**SUPPLEMENTARY FILE S1**

####README START#####

The rule for adding new edges to comparison components consists of set of conditions and associated actions.

If all the conditions are satisfied (on the Standard Dependency Graph), then a set of nodes are populated.

Based on the populated nodes, user can write actions specifying between which nodes he/she wants to add edges.

The set of conditions are based on Stanford Semgrex pattern.

The sets of conditions (semregex patterns) are applied to the dependency and it populates a set of nodes based on the pattern.

Then the actions are applied to add new edges between the named nodes.

Each Cond\_# is Semregex Pattern

Each Action\_# adds edges to comparison(Type A)/TypeB components

####README END#####

**TYPE A COMPARSION PATTERNS**

####arg0\_cmp points to the compared aspect

####arg1/2\_cmp points to the compared entities

####governor of arg edges is the comparison scale

##########X higher/lower in Y CMP Z###############

####Comparison 1: X higher/lower in Y than in Z; X in Y higher/lower than in Z####

RuleID : cmp1\_than\_1

Cond\_1 : {word:/(higher|lower|high|low)/}=N0

Cond\_2 : {}=N0 >nsubj {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : {}=N2 !> /case/ {word:than}

Cond\_5 : {}=N0 >/nmod:in/ ({}=N3 > /case/ {word:than})

Action\_1 : N0 >> arg0\_cmp >> N1

Action\_2 : N0 >> arg1\_cmp >> N2

Action\_3 : N0 >> arg2\_cmp >> N3

####Comparison 1\_1: X higher/lower in Y versus Z; X in Y higher/lower versus Z####

RuleID : cmp1\_vs\_1

Cond\_1 : {word:/(higher|lower|high|low)/}=N0

Cond\_2 : {}=N0 >nsubj {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : {}=N2 !> /cc/ {word:/(versus|vs.)/}

Cond\_5 : {}=N0 >/nmod:in/ ({}=N3 > /cc/ {word:/(versus|vs.)/})

Action\_1 : N0 >> arg0\_cmp >> N1

Action\_2 : N0 >> arg1\_cmp >> N3

Action\_3 : N0 >> arg2\_cmp >> N2

####Comparison 2: X higher/lower in Y than Z; X in Y higher/lower than Z####

RuleID : cmp1\_than\_2

Cond\_1 : {word:/(higher|lower|high|low)/}=N0

Cond\_2 : {}=N0 >nsubj {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : {}=N0 >/(nmod:than|nmod:than\_added|conj:vs.|conj:versus)/ {}=N3

Action\_1 : N0 >> arg0\_cmp >> N1

Action\_2 : N0 >> arg1\_cmp >> N2

Action\_3 : N0 >> arg2\_cmp >> N3

####Comparison 3: X higher/lower in Y compared with|to Z; X in Y ..####

RuleID : cmp1\_compare\_1

Cond\_1 : {word:/(higher|lower|high|low)/}=N0

Cond\_2 : {}=N0 >nsubj {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : [{}=N0 | {}=N2] >/(advcl|nmod):(compared\_to|compared\_with)/ {}=N3

Action\_1 : N0 >> arg0\_cmp >> N1

Action\_2 : N0 >> arg1\_cmp >> N2

Action\_3 : N0 >> arg2\_cmp >> N3

####Comparison 4: X higher/lower in Y compared with|to in Z; X in Y ..####

RuleID : cmp1\_compare\_2

Cond\_1 : {word:/(higher|lower|high|low)/}=N0

Cond\_2 : {}=N0 >nsubj {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : {}=N0 > /advcl:compared/ {word:/(to|with)/}

Cond\_9 : {}=N2 $++ {}=N3

Cond\_10 : [{}=N0 | {}=N1] >/nmod:in/ {}=N3

Action\_1 : N0 >> arg0\_cmp >> N1

Action\_2 : N0 >> arg1\_cmp >> N2

Action\_2 : N0 >> arg2\_cmp >> N3

####Comparison 5: X higher/lower in Y when compared with|to Z; X in Y ..####

RuleID : cmp1\_compare\_3

Cond\_1 : {word:/(higher|lower|high|low)/}=N0

Cond\_2 : {}=N0 >nsubj {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ !{word:/(compared|comparison)/}=N2

