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OF LAW



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

claudette.eui.eu

The right Als for the rights of citizens

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Bologna, Alma Al Seminar, June 17th, 2020

PART III

Methodologies

Machine learning methodologies

- The enactment of consumer-empowering AI requires to address a number of relevant (and foundational) tasks in AI...
- **Natural language understanding**
- **Knowledge representation and reasoning**
- **Computational linguistics across different languages**

Unfair clause detection in Terms of Service

- From a machine learning point of view, unfair clause detection can be seen just as a **sentence classification** task...
- **Classic algorithms** can be used: SVM with bag-of-words, deep networks (CNN or LSTM), structured approaches (SVM-HMM)
- The best performing system is an **ensemble**...

Experimental results for Terms of Service

[Lippi et al., AI & Law, 2019]

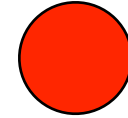
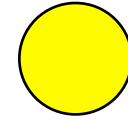
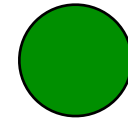
Classifier	Method	P	R	F_1
C1	SVM – Single Model	0.729	0.830	0.769
C2	SVM – Combined Model	0.806	0.779	0.784
C3	Tree Kernels	0.777	0.718	0.739
C4	Convolutional Neural Networks	0.729	0.739	0.722
C5	Long Short-Term Memory Networks	0.696	0.723	0.698
C6	SVM-HMM – Single Model	0.759	0.778	0.758
C7	SVM-HMM – Combined Model	0.848	0.720	0.772
C8	Ensemble (C1+C2+C3+C6+C7)	0.828	0.798	0.806
	Random Baseline	0.125	0.125	0.125
	Always Positive Baseline	0.123	1.000	0.217

P = Precision, R = Recall, $F_1 = 2PR/(P+R)$

Moving to privacy policies...

What is different?

- Ensure **compliance** with articles 13-14 of GDPR
- Detect **vague** language
- Detect **problematic** clauses for data processing



Can we improve CLAUDETTE with background knowledge?

- So far, we used purely **data-driven** approaches...
- Legal experts are able to **recognize** potentially unfair clauses thanks to their **background knowledge** of the domain
- Typically, when **detecting** a potentially unfair clause, a legal expert also knows the **reason** for which the clause is unfair...
- These explanations **should be useful** also for CLAUDETTE!

