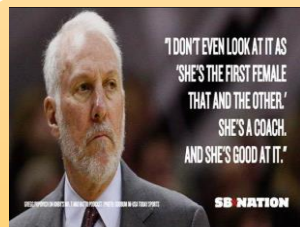


Pre-defined artificial samples



Text: @PerSources14 Gregg Popovich was asked about Becky Hammon and the social progress the NBA ...

Label: Named entities:1. Gregg Popovich (person)
2. ...

Reasoning: The sentence refers to an interview with Gregg Popovich, the head coach of the San Antonio Spurs in the NBA....

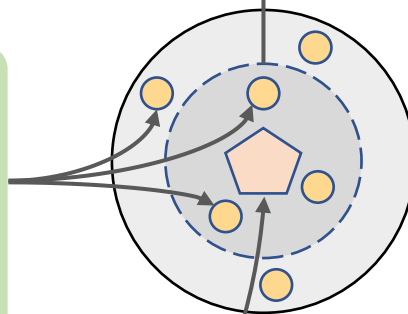


Input sample



Text: The Premier Leagues battle for #Champions League, Europa qualifying.

Vanilla MNER Model



Vision-Language Pre-training Model

Prompt Head

Text: #Sports Connor Cook could not satisfy NFL ...
Caption: Michigan state football player in uniform.
Question: Comprehensively analyze ...
Answer: Named entities: 1. Connor Cook...
Reasoning: The sentence mentions...

...

Text: #NBA Enhanced: OKC Thunder to win ...
Caption: Kevin Durant and Russell Westbrook.
Question: Comprehensively analyze ...
Answer: Named entities:1. OKC ...
Reasoning: The sentence mentions ...

Text: The Premier Leagues battle for #Champions...
Caption: A soccer player in action on the field.
Question: Comprehensively analyze ...
Answer:

Frozen ChatGPT

Input Text T

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Auxiliary Refined Knowledge Z

Transformer-based Embeddings

$P(y | T, Z)$