

# 113A 自然語言處理 課程專題

## 中文維度型面向情感分析

智能系統研究所 李龍豪

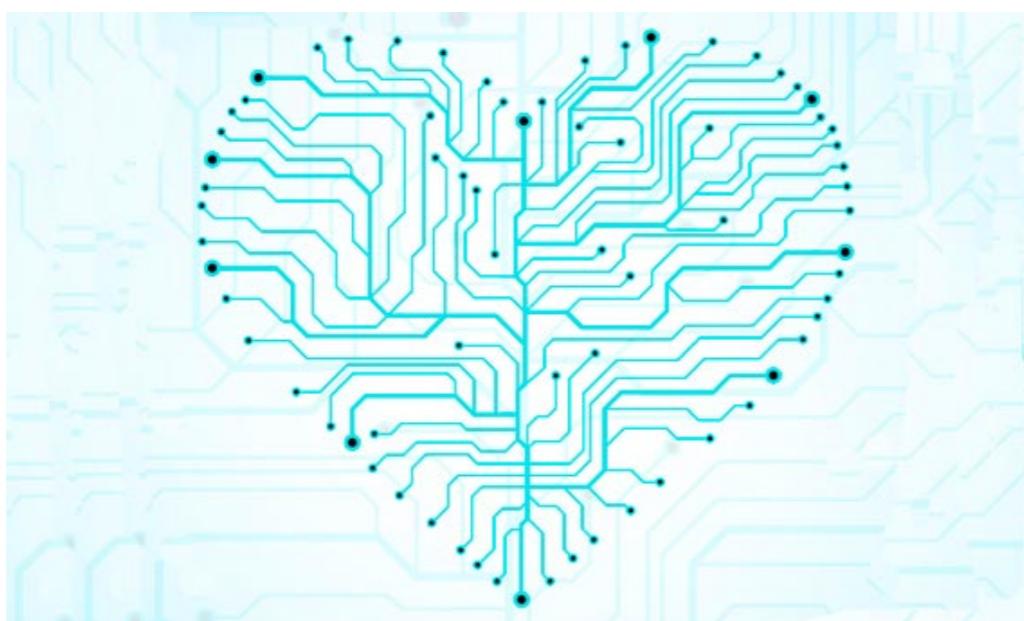
[lhlee@nycu.edu.tw](mailto:lhlee@nycu.edu.tw)

Updated: October 24th, 2024

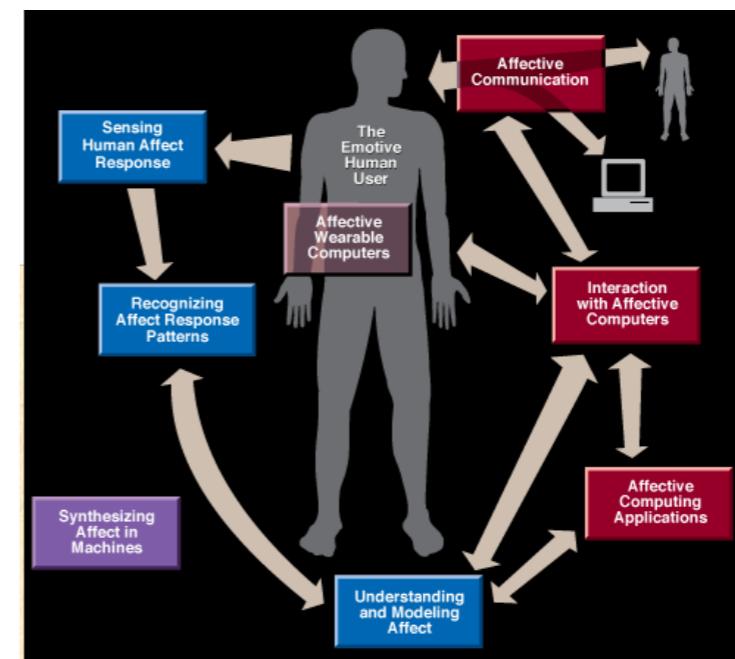
# Sentiment Analysis

- [https://en.wikipedia.org/wiki/Affective computing](https://en.wikipedia.org/wiki/Affective_computing)

**Affective Computing** (情感運算) (sometimes called **artificial emotional intelligence**, or **emotion AI**) is the study and development of systems and devices that can **recognize**, **interpret**, **process**, and **simulate human affects**. It's an interdisciplinary field spanning **computer science**, **psychology**, and **cognitive science**.



Source: [OpenMind](#)

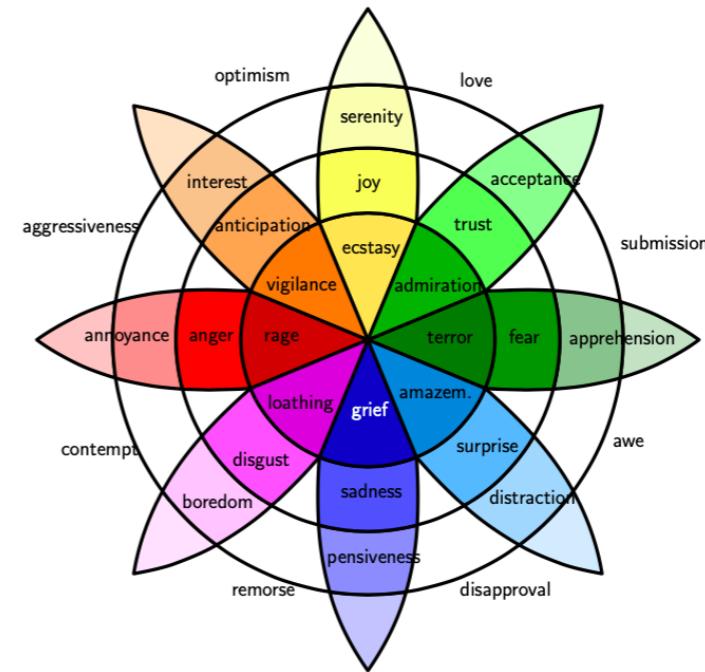


Source: [MIT Media Lab](#)

# Emotion Classification



(a) Ekman's model



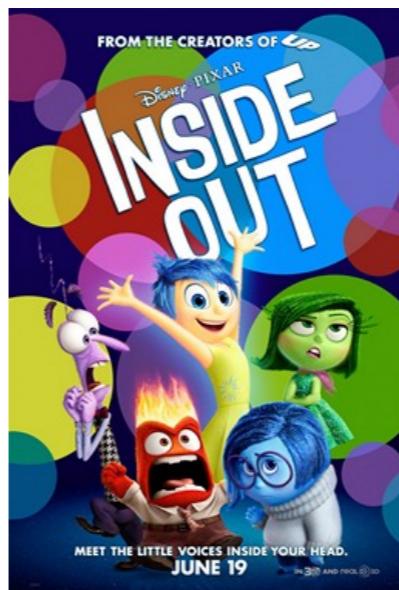
(b) Plutchik's Wheel of Emotions

Source: [Troiano et al. \(2022\)](#)

