Automatic Annotation Synchronizing with Textual Description for Visualization

Chufan Lai, Zhixian Lin, Ruike Jiang, Yun Han, Can Liu, Xiaoru Yuan

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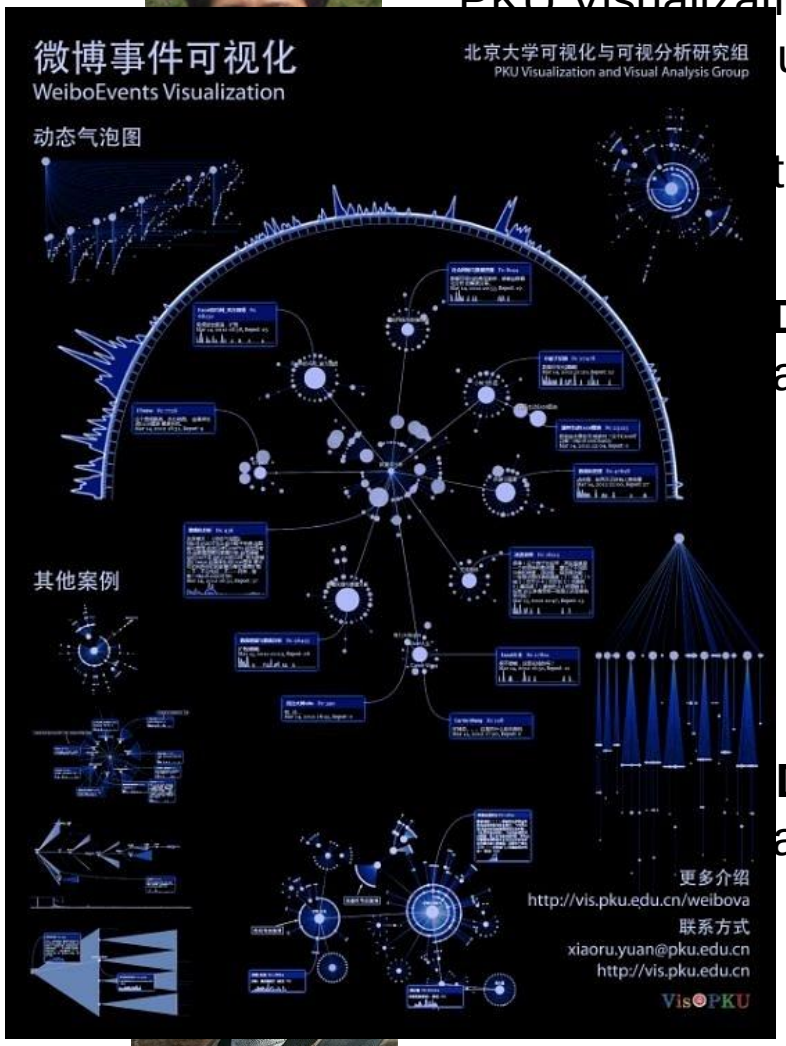
Xiaoru Yuan, Department of Intelligent Science and Technology, Peking University.
PKU Visualization and Visual Analytics Group

ualization, Computer Graphics, Interaction Design, High-dimensional data




疫情晴雨表


疫情晴雨表（城市版）


疫情晴雨表（世界版）

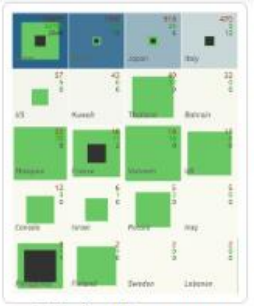

疫情晴雨表（境外输入）

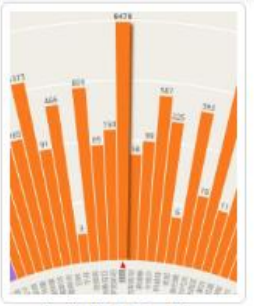

全国疫情态势


零增长地图


全国疫情态势


疫情方寸间


疫情方寸间（国际版）

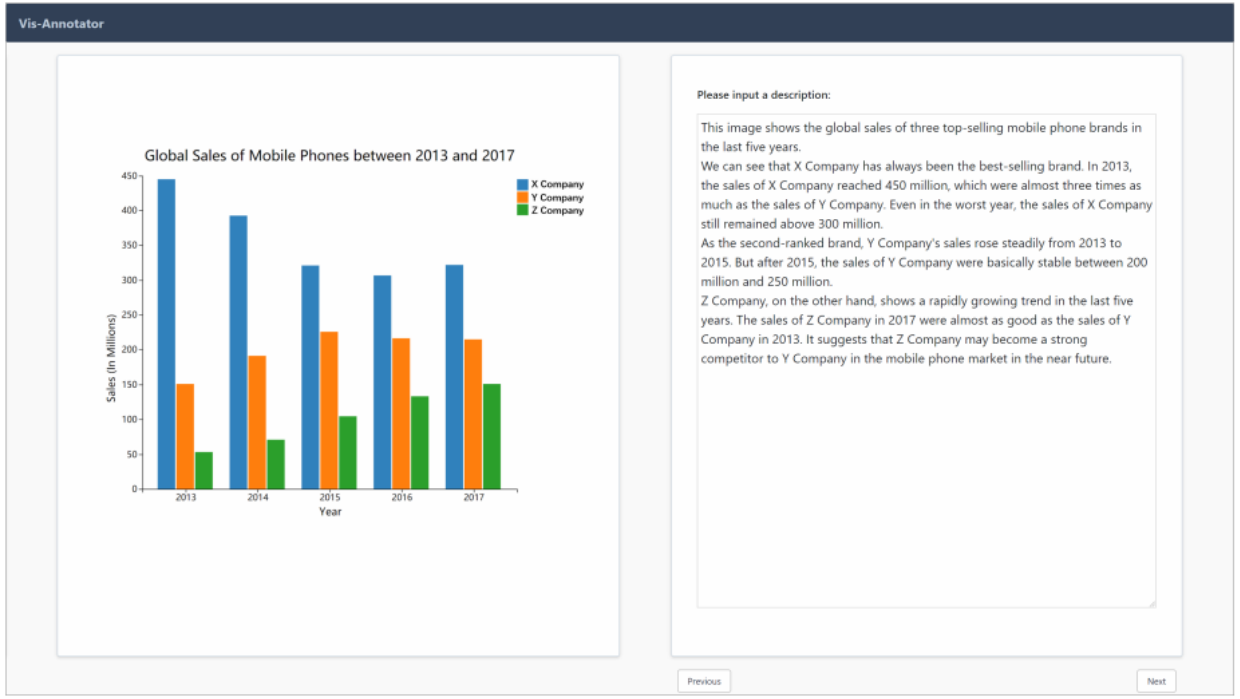

全球疫情态势图

Ruike Jiang, Department of Intelligent Science and Technology, Peking University.
PKU Visualization and Visual Analytics Group.

