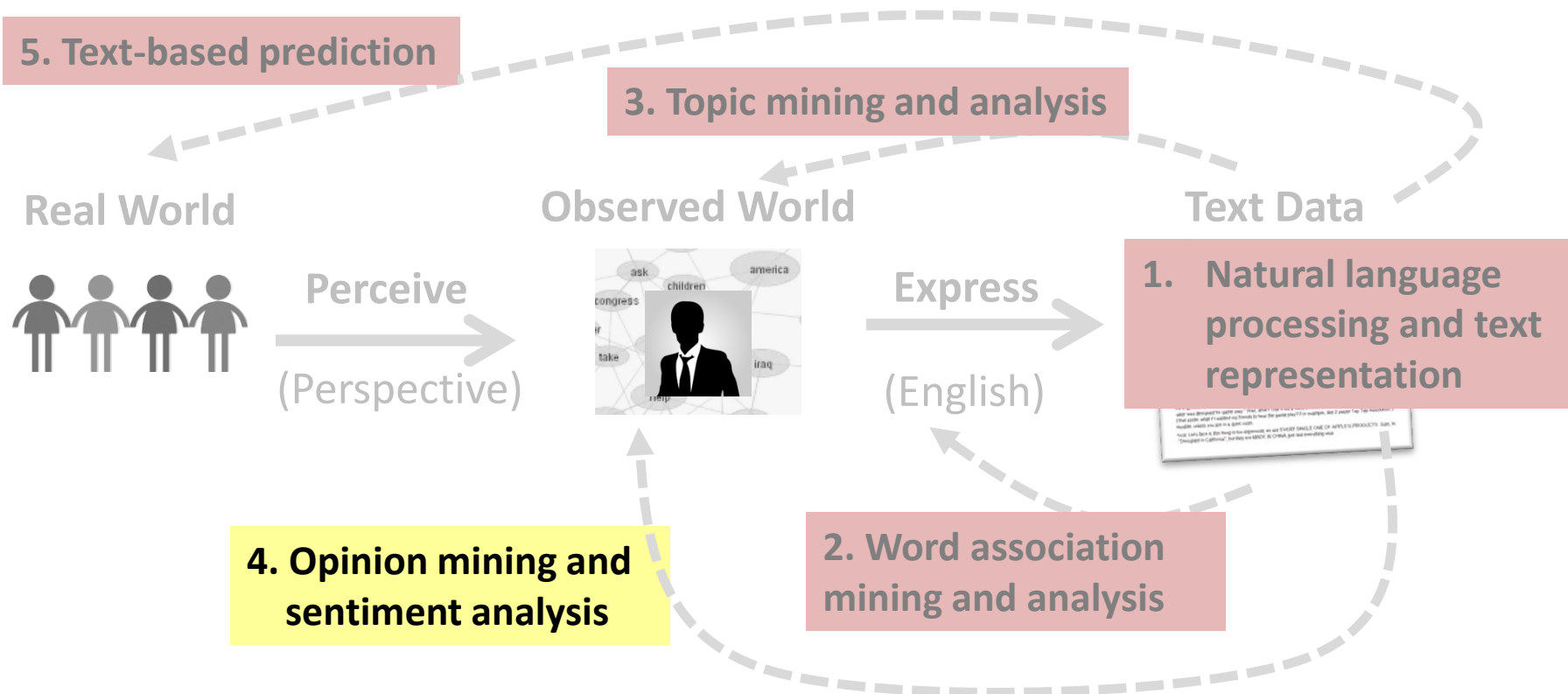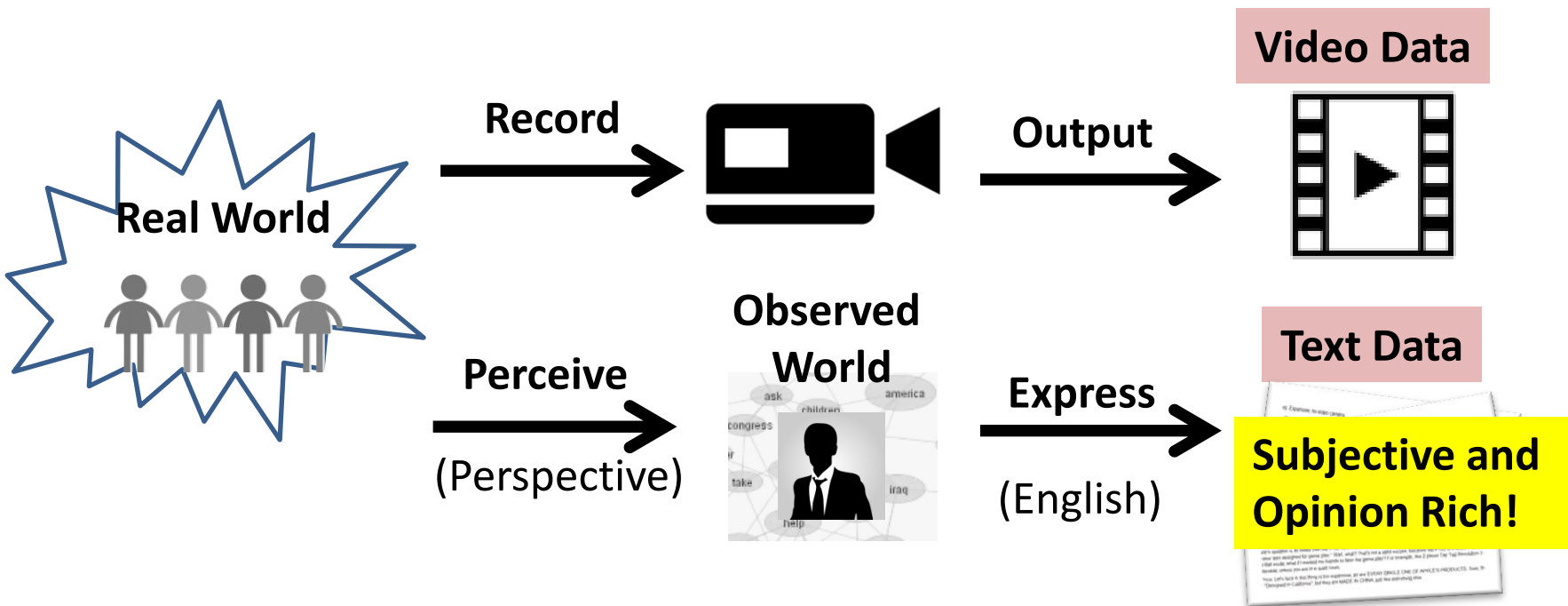# Opinion Mining and Sentiment Analysis: Motivation

