# Domain Adaptation for Semantic Parsing

**Zechang Li**[1,2], Yuxuan Lai[1], Yansong Feng[1,3*] and Dongyan Zhao[1,2]

[1] Wangxuan Institute of Computer Technology, Peking University, Beijing, China

[2] Center for Data Science, Peking University, Beijing, China

[3] The MOE Key Laboratory of Computational Linguistics, Peking University, China

# Background

utterance: how long is the weekly standup meeting

logical form: listValue ( getProperty en.meeting.weekly_standup ( string length ) )

# Background

target domain: calendar **few**

# Background

target domain: calendar **few**



source domain: housing, restaurants, …, publications **sufficient**

# Motivation

| Domain | Instance |
|---|---|
| calendar | **utterance:** meetings attended by two or more people<br>**logical form:** **listValue ( countComparative ( getProperty ( singleton** en.meeting **)** **( string !type ) ) ( string** attendee **) ( string >= ) ( number** 2 **) )** |
| housing | **utterance:** housing units with 2 neighborhoods<br>**logical form:** **listValue ( countComparative ( getProperty ( singleton** en.housing_unit **) ( string !type ) ) ( string** neighborhood **) ( string = ) ( number** 2 **) )** |

# Motivation

| Domain | Instance |
|---|---|
| calendar | **utterance:** meetings attended by two or more people<br>**logical form:** **listValue ( countComparative ( getProperty ( singleton** en.meeting **)** **( string !type ) ) ( string** attendee **) ( string >= ) ( number** 2 **) )** |
| housing | **utterance:** housing units with 2 neighborhoods<br>**logical form:** **listValue ( countComparative ( getProperty ( singleton** en.housing_unit **) ( string !type ) ) ( string** neighborhood **) ( string = ) ( number** 2 **) )** |

**sketch**

# Motivation

utterance: how long is the weekly standup meeting

coarse stage

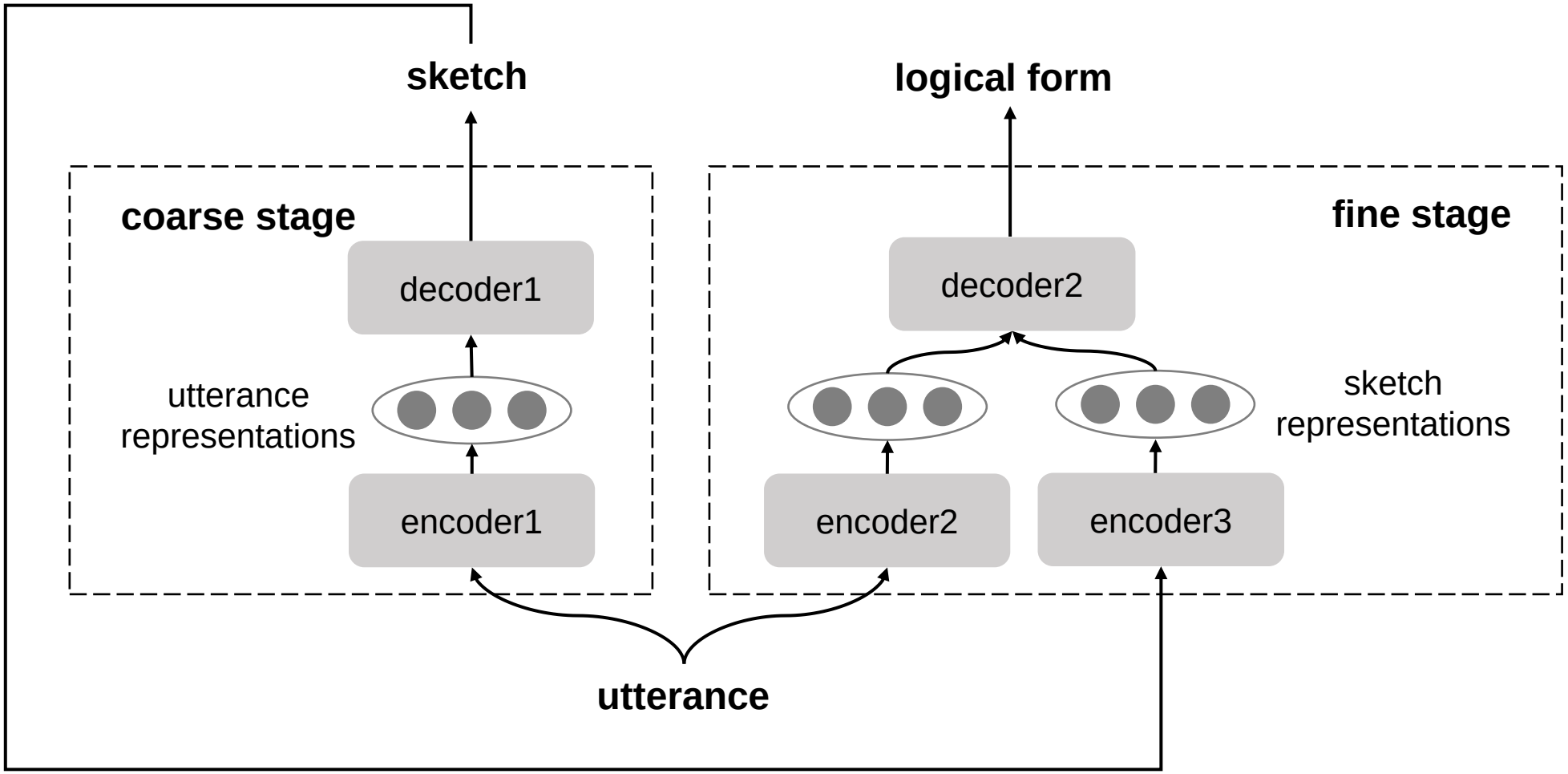
sketch: listValue ( getProperty@1 ( string@1 ) )