科學界重新定義了情緒 - 人類至少擁有27種情緒



3



2015 Inside Out 腦筋急轉彎

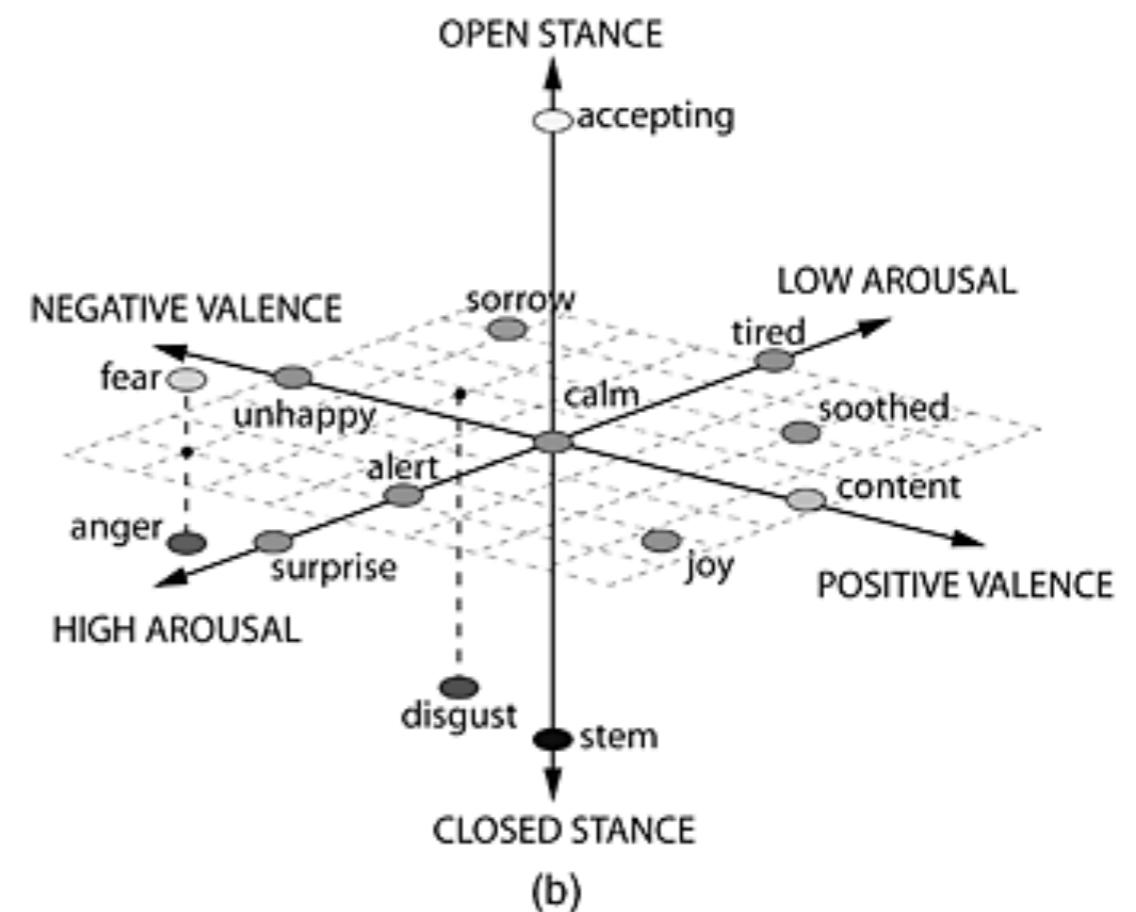
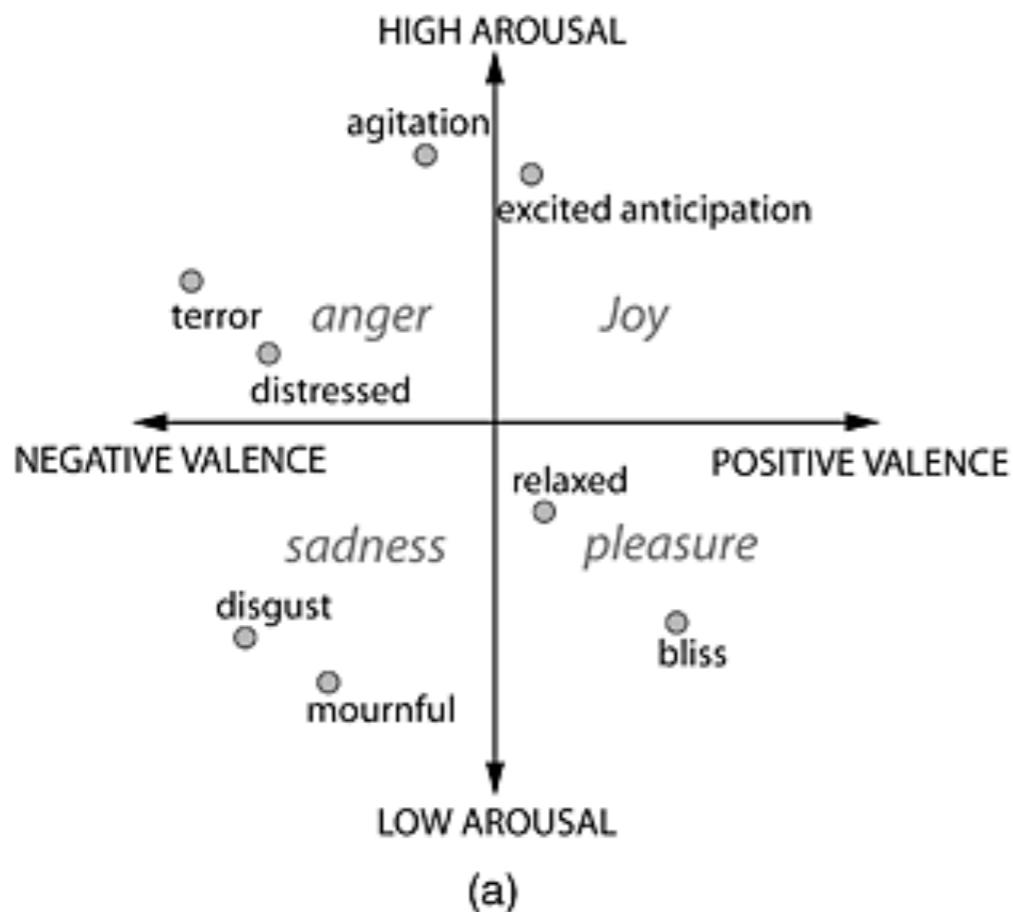


Source: [wiki](#)

2024 腦筋急轉彎2

# Emotion Dimensions

- Valence - Arousal - Dominance

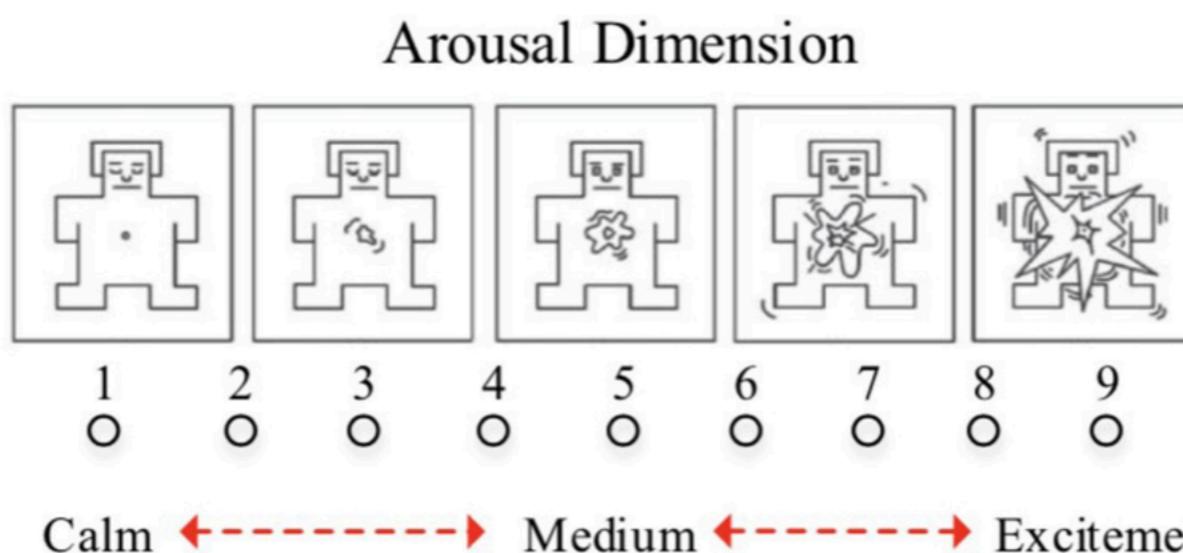
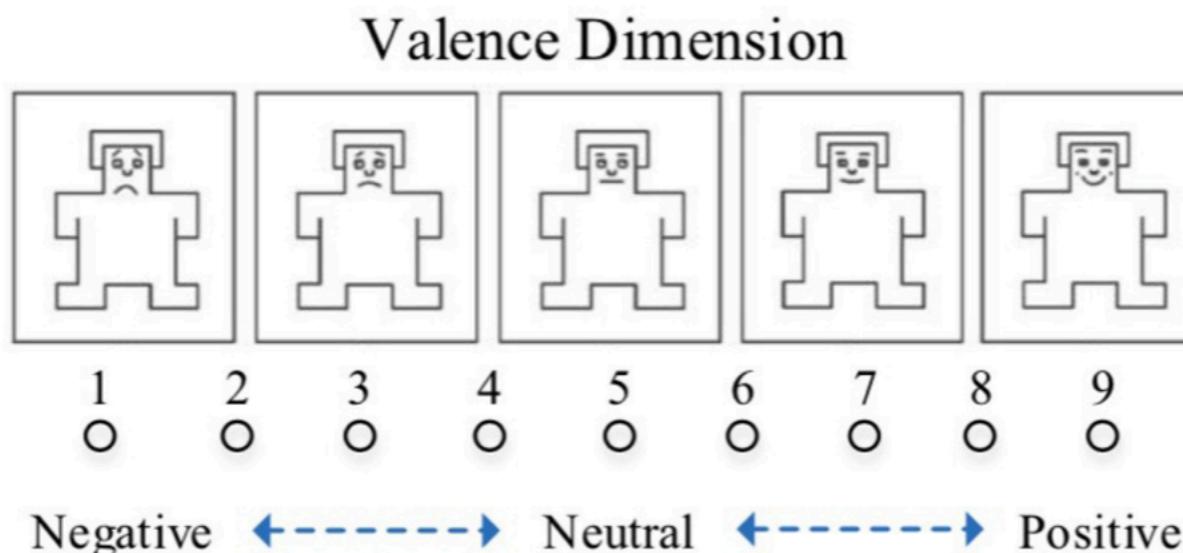