ChengXiang "Cheng" Zhai
Department of Computer Science
University of Illinois at Urbana-Champaign

Opinion Mining and Sentiment Analysis: Motivation

5. Text-based prediction

3. Topic mining and analysis

Real World

Observed World

Text Data

Perceive

(Perspective)

Express

(English)

1. Natural language processing and text representation

4. Opinion mining and sentiment analysis

2. Word association mining and analysis

2

Objective vs. Subjective Sensors

Real World

Record → (camera)

Output → **Video Data**

Perceive

(Perspective) → **Observed World**

Express

(English) → **Text Data**

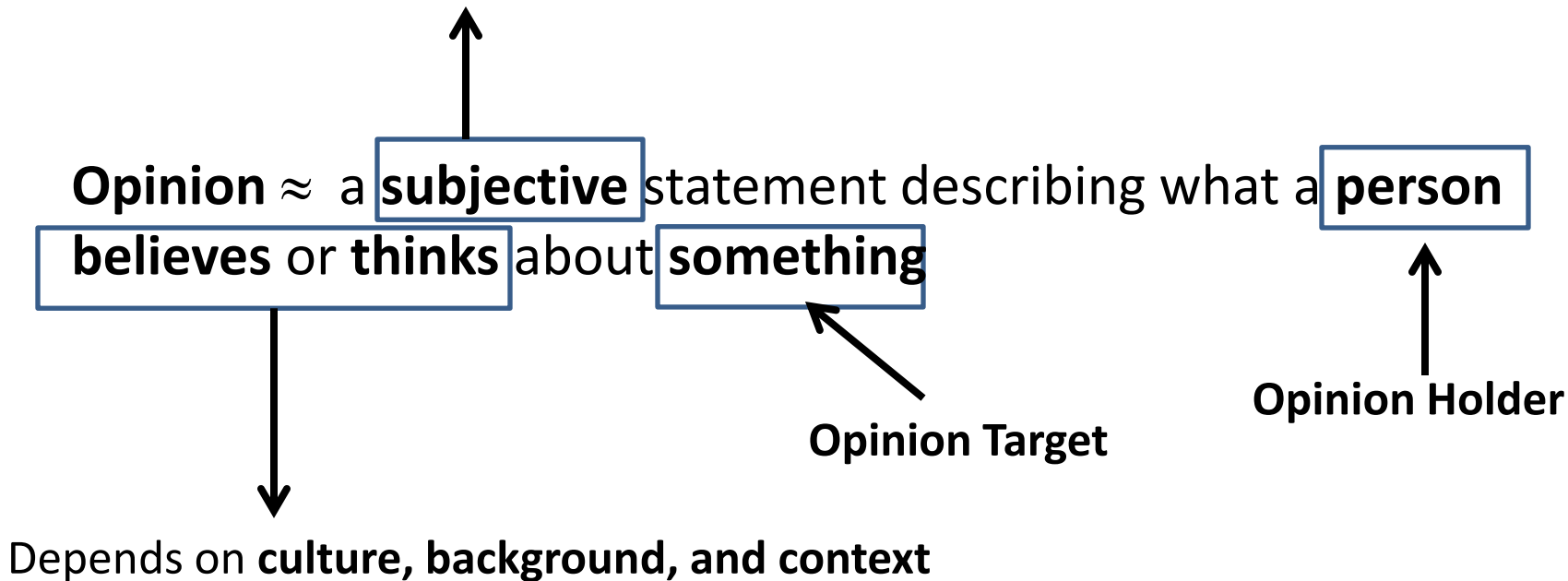**Subjective and Opinion Rich!**

How can we mine and analyze opinion buried in text?

What Is an Opinion?

Objective statement or **Factual** statement **(can be proved right/wrong)**

Opinion ≈ a **subjective** statement describing what a **person believes** or **thinks** about **something**

Opinion Target

Opinion Holder

Depends on **culture, background, and context**

Opinion Representation

- Basic Opinion Representation
  - Opinion **holder**: Whose opinion is this?
  - Opinion **target**: What is this opinion about?
  - Opinion **content**: What exactly is the opinion?
- Enriched Opinion Representation
  - Opinion **context**: Under what situation (e.g., time, location) was the opinion expressed?
  - Opinion **sentiment**: What does the opinion tell us about the opinion holder's feeling (e.g., positive vs. negative)?

A Product Review (Explicit Holder and Target)