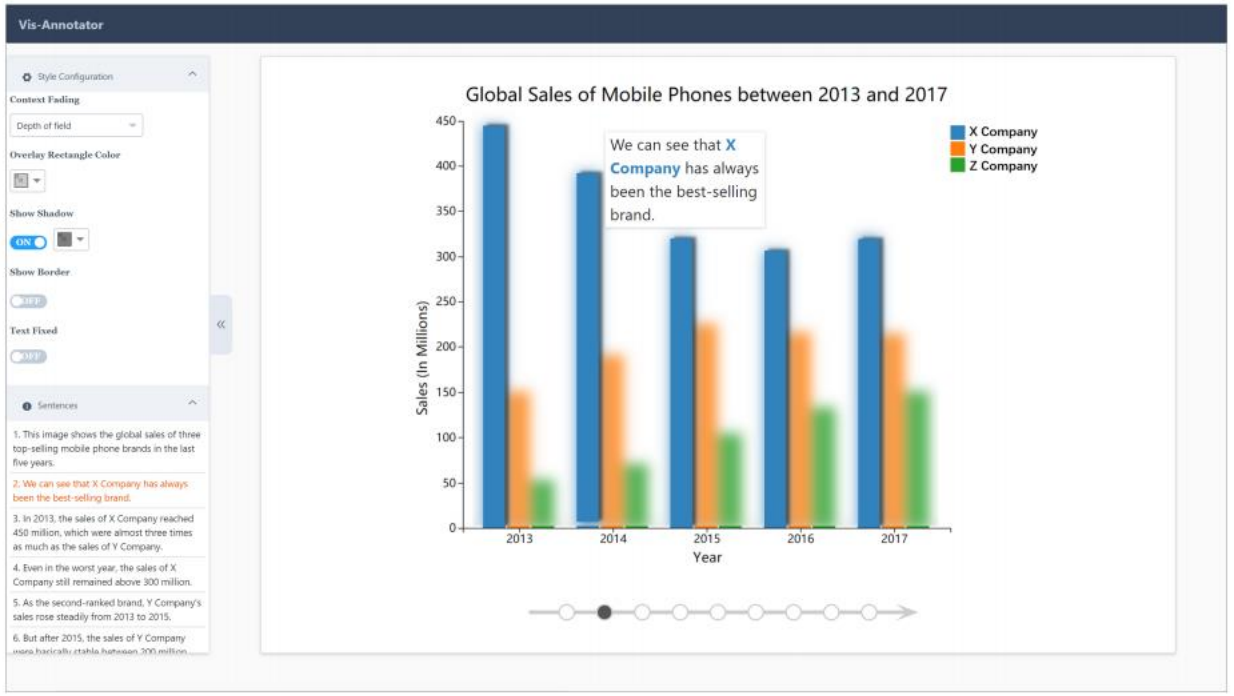
Yun Han, Department of Intelligent Science and Technology, Peking University.
PKU Visualization and Visual Analytics Group.

Can Liu, Department of Intelligent Science and Technology,Peking University.
PKU Visualization and Visual Analytics Group.

Vis-Annotator



(a) Upload



(b) Fine-Tune

https://www.youtube.com/watch?v=9SkGmdW4y-o

https://vimeo.com/361162531

Motivation

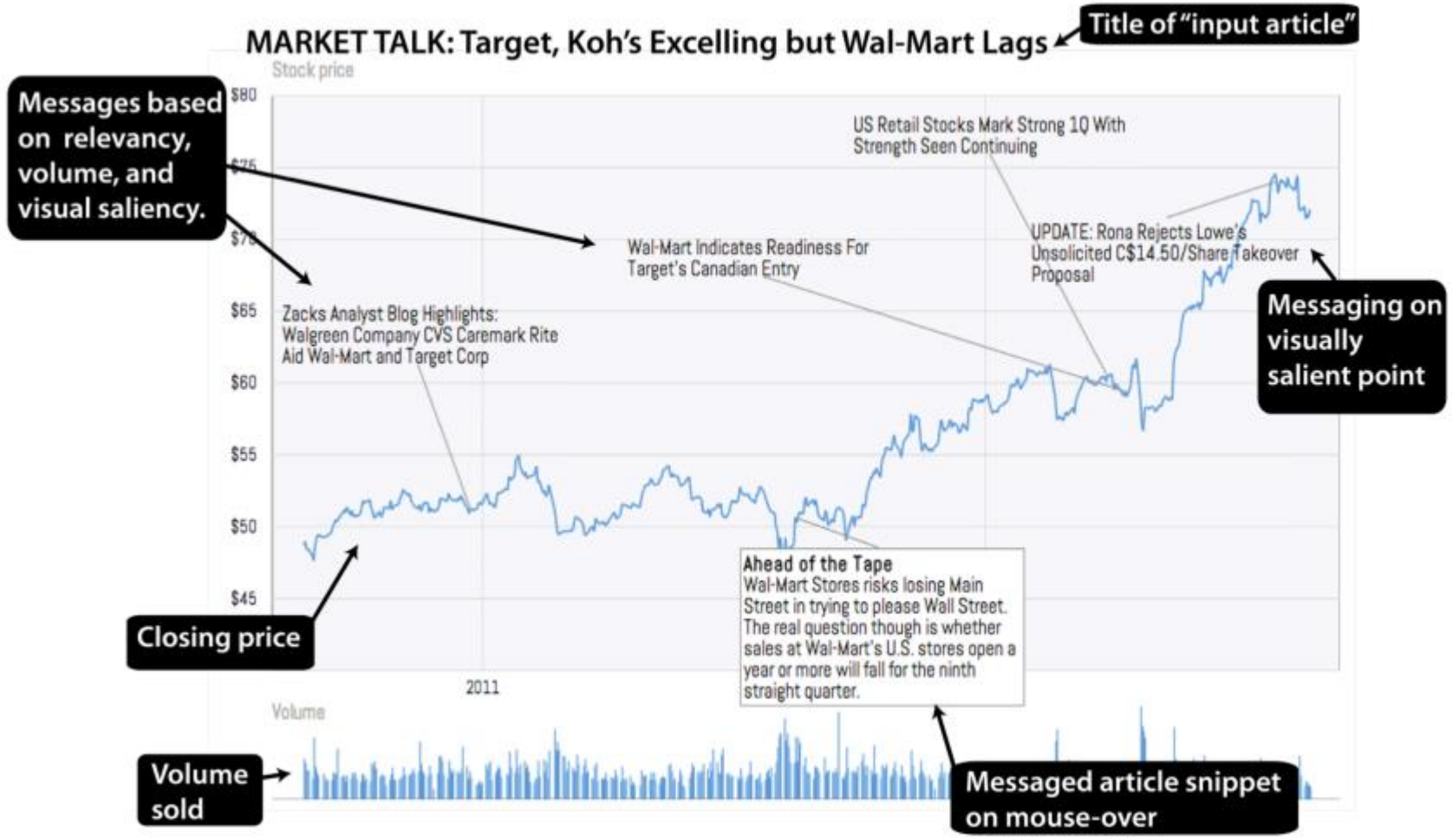
- As the visualization becomes more complicated, it becomes boring and time-consuming for audiences to understand descriptions of a visualization.

