

# 運用機器語言模型預測與分析 中文媒體之報導框架

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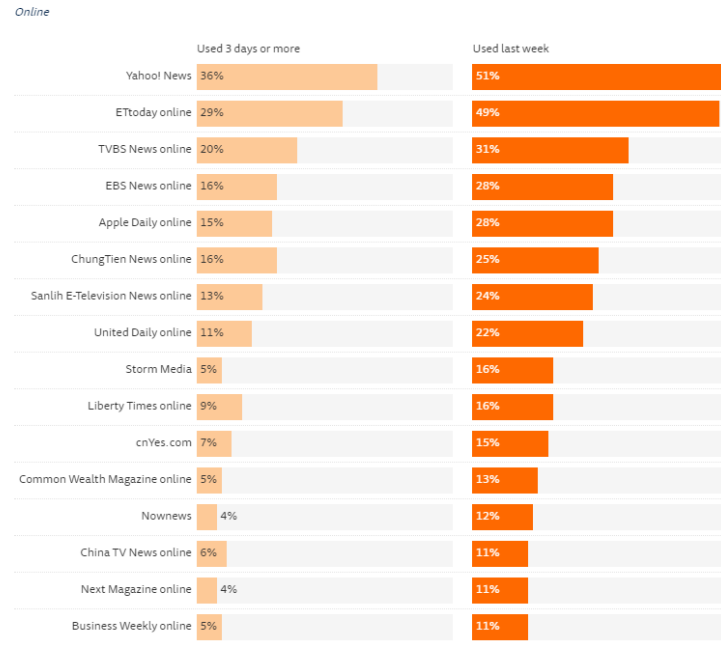
# Introduction - 動機

- 台灣媒體的現況：

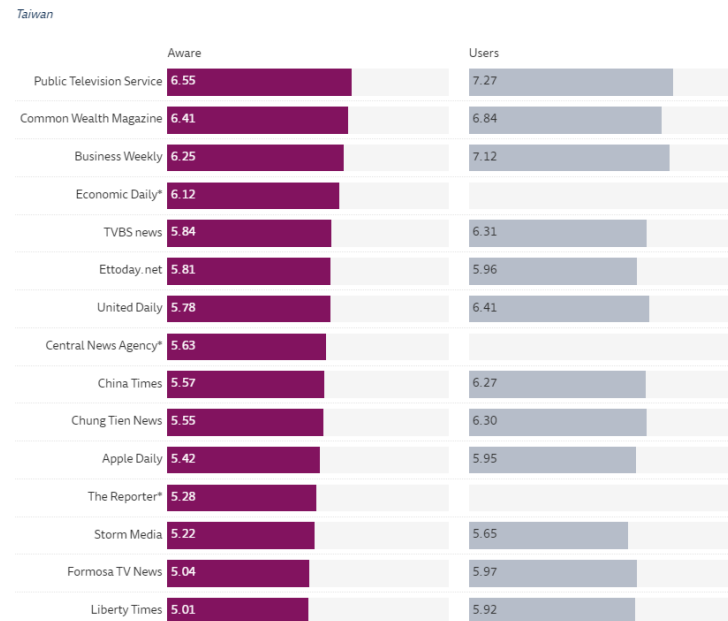
現代獲取報導更為快速、便利，民眾經常閱讀單一媒體的習慣  
媒體開源節流，聳動下標、**立場報導**，以吸引更多受眾；

賣新聞⇔立場報導； Internet penetration (Taiwan):88%

## NEWS SOURCES LAST WEEK: TAIWAN



## BRAND TRUST

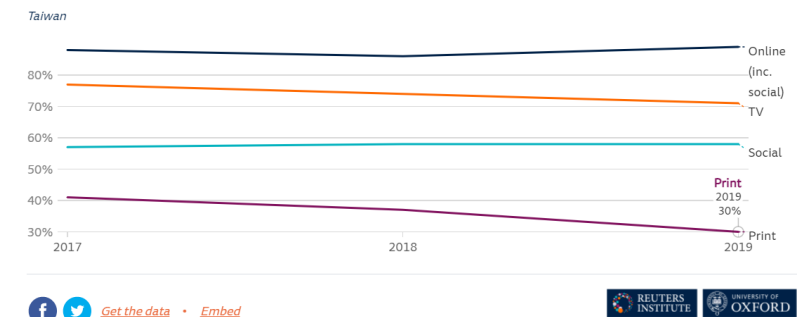


\* Some brands do not have trust scores for users of those brands (did not meet minimum 50 threshold).