fine stage

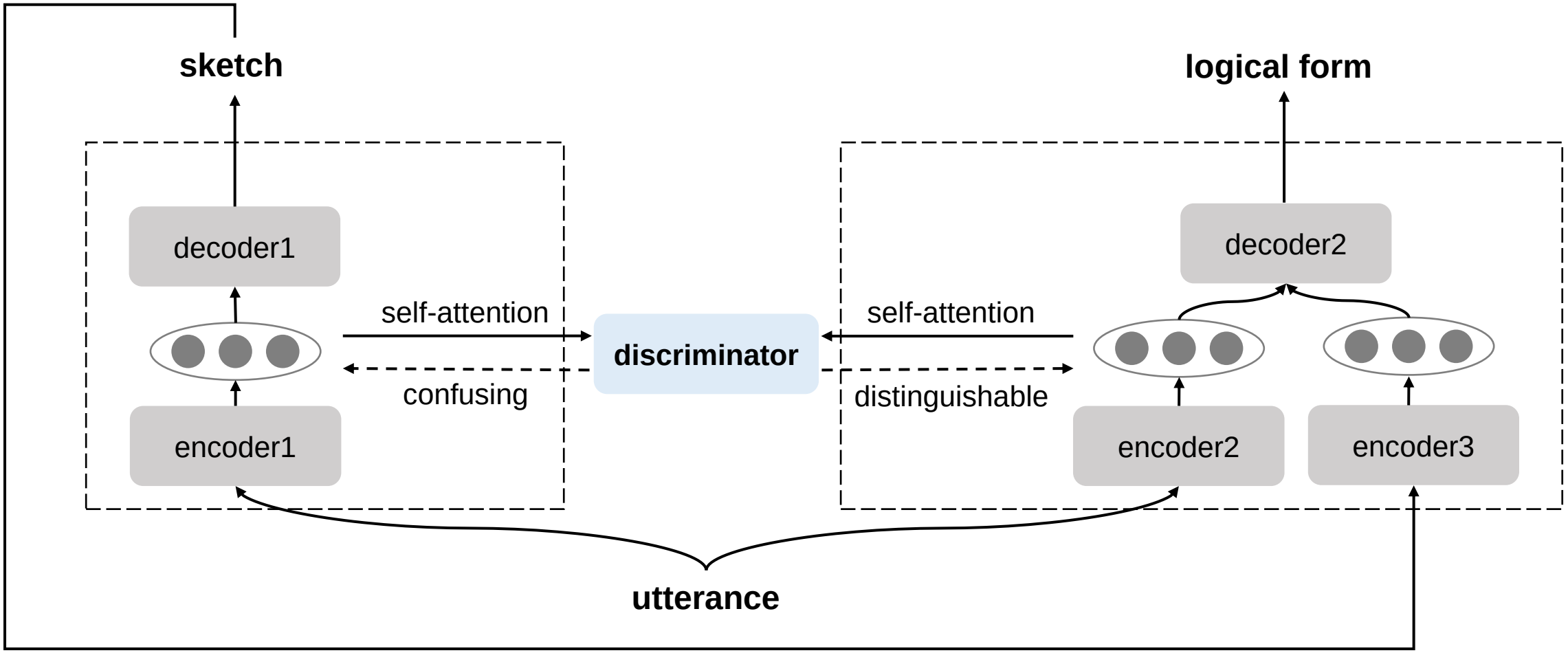
logical form: listValue ( getProperty en.meeting.weekly_standup ( string length ) )