- Due to limited short-term memory, the audiences must frequently switch between the description and the image.

- Automatic annotation can free the presenter's work.

Related Work

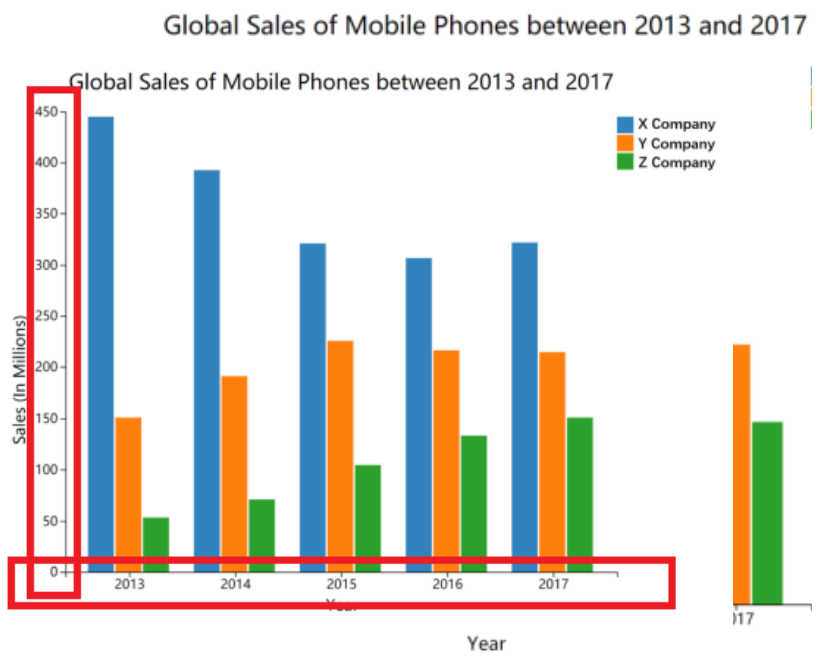
- An
- Au
  - O
- Ex
  - R
- Na
  - Ge

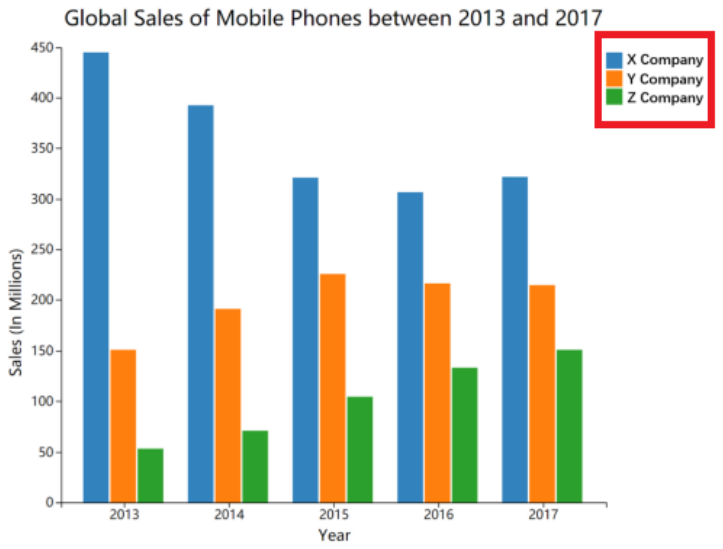


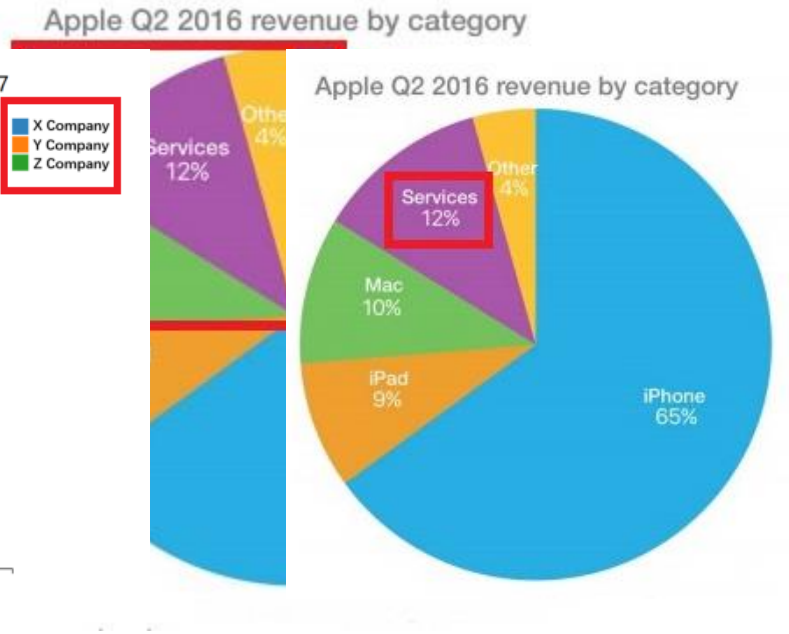
ation.