## Trust



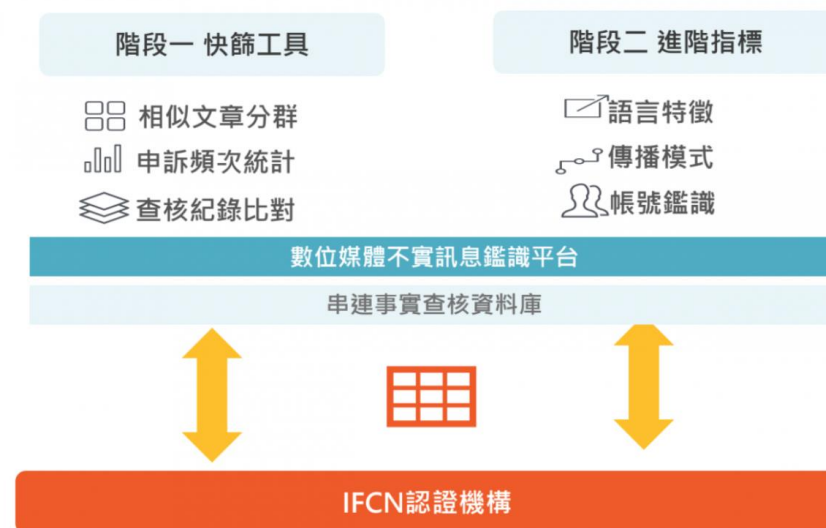
## SOURCES OF NEWS: 2017-2019



資料來源：DigitalNewsReport.org

# Introduction - 動機

- 現有技術與應用 (媒體) :
  - NLP媒體研究：假新聞分析、情感分析等
  - 針對假新聞 台灣現有查核機構：「台灣事實查核中心」、「Cofacts 真的假的」、「MyGoPen」與「蘭姆酒吐司」等
  - 資策會將AI自然語言處理模型BERT與IFCN認證機構結合，提前過濾假訊息，提升人工查證的效率
  - 但現在並沒有框架立場報導的分析系統



# Introduction - 目的與規劃

## 3步看懂媒體風向

**1** | 說了什麼？  
沒說什麼？

**2** | 服務了誰？  
傷害了誰？

**3** | 事實優先or  
立場搶先？

- 改善問題：
    - AI模型預測與分析報導框架 / 立場
    - 輔助受眾提升媒體識讀，促進民眾對於報導議題的全面了解
    - 進而讓受眾可以有效選擇媒體。

[illegible]

# 過去研究參考

- Kristen Johnson, Di Jin, & Dan Goldwasser (2017). *Leveraging Behavioral and Social Information for Weakly Supervised Collective Classification of Political Discourse on Twitter*. Proceedings of the 55th Annual Meeting of the Association for Computational Linguistics, pages 741–752. <https://doi.org/10.18653/v1/P17-1069>
- 研究中使用184,914則美國國會議員的推文(tweets)作為文本基礎
- 建立弱監督global PSL models可用於英文文本的框架(frames)分析
- 最終模型成功提升unsupervised F1 score by 21.52 points.

ISSUE	FRAMES																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Abortion	4	7	23	55	40	0	2	32	10	0	4	46	20	0	1	13	8
ACA	65	9	6	28	24	0	3	128	21	3	18	116	174	2	21	100	15
Guns	2	2	37	16	30	21	93	8	36	14	49	166	65	0	5	55	147
Immigration	16	7	6	6	42	3	15	0	29	19	7	81	52	1	1	32	2
LGBTQ	0	0	9	99	23	2	2	3	10	17	7	39	14	1	2	11	48
Terrorism	6	4	46	3	11	10	115	1	6	13	14	69	68	35	6	99	57

Table 7: Count of Each Type of Frame Per Issue in Labeled Dataset.

ISSUE AND KEYWORDS OR PHRASES
ABORTION: <i>abortion, pro-life, pro-choice, Planned Parenthood, StandWithPP, Hobby Lobby, birth control, women's choice, women's rights, women's health</i>
ACA: <i>patient protection, affordable care act, ACA, obamacare, health care, healthcare, Burwell, Medicare, Medicaid, repeal and replace</i>
GUNS: <i>Charleston, gun, shooting, Emanuel, Second Amendment, Oregon, San Bernadino, gun violence, gun control, 2A, NRA, Orlando, Pulse</i>
IMMIGRATION: <i>immigration, immigrants, illegal immigrants, border, amnesty, wall, Dreamers, Dream Act</i>
LGBTQ: <i>equality, marriage, gay, transgender, marriage equality, same sex, gay marriage, religious freedom, RFRA, bathroom bill</i>
TERRORISM: <i>terrorism, terrorists, terror network, ISIS, ISIL, Al Qaeda, Boko Haram, extremist</i>

Table 8: Keywords or Phrases Used to Filter Tweets for Issue.

