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Distinguish Confusing Law Articles for Legal Judgment Prediction

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TASK

Fact Description

At 18:00 on October 26, 2015, the defendant Zhao XX and Zhang XX had an altercation. **Zhao XX beat up Zhang and caused injuries. After identification, the injuries of bilateral nasal bone fractures of Zhang XX were minor injuries of grade ii**······

Judgment results

Law Articles

Law Article 234:**[The Crime of intentional injury]Whoever intentionally injures another person** shall be sentenced to fixed-term imprisonment of **not more than three years**, criminal detention or public surveillance······

Charges

Crime of intentional injury

Terms of Penalty

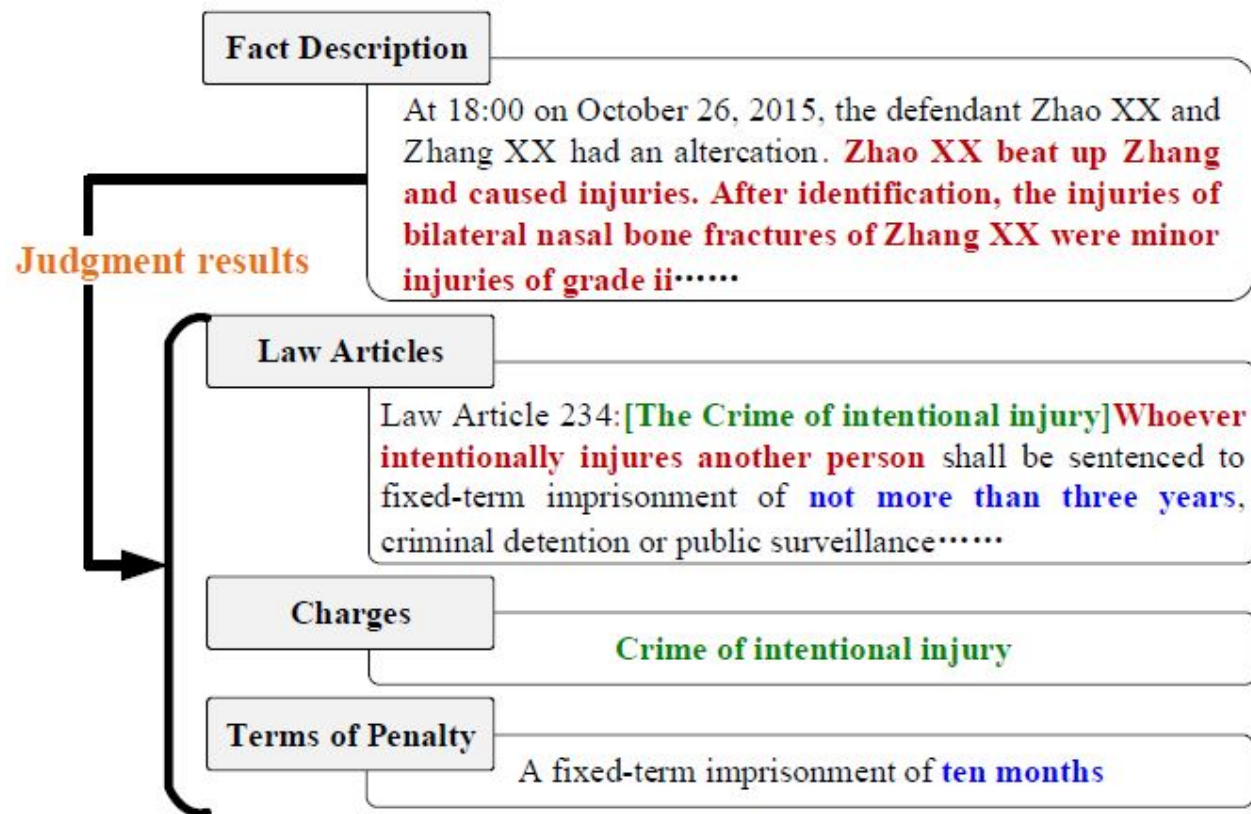A fixed-term imprisonment of **ten months**

Figure 1: An illustration of the LJP. Generally, a judge needs to conduct professional analysis and reasoning on the fact description of the case, and then choose reasonable law articles, charges and the term of penalty to convict the offender.