Source: IEEE Computer Society

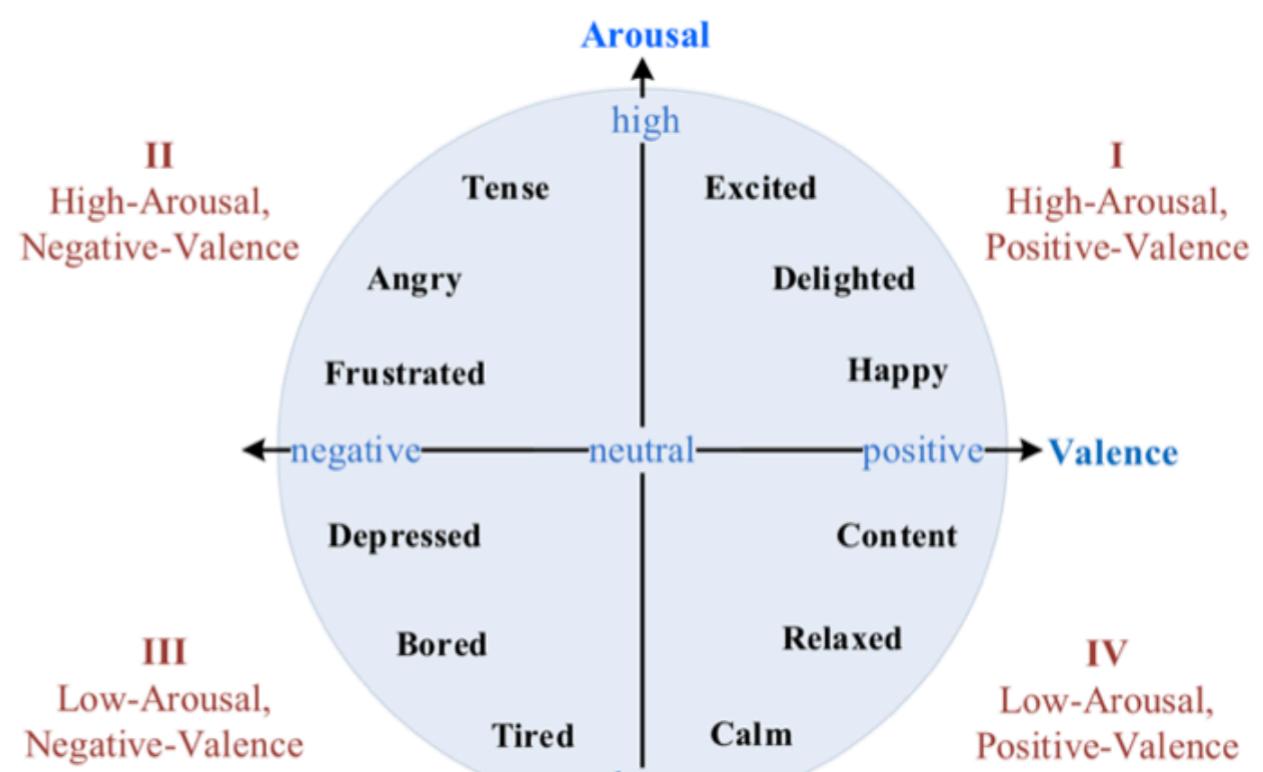
# How to Build Chinese Affective Resources?

- **Self-Assessment Manikin (SAM)**

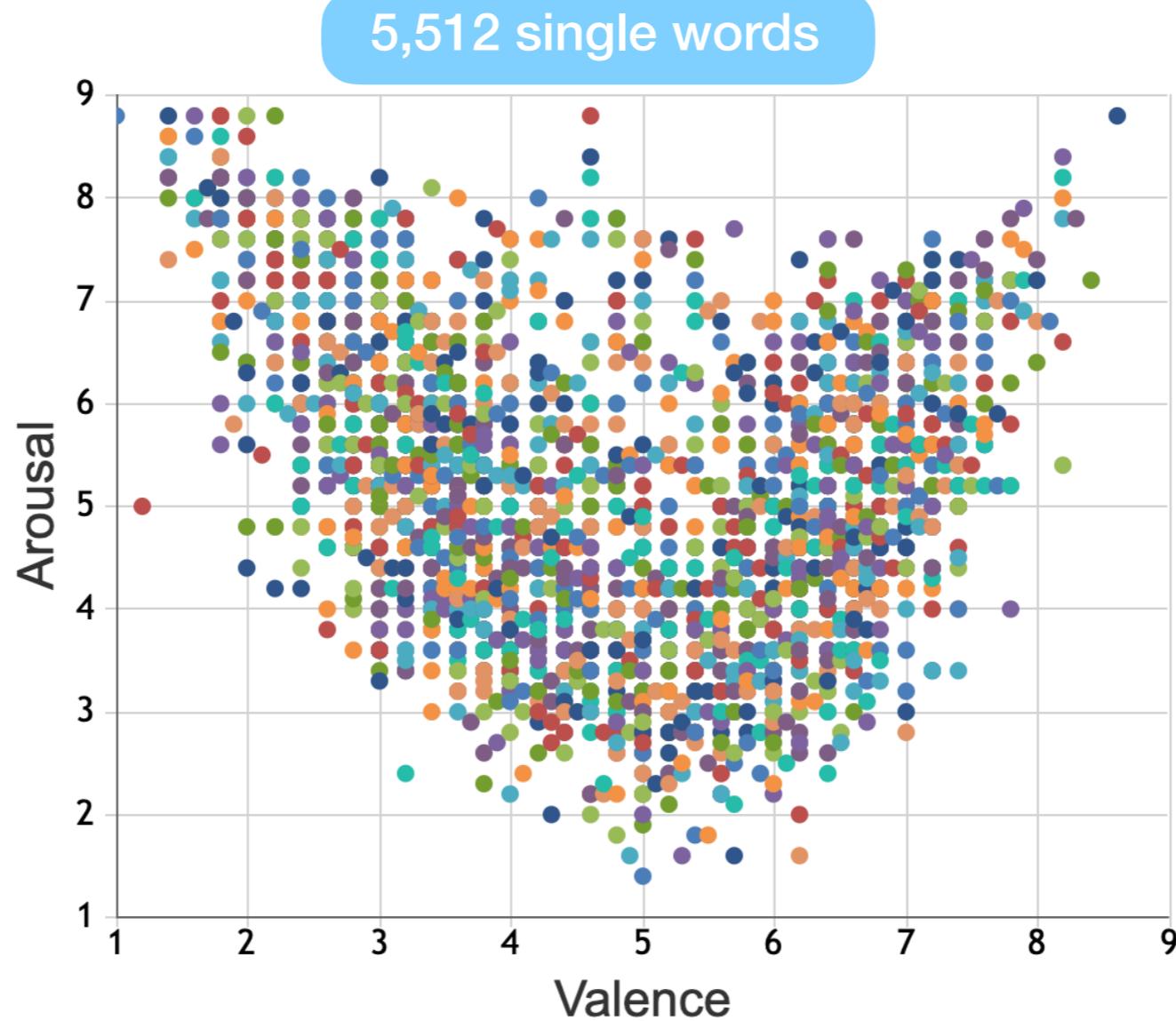
蘋果的回答是肯定的，從去年下半年開始，蘋果頻頻對外釋出向服務轉型的訊號，甚至在今年的春季釋出會上，徹底拋開硬體，全力宣傳其流媒體和金融服務。



