

Temporally-oriented possession: **A corpus for tracking possession over time**

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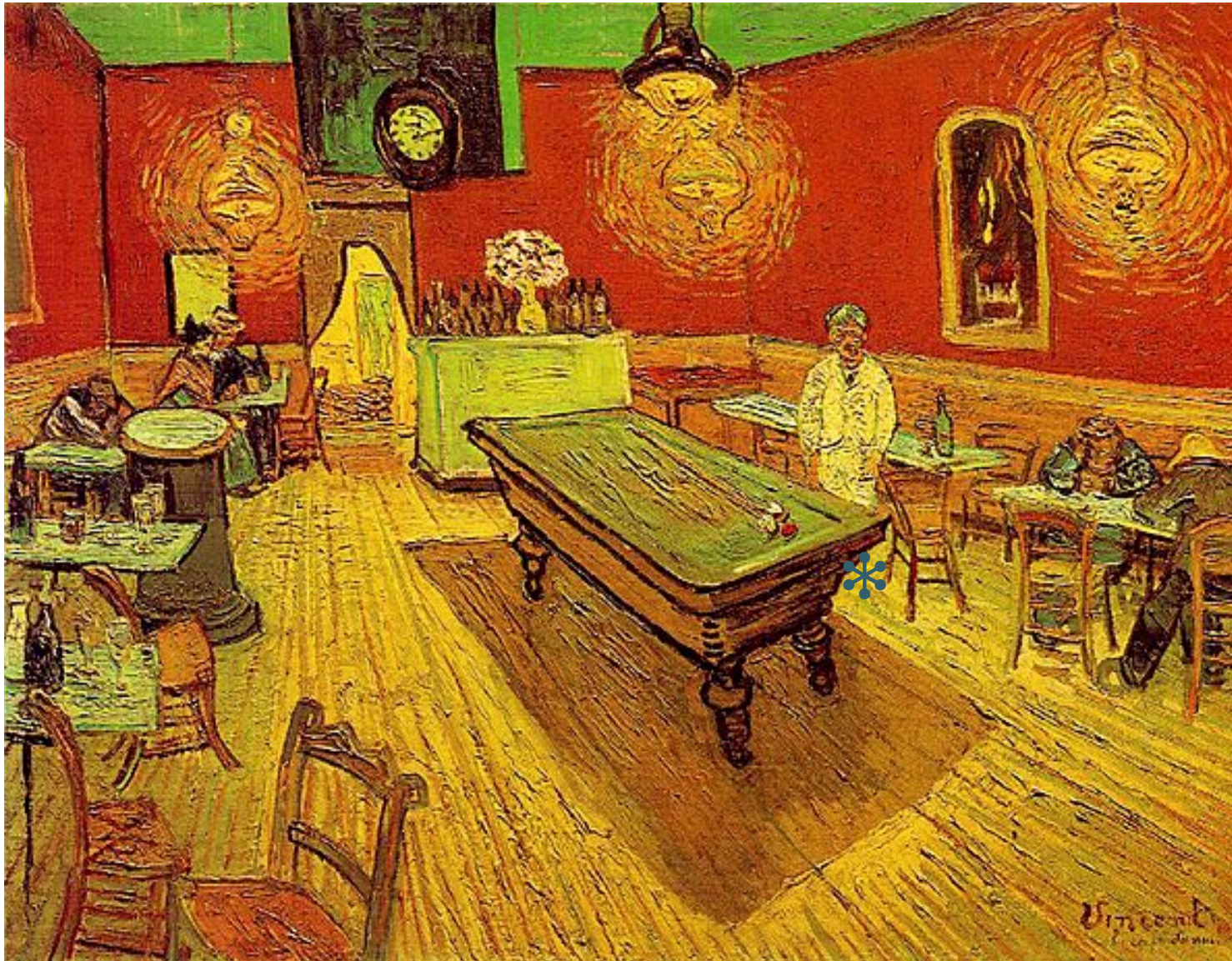


Eduardo Blanco



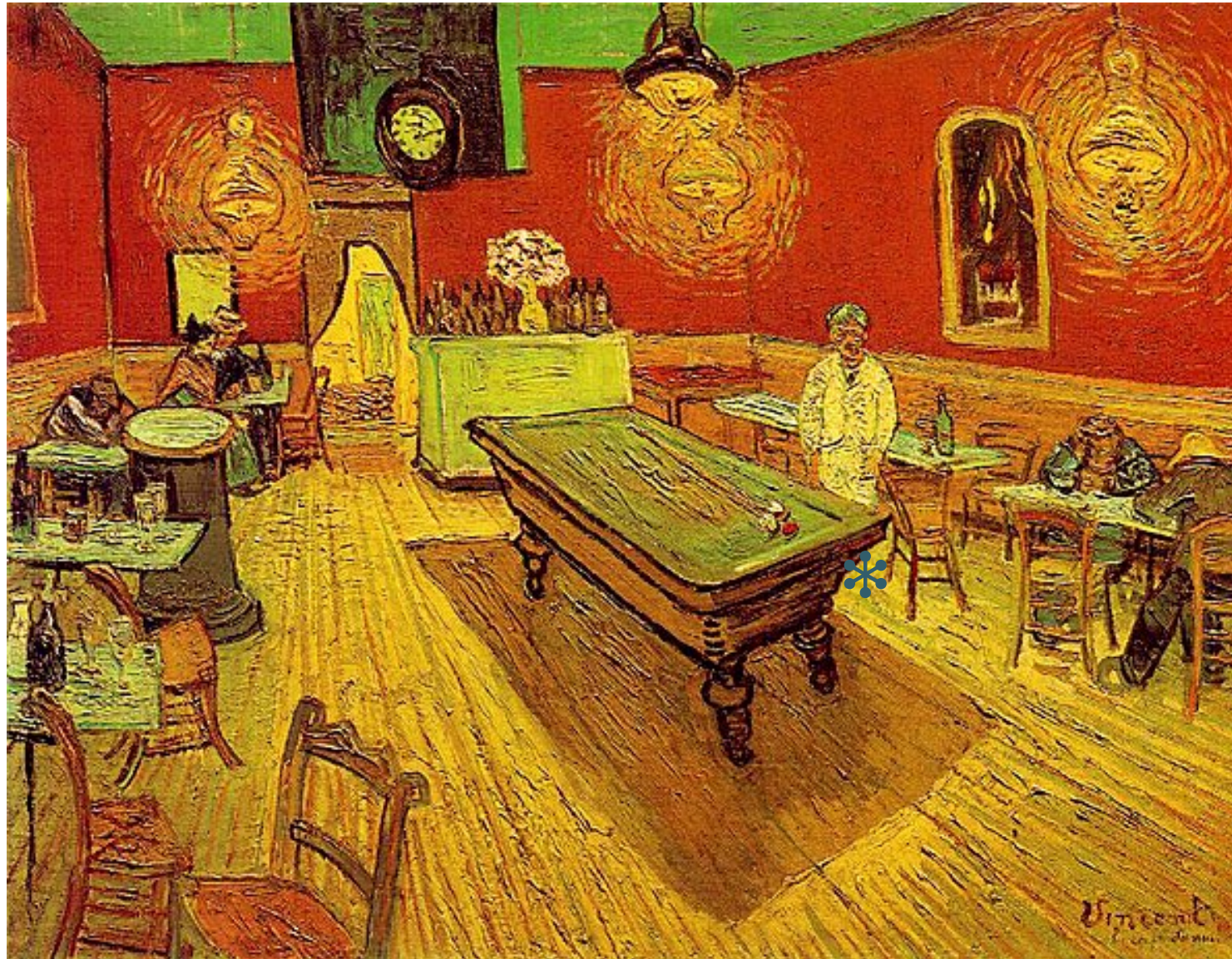
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OF NORTH TEXAS
EST. 1890