Main Work

- We develop an end-to-end framework, i.e.,LADAN, to solve the LJP task. It addresses theconfusing charges issue by mining similarities between fact descriptions and law articles as well asthe distinctions between confusing law articles

- We propose a novel graph distillation operator(GDO) to extract discriminative features for effectively distinguishing confusing law articles.

- We conduct extensive experiments on realworld datasets. The results show that our model outperforms all state-of-the-art methods.

Case

Article 385: The Crime of acceptance of bribes

Any state staffs who, taking advantage of his position, demands money or property from another person, or illegally accepts another person's money or property in return for securing benefits for the person *shall be guilty of acceptance of bribes.*

Article 163: Bribery crime of non-state staffs

The employees of companies, enterprises or other units who, taking advantage of his position, demands money or property from another person, or illegally accepts another person's money or property in return for securing benefits for the person *shall be guilty of bribery crime of non-state staffs.*

Article 389: Crime of offering bribes

Whoever, in order to seek illegitimate benefits, gives *any state staffs* with money and property, *shall be the crime of bribery*

Article 164: The crime of offering bribes to non-state staff

Whoever, in order to seek illegitimate benefits, gives employees of companies, enterprises or other units with money or property , *shall be guilty of bribing non-state staffs.*

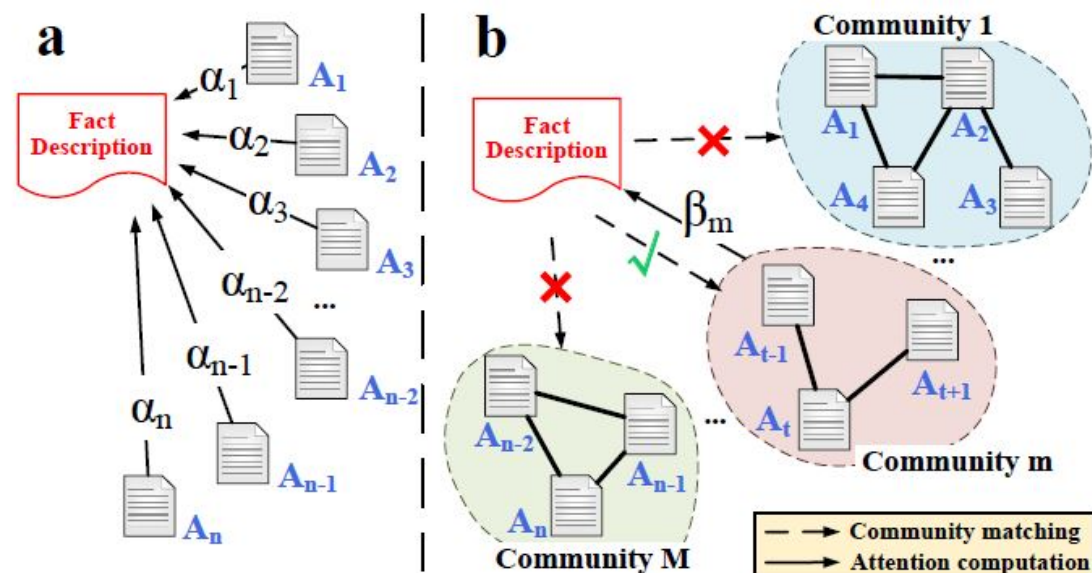Figure 2: Examples of confusing charges.