- **Chinese LIWC  
(Linguistic Inquiry and Word Count)**

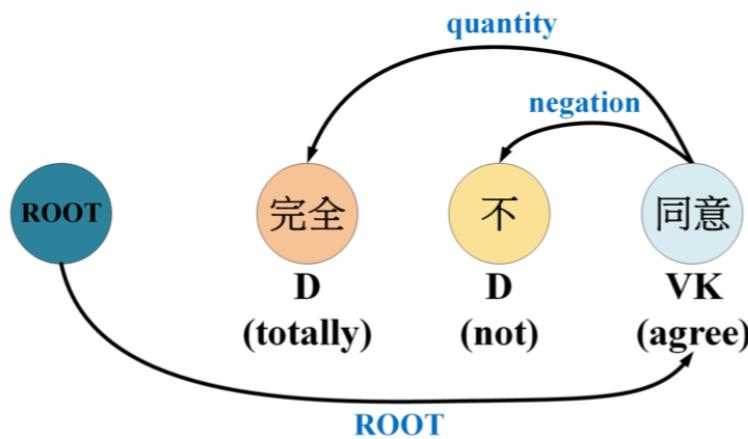


# Chinese Valence-Arousal Words (CVAW)

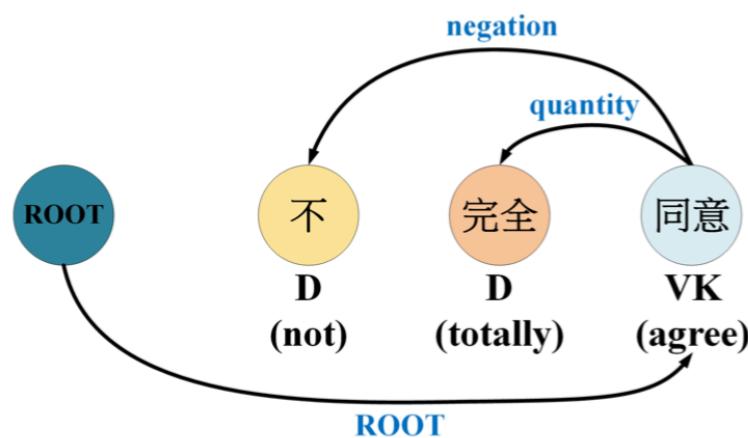


No.	Word	Valence_Mean	Valence_SD	Arousal_Mean	Arousal_SD	Frequency
286	乏味	3.4	0.800	3.0	1.414	25
559	放鬆	6.2	0.748	2.0	0.894	78
983	勝利	7.8	0.748	7.2	1.166	174
1099	痛苦	2.4	0.490	6.8	0.748	369

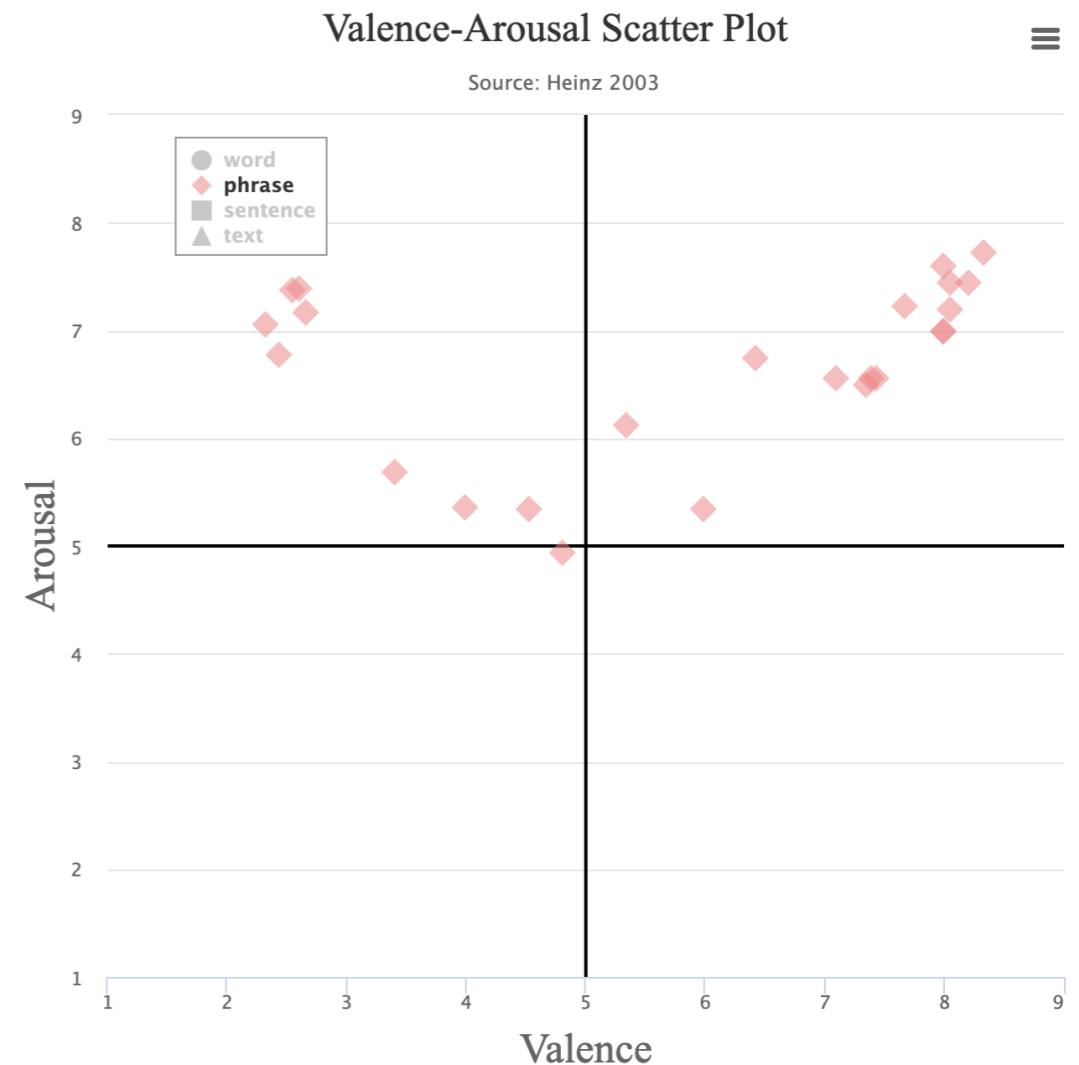
# Chinese Phrases



超不開心、相當不開心、本來很開心  
格外開心、應該超開心、挺開心....