- Basic Opinion Representation
  - Opinion **holder**: Whose opinion is this?   Reviewer X
  - Opinion **target**: What is this opinion about?   Product: iPhone 6
  - Opinion **content**: What exactly is the opinion?   Review Text
- Enriched Opinion Representation
  - Opinion **context**: Under what situation (e.g., time, location) was the opinion expressed?   Year = 2015
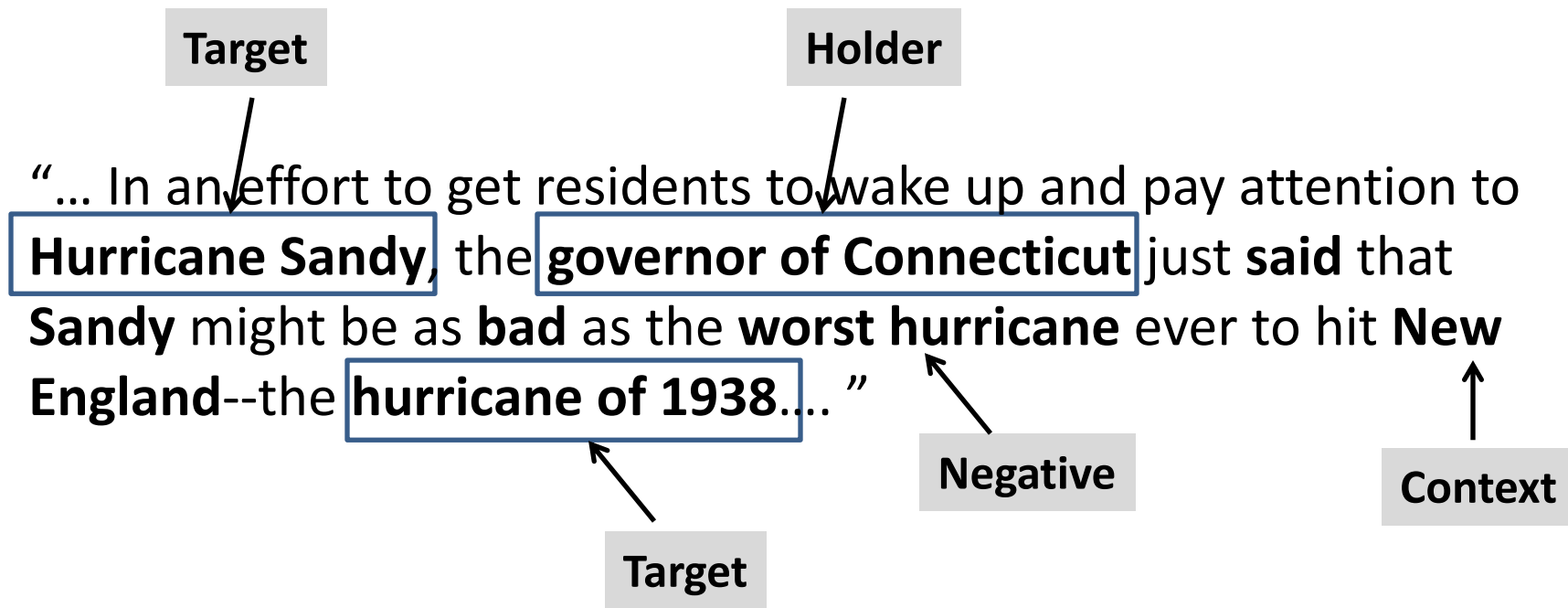 - Opinion **sentiment**: What does the opinion tell us about the opinion holder's feeling (e.g., positive vs. negative)?   Positive

Relatively Easy to Mine and Analyze

A Sentence in News (Implicit Holder and Target)