Figure 3: **a.** The fact-law attention model in (Luo et al., 2017). **b.** Our framework. *Variables α and β represent the encoded vectors learned for attentively extracting features from fact descriptions.*
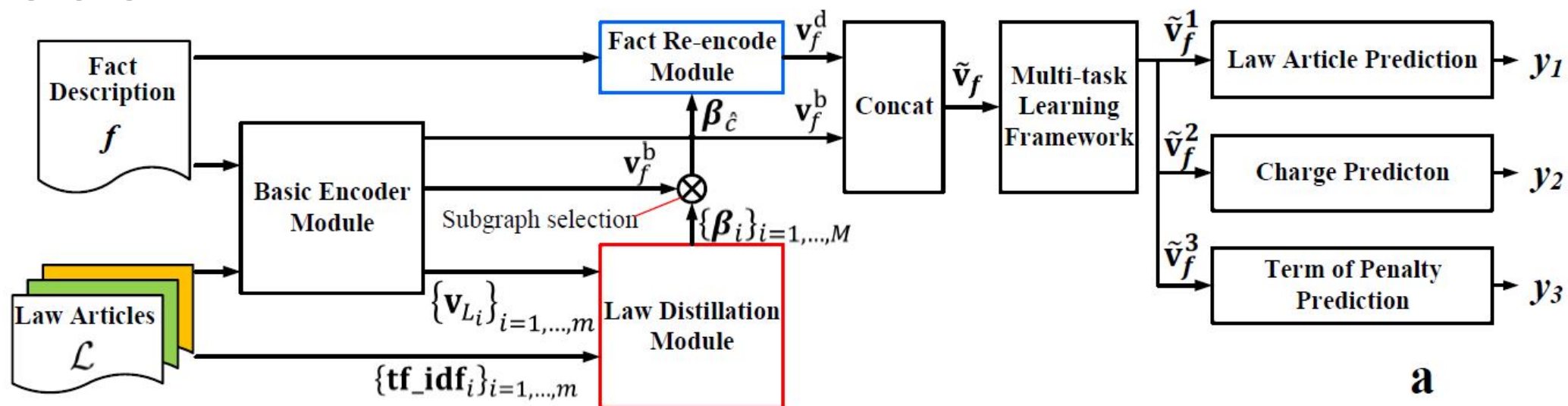
Dataset

- Chinese AI and Law challenge (CAIL2018)

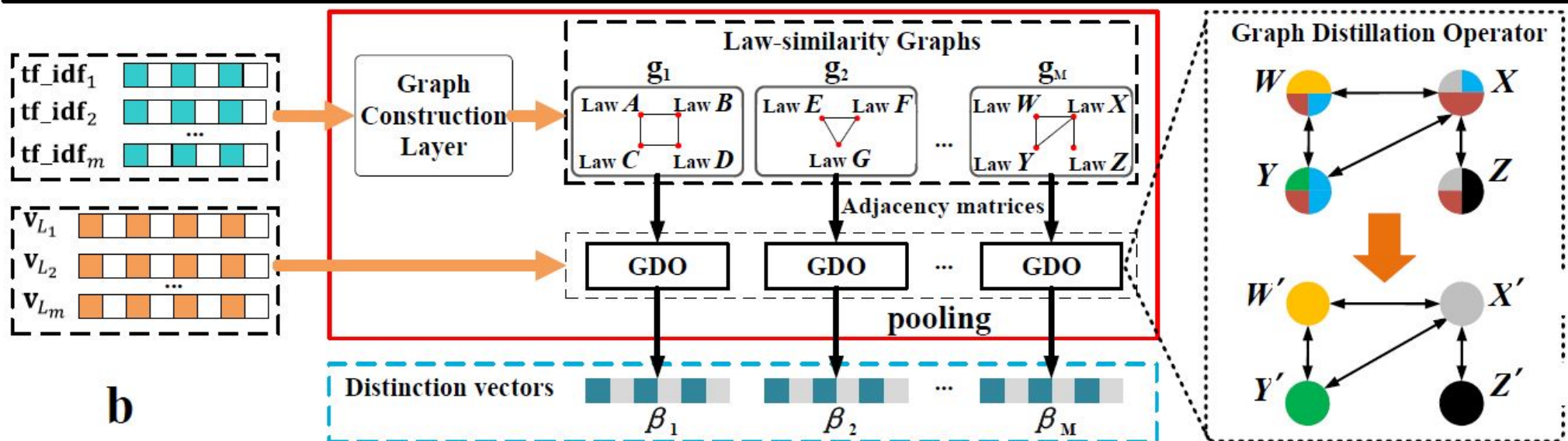| Dataset	CAIL-small	CAIL-big
#Training Set Cases	101,619	1,587,979
#Test Set Cases	26,749	185,120
#Law Articles	103	118
#Charges	119	130
#Term of Penalty	11	11

Table 1: Statistics of datasets.