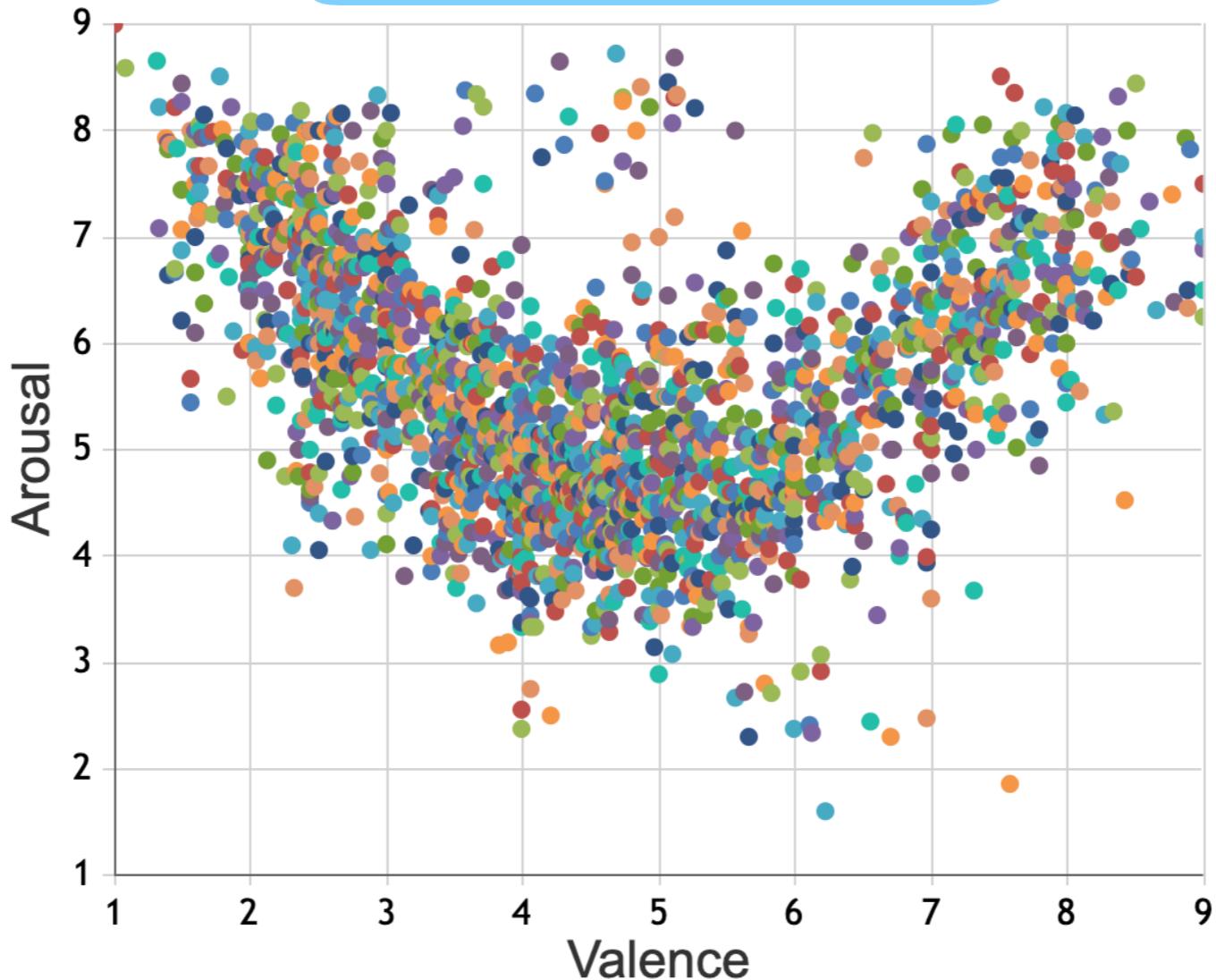


Modifier Type	Modifier
Negator	不, 不能, 沒, 沒有
Degree Adverb	有點, 稍, 稍許, 稍稍, 稍微, 略, 略微, 還, 蠻, 愈, 越, 越加, 越發, 好, 老, 怪, 尤其, 較, 較為, 比較, 完全, 更, 更加, 更為, 非常, 挺, 很, 太, 相當, 十分, 格外, 特別, 異常, 最, 最為, 無比, 超, 超級, 極其, 極度, 極為, 萬分
Modal	也許, 可能, 本來, 應該, 本該, 本能



# Chinese Valence-Arousal Phrases (CVAP)

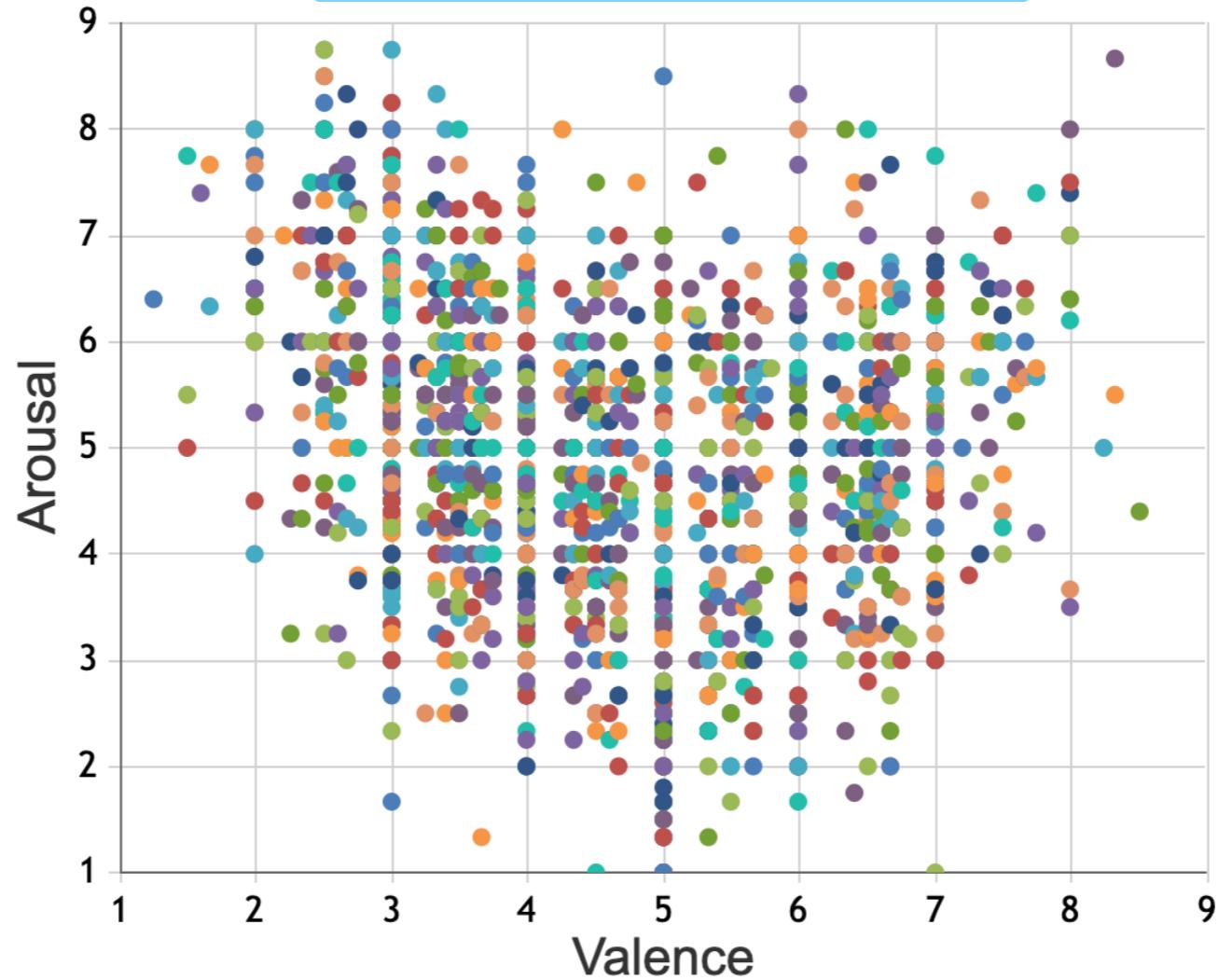
2,998 multi-word phrases



Modifier Type	Phrase	Valence_Mean	Arousal_Mean	Valence_SD	Arousal_SD
deg	十分有趣	8.222	7.063	0.533	0.390
mod	應該開心	5.986	5.350	0.242	0.456
neg	不喜歡	3.033	5.788	0.481	0.605
neg_deg	沒有太難過	4.478	4.675	0.413	0.538