[Dong et al. 2018]

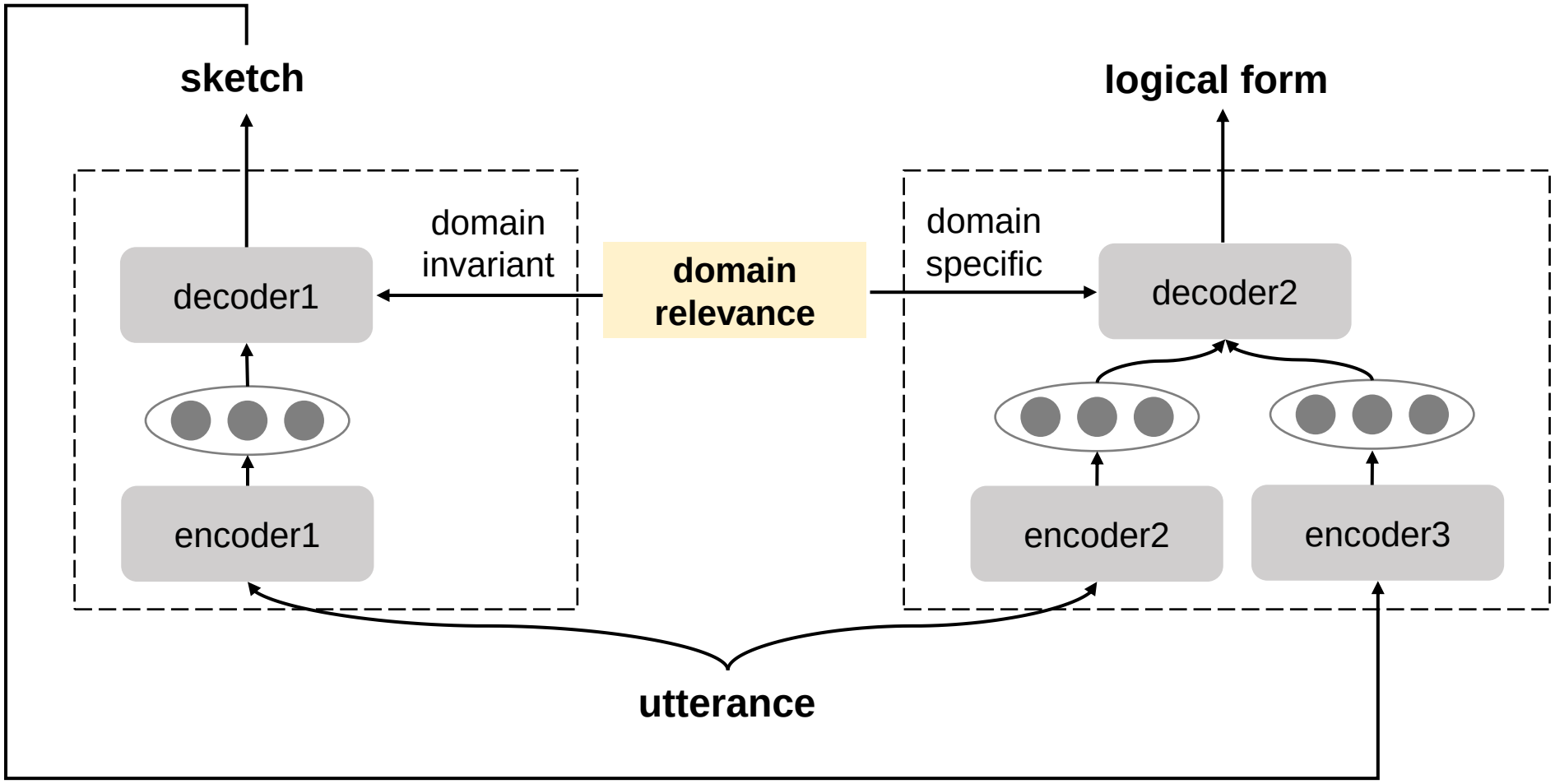
# Domain-Aware seMantic Parser



# Domain Discrimination



# Domain Relevance Attention



# Domain Relevance Attention

$$\boldsymbol{\alpha}_t = softmax(\boldsymbol{U} \cdot \boldsymbol{d}_t)$$

$$\boldsymbol{c}_t = \boldsymbol{U} \cdot \boldsymbol{\alpha}_t$$

$$[\boldsymbol{d}_t; \boldsymbol{c}_t]$$

# Domain Relevance Attention

$$\boldsymbol{\alpha}_t = softmax(\boldsymbol{U} \cdot \boldsymbol{d}_t)$$

$$\boldsymbol{c}_t = \boldsymbol{U} \cdot \boldsymbol{\alpha}_t$$

$$\boldsymbol{\alpha}_t^{pri} = softmax((\boldsymbol{U} \cdot \boldsymbol{d}_t) \circ \boldsymbol{q}^c)$$

$$\boldsymbol{c}_t^{pri} = \boldsymbol{U} \cdot \boldsymbol{\alpha}_t^{pri}$$

$$[\boldsymbol{d}_t; \boldsymbol{c}_t]$$