Cond\_4 : {}=N0 >/(advcl|dep|nmod:in|nmod\_acl:in)/ {word:/(compared|comparison)/}=N4

Cond\_5 : {}=N4 >/(nmod:in|nmod:with|nmod:to)/ {}=N3

Action\_1 : N0 >> arg0\_cmp >> N1

Action\_2 : N0 >> arg1\_cmp >> N2

Action\_3 : N0 >> arg2\_cmp >> N3

########X [DIFF\_EXPRESSED\_IN] Y CMP Z##############

####Comparison 1': X increased in Y than in Z; X in Y increased than in Z####

RuleID : cmp2\_than\_1

Cond\_1 : {pos:VBN;lemma:/.\*(increase|decrease|express|silence|reduce|elevate|change|regulate)/}=N0

Cond\_2 : {}=N0 >nsubjpass {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : {}=N2 !> /case/ {word:than}

Cond\_5 : {}=N0 >/nmod:in/ ({}=N3 > /case/ {word:than})

Action\_1 : N0 >> arg0\_cmp >> N1

Action\_2 : N0 >> arg1\_cmp >> N2

Action\_3 : N0 >> arg2\_cmp >> N3

####Comparison 1'\_1: X increased in Y versus Z; X in Y increased versus Z####

RuleID : cmp2\_vs\_1

Cond\_1 : {pos:VBN;lemma:/.\*(increase|decrease|express|silence|reduce|elevate|change|regulate)/}=N0

Cond\_2 : {}=N0 >nsubjpass {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : {}=N2 !> /cc/ {word:/(versus|vs.)/}

Cond\_5 : {}=N0 >/nmod:in/ ({}=N3 > /cc/ {word:/(versus|vs.)/})

Action\_1 : N0 >> arg0\_cmp >> N1

Action\_2 : N0 >> arg1\_cmp >> N3

Action\_3 : N0 >> arg2\_cmp >> N2

####Comparison 2': X increased in Y than Z; X in Y increased than Z####

RuleID : cmp2\_than\_2

Cond\_1 : {pos:VBN;lemma:/.\*(increase|decrease|express|silence|reduce|elevate|change|regulate)/}=N0

Cond\_2 : {}=N0 >nsubjpass {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : {}=N0 >/(nmod:than|nmod:than\_added|conj:vs.|conj:versus)/ {}=N3

Action\_1 : N0 >> arg0\_cmp >> N1

Action\_2 : N0 >> arg1\_cmp >> N2

Action\_3 : N0 >> arg2\_cmp >> N3

####Comparison 3': X increased in Y compared with|to Z; X in Y ..####

RuleID : cmp2\_compare\_1

Cond\_1 : {pos:VBN;lemma:/.\*(increase|decrease|express|silence|reduce|elevate|change|regulate)/}=N0

Cond\_2 : {}=N0 >nsubjpass {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : [{}=N0 | {}=N2] >/(advcl|nmod):(compared\_to|compared\_with)/ {}=N3

Action\_1 : N0 >> arg0\_cmp >> N1

Action\_2 : N0 >> arg1\_cmp >> N2

Action\_3 : N0 >> arg2\_cmp >> N3

####Comparison 4': X increased in Y compared with|to in Z; X in Y ..####

RuleID : cmp2\_compare\_2

Cond\_1 : {pos:VBN;lemma:/.\*(increase|decrease|express|silence|reduce|elevate|change|regulate)/}=N0

Cond\_2 : {}=N0 >nsubjpass {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : {}=N0 > /advcl:compared/ {word:/(to|with)/}