# Chinese Valence-Arousal Sentences (CVAS)

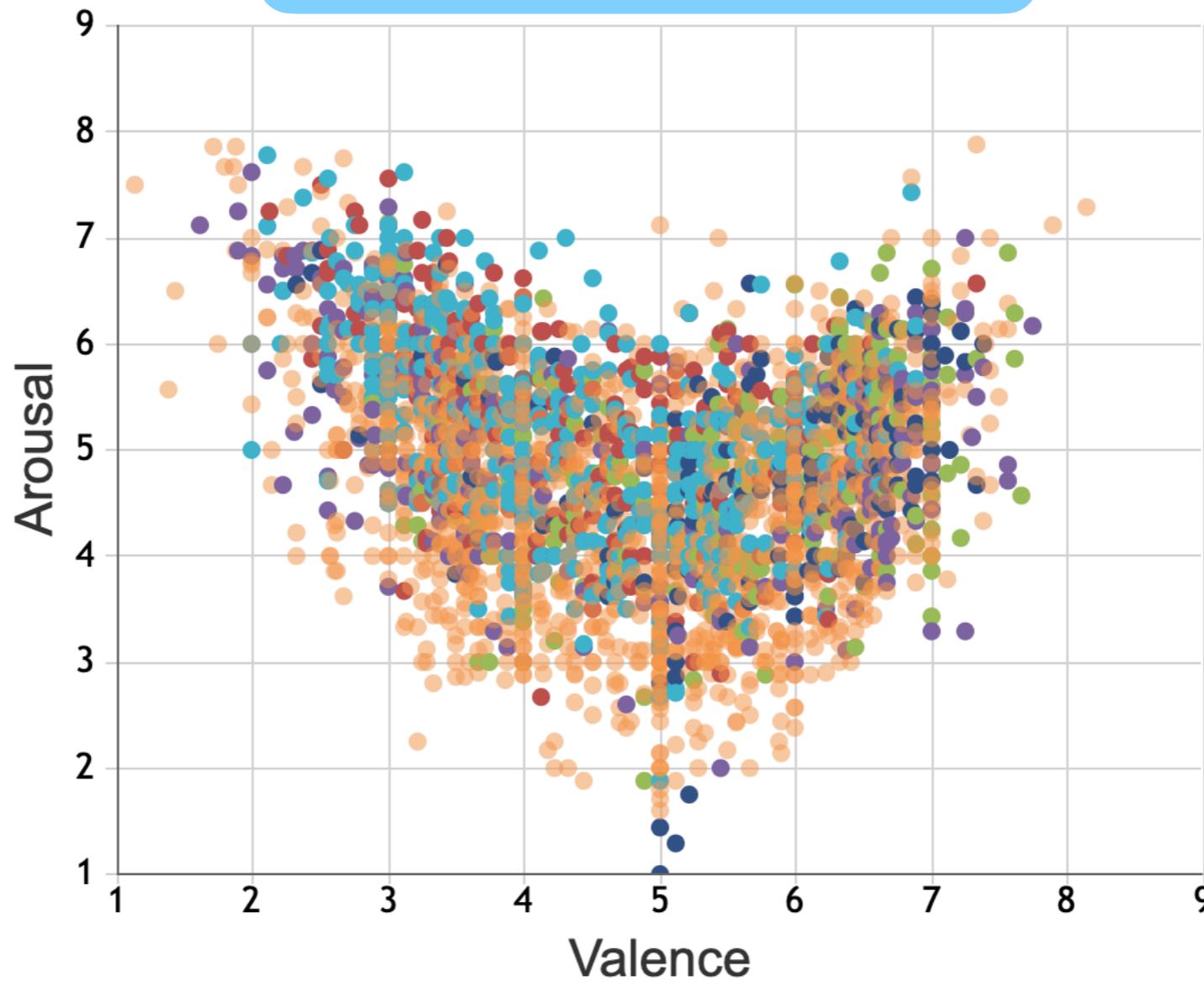
2,582 single sentences



Text	Valence_Mean	Arousal_Mean	Valence_SD	Arousal_SD
這是我觀賞過的最令人驚歎的演出。	7.000	7.750	0.000	0.433
簡直是人生惡夢的開端。	2.600	6.750	0.490	0.829
從小我經常覺得現實很無聊。	3.667	4.333	0.471	0.471
過去他們很輕鬆地賺錢。	5.667	4.000	1.247	0.816

# Chinese Valence-Arousal Texts (CVAT)

2,969 multi-sentence texts

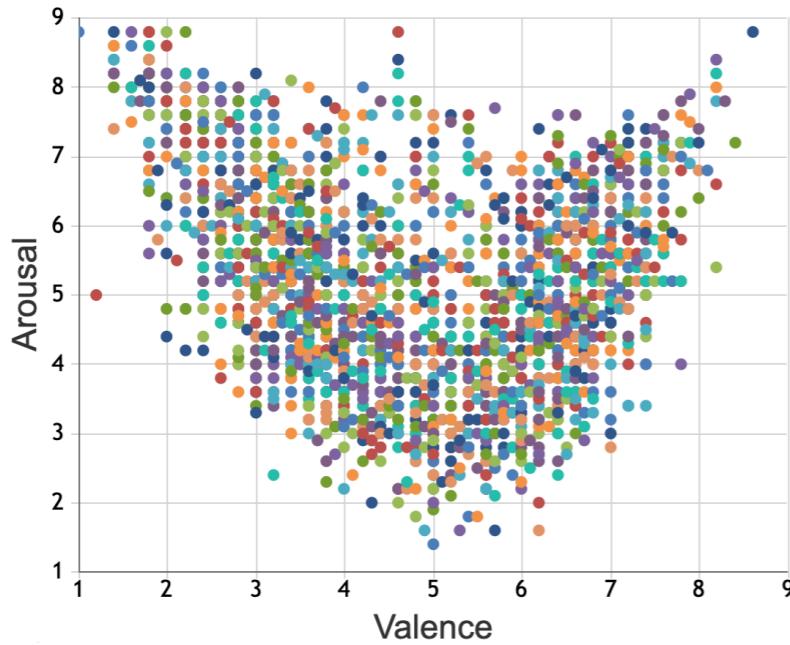


No.	Text	Category	Valence	Arousal
357	很多車主抱怨新車怠速抖動嚴重----冷車時更嚴重。	Car	3.250	5.667
805	房間裏徽味，煙味撲鼻，沒有窗戶通風，骯髒的地毯上的斑斑點點的污蹟，令人觸目驚心。	Hotel	1.889	6.875
982	CPU顯卡也完全夠用，接口也非常齊全，總體來說很滿意！	Laptop	7.143	5.000
1078	飛安帶來更多保障，也提供旅客更安心的服務品質。	News	7.000	4.222

