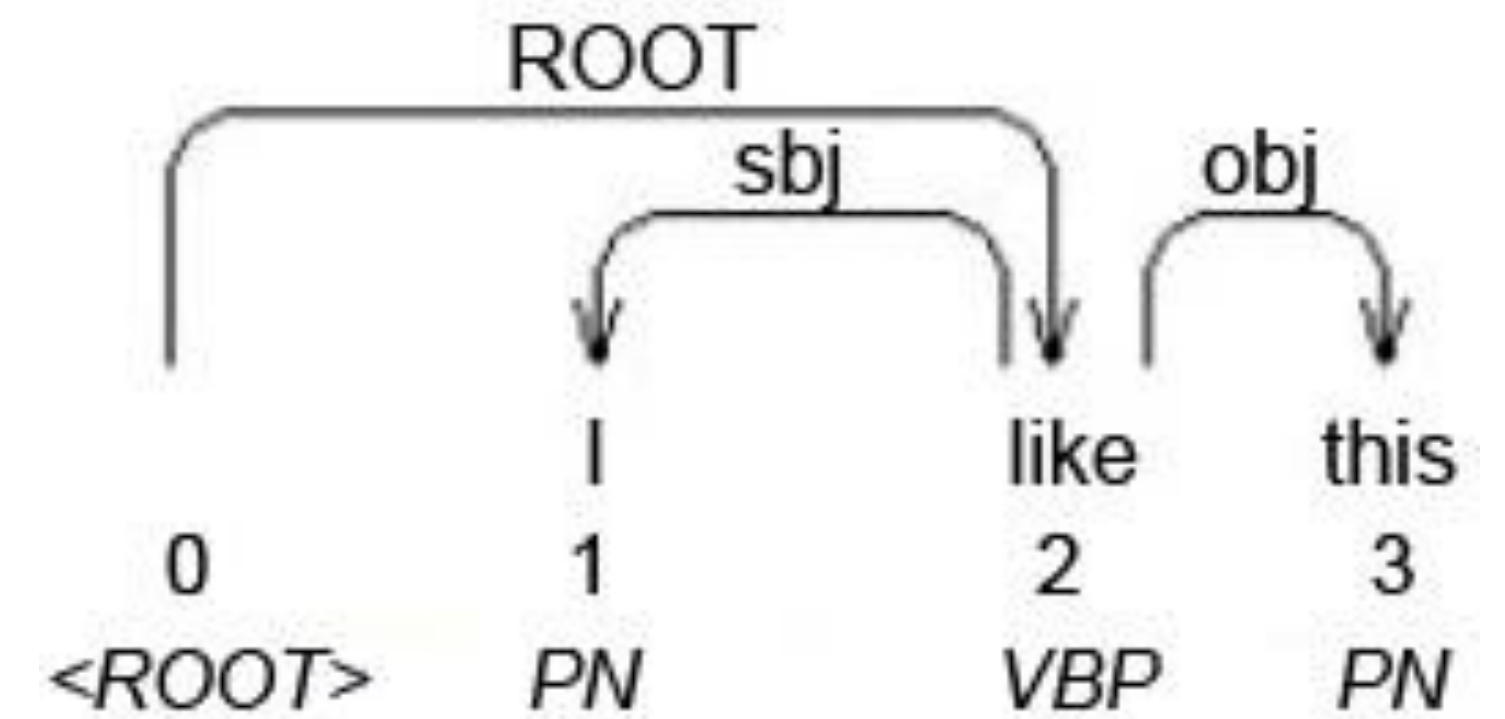
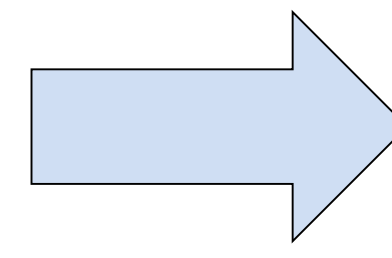