Cond\_9 : {}=N2 $++ {}=N3

Cond\_10 : [{}=N0 | {}=N1] >/nmod:in/ {}=N3

Action\_1 : N0 >> arg0\_cmp >> N1

Action\_2 : N0 >> arg1\_cmp >> N2

Action\_2 : N0 >> arg2\_cmp >> N3

####Comparison 5': X increased in Y when compared with|to Z; X in Y ..; X increased in Y in cmp to Z####

RuleID : cmp2\_compare\_3

Cond\_1 : {pos:VBN;lemma:/.\*(increase|decrease|express|silence|reduce|elevate|change|regulate)/}=N0

Cond\_2 : {}=N0 >nsubjpass {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ !{word:/(compared|comparison)/}=N2

Cond\_4 : {}=N0 >/(advcl|dep|nmod:in|nmod\_acl:in)/ {word:/(compared|comparison)/}=N4

Cond\_5 : {}=N4 >/(nmod:in|nmod:with|nmod:to)/ {}=N3

Action\_1 : N0 >> arg0\_cmp >> N1

Action\_2 : N0 >> arg1\_cmp >> N2

Action\_3 : N0 >> arg2\_cmp >> N3

###########Higher/Lower of X [FOUND IN] Y CMP Z

####Comparison 1'': Higher of X found in Y than in Z; Higher of X in Y found than in Z####

RuleID : cmp3\_than\_1

Cond\_1 : {word:/(found|noted|detected|observed|discovered|occurred|occur|occurs)/}=N0

Cond\_2 : {}=N0 >/(nsubjpass|dobj)/ {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : {}=N2 !> /case/ {word:than}

Cond\_5 : [{}=N0 | {}=N2] >/nmod:in/ ({}=N3 > /case/ {word:than})

Cond\_6 : {}=N1 >amod {tag:/(JJ|JJR|VBN)/}=N4

Action\_1 : N4 >> arg0\_cmp >> N1

Action\_2 : N4 >> arg1\_cmp >> N2

Action\_3 : N4 >> arg2\_cmp >> N3

####Comparison 2'': Higher of X found in Y than Z; Higher of X in Y found than Z####

RuleID : cmp3\_than\_2

Cond\_1 : {word:/(found|noted|detected|observed|discovered|occurred|occur|occurs)/}=N0

Cond\_2 : {}=N0 >/(nsubjpass|dobj)/ {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : [{}=N0 | {}=N2] >/nmod:than|conj:vs.|conj:versus/ {}=N3

Cond\_5 : {}=N1 >amod {tag:/(JJ|JJR|VBN)/}=N4

Action\_1 : N4 >> arg0\_cmp >> N1

Action\_2 : N4 >> arg1\_cmp >> N2

Action\_3 : N4 >> arg2\_cmp >> N3

####Comparison 2''\_1: Higher of X found in Y versus Z; Higher of X in Y found versus Z####

RuleID : cmp3\_vs\_1

Cond\_1 : {word:/(found|noted|detected|observed|discovered|occurred|occur|occurs)/}=N0

Cond\_2 : {}=N0 >/(nsubjpass|dobj)/ {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : {}=N2 !> /cc/ {word:/(versus|vs.)/}

Cond\_5 : {}=N0 >/nmod:in/ ({}=N3 > /cc/ {word:/(versus|vs.)/})

Cond\_6 : {}=N1 >amod {tag:/(JJ|JJR|VBN)/}=N4

Action\_1 : N4 >> arg0\_cmp >> N1

Action\_2 : N4 >> arg1\_cmp >> N3

Action\_3 : N4 >> arg2\_cmp >> N2

####Comparison 3'': Higher of X found in Y compared with|to Z; X in Y ..####

RuleID : cmp3\_compare\_1

Cond\_1 : {word:/(found|noted|detected|observed|discovered|occurred|occur|occurs)/}=N0

Cond\_2 : {}=N0 >/(nsubjpass|dobj)/ {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : [{}=N0 | {}=N2] >/(advcl|nmod):(compared\_to|compared\_with)/ {}=N3