Data Entity: rectangles, circles, and sectors

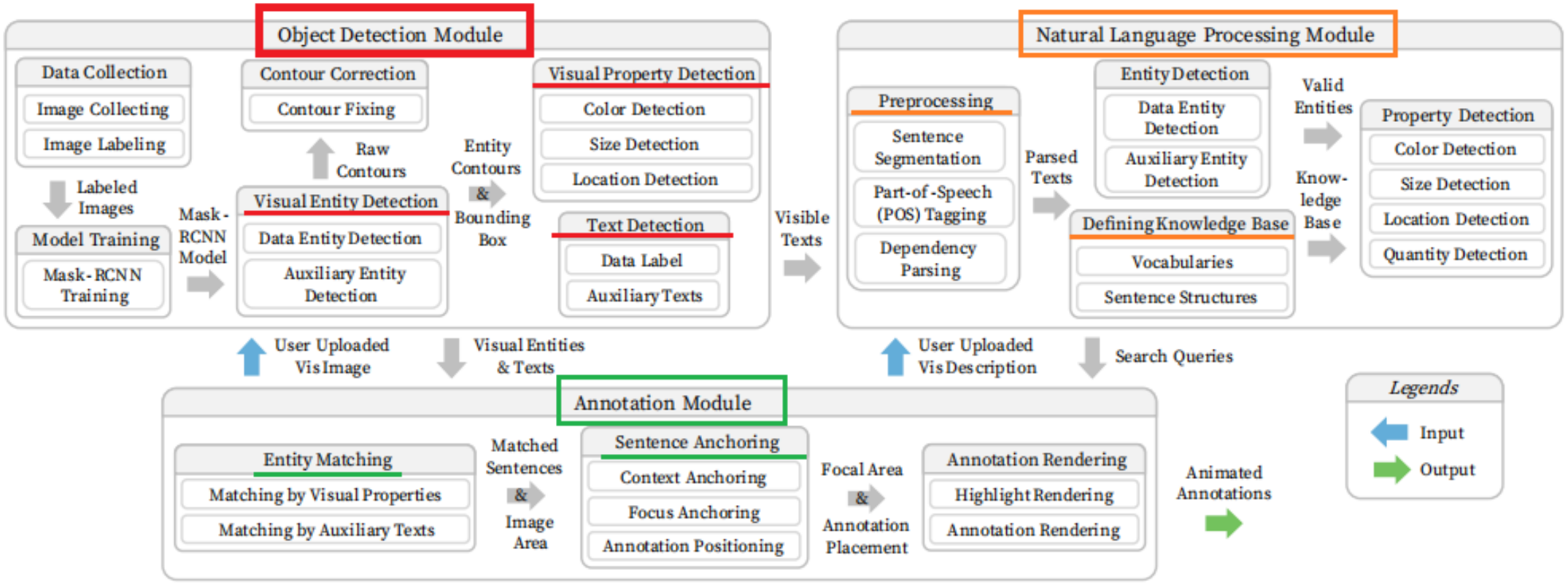
Auxiliary Entity: axes, legneds, and data labels







Three Major Modules



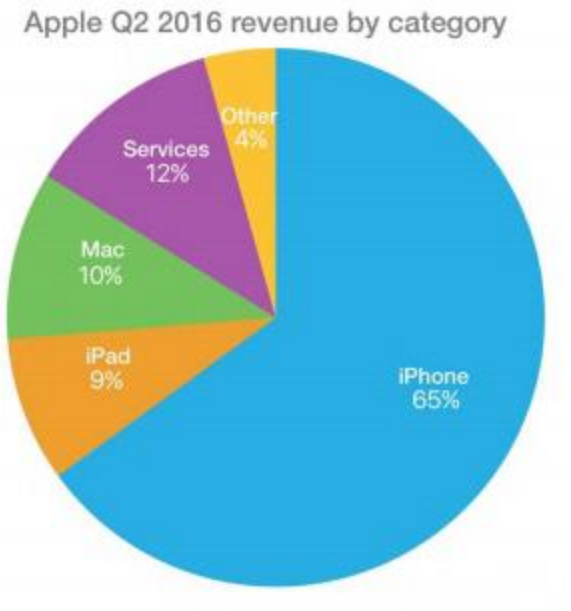
Object Detection Module(OD)

- Visual Entity Detection

Mask R-CNN

Object Detection Module(OD)

- Visual Entity Detection



Corpus Collecting

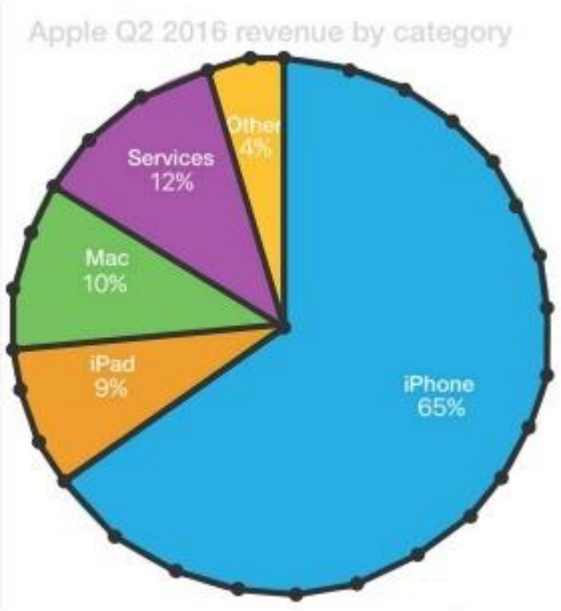
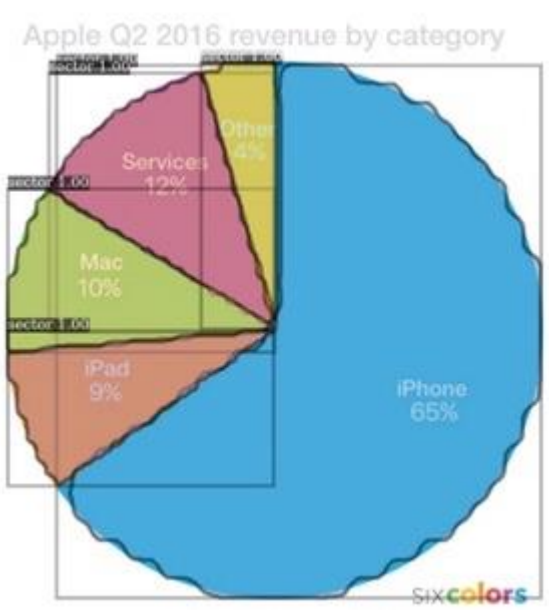
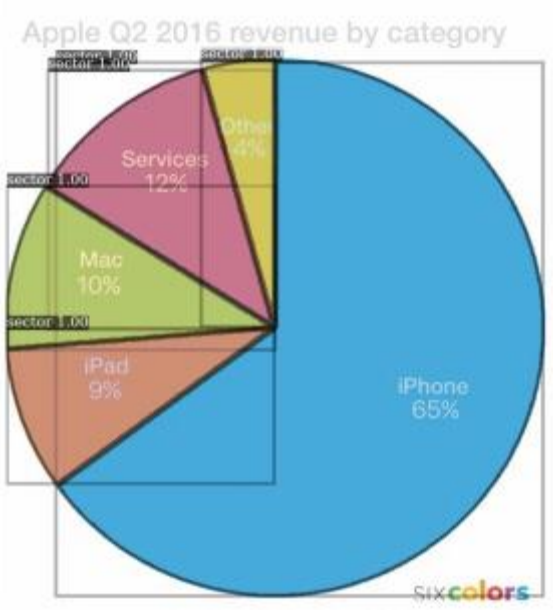