Hyperbolic Dependency Tree Visualization for Parser Evaluation

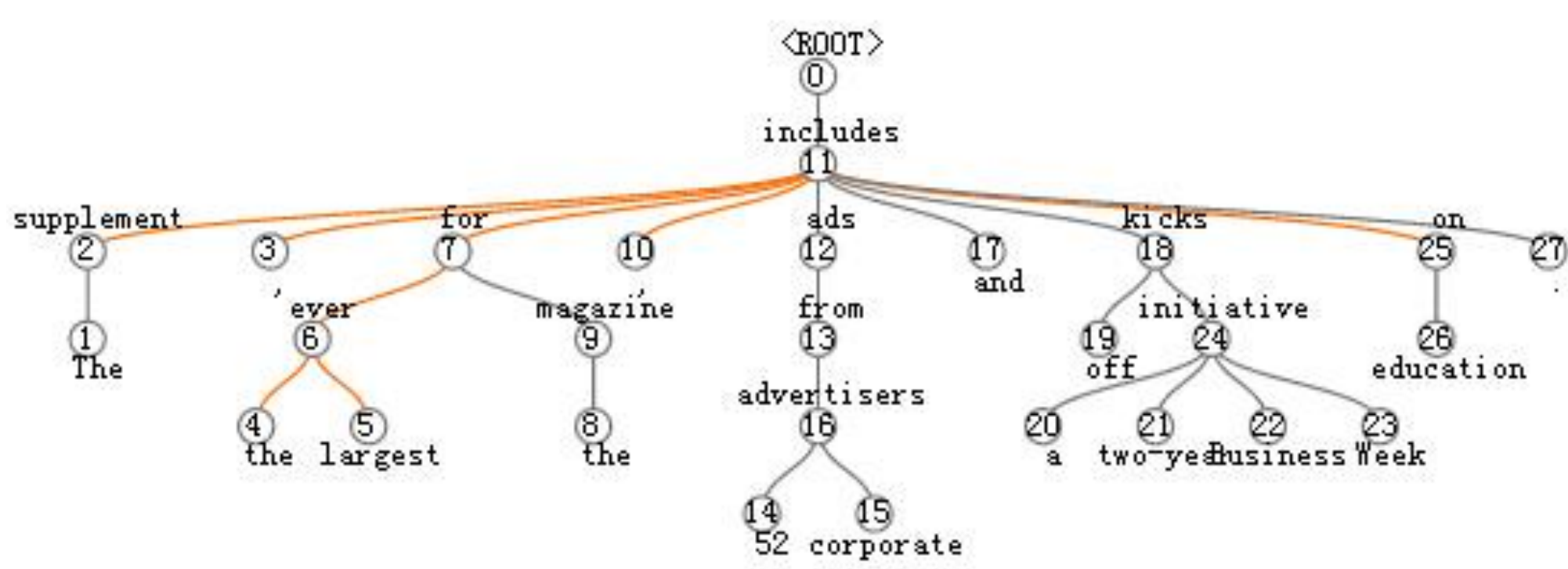
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Background

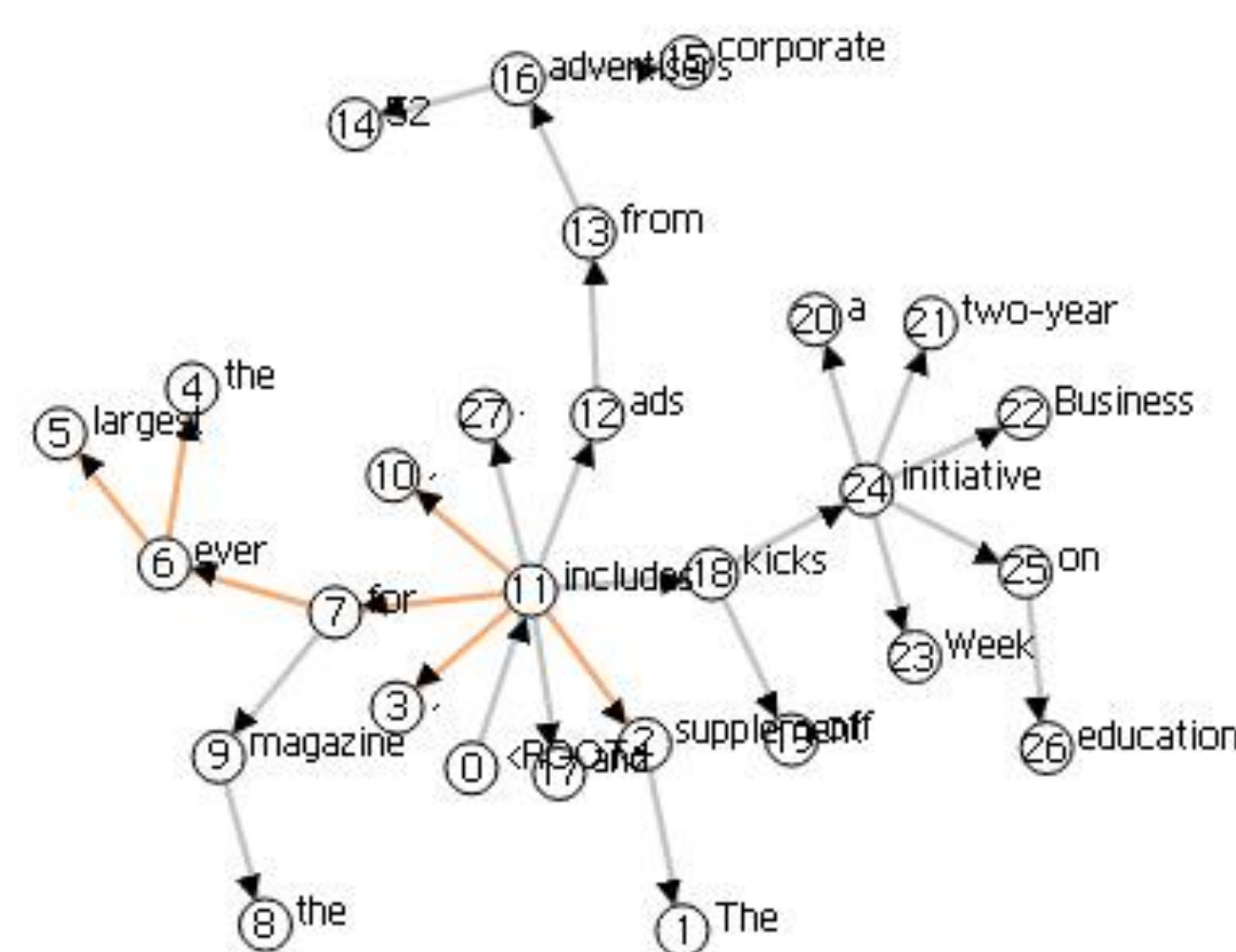
Dependency grammar models the structure of a sentence based on dependency relations.