$$[\boldsymbol{d}_t; \boldsymbol{c}_t; \boldsymbol{c}_t^{pri}]$$

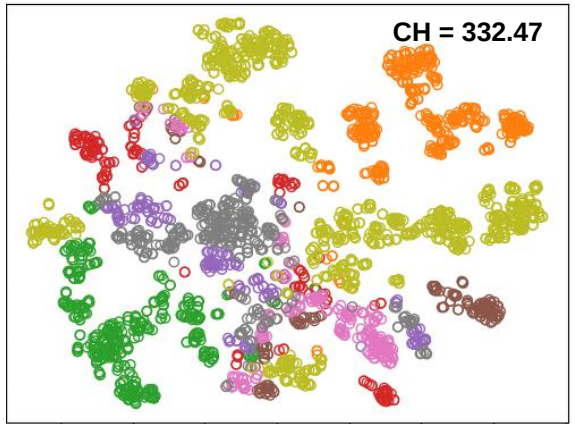
# Experiments

| | recipes | publications | calendar | housing | **average** |
|---|---|---|---|---|---|
| seq2seq | 58.80 | 36.64 | 34.52 | 36.50 | 41.62 |
| coarse2fine | 62.96 | 38.51 | 38.10 | 39.15 | 44.68 |
| p-share | 51.39 | 27.33 | 27.97 | 33.86 | 35.14 |
| pre-train | 59.72 | 40.99 | 43.45 | 42.32 | 46.62 |
| adversarial | 68.06 | 40.37 | **44.04** | 41.27 | 48.44 |
| DAMP | **72.22** | **45.96** | 39.88 | **43.39** | **50.36** |

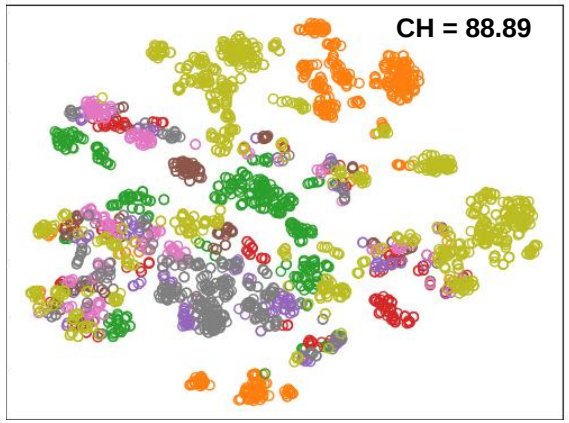
# Experiments

| Model | $Sketch$ | $LF_{oracle}$ | $LF$ |
|---|---|---|---|
| $DAMP$ | 83.80 | 85.19 | 72.22 |
| $DAMP_{-dis}$ | 82.87 | 85.19 | 70.83 |
| $DAMP_{-att}$ | 81.94 | 82.41 | 68.06 |
| coarse2fine | 73.61 | 82.87 | 62.96 |