Cond\_5 : {}=N1 >amod {tag:/(JJ|JJR|VBN)/}=N4

Action\_1 : N4 >> arg0\_cmp >> N1

Action\_2 : N4 >> arg1\_cmp >> N2

Action\_3 : N4 >> arg2\_cmp >> N3

####Comparison 4'': Higher of X found in Y compared with|to in Z; X in Y ..####

RuleID : cmp3\_compare\_2

Cond\_1 : {word:/(found|noted|detected|observed|discovered|occurred|occur|occurs)/}=N0

Cond\_2 : {}=N0 >/(nsubjpass|dobj)/ {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ {}=N2

Cond\_4 : {}=N0 > /advcl:compared/ {word:/(to|with)/}

Cond\_5 : {}=N1 >amod {tag:/(JJ|JJR|VBN)/}=N3

Cond\_9 : {}=N2 $++ {}=N4

Cond\_10 : [{}=N0 | {}=N1] >/nmod:in/ {}=N4

Action\_1 : N3 >> arg0\_cmp >> N1

Action\_2 : N3 >> arg1\_cmp >> N2

Action\_2 : N3 >> arg2\_cmp >> N4

####Comparison 5'': Higher of X found in Y when compared with|to Z; X in Y ..; Higher of X found in Y in cmp to Z####

RuleID : cmp3\_compare\_3

Cond\_1 : {word:/(found|noted|detected|observed|discovered|occurred|occur|occurs)/}=N0

Cond\_2 : {}=N0 >/(nsubjpass|dobj)/ {}=N1

Cond\_3 : [{}=N0 | {}=N1] >/nmod:in/ !{word:/(compared|comparison)/}=N2

Cond\_4 : {}=N0 >/(advcl|dep|nmod:in|nmod\_acl:in)/ {word:/(compared|comparison)/}=N4

Cond\_5 : {}=N4 >/(nmod:in|nmod:with|nmod:to)/ {}=N3

Cond\_5 : {}=N1 >amod {tag:/(JJ|JJR|VBN)/}=N5

Action\_1 : N5 >> arg0\_cmp >> N1

Action\_2 : N5 >> arg1\_cmp >> N2

Action\_3 : N5 >> arg2\_cmp >> N3

####Comparison 2.1: Y VB.\* JJR X than/compared Z

RuleID : cmp\_VBD\_JJR\_1

Cond\_1 : {tag:/VBD/}=N0

Cond\_2 : {}=N0 >nsubj {}=N1

Cond\_3 : {}=N0 >/dobj/ {}=N2

Cond\_4 : {}=N2 >amod {tag:JJR}=N3

Cond\_5 : [{}=N2 | {}=N0 | {}=N1] >/nmod:than|(advcl|acl|nmod):compared\_(to|with)/ {}=N4

Action\_1 : N3 >> arg0\_cmp >> N2

Action\_2 : N3 >> arg1\_cmp >> N1

Action\_3 : N3 >> arg2\_cmp >> N4

####arg\_cmp that/those propagation####

RuleID : comparisonPropagation1

Cond\_1 : {}=N0 >/arg.\*\_cmp/=R1 {word:/(that|those)/}=N1

Cond\_2 : {}=N1 >/nmod:in/ {}=N2

Action\_1 : N0 >> R1\_prop >> N2

**TYPE B PATTERNS**

####arg0\_exp or arg0\_fnd points to the expressed aspect

####arg1\_exp or arg0\_exp points to the expressed location

####X is expressed in Y#####

RuleID : expressionIn\_1

Cond\_1 : {pos:VBN;lemma:/.\*(increase|decrease|express|silence|reduce|elevate|change|regulate)/}=N0