Limitation of Existing Layouts



Hierarchical Layout: poor space efficiency



Force-directed
Layout: implicit
tree structure

System and Visual Design

(a) Index panel :

List sentences by the type of parsing errors

(b) Top panel :

Display the dependency trees in a traditional flat view

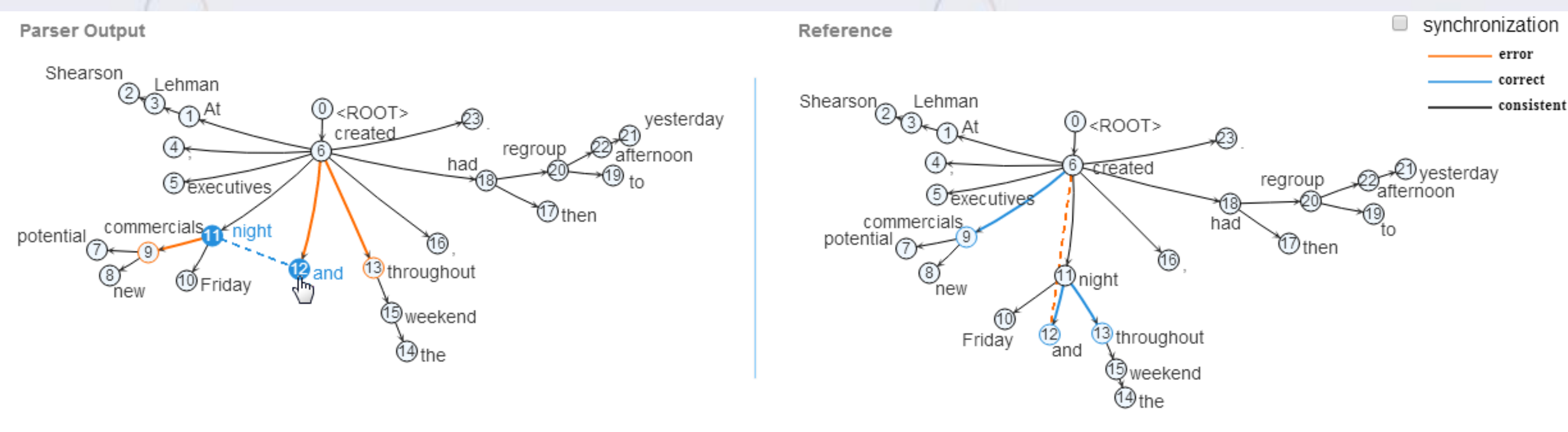
(c) Bottom panel :

Display the dependency trees using hyperbolic views

The screenshot shows the system interface with three main panels:

- Index Panel (a):** A table with columns 'Order', 'POS', 'Label', and 'Word'. It lists various POS tags and their instance counts, such as 'IN (698 instances)', 'NN (440 instances)', 'NNP (233 instances)', etc.
- Flat View (b):** A dependency tree for the sentence 'The supplement, the largest ever for the magazine, includes ads from 52 corporate advertisers and kicks off a two-year Business Week initiative on education.' The root node is 'includes' (index 11). The tree is shown in a flat, hierarchical structure with various dependency labels like 'SUB', 'P', 'VMOD', 'NMOD', 'OBJ', 'PMOD'.
- Hyperbolic View (c):** A hyperbolic dependency tree for the same sentence. The root node is 'includes' (index 11). The nodes are arranged in a hyperbolic space, making the tree more compact and easier to read. A legend indicates synchronization (grey square), error (red line), correct (blue line), and consistent (black line).

Parsing Error Comparative Visualization



Mouse-hover on the node "and" (index 12 in the left figure), the correct dependency relationship, ("night" → "and") is shown by a dotted blue edge. At the same time, in the reference view (right figure), the erroneous dependency relationship ("created" → "and") is displayed by a dotted red edge.