Image Labeling



Model Training



Contour Correction

Object Detection Module(OD)

- Visual Property Detection

Color Detection	Size Detection	Location Detection
HSV color space ——> 11 colors(• • • • • • •)	area, X-range, and Y-range	the position of centroid

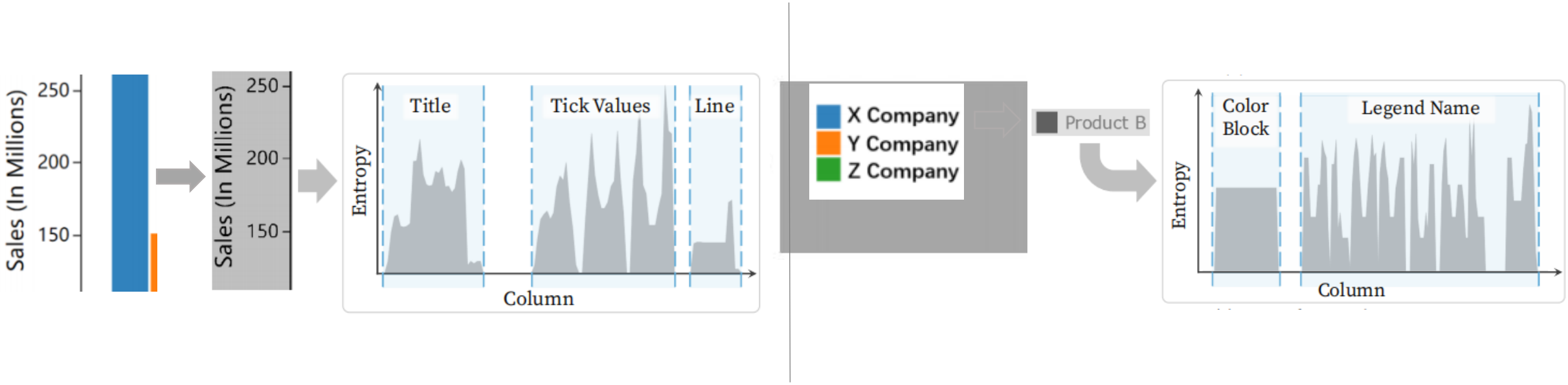
Object Detection Module(OD)

- Text Detection(Tesseract-OCR)

Data Lables

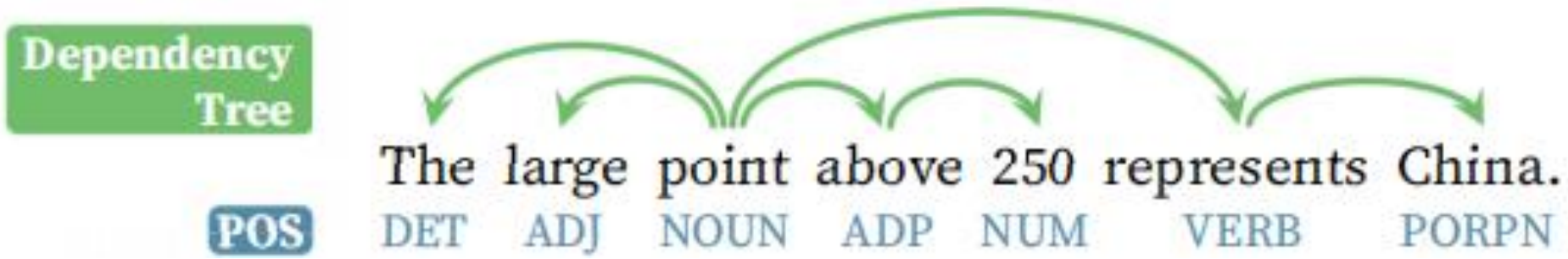
Axes

Legends



Natural Language Processing Module(NLP)

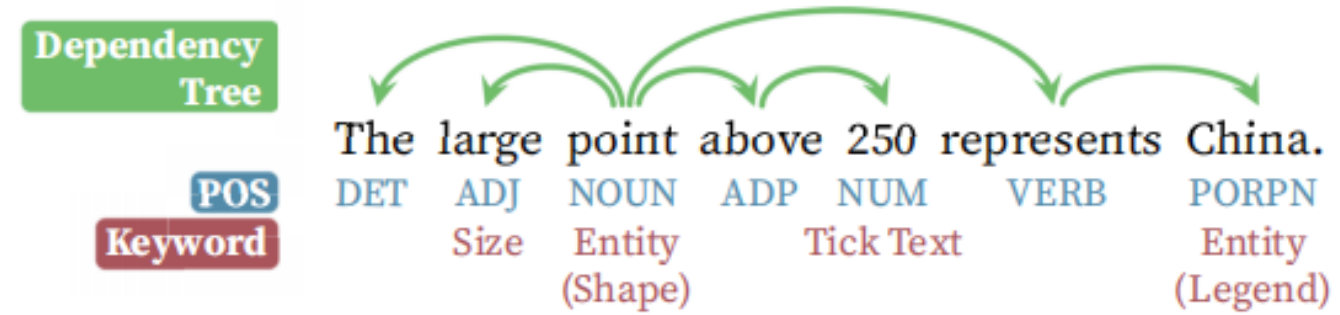
- Processing(SpaCy)