Motivation: Possession Timelines



The Night Café, van Gogh (1888)

Motivation: Possession Timelines



1888: van Gogh
creates painting

Ivan Morozov has
painting in Moscow

1930: held by
Soviet authorities

Stephen Carlton
Clark

Now: Yale, New
Haven, CT

The Night Café, van Gogh (1888)

Motivation: Extract timelines from text

The Night Café

Wikipedia

The Night Café ([French](#): *Le Café de nuit*) is an oil painting created by Dutch artist [Vincent van Gogh](#) September 1888 in [Arles](#).^[1] Its title is inscribed lower right beneath the signature. The painting is owned by [Yale University](#) and is currently held at the [Yale University Art Gallery](#) in [New Haven, Connecticut](#).

The interior depicted is the *Café de la Gare*, 30 Place Lamartine, run by Joseph-Michel Ginoux and his wife Marie, who in November 1888 posed for Van Gogh's and Gauguin's *Arlésienne*; a bit later, Joseph Ginoux evidently posed for both artists, too.

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...

- 1888: van Gogh creates painting
- Now: Yale, New Haven, CT



This work

- 90 Wikipedia articles about well-known artifacts
- Annotated for possession relationships, temporal information related to possession, and certainty
- Annotation process requires inference and reasoning - these are very human annotations
- Goal: better understanding of strategies for automating extraction of possession timelines

Previous computational work on possession

- Semantic relation extraction from (canonical) English possessives [Tratz and Hovy 2013]
- Extraction of possession relations from English noun compounds [Nakov and Hearst 2013, Tratz and Hovy 2010]
- Annotation of English genitives with adpositional supersenses [Blodgett and Schneider 2018]
- Extraction of possession relations from blog posts [Banea et al. 2016]
- Syntactically-conditioned extraction of possession relations from OntoNotes [Chinnappa and Blanco 2018a]

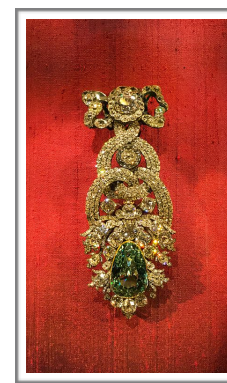
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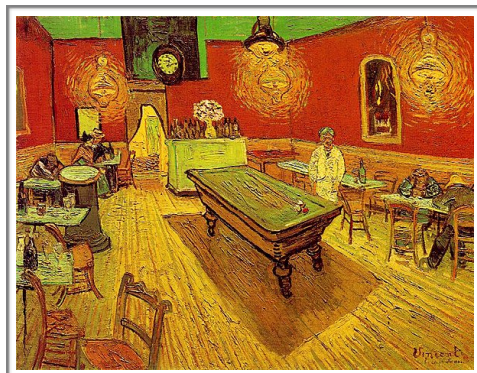
What kinds of possessions do we address?

- Only alienable and control possession
[Aikhenvald and Dixon 2012, Tham 2004, Heine 1997]
- Broad notion of possession: from ownership to temporary possession to location
- Only concrete possesseees
- Possessors restricted to people, organizations, and places
- All forms of expression: phrasal, clausal, sentential, inter-sentential

Data selection



- 90 Wikipedia articles about well-known artifacts: mostly paintings, but also diamonds, relics, sculptures, and archaeological findings
- Chosen because such objects tend to change hands
- Each article focuses on a single artifact/possessee
- Minimum of three different possessors