Model

Graph distillation operator

- The basic idea behind our GDO is to learn effective features with distinction by removing similar features between nodes

$$\mathbf{v}_{L_i}^{(l+1)} = \Phi^{(l)}\mathbf{v}_{L_i}^{(l)} - \sum_{L_j \in N_i} \frac{\Psi^{(l)}[\mathbf{v}_{L_i}^{(l)}, \mathbf{v}_{L_j}^{(l)}]}{|N_i|} + \mathbf{b}^{(l)}$$

$$\beta_i = [\mathbf{MaP}(\{\mathbf{v}_{L_i}^{(H)}\}_{L_j \in g_i}), \mathbf{MiP}(\{\mathbf{v}_{L_i}^{(H)}\}_{L_j \in g_i})]$$

Re-encoding Fact with Distinguishable Attention

- firstly define the following linear function, which is used to predictits most related community in $g_{\hat{c}}$ graph G:

$$\hat{\mathbf{X}} = \text{softmax}(\mathbf{W}_g \mathbf{v}_f^{\text{b}} + \mathbf{b}_g)$$

$$\hat{c} = \arg\max_{i=1,\dots,M} \hat{X}_i.$$

- Re-encoding

$$\mathbf{h}_{i,j} = [\overrightarrow{\text{GRU}}(\mathbf{w}_{i,j}), \overleftarrow{\text{GRU}}(\mathbf{w}_{i,j})], \quad j = 1, \dots, n_i,$$

$$\mathbf{h}_i = [\overrightarrow{\text{GRU}}(\mathbf{v}_{s_i}), \overleftarrow{\text{GRU}}(\mathbf{v}_{s_i})], \quad i = 1, 2, \dots, n_f,$$

$$\alpha_{i,j} = \frac{\exp(\tanh(\mathbf{W}_w \mathbf{h}_{i,j})^{\mathsf{T}}(\mathbf{W}_{gw}\beta_{\hat{c}}))}{\sum_j \exp(\tanh(\mathbf{W}_w \mathbf{h}_{i,j})^{\mathsf{T}}(\mathbf{W}_{gw}\beta_{\hat{c}}))}$$

$$\alpha_i = \frac{\exp(\tanh(\mathbf{W}_s \mathbf{h}_i)^{\mathsf{T}}(\mathbf{W}_{gs}\beta_{\hat{c}}))}{\sum_i \exp(\tanh(\mathbf{W}_s \mathbf{h}_i)^{\mathsf{T}}(\mathbf{W}_{gs}\beta_{\hat{c}}))},$$

$$\mathbf{v}_{s_i} = \sum_{j=1}^{n_i} \alpha_{i,j} \mathbf{h}_{i,j},$$

$$\mathbf{v}_f^{\text{d}} = \sum_i \alpha_i \mathbf{h}_i.$$

Result

Tasks	Law Articles				Charges				Term of Penalty			
Metrics	Acc.	MP	MR	F1	Acc.	MP	MR	F1	Acc.	MP	MR	F1
FLA+MTL	77.74	75.32	74.36	72.93	80.90	79.25	77.61	76.94	36.48	30.94	28.40	28.00
CNN+MTL	78.71	76.02	74.87	73.79	82.41	81.51	79.34	79.61	35.40	33.07	29.26	29.86
HARNN+MTL	79.79	75.26	76.79	74.90	83.80	82.44	82.78	82.12	36.17	34.66	31.26	31.40
Few-Shot+MTL	79.30	77.80	77.59	76.09	83.65	80.84	82.01	81.55	36.52	35.07	26.88	27.14
TOPJUDGE	79.88	79.77	73.67	73.60	82.10	83.60	78.42	79.05	36.29	34.73	32.73	29.43
MPBFN-WCA	79.12	76.30	76.02	74.78	82.14	82.28	80.72	80.72	36.02	31.94	28.60	29.85
LADAN+MTL	**81.20**	**78.24**	**77.38**	**76.47**	**85.07**	**83.42**	**82.52**	**82.74**	**38.29**	**36.16**	**32.49**	**32.65**
LADAN+TOPJUDGE	**81.53**	**78.62**	**78.29**	**77.10**	**85.12**	**83.64**	**83.57**	**83.14**	**38.34**	**36.39**	**32.75**	**33.53**
LADAN+MPBFN	**82.34**	**78.79**	**77.59**	**76.80**	**84.83**	**83.33**	**82.80**	**82.85**	**39.35**	**36.94**	**33.25**	**34.05**

Table 2: Judgment prediction results on CAIL-small.