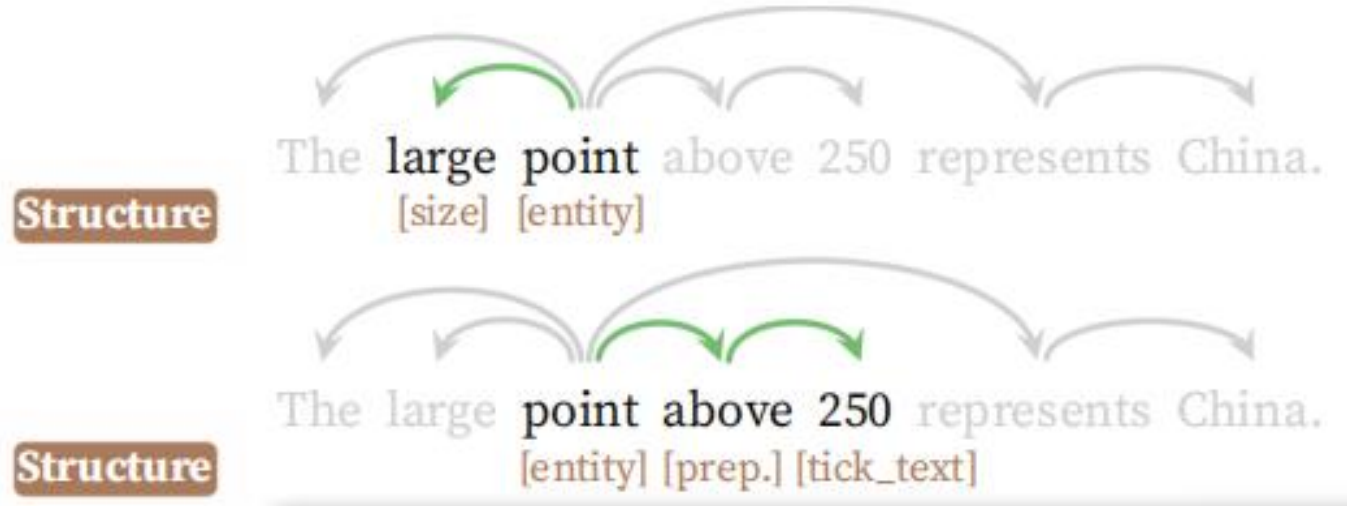
Natural Language Processing Module(NLP)

- Defining Knowledge Base
  standard vocabulary, synonyms vocabulary, structure library

(a)



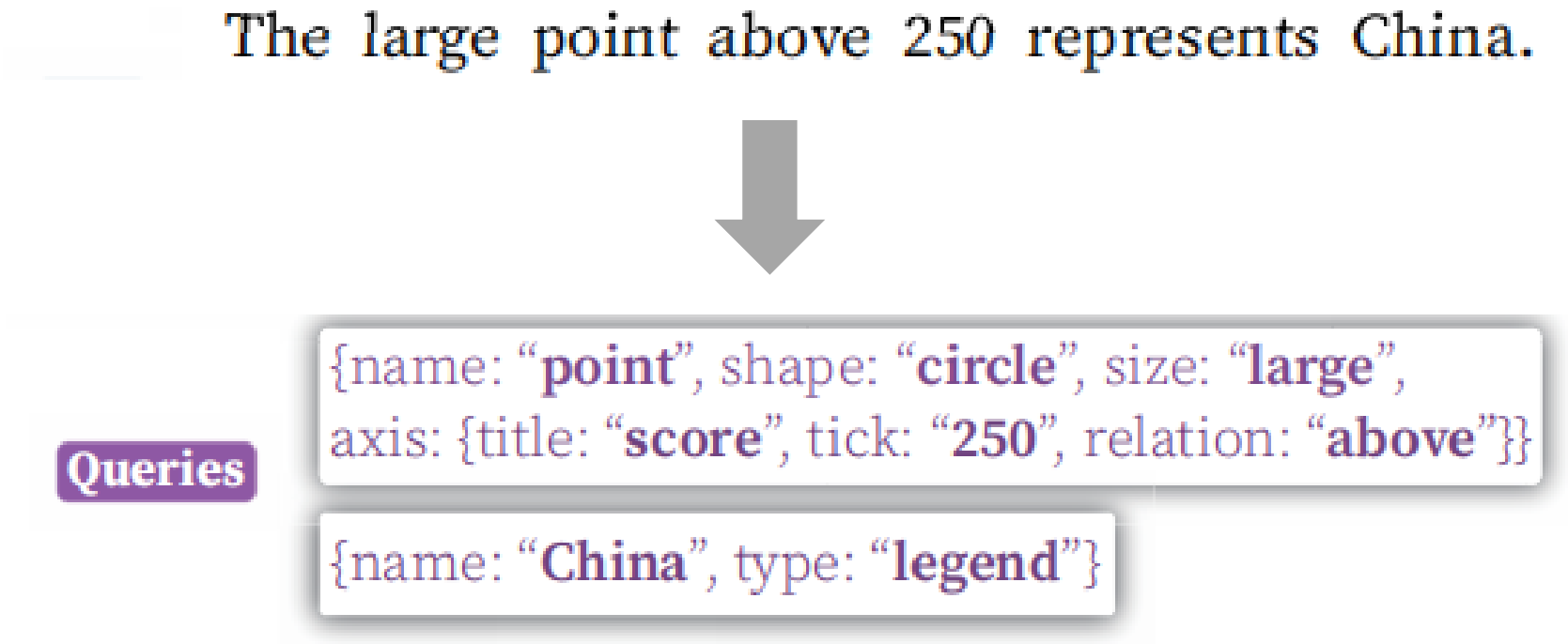
(b)



"the red point"
"the point in red"

Natural Language Processing Module(NLP)

- Entity Detection



Natural Language Processing Module(NLP)

- Property Detection

“red”, “orange”, “brown”, “yellow”....

“large”, “small”, “long”....

“middle”, “top”, “bottom”....