Target

Holder

"… In an effort to get residents to wake up and pay attention to **Hurricane Sandy**, the **governor of Connecticut** just **said** that **Sandy** might be as **bad** as the **worst hurricane** ever to hit **New England**--the **hurricane of 1938**…. "
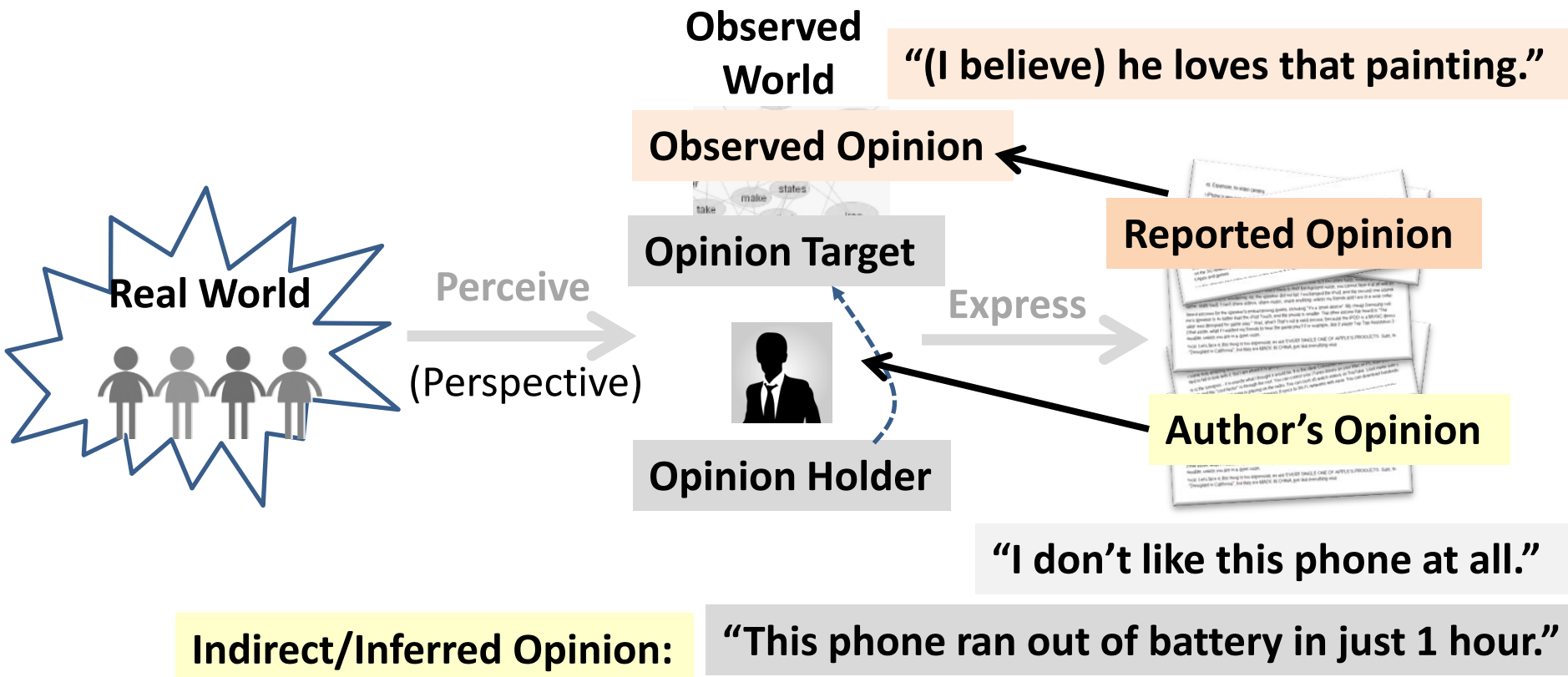
Negative

Context

Target

Harder to Mine and Analyze: Need deeper NLP

Variations of Opinions

- **Opinion holder**: Individual vs. group
- **Opinion target**: One entity, a group of entities, one attribute of an entity, someone else's opinion, etc.
- **Opinion content**:
  - Surface variation: one sentence/phrase, a paragraph, a whole article
  - Sentiment/emotion variation: positive vs. negative, happy vs. sad, etc.
- **Opinion context**
  - Simple context: Different time, location, etc.
  - Complex context: Potentially includes the entire discourse context of an opinion

Different Kinds of Opinions in Text Data

Observed World

"(I believe) he loves that painting."

Observed Opinion

Reported Opinion

Opinion Target

Real World

Perceive

(Perspective)

Express

Author's Opinion

Opinion Holder

"I don't like this phone at all."

Indirect/Inferred Opinion: "This phone ran out of battery in just 1 hour."

The Task of Opinion Mining

Text Data

A Set of Opinion Representations

Opinion Holder

Opinion Target

Opinion Content → Opinion Sentiment

Opinion Context →

Often some elements of the representation are already known

Simplest Opinion Mining task(s)?

Why Opinion Mining?

- **Decision Support**
  - Help consumers choose a product or service
  - Help voters decide whom to vote for
  - Help policy makers design new policy
- **Understand People**
  - Help understand people's preferences to better serve them (e.g., optimize a product search engine; optimize recommender systems)
  - Help with advertising (targeted advertising)
- **"Voluntary Survey" (humans as sensors; aggregated opinions)**
  - Business intelligence
  - Market research
  - Data-driven social science research
  - Gain advantage in **any** prediction (text-based prediction)