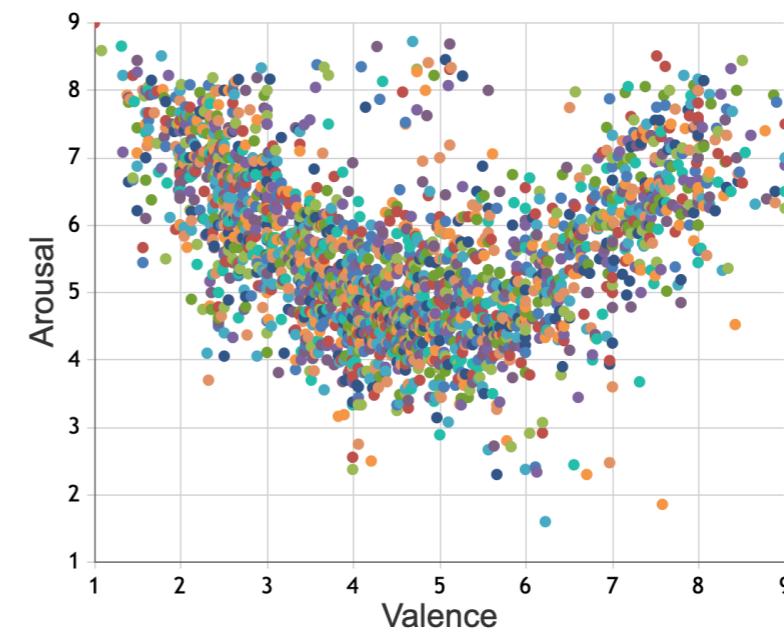
# Chinese EmoBank

<http://nlp.innobic.yzu.edu.tw/resources/ChineseEmoBank.html>

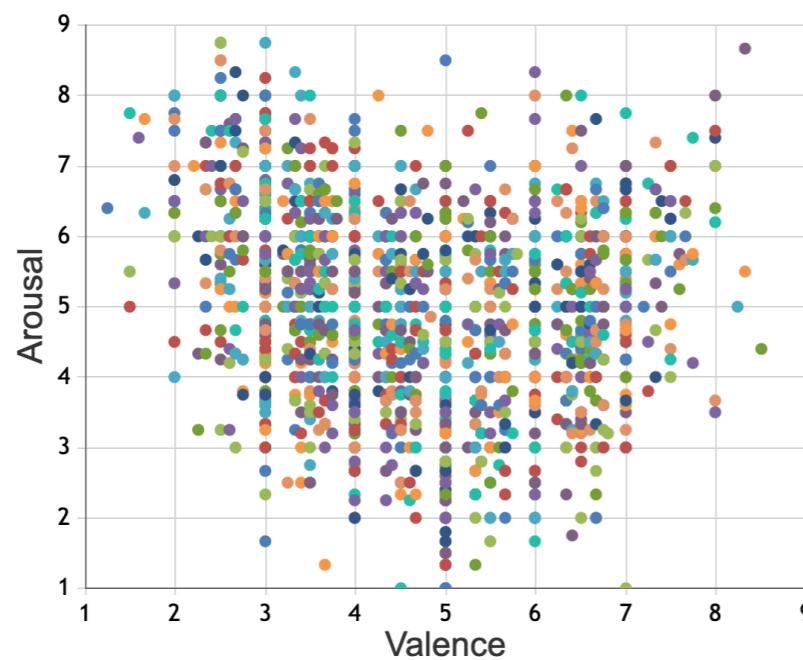
**CVAW:** 5,512 single words



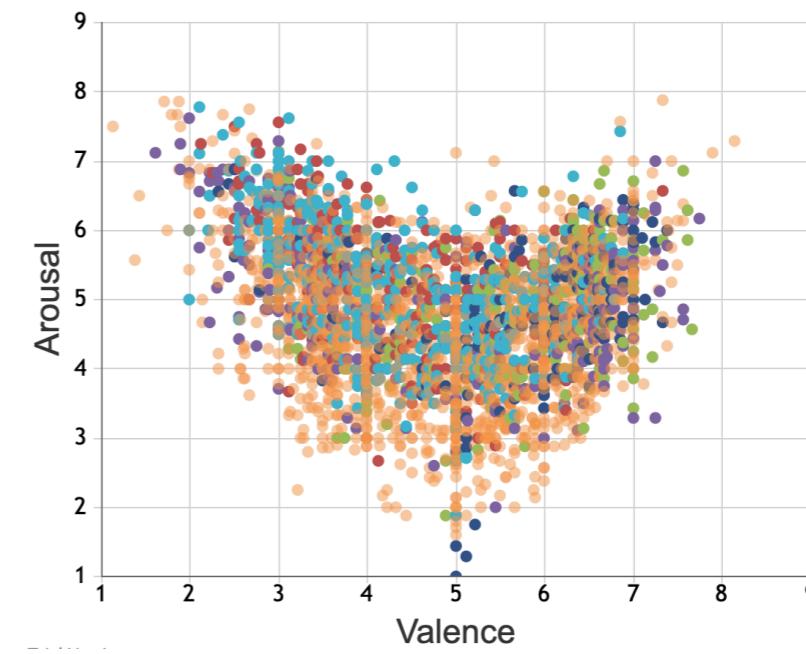
**CVAP:** 2,998 multi-word phrases



**CVAS:** 2,582 single sentences



**CVAT:** 2,969 multi-sentence texts



# Dimensional Sentiment Analysis

- 112B NLP Term Project: 中文醫療反思維度情感分析

## Example 1

Input: ex01, 主治醫師曾經多次強調血液透析和輸血，以病人的狀況就是不建議，已經在加護病房積極治療了兩個禮拜，家屬却遲遲無法達到共識。

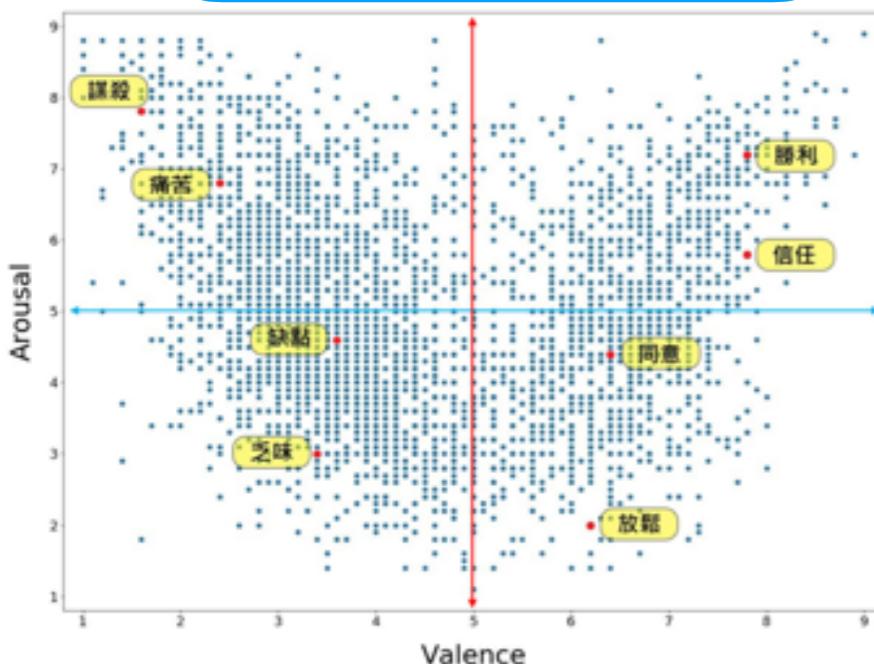
Output: ex01, 4.750, 2.750

## Example 2

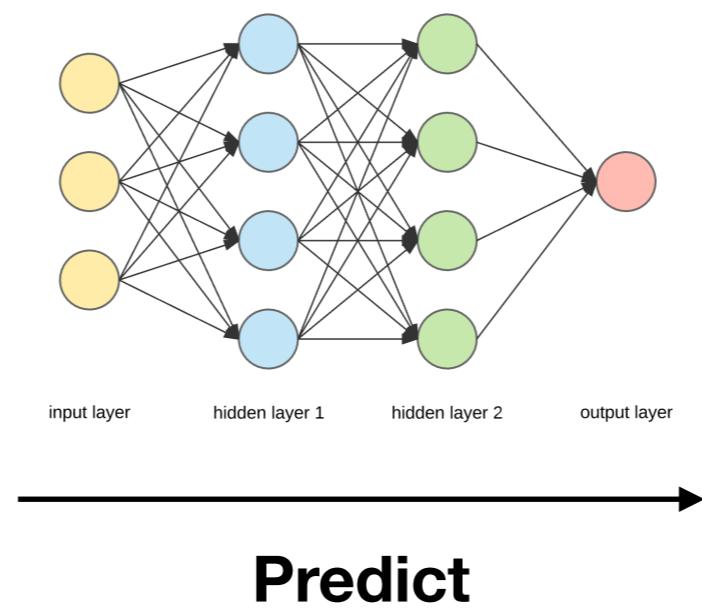
Input: ex02, 視病如親，這個成語一直是一個難以達成的理想，但在ICU我感受到醫療端與病人和家屬站在同一陣線、共同努力對抗病魔，完成病人的願望的努力，讓我十分的動容。

Output: ex02, 6.900, 5.600

Chinese EmoBank

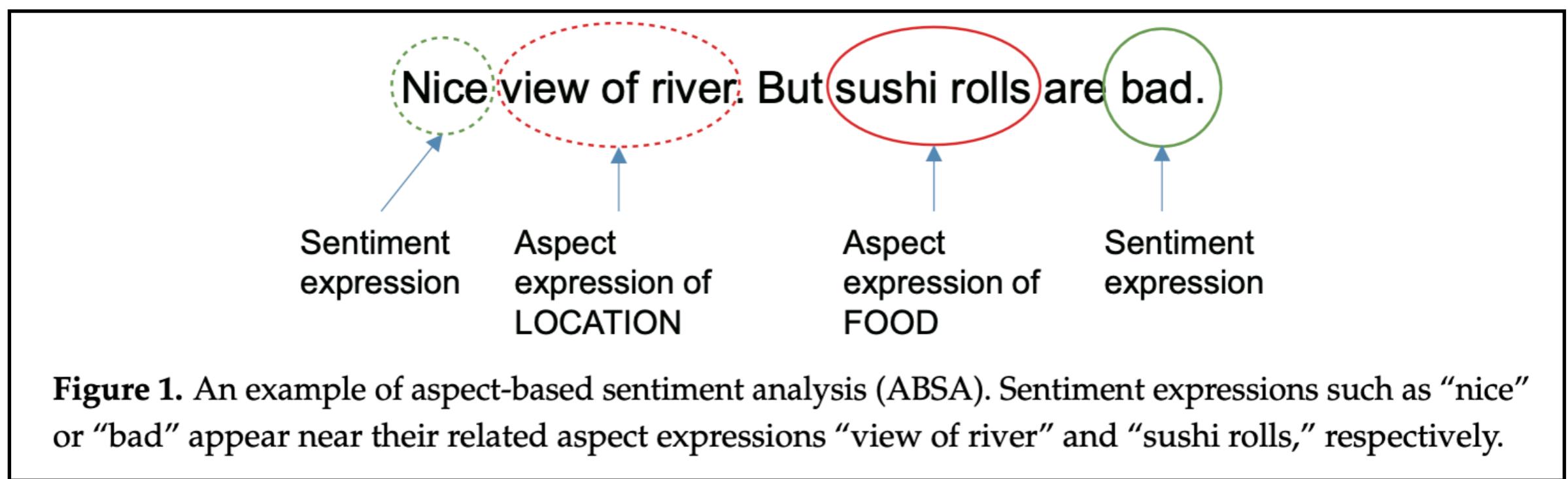


Medical Self-Reflection Texts



# Aspect-Based Sentiment Analysis

- **Aspect-Based Sentiment Analysis (ABSA)** (Pontiki et al., 2014; 2015; 2016) is a critical NLP research topic that aims to identify the aspects of a given entity and analyzing the sentiment polarity associated with each aspect. In recent years, numerous research efforts have been made on ABSA, which can be categorized into different tasks based on the number of sentimental elements to be extracted.



