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#
# HIGH PRECISION CAUSAL EXTRACTION RULES
# Supplementary Material for paper:
#     Creating Causal Embeddings for Question Answering
#         with Minimal Supervision
# Usage of rules is described in the above paper, Section 5.
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taxonomy:
- Entity:
  - NP
  - CM:
    - CM_NP
    - CM_event
  - VP
  - Predicate
- Event:
  - Causal
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rules:
#
# Rules for identifying entities/nouns/verbs
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- name: entity_rule
  label: Entity
  priority: 1
  type: token
  pattern: |
    [word=/.+/]

- name: np_rule
  label: NP
  priority: 2
  type: token
  unit: "tag"
  pattern: |
    /^NN/

- name: vp_rule
  label: VP
  priority: 2
  type: token
  unit: "tag"
  pattern: |
    /^VB/ # verb
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#
# Rules for Causal Mentions (CMs) (i.e. the potential arguments of the
# causal relation)
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- name: CM_expansion
  label: CM_event
  priority: 4
  pattern: |
    trigger = [mention=VP & !lemma=/(cause|result|lead|create)/]
    deps:Entity* =
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/^(nsubj|nn|amod|advmod|ccmod|prep_(with|for|into|on|to)|dobj|xcomp|ccomp
|agent|vmod)/{1,2}
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- name: CM_expansion_2
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label: CM_NP
priority: 3
pattern: |
    trigger = [mention=NP & !lemma=/(cause|result)/]
    deps:Entity* =
/^ (nn|amod|advmod|ccmod|prep_(of|with|for|into|on|to|in)|doobj) /{1,2}

- name: CM_expansion_3_copular
label: CM_event
priority: 3
pattern: |
    trigger = [lemma=be]
    deps:Entity* = /^ (nsubj|prep_(in|on|with|for|of)|doobj|nn|amod) /+

- name: CM_nounphrase_with_property
label: CM_NP
priority: 5
example: "... will cause huge <np> damage to the reef <\np>."
pattern: |
    trigger = [tag=/^NN/ & !lemma=/(cause|result|lead|create)/]
    modifier:CM = <doobj [lemma=cause & tag=/^VB/]
>/ (prep_(to|for|of)) |xcomp/

#
# Rules for Causal Relations
#
- name: PosReg_syntax_1_verb
label: Causal
priority: 9
example: "X causes Y"
pattern: |
    trigger = [lemma=cause]
    controlled:CM+ = prepc_by? (doobj | xcomp | ccomp)
    controller:CM+ = <xcomp? (nsubj | agent | <vmod)
/appos|nn|conj_|cc|prep_of|prep_in/{,2}

- name: causal_2
label: Causal
priority: 9
example: "X will cause huge <np> damage to the reef <\np>."
pattern: |
    trigger = [lemma=cause & tag=/^VB/]
    controlled:CM+ = doobj
    controller:CM+ = nsubj (?! <nsubj >neg)
        # lookaround: follow the nsubj and check for negation

- name: causal_3
label: Causal
priority: 9
example: "X cause Y to Z"
pattern: |
    trigger = [lemma=cause & tag=/^VB/]
    controlled:CM_event+ = xcomp
    controller:CM+ = nsubj (?! <nsubj >neg)

- name: causal_4
label: Causal
priority: 9
example: "X was the cause of Y"
pattern: |

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    trigger = [lemma=cause & tag=/^NN/]
    controlled:CM+ = prep_of
    controller:CM+ = nsubj (?! <nsubj >neg)

- name: causal_5
  label: Causal
  priority: 9
  example: "X was caused by Y"
  pattern: |
    trigger = [lemma=cause & tag=/^VB/]
    controlled:CM+ = nsubjpass
    controller:CM+ = agent (?! <agent >neg)

- name: causal_6
  label: Causal
  priority: 9
  example: "They did not provide a motive for the alleged crime , which
caused the city 's first fire-related deaths in more than a decade ."
  pattern: |
    trigger = [lemma=cause & tag=/^VB/]
    controlled:CM_NP = <rcmod (?= >rcmod >nsubj [tag=WDT])
    controller:CM+ = dobj (?! <dobj >neg)

- name: causal_7
  label: Causal
  priority: 9
  example: "After the exam grades begin to count , students often start
taking them more seriously , which causes passage rates to increase ,
Jennings said ."
  pattern: |
    trigger = [lemma=cause & tag=/^VB/]
    controlled:CM+ = dobj
    controller:CM_NP = <advcl (?= >advcl >nsubj [tag=WDT])

- name: result_1
  label: Causal
  priority: 9
  example: "X resulted in Y"
  pattern: |
    trigger = [lemma=result & tag=/^VB/]
    controlled:CM+ = prep_in
    controller:CM+ = nsubj (?! <nsubj >neg)

- name: result_2
  label: Causal
  priority: 9
  example: "X as a result of Y"
  pattern: |
    trigger = [lemma=result & tag=/^NN/]
    controlled:CM+ = <prep_as
    controller:CM+ = prep_of

- name: result_3
  label: Causal
  priority: 9
  example: "X was the result of Y"
  pattern: |
    trigger = [lemma=result & tag=/^NN/]
    controlled:CM+ = nsubj (?! <nsubj >neg)
    controller:CM+ = prep_of

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- name: result_4
  label: Causal
  priority: 9
  example: "Jet lag results when the body 's internal clock is out of
sync with daily life , making people sleepy when they want to be awake
and wakeful when they want to sleep."
  pattern: |
    trigger = [lemma=result & tag=/^VB/]
    controlled:CM+ = nsubj (?! <nsubj >neg)
    controller:CM+ = /(advcl|prep_from)/

- name: led_to_1
  label: Causal
  priority: 9
  example: "X led to Y"
  pattern: |
    trigger = [lemma=lead & tag=/^(VB|NN)/] to
    controlled:CM+ = prep_to
    controller:CM+ = nsubj (?! <nsubj >neg)

- name: create_1
  label: Causal
  priority: 9
  example: "X was created by Y"
  pattern: |
    trigger = [lemma=create & tag=/^VB/]
    controlled:CM+ = nsubjpass (?! <nsubjpass >neg)
    controller:CM+ = agent

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