Tasks	Law Articles				Charges				Term of Penalty			
Metrics	Acc.	MP	MR	F1	Acc.	MP	MR	F1	Acc.	MP	MR	F1
FLA+MTL	93.23	72.78	64.30	66.56	92.76	76.35	68.48	70.74	57.63	48.93	45.00	46.54
CNN+MTL	95.84	83.20	75.31	77.47	95.74	86.49	79.00	81.37	55.43	45.13	38.85	39.89
HARNN+MTL	95.63	81.48	74.57	77.13	95.58	85.59	79.55	81.88	57.38	43.50	40.79	42.00
Few-Shot+MTL	96.12	85.43	80.07	81.49	96.04	88.30	80.46	83.88	57.84	47.27	42.55	43.44
TOPJUDGE	95.85	84.84	74.53	77.50	95.78	86.46	78.51	81.33	57.34	47.32	42.77	44.05
MPBFN-WCA	96.06	85.25	74.82	78.36	95.98	89.16	79.73	83.20	58.14	45.86	39.07	41.39
LADAN+MTL	**96.57**	**86.22**	**80.78**	**82.36**	**96.45**	**88.51**	**83.73**	**85.35**	**59.66**	**51.78**	**45.34**	**46.93**
LADAN+TOPJUDGE	**96.62**	**86.53**	**79.08**	**81.54**	**96.39**	**88.49**	**82.28**	**84.64**	**59.70**	**51.06**	**45.46**	**46.96**
LADAN+MPBFN	**96.60**	**86.42**	**80.37**	**81.98**	**96.42**	**88.45**	**83.08**	**84.95**	**59.85**	**51.75**	**45.59**	**47.18**

Result

Tasks	Law		Charge		Penalty	
Metrics	Acc.	F1	Acc.	F1	Acc.	F1
LADAN+MTL	81.20	76.47	85.07	83.14	38.29	32.65
-no GCL	80.46	75.98	84.04	82.33	37.80	31.85
-no GDO	80.82	76.19	84.65	82.50	36.69	31.62
-no both	79.79	74.97	83.72	82.02	34.87	31.34

Table 4: Ablation analysis on CAIL-small.

Result

Tasks	Law		Charge		Penalty	
Metrics	Acc.	F1	Acc.	F1	Acc.	F1
LADAN+MTL	81.20	76.47	85.07	83.14	38.29	32.65
-no GCL	80.46	75.98	84.04	82.33	37.80	31.85
-no GDO	80.82	76.19	84.65	82.50	36.69	31.62
-no both	79.79	74.97	83.72	82.02	34.87	31.34

Table 4: Ablation analysis on CAIL-small.

Case

Basic Encoder:

In the second half of 2017, the defendant Tian, while working in the Cadastral Unit of Luocheng Branch of Luohe City Land and Resources Bureau, used his position responsibility for cadastral registration to provide Zhao with a blank cadastral registration form, forged a false cadastral file, and accepted Zhao a certain amount of cash of 25,000 yuan for personal consumption.

Fact Re-encoder:

In the second half of 2017, the defendant Tian, while working in the Cadastral Unit of Luocheng Branch of Luohe City Land and Resources Bureau, used his position responsibility for cadastral registration to provide Zhao with a blank cadastral registration form, forged a false cadastral file, and accepted Zhao a certain amount of cash of 25,000 yuan for personal consumption.

Case example of Law Article 185:
Crimeof acceptance of bribes

Basic Encoder:

From Jan. 2006 to Mar.2007, the defendant Gong used the position of signing and clearing the contract for the coal unloading business of the plant's steam coal during his service as a company manager to obtain benefits for a loading and unloading team. And he illegally accepted the benefit fee of 40,000 yuan from the legal person of the loading and unloading team......

Fact Re-encoder:

From Jan. 2006 to Mar.2007, the defendant Gong used the position of signing and clearing the contract for the coal unloading business of the plant's steam coal during his service as a company manager to obtain benefits for a loading and unloading team. And he illegally accepted the benefit fee of 40,000 yuan from the legal person of the loading and unloading team......

Case example of Law Article 163:
Bribery crime of non-state emplotees

Figure 5: The attention visualization on case examples for Article 185 and Article 163.

Work

- Read ACL2020 Papers
- 模型实现进度 70%