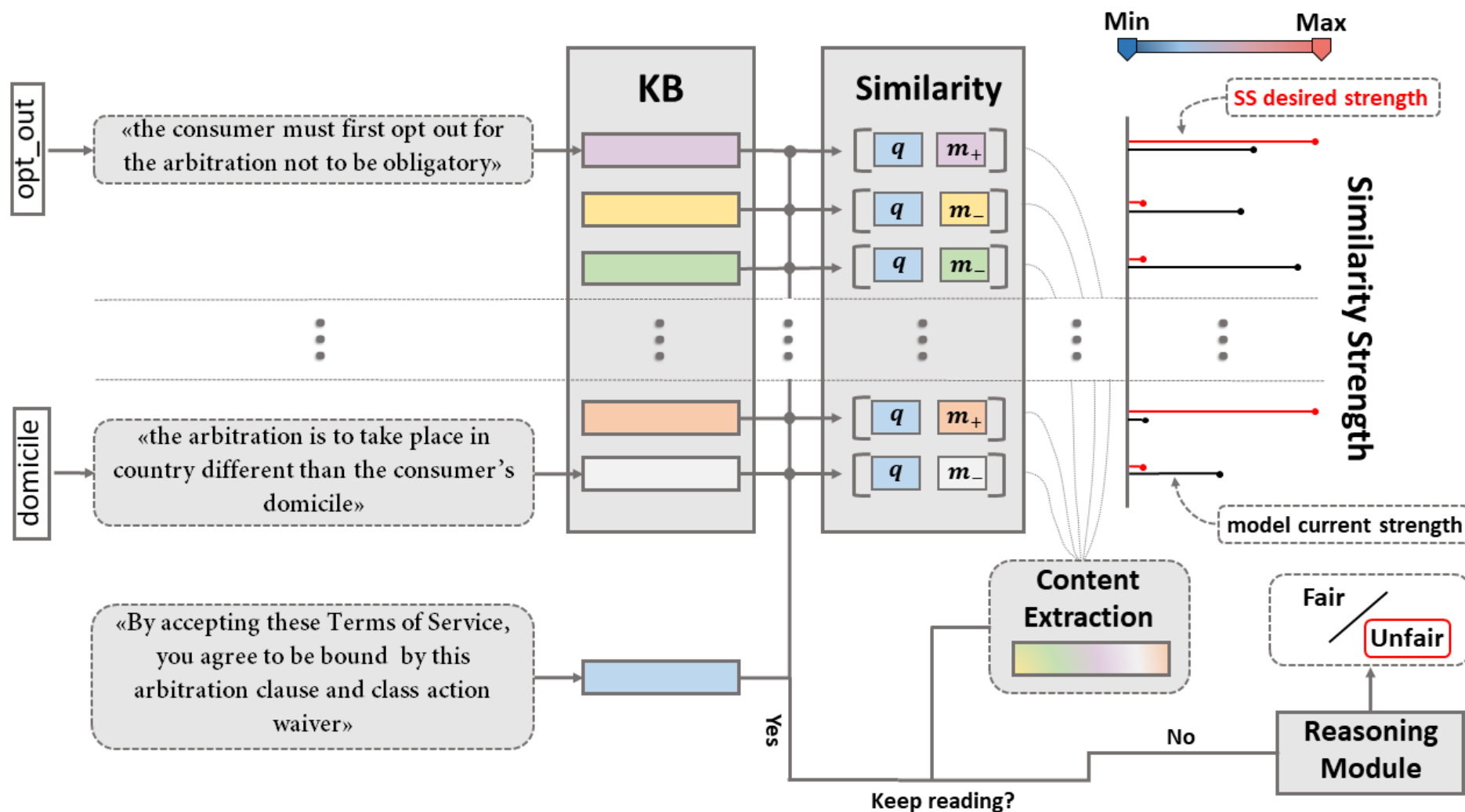
Can we improve CLAUDETTE with background knowledge?

- Symbolic vs. sub-symbolic approaches...
- Most recent research directions
 - **Neural-symbolic learning**
 - **Statistical relational learning**
 - **Connectionist models for reasoning**

Memory-Augmented Neural Networks

- Process input and **store** the information in some **memory**
- Understand **pieces of knowledge** relevant to a given **query**
- Retrieve **concepts** from memory
- Combine **memory and query** to make a prediction

Memory-Augmented Neural Networks



Memory-Augmented Neural Networks in CLAUDETTE

Potentially unfair clause #4

EXCEPT FOR CERTAIN TYPES OF DISPUTES MENTIONED IN THE ARBITRATION CLAUSE , YOU AND HEADSPACE AGREE THAT DISPUTES RELATING TO THESE TERMS OR YOUR USE OF THE PRODUCTS WILL BERESOLVED BY MANDATORY BINDING ARBITRATION , AND YOU WAIVE ANY RIGHT TO PARTICIPATE IN A CLASS-ACTION LAWSUIT OR CLASS-WIDE ARBITRATION .

Unfairness categories: **Arbitration**

[Hide/show rationales](#)

Potentially unfair clause #5

1.4 CHANGES TO TERMS Headspace reserves the right to change or update these Terms , or any other of our policies or practices , at any time , and will notify users by posting such changed or updated Terms on this page .

Unfairness categories: **Unilateral Change**

[Hide/show rationales](#)

The clause is potentially unfair for **Unilateral Change** since the provider has the right for unilateral change of the contract, services, goods, features for any reason at its full discretion, at any time (score = 0.834)

Potentially unfair clause #6

Your continued use of the Products constitutes your agreement to abide by the Terms as changed .