# Dimensional Aspect-Based Sentiment Analysis

- SIGHAN 2024 dimABSA task: <https://dimabsa2024.github.io/>
- Subtask 1: Intensity Prediction  
Input: E0001:S001, 檸檬醬也不會太油，塔皮對我而言稍軟。, 檸檬醬#塔皮  
Output: E0001:S001 (檸檬醬,5.67#5.5)(塔皮,4.83#5.0)
- Subtask 2: Triplet Extraction  
Input: E0002:S002, 不僅餐點美味上菜速度也是飛快耶！！  
Output: E0002:S002 (餐點, 美味, 6.63#4.63) (上菜速度, 飛快, 7.25#6.00)
- Subtask 3: Quadruple Extraction  
Input: E0003:S003, 這碗拉麵超級無敵霹靂難吃  
Output: E0003:S003 (拉麵, 食物#品質, 超級無敵霹靂難吃, 2.00#7.88)

# 113A Term Project

- **Dimensional Aspect Sentiment Triplet Extraction (ASTE)**

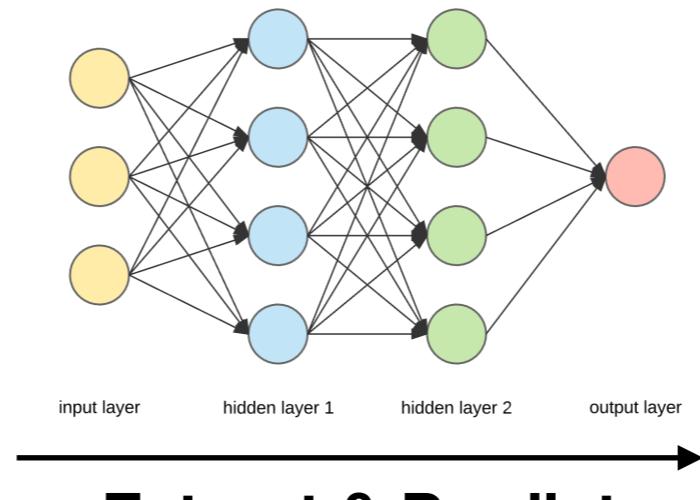
Input: E0002:S002, 不僅餐點美味上菜速度也是飛快耶！！

Output: E0002:S002 (餐點, 美味, 6.63#4.63) (上菜速度, 飛快, 7.25#6.00)

SIGHAN 2024 dimABSA datasets

```
1 [  
2 {  
3   "ID": "E0001:S001",  
4   "Sentence": "這個湯頭濃重了一些",  
5   "Aspect": [  
6     "湯頭"  
7   ],  
8   "AspectFromTo": [  
9     "3#4"  
10  ],  
11  "Category": [  
12    "食物#品質"  
13  ],  
14  "Opinion": [  
15    "濃重了一些"  
16  ],  
17  "OpinionFromTo": [  
18    "5#9"  
19  ],  
20  "Intensity": [  
21    "4.5#3.25"  
22  ]  
},  
]
```

Restaurant Review



Extract & Predict



# Evaluation Metrics

- First, the valence and arousal values are rounded to an integer
- Next, a triplet is regarded as correct if and only if the three elements and their combination match those in the gold triplet
- Each metric for the valence and arousal dimensions is calculated and ranked either independently or in combination.

$$Precision = \frac{TP}{TP + FP}$$

$$Recall = \frac{TP}{TP + FN}$$

$$F1 = \frac{2 * Precision * Recall}{Precision + Recall}$$

# SIGHAN-24 dimABSA Results

Subtask 2: Triplet Extraction				
Team	Evaluation Metrics			Overall Rank
	V-Tri-F1	A-Tri-F1	VA-Tri-F1	
HITSZ-HLT	<b>0.589</b> (1)	<b>0.545</b> (1)	<b>0.433</b> (1)	<b>1</b>
CCIPLab	0.573 (2)	0.522 (2)	0.403 (2)	2
ZZU-NLP	0.542 (3)	0.507 (3)	0.389 (3)	3
BIT-NLP	0.490 (4)	0.450 (4)	0.342 (4)	4
SUDA-NLP	0.475 (5)	0.448 (5)	0.326 (5)	5
TMAK-Plus	0.269 (6)	0.307 (6)	0.157 (6)	6

Restaurant (REST) Domain									
Subtask	Dataset	#Sent	#Char	#Tuple	Aspect			Opinion	
					#NULL	#Unique	#Repeat	#Unique	#Repeat
ST1	Train	6,050	85,769	8,523	169	6,430	1924	-	-
	Dev.	100	1,109	115	0	115	0	-	-
	Test	2,000	34,002	2,658	0	2,658	0	-	-
ST2 & ST3	Train	6,050	85,769	8,523	169	6,430	1,924	7,986	537
	Dev.	100	1,280	150	0	78	72	143	7
	Test	2,000	39,014	3,566	52	1,693	1,821	3263	303

# Project Data Sets

- **Training Set: 6,050 sentences, 8523 tuples**  
SIGHAN-24-REST training set
- **Development Set: 800 sentences**  
A part of SIGHAN-24-REST test set
- **Test Set: 800 sentences**  
A new annotated dataset

# Registration

- <https://www.codabench.org/competitions/4257/>

## 資料上傳格式

將檔案存成 "submission.txt"，其中包含"ID"、"Triplets"兩個欄位，並以" "(空白)隔開

以下為上傳格式範例

```
ID Triplets
E0002:S002 (餐點,美味,6.63#4.63)(上菜速度,飛快,7.25#6.00)
E0003:S003 (拉麵,超級無敵霹靂難吃,2.00#7.88)
```

直接對"submission.txt"進行壓縮並上傳即可

**Registration Status: Pending**

Your request to participate in this competition is waiting for an approval from the competition organizer.

請使用 [@nycu.edu.tw](mailto:@nycu.edu.tw) 信箱註冊帳號

# Schedule

- Development Starts: 10/24
- Development Ends: 12/5
- 課程專題進度報告 : Week #12 (11/21)
- **The release of test data:** 12/6 08:00
- **Testing results submission deadline:** 12/9 08:00
- 專題成果口頭報告 : Week #15 (12/12)
- 專題成果書面報告 : Week #16 (12/19)

# 專題進度報告順序: 11/21

- Team #3: 智能系統 吳冠廷
- Team #4: 智能系統 連文聖、電機碩 楊詠晴
- Team #5: 人工智慧 林家賢
- Team #6: 智能系統 陳天禕、智能系統 藍禹翔
- Team #7: 智能系統 周建宇、智能系統 許哲瑜
- Team #1: 智能系統 許瀚丰、智能系統 蔡逸蕙
- Team #2: 智能系統 曹心瞳、數據所黃梓誠

# 專題成果口頭報告順序: 12/12

- Team #2: 智能系統 曹心瞳、數據所黃梓誠
- Team #1: 智能系統 許瀚丰、智能系統 蔡逸蕙
- Team #7: 智能系統 周建宇、智能系統 許哲瑜
- Team #6: 智能系統 陳天禕、智能系統 藍禹翔
- Team #5: 人工智慧 林家賢
- Team #4: 智能系統 連文聖、電機碩 楊詠晴
- Team #3: 智能系統 吳冠廷

# The End