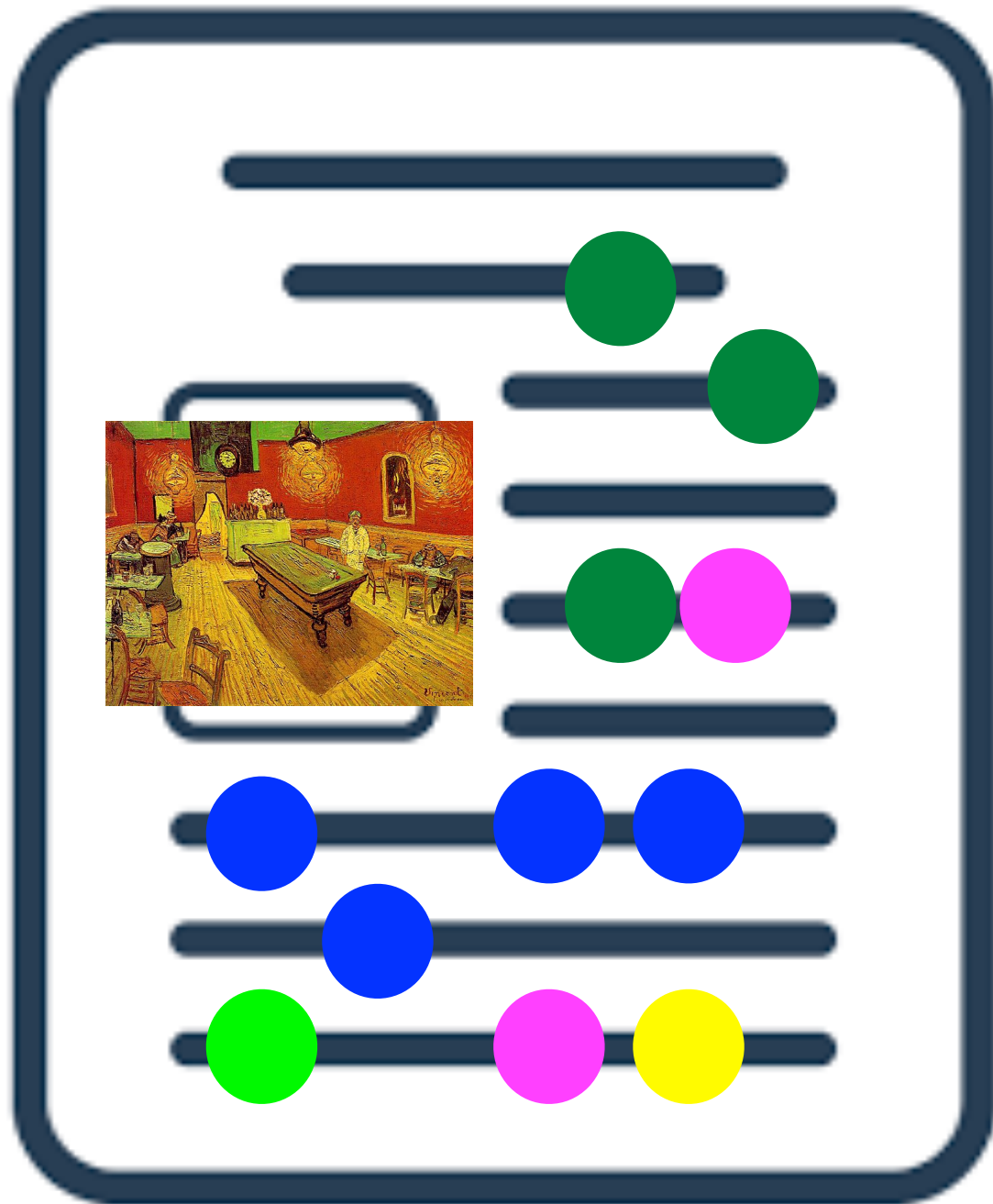


WIKIPEDIA
The Free Encyclopedia

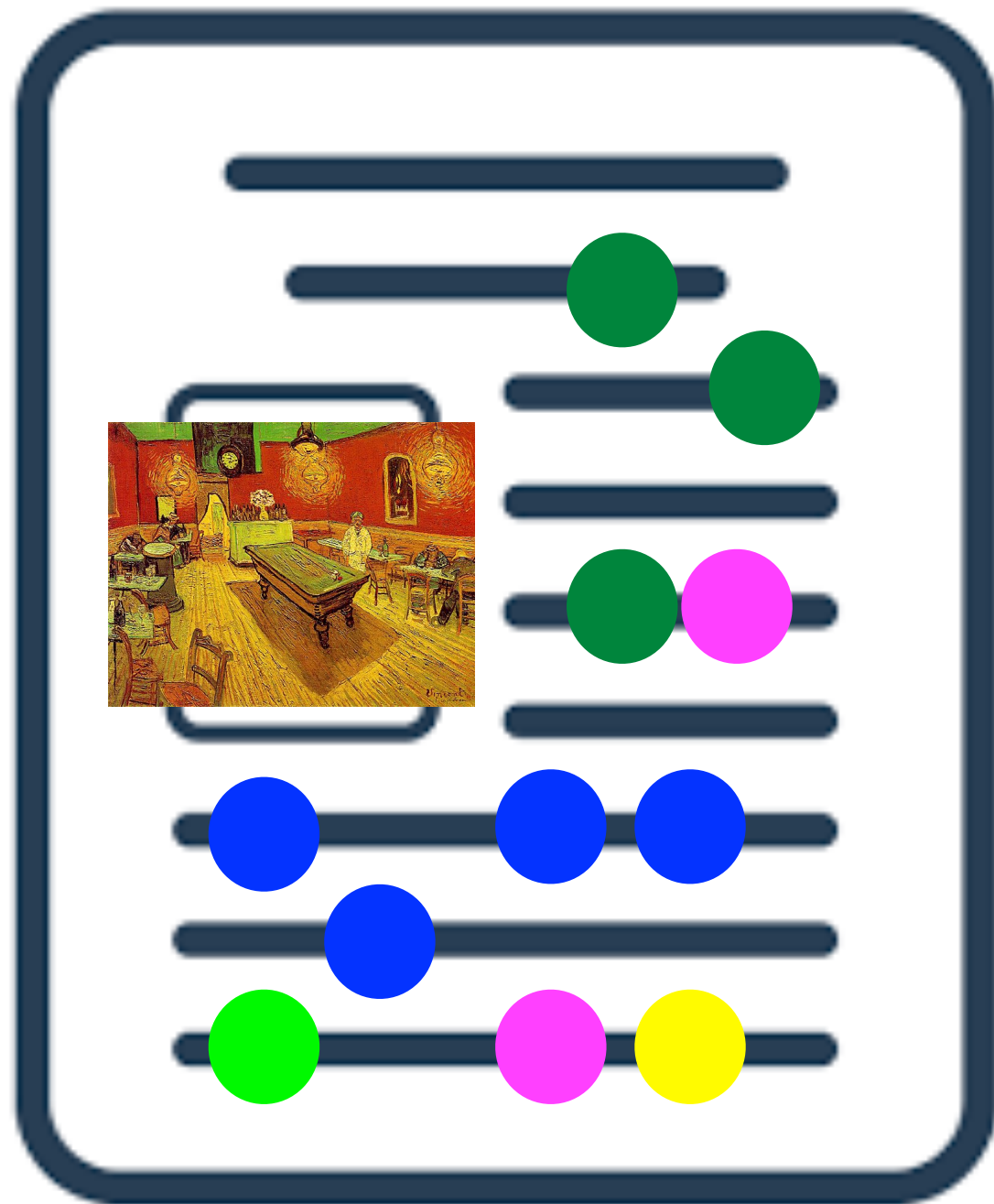
Annotation process - per article

- Topic of article is single possessee; annotator instructed to read entire article
- Identify possessors
- Identify temporal anchors per possession relation (i.e. possessee/possessor pair)
- Specify duration features per temporal anchor
- Assign an order to identified possession relations