Unfairness categories: **Contract by Using**

[Hide/show rationales](#)

<http://claudette.eui.eu/demo>

The challenge of multilingualism

- Both Terms of Service and Privacy Policies are available in (almost) **each of the languages** of the European Union
- Can we develop a **CLAUDETTE** for **each language**?
- Do we need to start **from scratch** for any language?

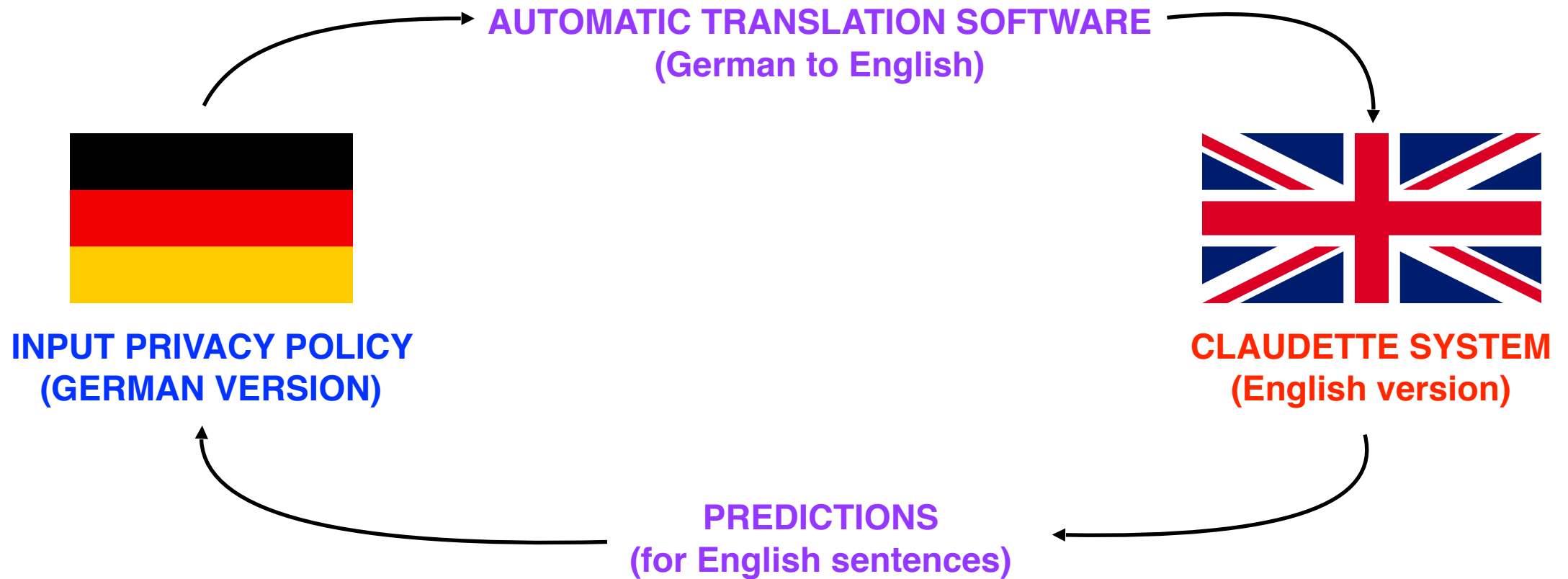


The challenge of multilingualism

- Can we use **English tagging** for other languages?
- Can we automatically compare a document in **two languages**?
- Do we need competence for **each and every language**?
- Is it **easier** (or more difficult) to detect potential unfair clauses in **some** of the languages, maybe due to **lexicon** or **style**?