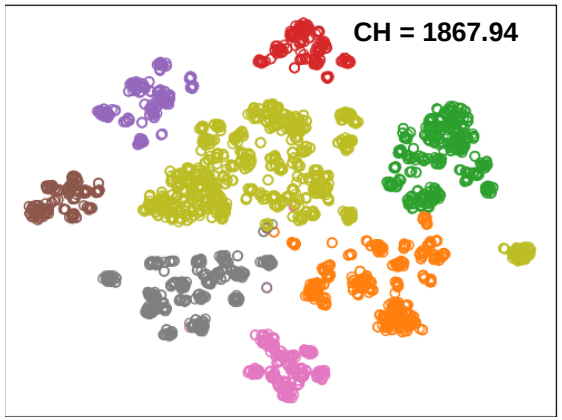
# Experiments




(a) coarse2fine

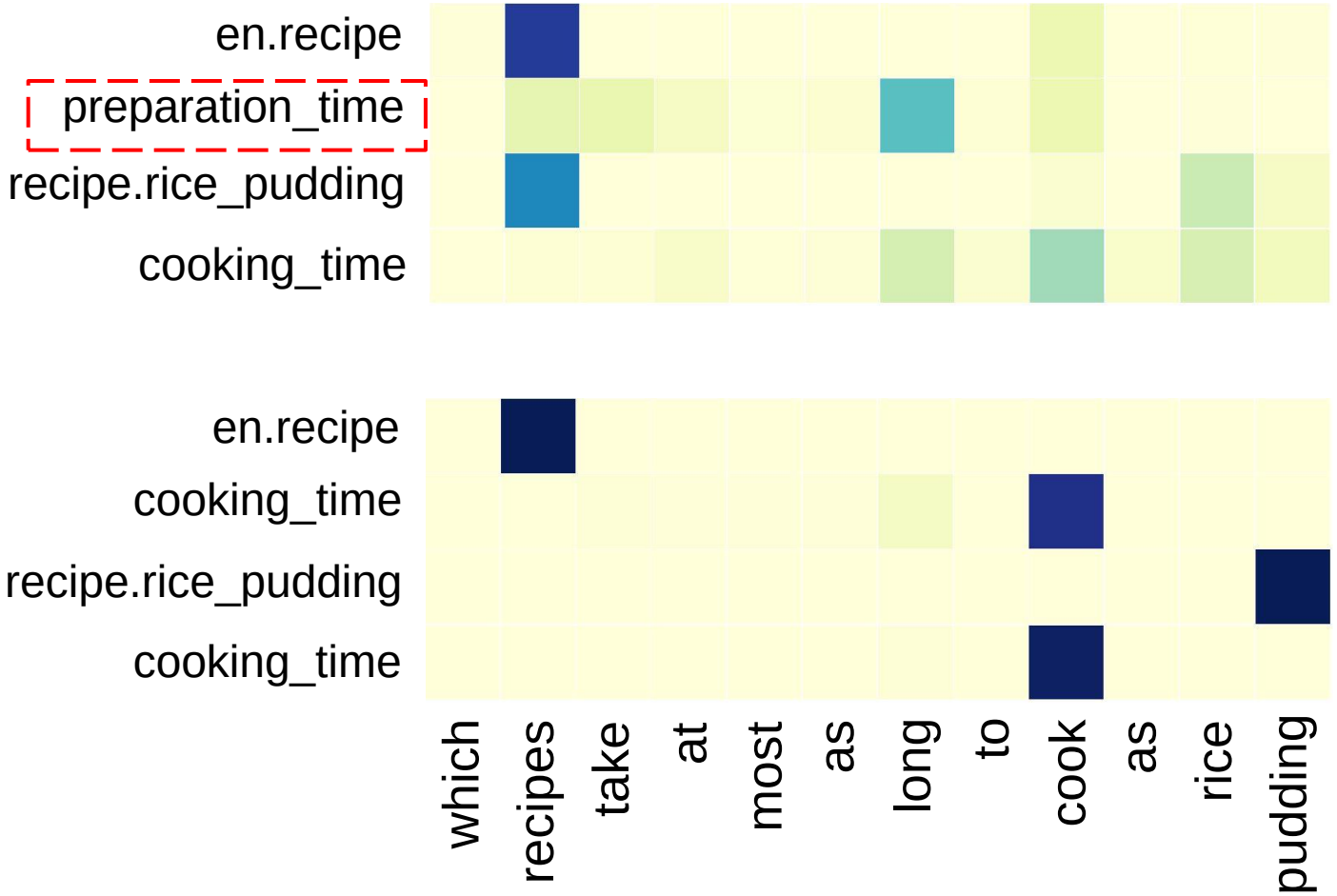



(b) DAMP - coarse




(c) DAMP - fine