Step One: Identify possessors

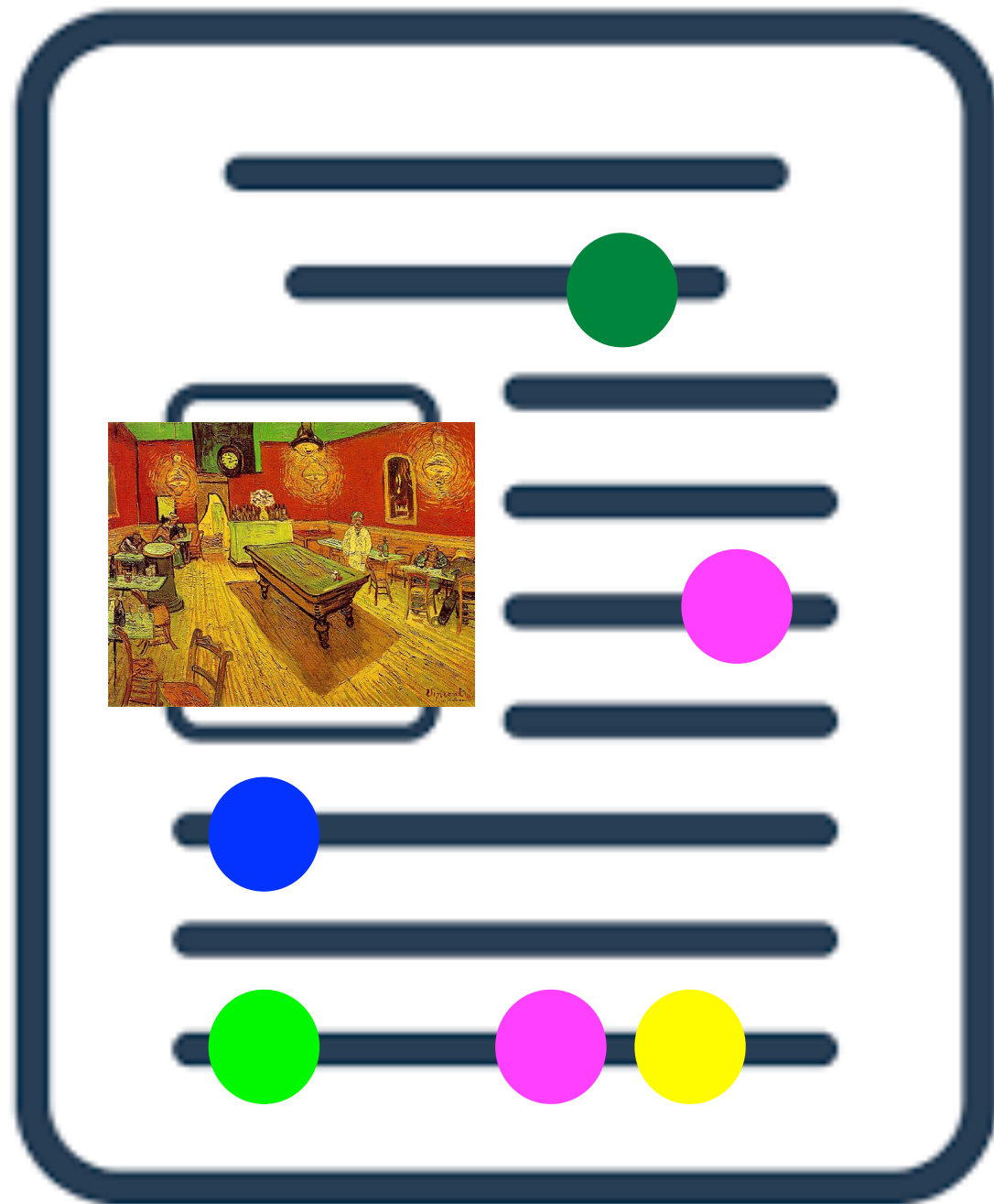


Step One: Identify possessors



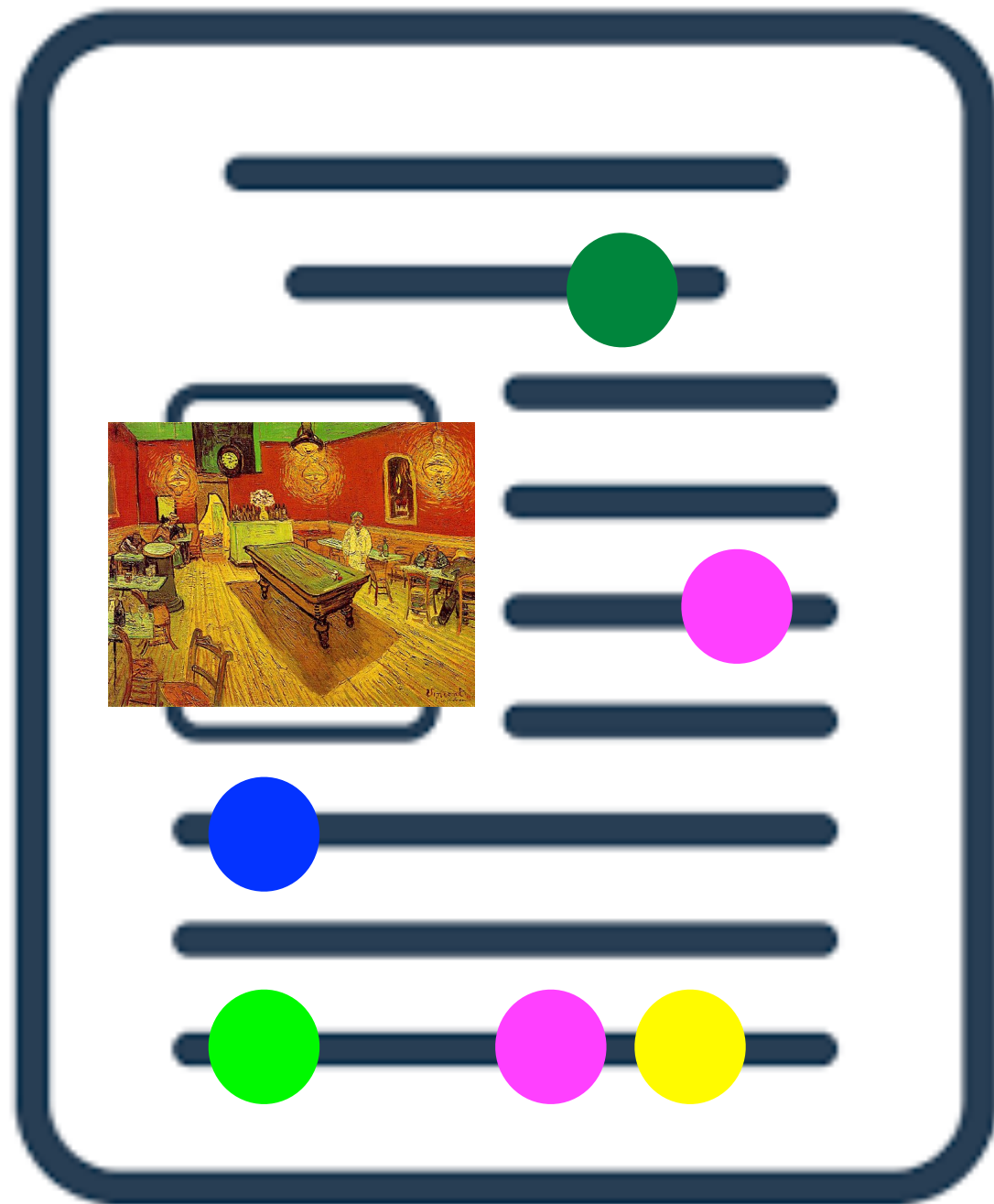
- Only one relation generated for each period of possession, regardless of number of mentions

Step One: Identify possessors



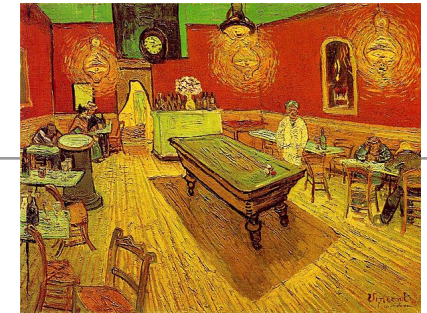
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Step One: Identify possessors



- Only one relation generated for each period of possession, regardless of number of mentions
- Possessors limited to persons, organizations, locations (not only NEs)

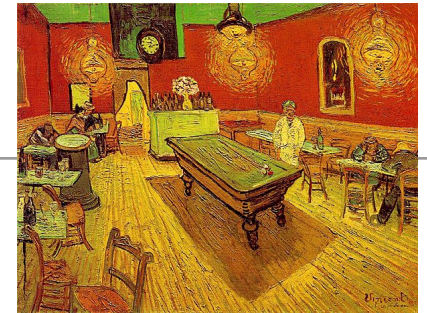
Identifying possessors



History [\[edit \]](#)

Van Gogh used the picture to settle debts with Ginoux, the landlord said to be depicted (standing) in it.^[3] Formerly a highlight of the [Ivan Morozov](#) collection in [Moscow](#), the painting was nationalized and sold by the [Soviet authorities](#) in the 1930s. The painting was eventually acquired by [Stephen Carlton Clark](#), who bequeathed it to the art gallery of [Yale University](#).