FRAME NUMBER, FRAME, AND ADAPTED UNIGRAMS
1. ECONOMIC: <i>premium(s), small, business(es), tax(es), economy, economic, cost(s), employment, market, spending, billion(s), million(s), company, companies, funding, regulation, benefit(s), health</i>
2. CAPACITY & RESOURCES: <i>resource(s), housing, infrastructure, IRS, national, provide(s), providing, fund(s), funding, natural, enforcement</i>
3. MORALITY & ETHICS: <i>moral, religion(s), religious, honor(able), responsible, responsibility, illegal, protect, god(s), sanctity, Islam, Muslim, Christian, radical, violence, victim(s), church</i>
4. FAIRNESS & EQUALITY: <i>fair(ness), equal(ity), inequality, law(s), right(s), race, gender, class, access, poor, civil, justice, social, women(s), LGBT, LGBTQ, discrimination, decision(s)</i>
5. LEGALITY, CONSTITUTIONALITY, & JURISDICTION: <i>right(s), law(s), executive, ruling, constitution(al), amnesty, decision(s), reproductive, legal, legality, court, SCOTUS, immigration, amendment(s), judge, authority, precedent, legislation</i>
6. CRIME & PUNISHMENT: <i>crime(s), criminal(s), gun(s), violate(s), enforce(s), enforced, enforcement, civil, tribunals, justice, victim(s), civilian(s), kill, murder, hate, genocide, consequences</i>
7. SECURITY & DEFENSE: <i>security, secure, defense, defend, threat(s), terror, terrorism, terrorist(s), gun(s), attack(s), wall, border, safe, safety, violent, violence, ISIS, ISIL, suspect(s), domestic, prevent, protect</i>
8. HEALTH & SAFETY: <i>health(y), care, healthcare, obamacare, access, disease(s), mental, physical, affordable, coverage, quality, (un)insured, disaster, relief, unsafe, cancer, abortion</i>
9. QUALITY OF LIFE: <i>quality, happy, social, community, life, benefit(s), adopt, fear, deportation, living, job(s), activities, family, families, health, support</i>
10. CULTURAL IDENTITY: <i>identity, social, value(s), Reagan, Lincoln, conservative(s), liberal(s), nation, America, American(s), community, communities, country, dreamers, immigrants, refugees, history, historical</i>
11. PUBLIC SENTIMENT: <i>public, sentiment, opinion, poll(s), turning, survey, support, American(s), reform, action, want, need, vote</i>
12. POLITICAL FACTORS & IMPLICATIONS: <i>politic(s), political, stance, view, (bi)partisan, filibuster, lobby, Republican(s), Democrat(s), House, Senate, Congress, committee, party, POTUS, SCOTUS, administration, GOP</i>
13. POLICY DESCRIPTION, PRESCRIPTION, & EVALUATION: <i>policy, fix(ing), work(s), working, propose(d), proposing, proposal, solution, solve, outcome(s), bill, law, amendment, plan, support, repeal, reform</i>
14. EXTERNAL REGULATION AND REPUTATION: <i>regulation, US, ISIS, ISIL, relations, international, national, trade, foreign, state, border, visa, ally, allies, united, refugees, leadership, issues, Iraq, Iran, Syria, Russia, Europe, Mexico, Canada</i>
15. FACTUAL: <i>health, insurance, affordable, deadline, enroll, sign, signed, program, coverage</i>
16. (SELF) PROMOTION: <i>statement, watch, discuss, hearing, today, tonight, live, read, floor, talk, tune, opinion, TV, oped</i>
17. PERSONAL SYMPATHY & SUPPORT: <i>victims, thoughts, prayer(s), pray(ing), family, stand, support, tragedy, senseless, heartbroken, people, condolences, love, remember, forgive(ness), saddened</i>

Table 9: Frame and Corresponding Unigrams Used for Initial Supervision.