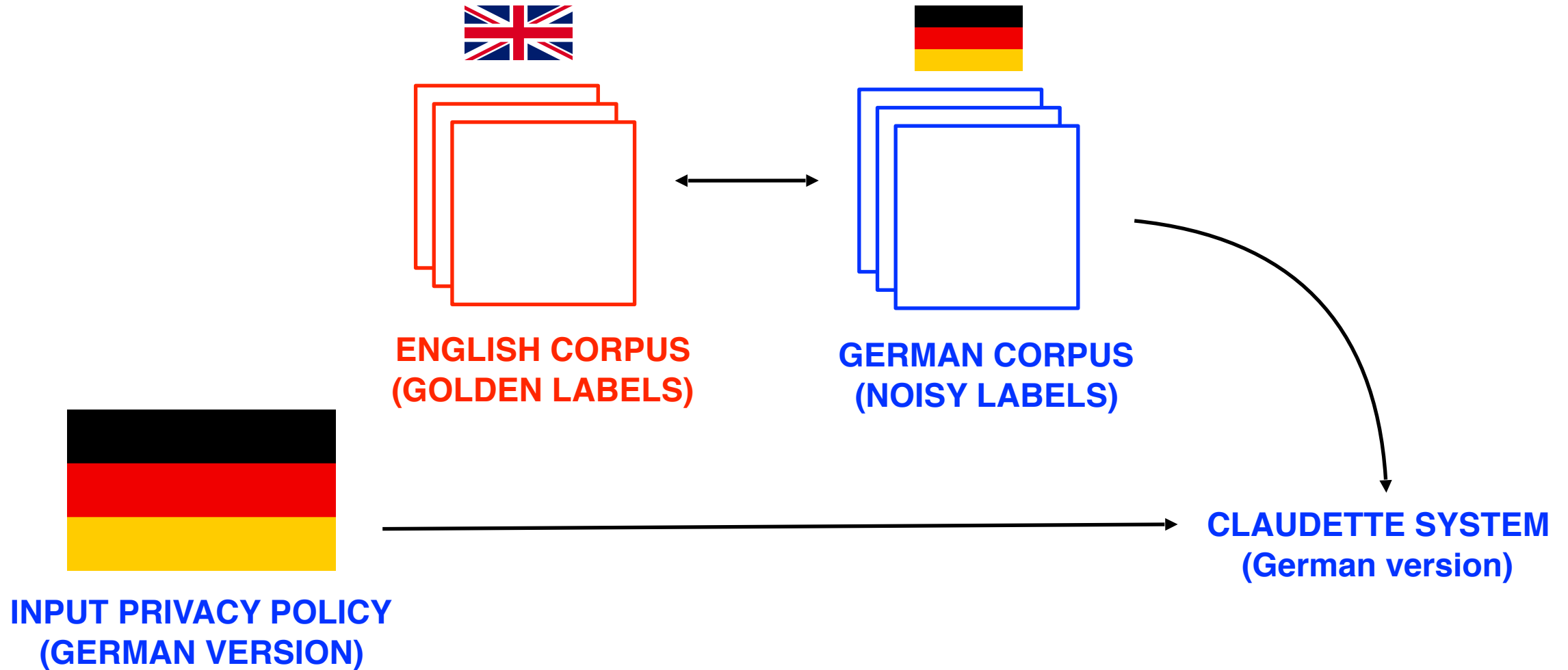
Two main possible approaches

1/2 - Use just English version of Claudette



Two main possible approaches

2/2 - Retrain a German version of Claudette



Two main possible approaches

Pros and cons

- System #1: **only one** (English) version
- System #2: **multiple systems** to maintain
- System #1: **only one** golden corpus
- System #2: need (advantage?) to **retrain** a corpus
- System #1: processing **noisy** documents
- System #2: using **noisy** labels

Looking to the future

- Which **kind of AIs** do consumers need?
- **Explainability** vs. performance accuracy...
- Capability to digest and exploit **background knowledge**
- Impact on civil society and **cooperation** among consumers
- **Multilingualism** can be an **incentive to cooperate**...