Identifying possessors



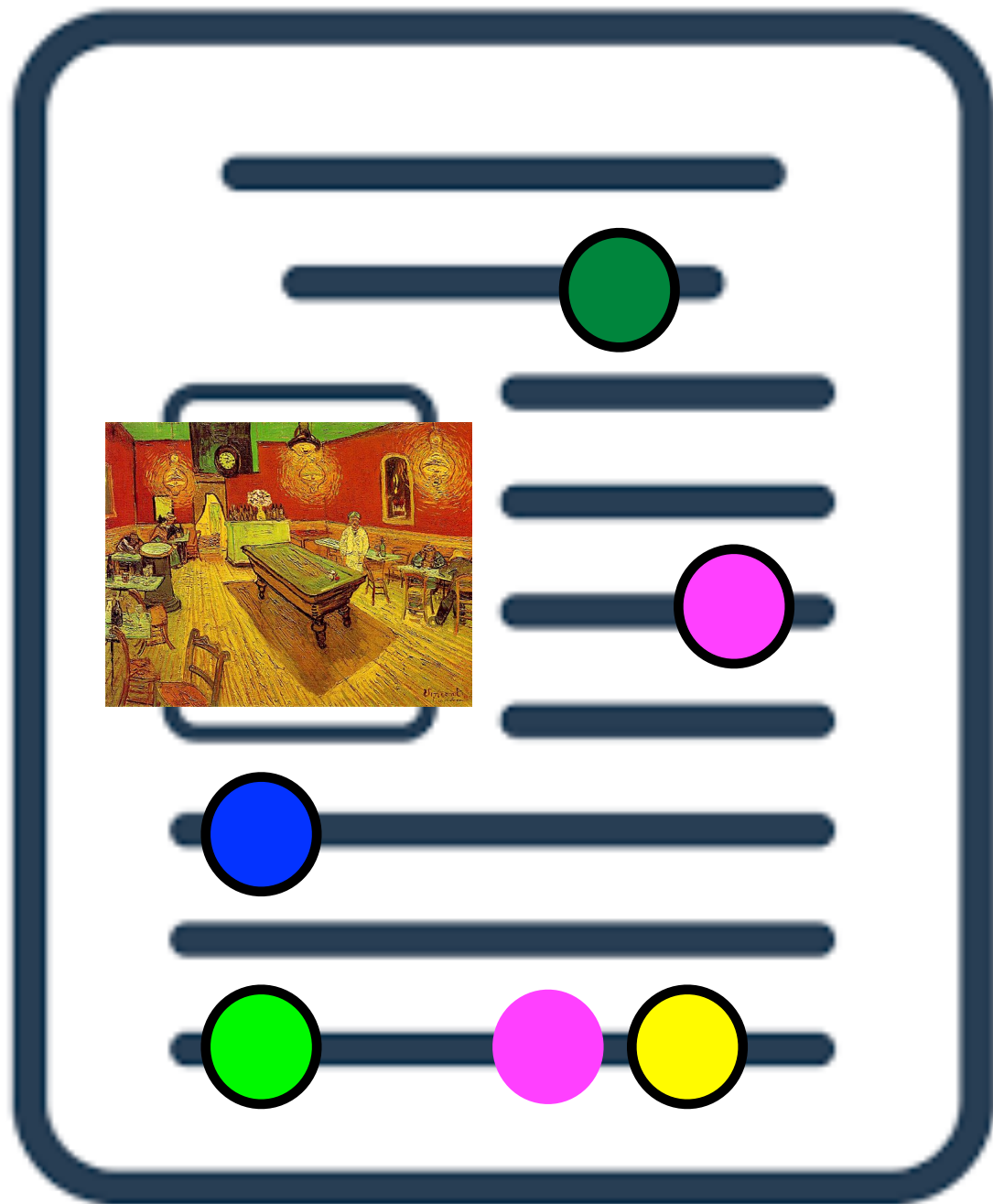
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*On the morning of March 18, 1990, [thieves](#) disguised as police officers broke into the museum and stole *The Storm on the Sea of Galilee* and 12 other works.*



Step One: Identify possessors



- Only one relation generated for each period of possession, regardless of number of mentions
- Possessors limited to persons, organizations, locations (not only NEs)
- Each relation labeled with certainty according to textual evidence

Possession certainty

- Yes/no annotation - according to the textual content, is the possession relation certain?