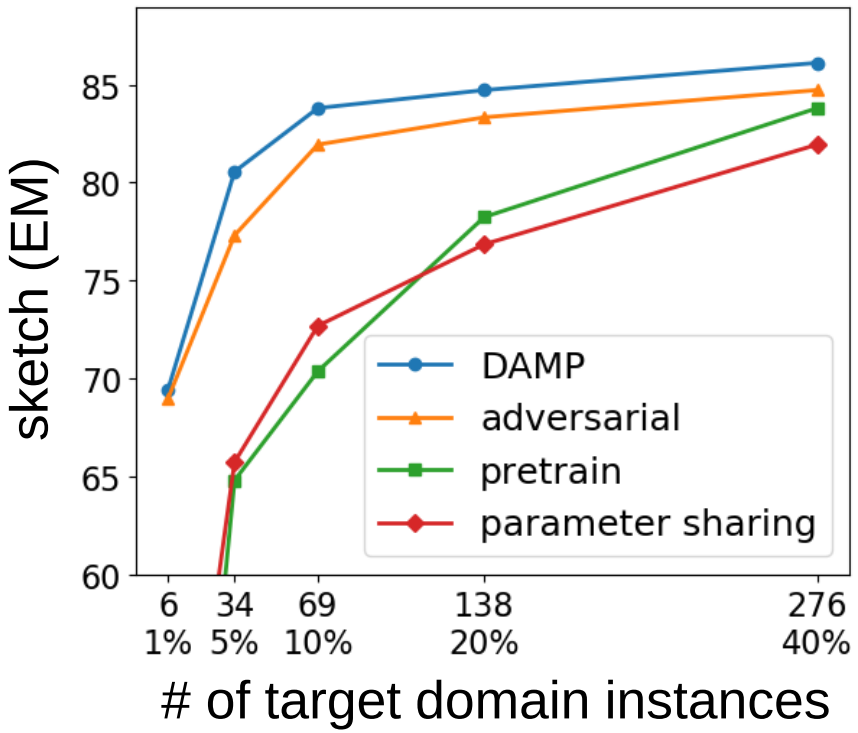
# Experiments

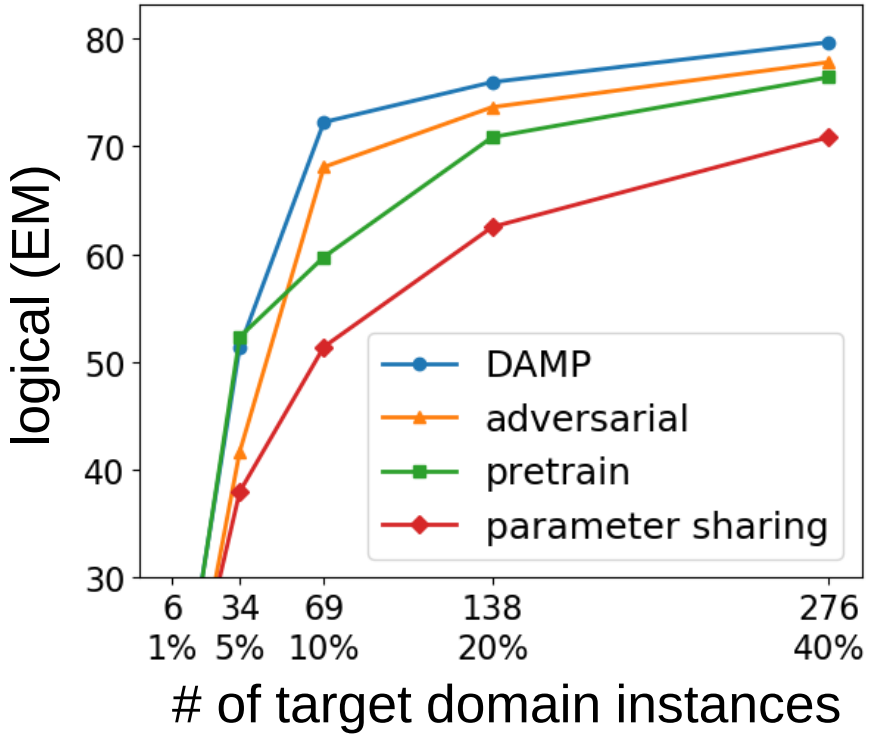



(a) coarse2fine - fine

(b) DAMP - fine

# Experiments



github

# Thank you!