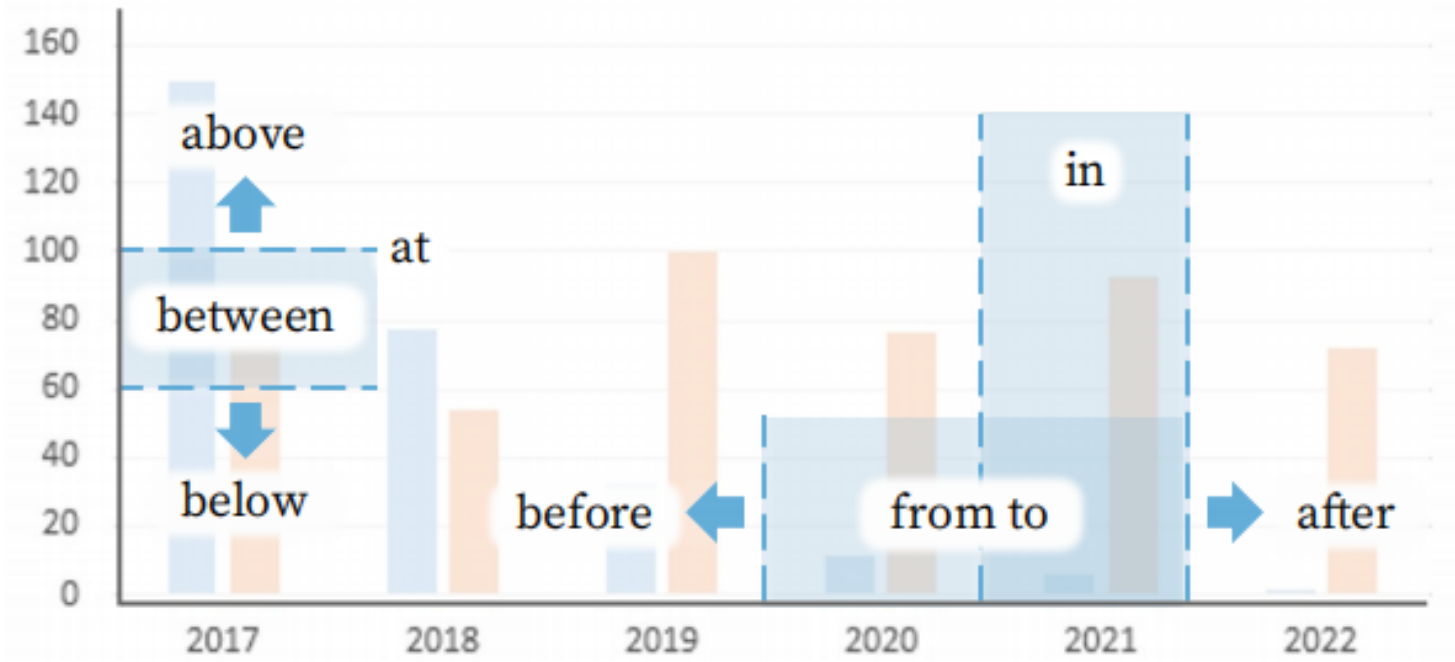
Annotation

- Entity Matching(shape, a data label, or a legend name(NLP))

Matching by Visual Properties
(Color / Size / Location Matching)

“sector”

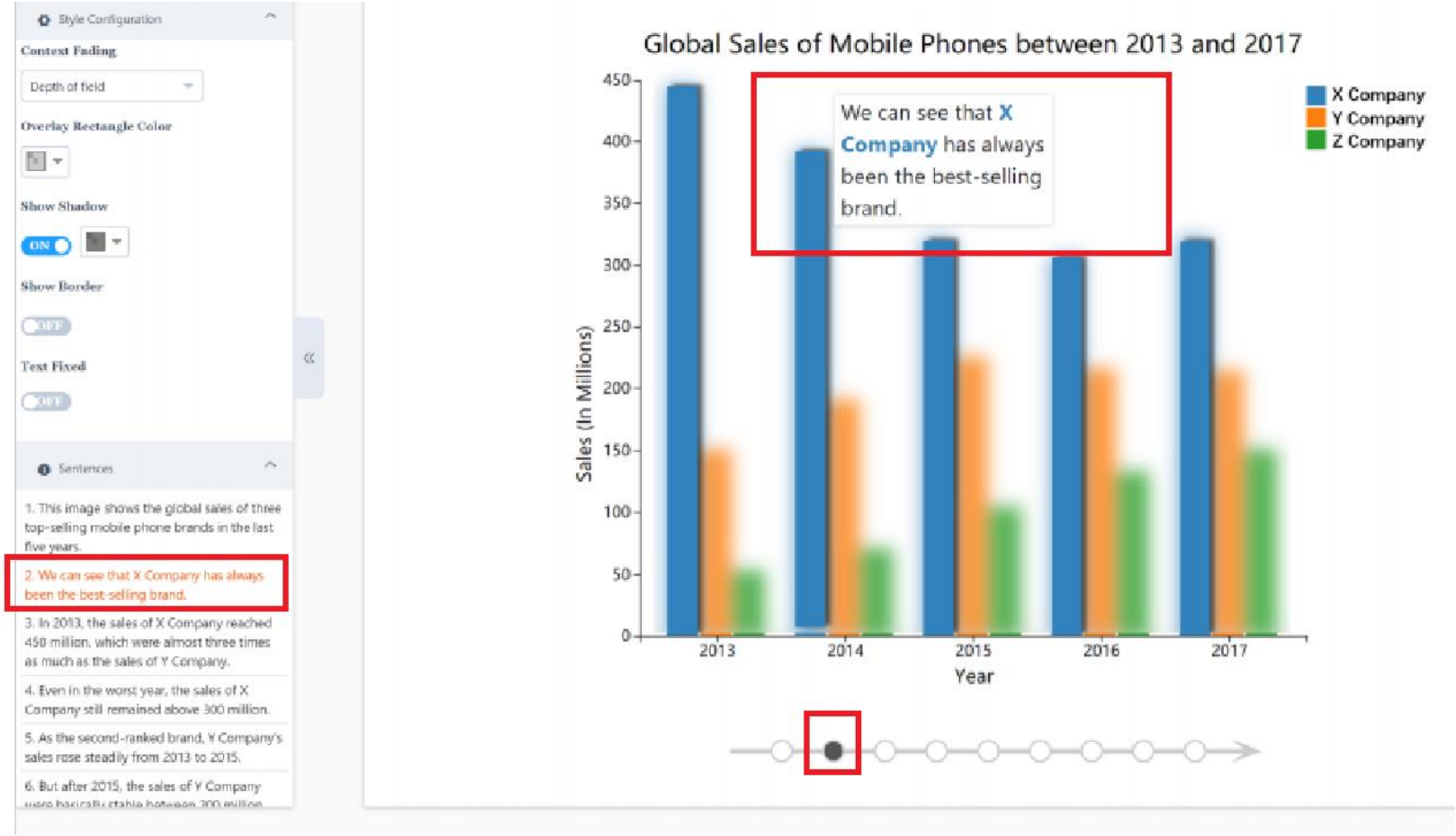
Matching by Auxiliary Texts
(Data labels / Legend / Axis Matching)



"below 2014" (numerical) vs. "before 2014" (ordinal)