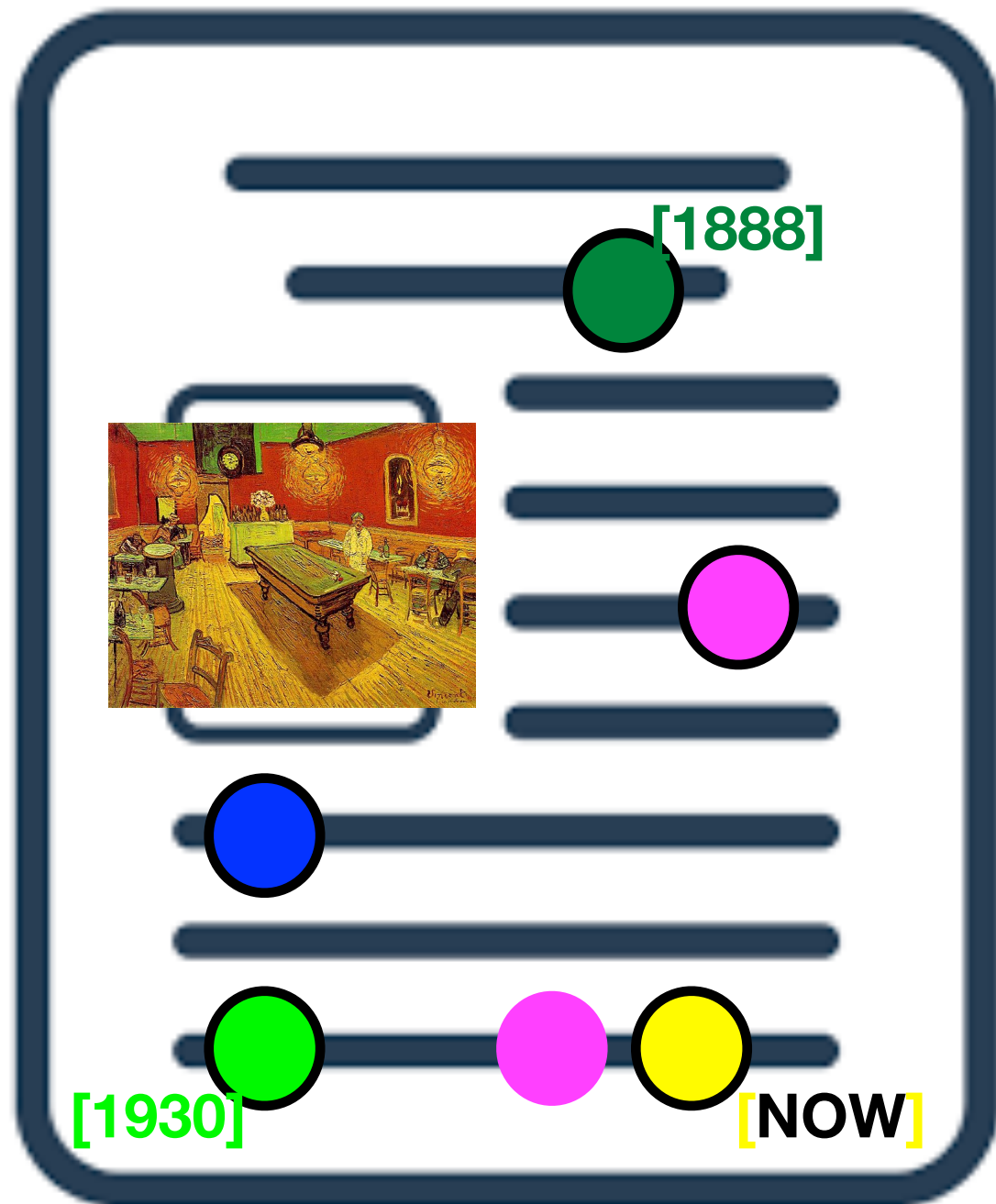


It is in [the Gemäldegalerie, Dresden](#).



It was completed after Giorgione's death in 1510, [...] generally accepted to have been completed by [Titian](#).

Step Two: Identify temporal anchors



- Where possible, each relation associated with temporal anchor
- Granularity no finer than the year: often span of years, or historical event (e.g. “WW1”)

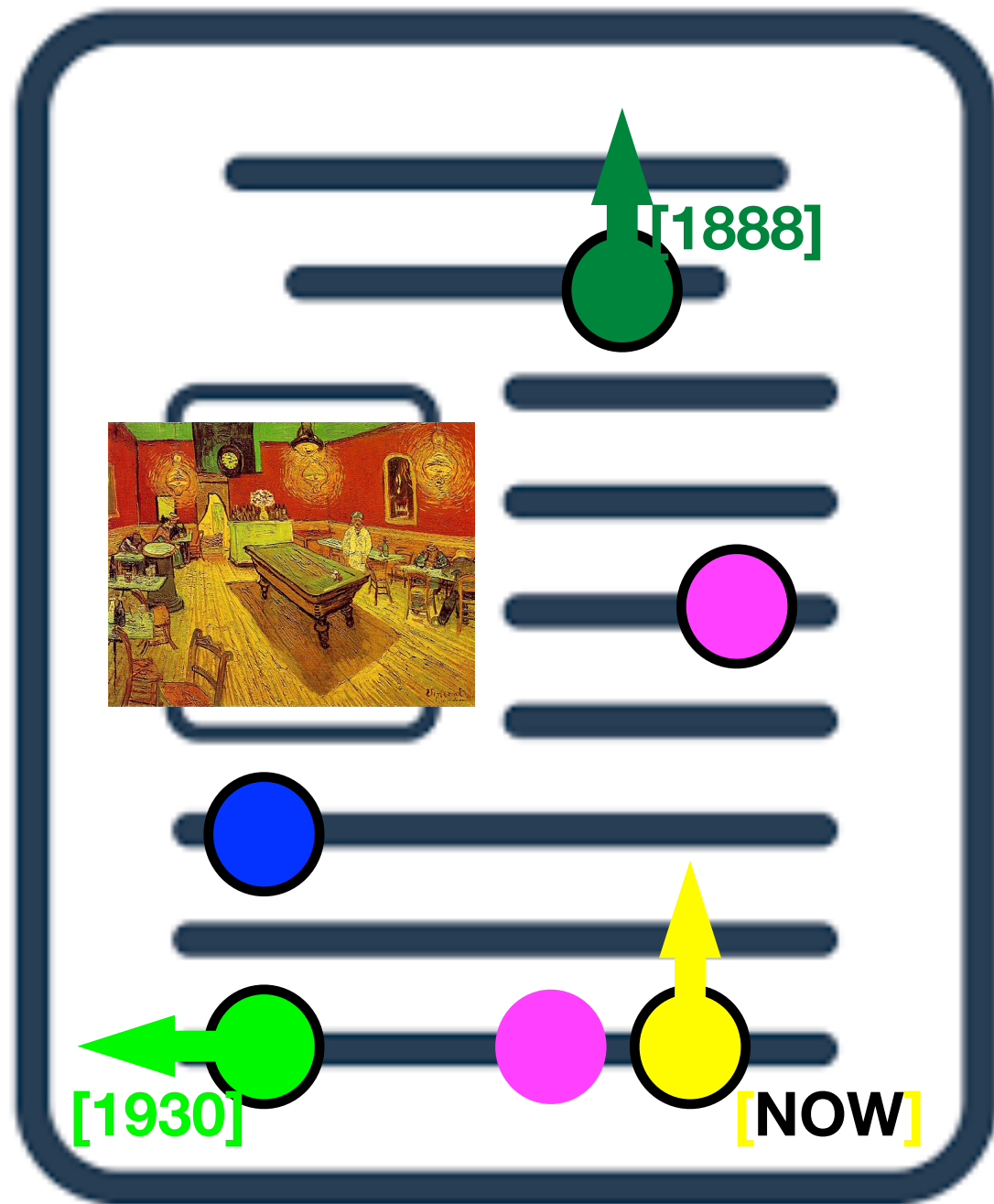
Temporal anchors

- Not all possession relations can be associated with temporal anchors



*Despite its progressive implications, Barge Haulers was bought by the **Tsar's second son**. It was lent for exhibition at the 1873 **International Exhibition in Vienna**, where it won a bronze medal. It was exhibited **outside Russia** again in 1878.*

Step Three: Duration of possession



- For relations with temporal anchors, duration is annotated
- Three binary features: before, during, after