# 研究方法

- 文本蒐集與建立

- Web Crawler

- 針對台灣六家中文媒體的政治新聞：

中央社、華視新聞網、中國時報、自由時報、民視新聞網、東森ET Today

- 劃分Datasets：(初期將使用約30,000筆data)

<Train> <Test> <Inference>



蒐集文本

訓練模型

評估與修正

分析與應用

# 研究方法

- 資料標註

- 依政治立場：

<DPP> <KMT> <無>

- 依媒體框架：

<經濟> <民生> <國防> <政治與政策> <道德>

<法律與平等> <健康與安全> <置入行銷> <外交>

(需事先設定標籤的關鍵字詞)



蒐集文本

訓練模型

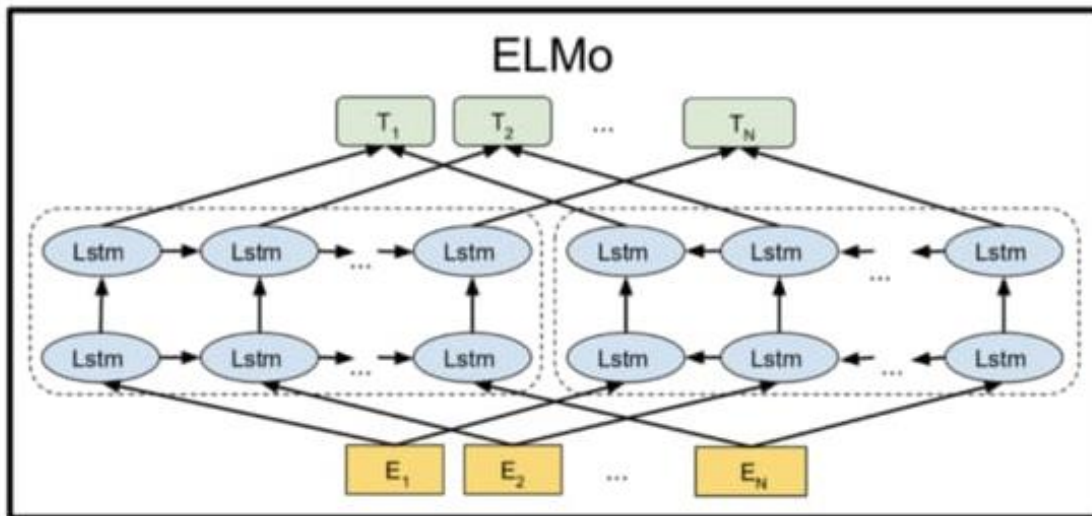
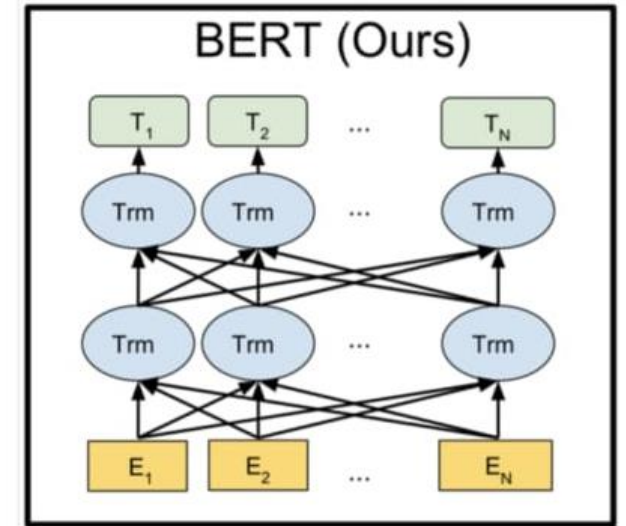
評估與修正

分析與應用



# 研究方法

- 建立模型
  - 期望能在BERT、ELMo架構下做到遷移學習
  - 主要先嘗試建立Linear SVC、Naive Bayes等模型
  - 甚至RFC、SVM等多種方法



## Naive Bayes

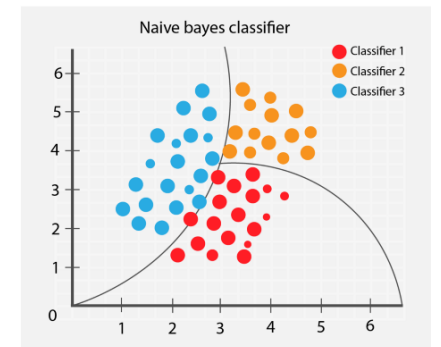
[thatware.co](https://thatware.co)

In machine learning, naive Bayes classifiers are a family of simple "probabilistic classifiers" based on applying Bayes' theorem with strong (naive) independence assumptions between the features.