Annotation

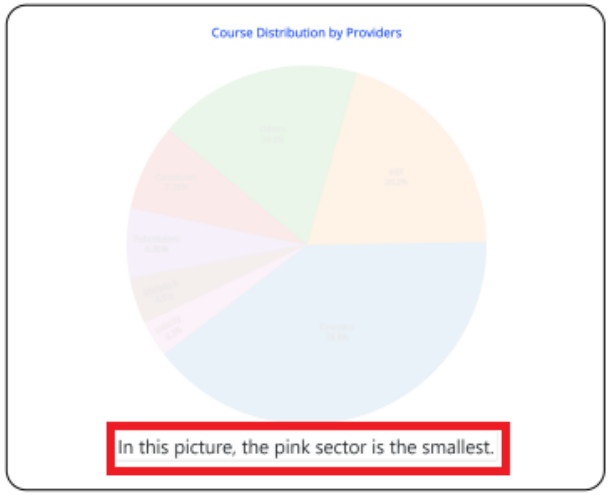
- Sentence Anchoring (collision detection)
- Annotation Rendering



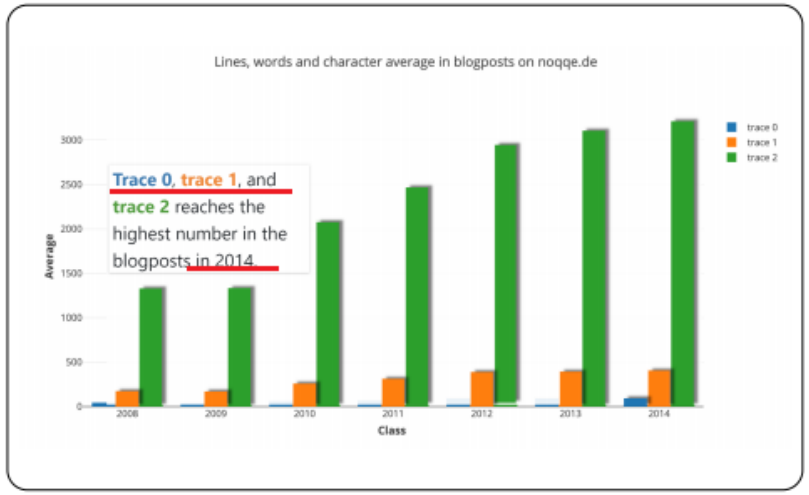
Evaluation

- C
- C
- N

(1)
(2)



(a)



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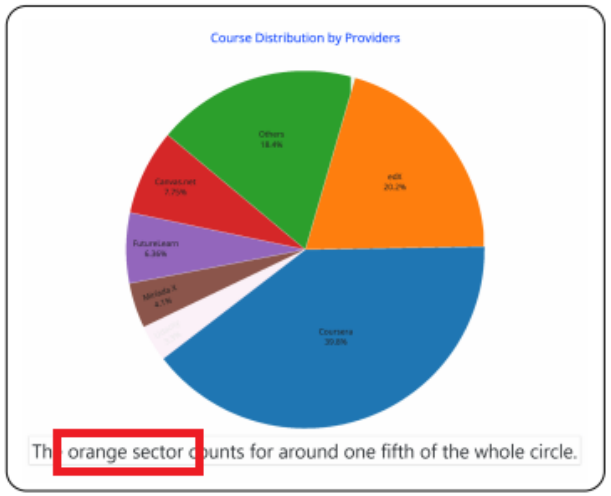

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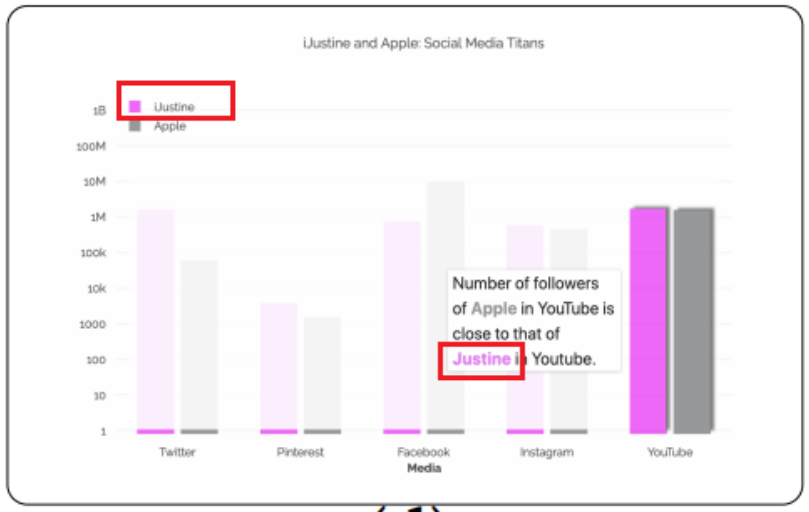

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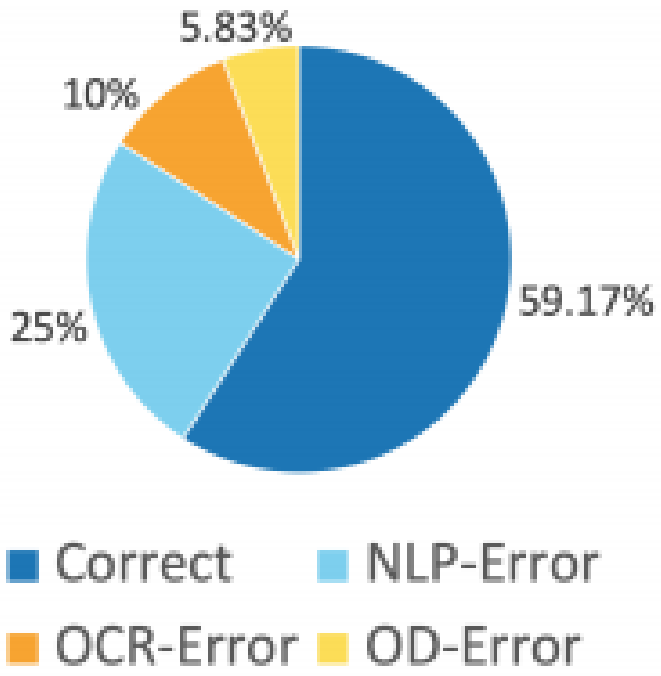

Pros

1.Automatic annotation is a new research perspective and cut-in point.

2.There is not much knowledge in other fields.

3.Point out the reason of automatic annotation error.

Cons

Automatic annotation has limitations in more complex visualizations.

Thanks!