Duration of possession

- Duration viewed as attribute of the temporal anchor

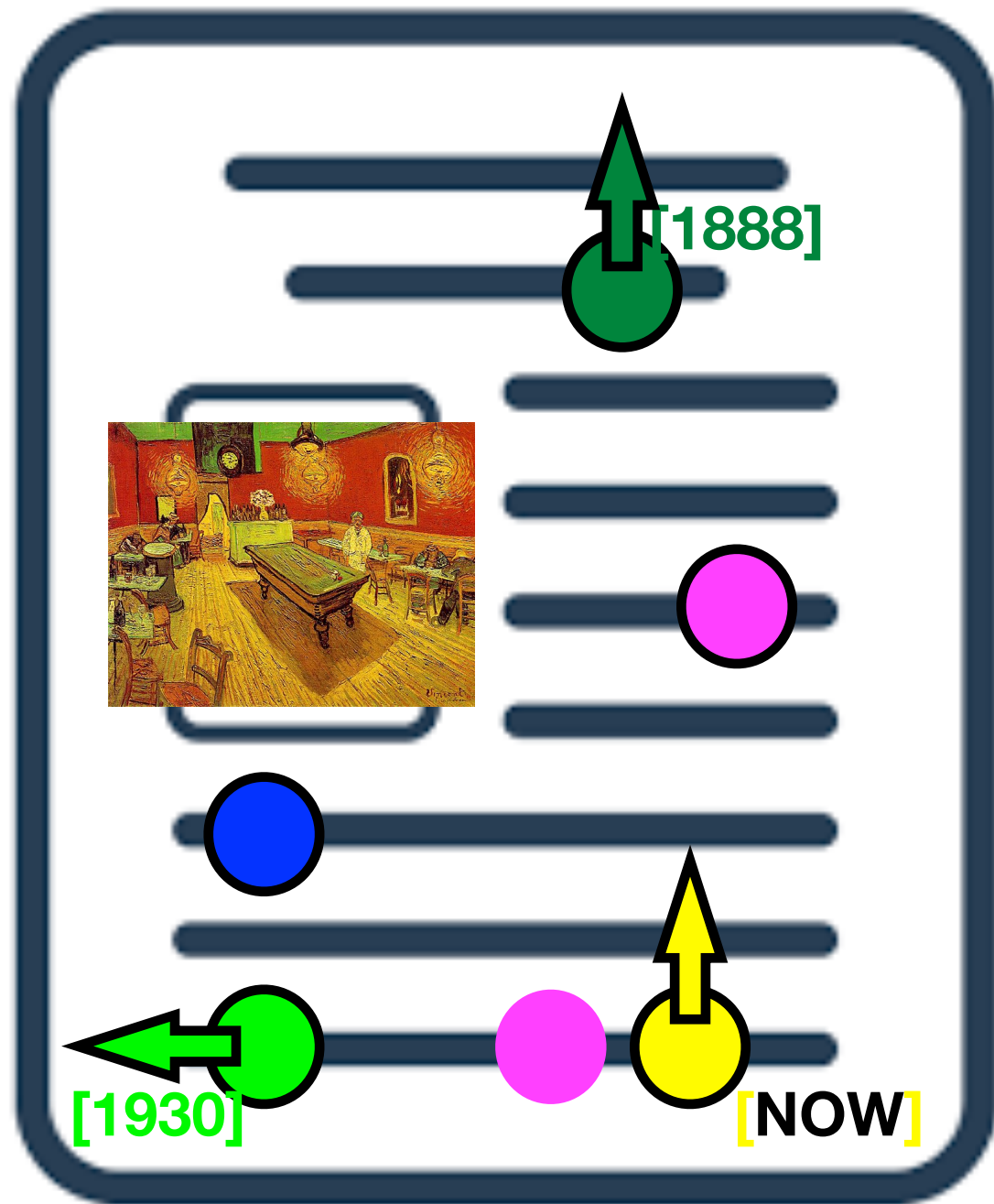
BEFORE: *At some undetermined point before 1516 it came into the possession of Don Diego de Guevara ...*

DURING: *In 1599 a German visitor saw it in the Alcazar Palace in Madrid.*

AFTER: *In 1530 the painting was inherited by Margaret's niece Mary of Hungary, who in 1556 went to live in Spain.*