$$P(A|B) = \frac{P(B|A) P(A)}{P(B)}$$

using Bayesian probability terminology, the above equation can be written as

$$\text{Posterior} = \frac{\text{prior} \times \text{likelihood}}{\text{evidence}}$$





# 研究方法

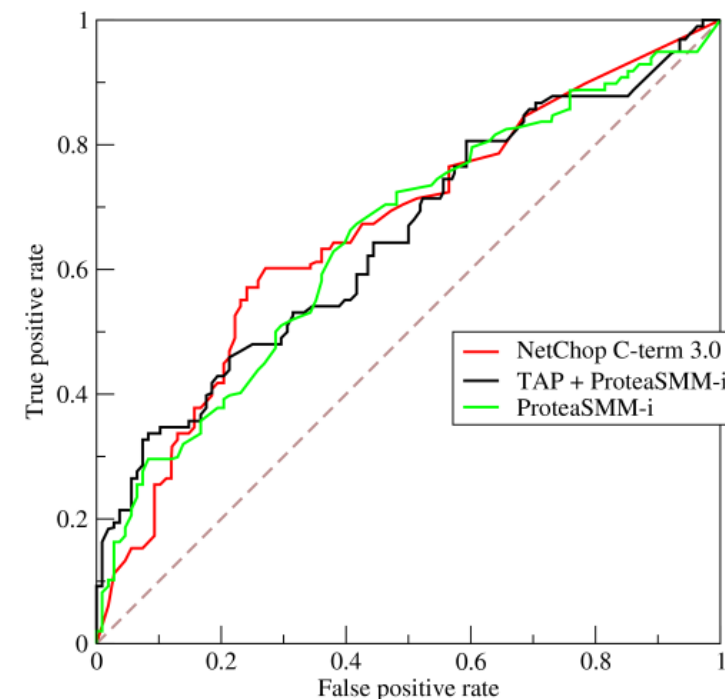
$$F_1 = 2 * \frac{precision * recall}{precision + recall}$$

		Actual	
		Positive	Negative
Predicted	Positive	True Positive	False Positive
	Negative	False Negative	True Negative

- 模型評估

- F1-measure
- 使用 Scikit-learn 架構來定型和評估模型
- ROC curve圖形，

運用AUC的方式提供更客觀、公正的評估方法



蒐集文本

訓練模型

評估與修正

分析與應用

# 研究方法

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## • 分析與應用



### 政治立場

- DPP
- KMT
- none

### 框架報導

- 經濟
- 民生
- 國防
- 政治 等

### 應用分析

- 總結歸納
- 分析報導  
媒體

## 預期成果與展望

- 使機器具備預測報導立場框架能力
- 避免讀者被框架報導所影響誤導
- 若持續整合假新聞辨識、情感分析、框架預測有助媒體與社會發展
- ACCESS × ANALYZE × EVALUATE
- 營造互利共榮的健全媒體生態



# References

- Kristen Johnson, Di Jin, & Dan Goldwasser (2017). *Leveraging Behavioral and Social Information for Weakly Supervised Collective Classification of Political Discourse on Twitter*. Proceedings of the 55th Annual Meeting of the Association for Computational Linguistics, pages 741–752. <https://doi.org/10.18653/v1/P17-1069>
- Arthur Amalvy(2020)。應用自然語言處理技術分析文學小說角色。國立中央大學資訊工程學系碩士論文。
- 吳承軒(2019)。基於BERT模型之多國語言機器閱讀理解研究。國立台北科技大學資訊工程系碩士班碩士學位論文。
- 邱彥誠(2020)。應用人工智慧於股市新聞與情感分析預測股價走勢。國立臺北大學資訊管理研究所碩士學位論文。
- 姜力綱(2020)。基於BERT之關鍵字生成新聞文章。國立中興大學 資訊科學與工程學系碩士學位論文。
- 許湘鈴、任恬儀(2017)。英文篇章難易度自動分級之研究。2017年臺灣國際科學展覽會。
- 楊登堯(2017)。利用臉書資訊探討網路新聞的吸引度及極性分析。國立臺灣師範大學資訊工程研究所碩士論文。
- 劉芷妤(2021)。文本特徵於新聞立場偵測之效能評估。元智大學資訊管理學系碩士班碩士論文。
- 劉鉞志(2014)。從使用者自建內容挖掘網民對議題的立場：以兩岸服貿為例。國立中山大學資訊管理學系研究所碩士論文。
- 戴雅婕(2019)。英文句子依閱讀程度進行簡化之研究。2019年臺灣國際科學展覽會。