Cond\_2 : {}=N0 >/(nsubjpass|nsubj\_null)/ {}=N1

Cond\_3 : {}=N0 >/nmod:in/ {}=N2

Cond\_10 : {}=N0 !>/.\*\_cmp/ {}

Action\_1 : N0 >> arg0\_exp >> N1

Action\_2 : N0 >> arg1\_exp >> N2

####X is expressed in Y#####

RuleID : expressionIn\_2

Cond\_1 : {pos:/(JJ|JJR)/;lemma:/(high|low|higher|lower)/}=N0

Cond\_2 : {}=N0 >/(nsubj|nsubj\_null)/ {}=N1

Cond\_3 : {}=N0 >/nmod:in/ {}=N2

Cond\_10 : {}=N0 !>/.\*\_cmp/ {}

Action\_1 : N0 >> arg0\_exp >> N1

Action\_2 : N0 >> arg1\_exp >> N2

####X is found in Y#####

RuleID : foundIn\_1

Cond\_1 : {word:/(found|noted|detected|observed|discovered|occurred|occur|occurs)/}=N0

Cond\_2 : {}=N0 >/(nsubjpass|nsubj|nsubj\_null)/ {}=N1

Cond\_3 : {}=N0 >/nmod:in/ {}=N2

Cond\_10 : {}=N0 !>/.\*\_cmp/ {}

Action\_1 : N0 >> arg0\_fnd >> N1

Action\_2 : N0 >> arg1\_fnd >> N2

####X in Y was found#####

RuleID : foundIn\_2

Cond\_1 : {word:/(found|noted|detected|observed|discovered|occurred|occur|occurs)/}=N0

Cond\_2 : {}=N0 >/(nsubjpass|nsubj\_null)/ {}=N1

Cond\_3 : {}=N1 >/nmod:in/ {}=N2

Cond\_10 : {}=N0 !>/.\*\_cmp/ {}

Action\_1 : N0 >> arg0\_fnd >> N1

Action\_2 : N0 >> arg1\_fnd >> N2

####We found X in Y#####

RuleID : foundIn\_3

Cond\_1 : {word:/(found|noted|detected|observed|discovered|occurred|occur|occurs)/}=N0

Cond\_2 : {}=N0 >/dobj/ {}=N1

Cond\_3 : {}=N1 >/nmod:in/ {}=N2

Cond\_10 : {}=N0 !>/.\*\_cmp/ {}

Action\_1 : N0 >> arg0\_fnd >> N1

Action\_2 : N0 >> arg1\_fnd >> N2

####High X is found in Y#####

RuleID : EXPfoundIn\_1

Cond\_1 : {word:/(found|noted|detected|observed|discovered|occurred|occur|occurs)/}=N0

Cond\_2 : {}=N0 >/(nsubjpass|nsubj|nsubj\_null)/ {}=N1

Cond\_3 : {}=N0 >/nmod:in/ {}=N2

Cond\_4 : {}=N1 >amod {tag:/(JJ|JJR|VBN)/}=N3

Cond\_10 : {}=N3 !>/.\*\_cmp/ {}

Action\_1 : N3 >> arg0\_exp >> N1

Action\_2 : N3 >> arg1\_exp >> N2

####High X in Y was found#####

RuleID : EXPfoundIn\_2

Cond\_1 : {word:/(found|noted|detected|observed|discovered|occurred|occur|occurs)/}=N0

Cond\_2 : {}=N0 >/(nsubjpass|nsubj\_null)/ {}=N1

Cond\_3 : {}=N1 >/nmod:in/ {}=N2

Cond\_4 : {}=N1 >amod {tag:/(JJ|JJR|VBN)/}=N3

Cond\_10 : {}=N3 !>/.\*\_cmp/ {}

Action\_1 : N3 >> arg0\_exp >> N1

Action\_2 : N3 >> arg1\_exp >> N2

####We found high X in Y#####

RuleID : EXPfoundIn\_3

Cond\_1 : {word:/(found|noted|detected|observed|discovered|occurred|occur|occurs)/}=N0

Cond\_2 : {}=N0 >/dobj/ {}=N1

Cond\_3 : {}=N1 >/nmod:in/ {}=N2

Cond\_4 : {}=N1 >amod {tag:/(JJ|JJR|VBN)/}=N3

Cond\_10 : {}=N3 !>/.\*\_cmp/ {}

Action\_1 : N3 >> arg0\_exp >> N1

Action\_2 : N3 >> arg1\_exp >> N2