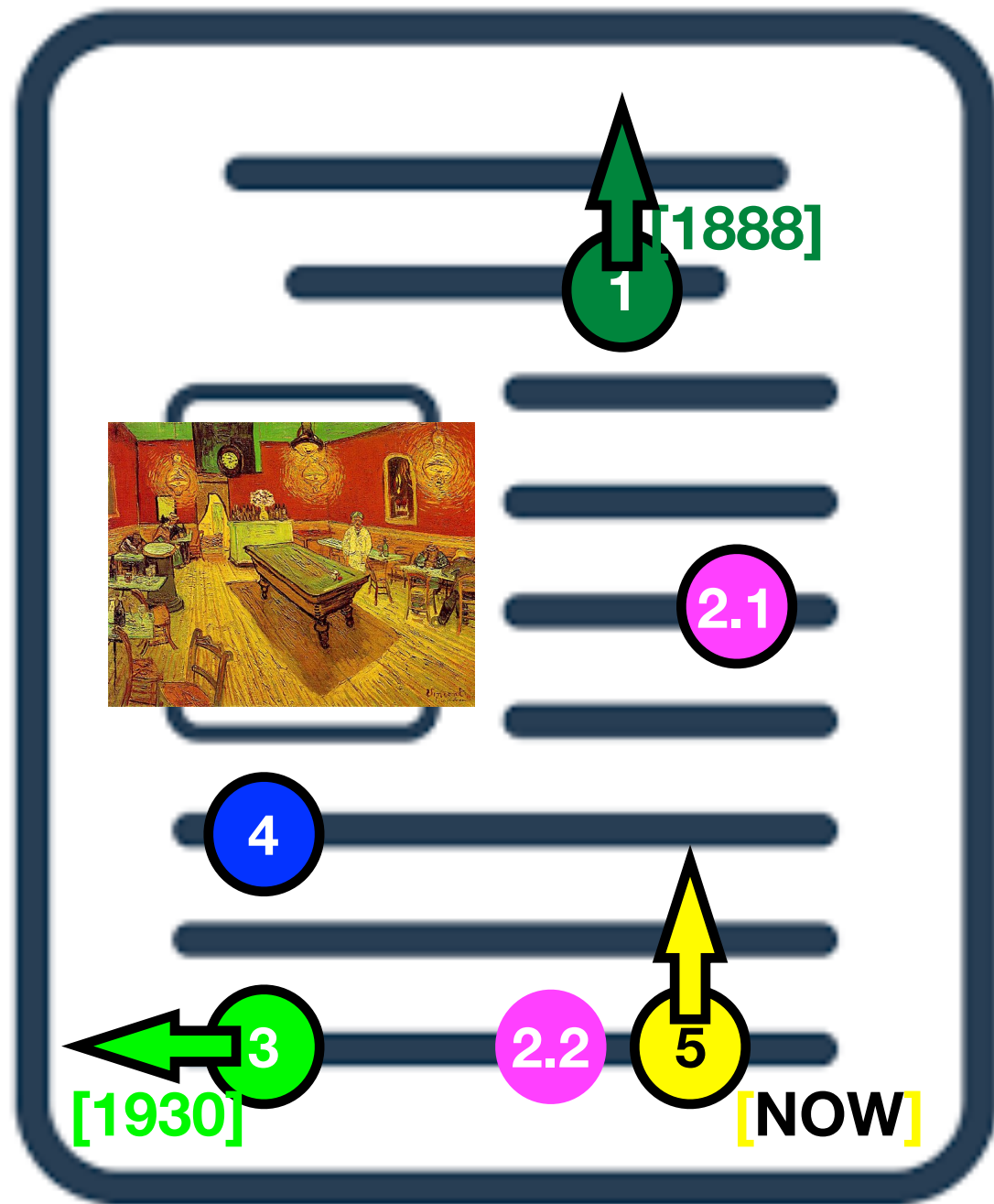


Step Three: Duration of possession



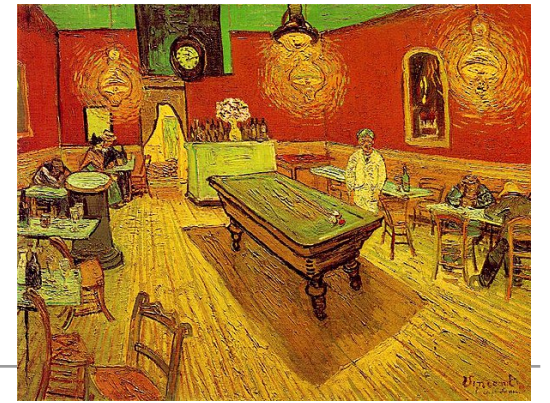
- For relations with temporal anchors, duration is annotated
- Three binary features: before, during, after
- Certainty is also marked for duration

Step Four: Order of possessions



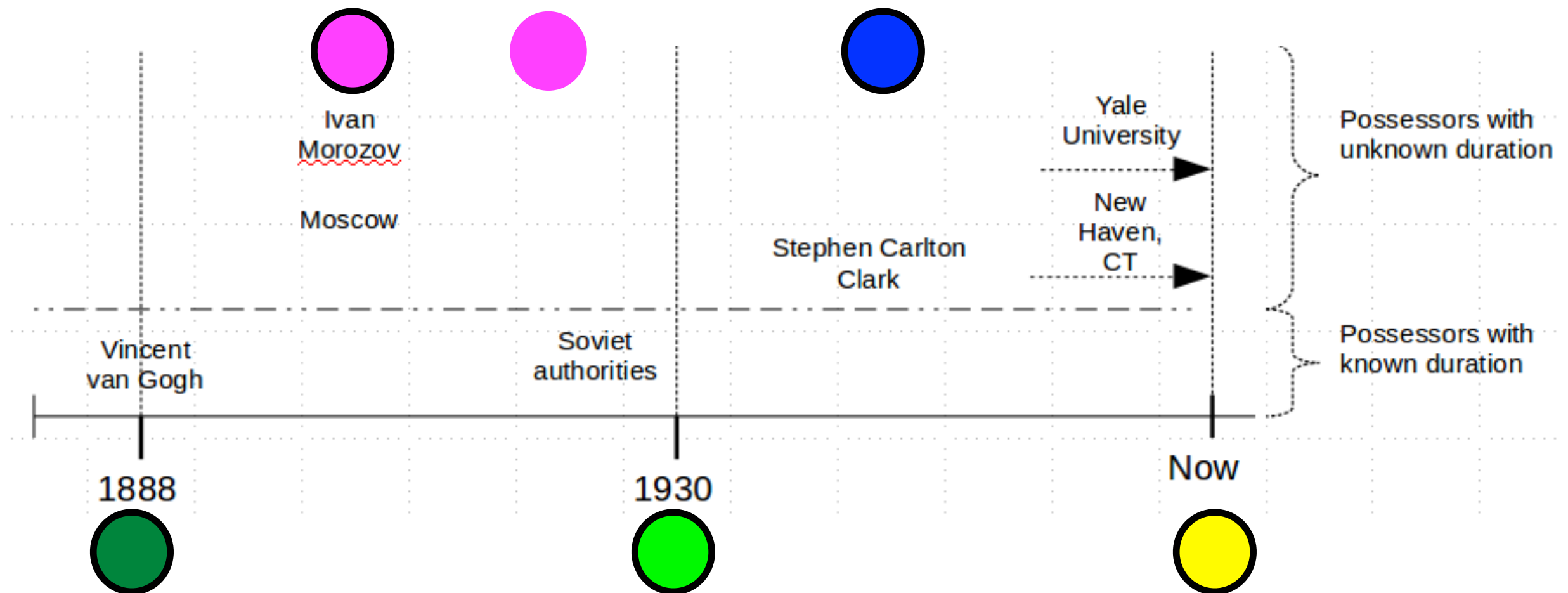
- Finally, all possessions are ordered
- In essence, this step produces a gold standard possession timeline

Full annotation for *The Night Café*



NE	Possessor	Poss. Certainty	Order	Temporal Anchor	Duration	Dur. Certainty
PER	Vincent van Gogh	C	1	1888	During	C
PER	Ivan Morozov	C	2	Unknown	-	-
PER	Stephen Carlton Clark	C	4	Unknown	-	-
ORG	Soviet authorities	C	3	1930	Before	C
ORG	Yale University	C	5	Unknown-Now	During	C
LOC	Moscow	C	2	Unknown	-	-
LOC	New Haven, CT	C	5	Unknown-Now	During	C

Timeline for *The Night Café*



Annotation statistics

All possessors	
Total # of possessors	799
NE type: PER/ORG/LOC	281/318/200
Possession certainty: Certain/Uncertain	774/25
Temporal Anchor: Known/Unknown	660/139
Duration:BEFORE/DURING/AFTER	7/647/6
Duration Certainty: Certain/Uncertain	608/52

Annotator agreement

- 12 randomly-selected articles labeled by second annotator; Anno. A treated as pseudo-gold standard

Annotation step	
Identification of possessors	0.97 P / 0.69 R
Certainty (both possession and duration)	0.92 K
Temporal Anchor	0.77 K
Possession Duration	0.76 K
Order of possessions	0.93 P / 0.90 R

Wrapping up

- Corpus of articles annotated for **temporally-oriented possession**
- Expanding range of forms to be annotated increases coverage of possession relations, while reducing learnability (for the machine)
- Knowledge-heavy annotations; may be useful for detailed analysis
- Knowledge-heavy annotations; were not useful for learning (we tried)

Extensions

- Recent work (Chinnappa and Blanco, EMNLP 2018) takes new, simpler approach to annotation (same data)
- Potential possessors and years extracted automatically
- All possible possessor-year pairs are labeled
- This data moderately successful for learning to extract possession relations more robustly
- In progress: multimodal possession extraction

References

Bach, E.

Corpus statistics

Total # of Wikipedia articles	90
Total # of mentioned possessors	799
Total # of unique possessors	735
Avg. # of words per article	2315
Avg. # of sections per article	6.66
Avg. # of possessors per article	8.87
Avg. # of unique possessors per article	8.17