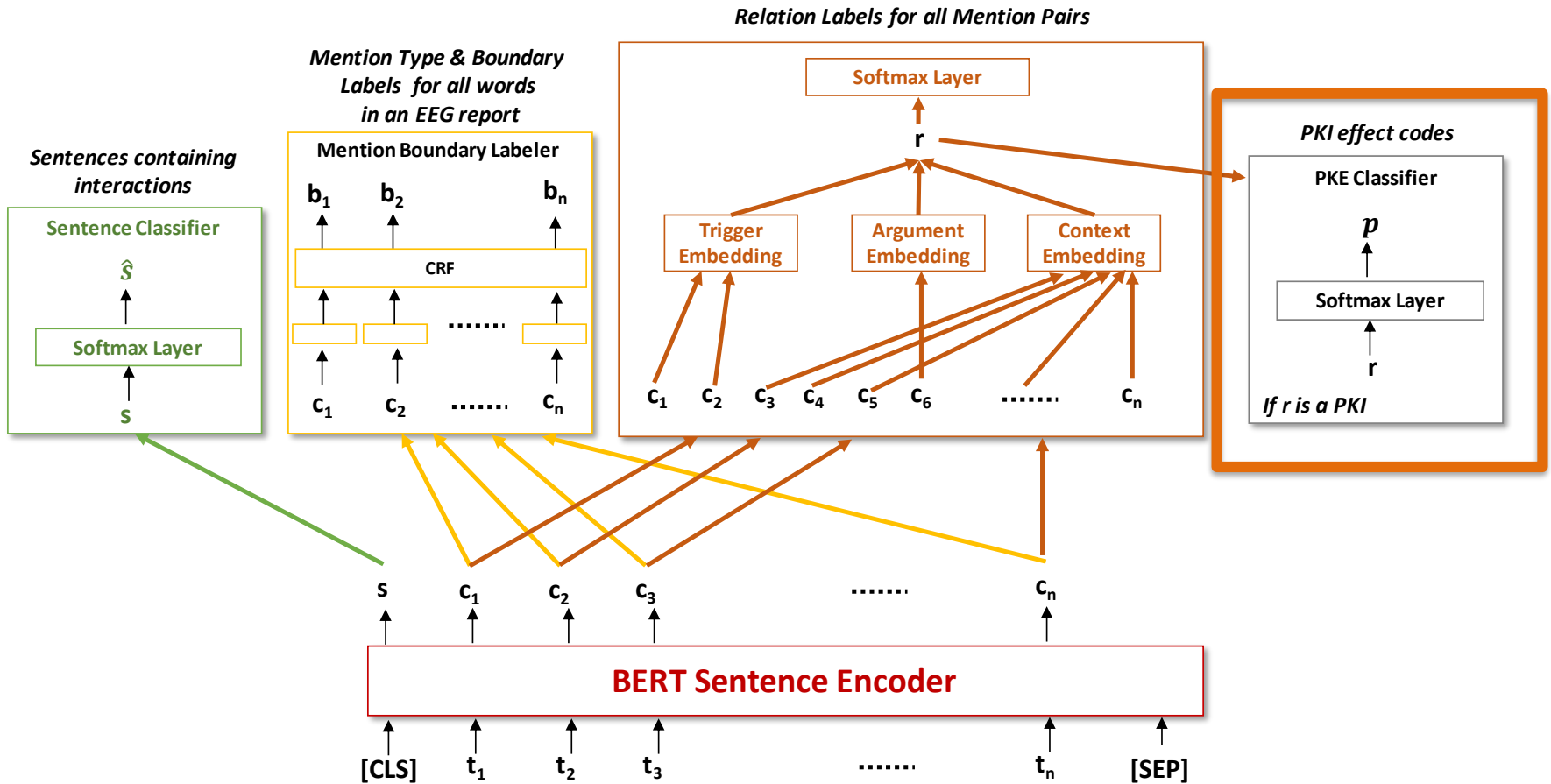
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- Filtering
 - Invalid boundary tag sequences
 - Repeated mentions
 - Mentions not involved in an interaction
- C-spans linked to closest mention
- Reconstruct ternary interactions from binary through shared trigger

- Normalization
 - String matching
 - SNOMED-CT
 - Specific interactions
 - MED-RT
 - Drug classes
 - UNII
 - precipitants
 - Augmented with atoms from UMLS
- Map precipitants first to MED-RT, then to UNII of no match was found

Task 4

- inferred from unique interactions between normalized mentions
- PK effect codes from MTTDDI

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Evaluated MTTDDI against two alternate configurations:

- **UTDHLTRI Run3**: No sentence filtering/targeted training
- **Run3 + Filtering**: Dedicated Learners

System	Task1	Task2	Task3	Task4
Best Submission	65.38	49.03	62.39	17.56
Median	48.97	37.13	45.53	17.56
UTDHLTRI Run3	35.04	27.48	28.66	17.56
Run3 + Filtering	<i>56.03</i>	<i>42.29</i>	<i>45.73</i>	24.07
MTTDDI	54.39	41.34	44.08	25.20

* Bold indicated best score. *Italics* indicates best score among LDIIIP systems.

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Questions

