Machine Translation - Are you going to adopt it?

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Selection Criteria
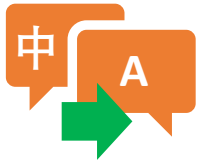
- 平靓正?

Experience on Machine Translation

香港平靚正親子活動好去處

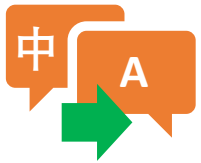**1** Hong Kong Pingliang is a good place for parent-child activities

Experience on Machine Translation

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2 Hong Kong Pingliang is a good place for parent-child activities
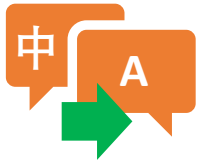
Experience on Machine Translation

香港平靚正親子活動好去處

3   Hong Kong is in the process of doing activities to find a place to go.

Experience on Machine Translation

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A good place for family activities in Hong Kong Ping Shuai Zheng

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5 Hong Kong is a good place for parent-child activities

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6 The best places to go in Hong Kong for smart and good parenting activities

Which one do you "Like"? 👍

香港平靚正親子活動好去處

中 → A

1. Hong Kong Pingliang is a good place for parent-child activities

2. Hong Kong Pingliang is a good place for parent-child activities

3. Hong Kong is in the process of doing activities to find a place to go.

4. A good place for family activities in Hong Kong Ping Shuai Zheng

5. Hong Kong is a good place for parent-child activities

6. The best places to go in Hong Kong for smart and good parenting activities
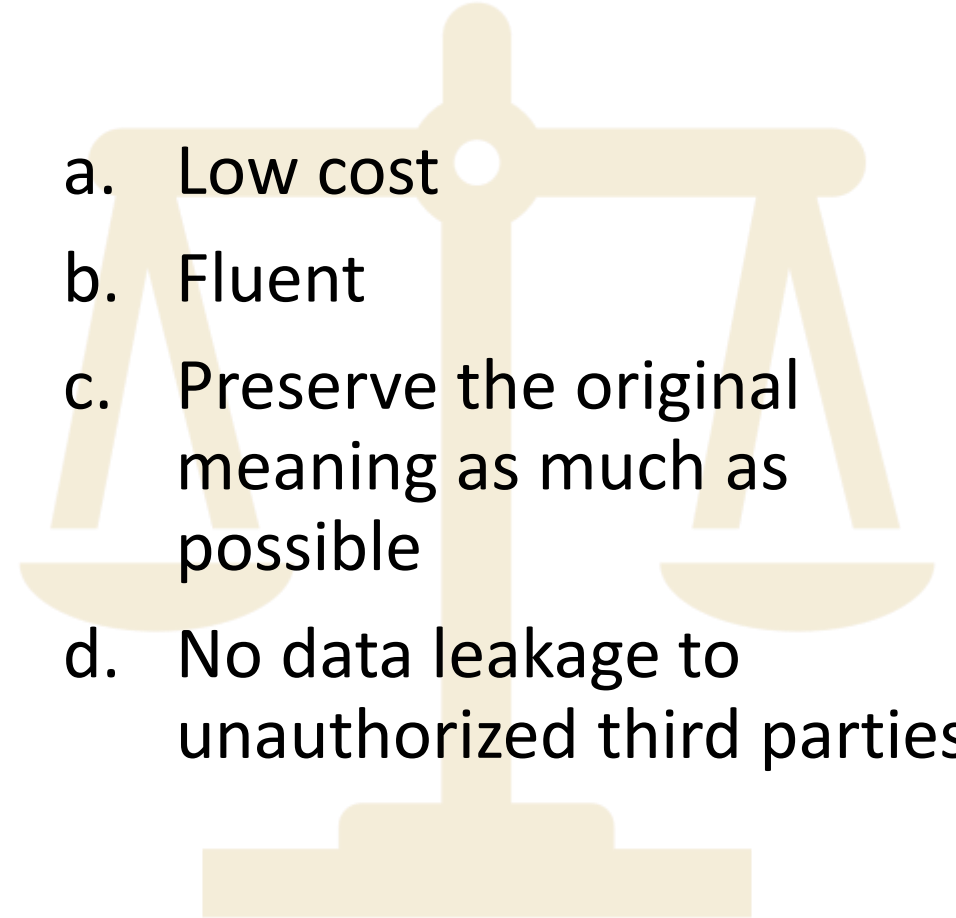
Selection Criteria

a. 平
b. 靚
c. 正

➡

a. Low cost
b. Elegant
c. Fit for the purpose
d. Confidentiality preserved

➡

a. Low cost
b. Fluent
c. Preserve the original meaning as much as possible
d. No data leakage to unauthorized third parties

a. Cost

- Free

- Pricing example #1: HK$77.60 per million chars (one A4 page with 1,600 chars costs about HK$0.12416)

- Pricing example #2: US$20 per million chars (one A4 page with 1,600 chars costs about HK$0.2496)

b. Fluency

- "However, it could be argued that the NMT output is more fluent. Both of these examples highlight the strength in fluency sometimes observed with NMT."

- "Neural machine translation (NMT) reduces post-editing effort by 25%, outputs more fluent translations ...."

- "As it emerges from Figure 7, the tailored-NMT output was rated higher for both adequacy and fluency followed by the NMT output."
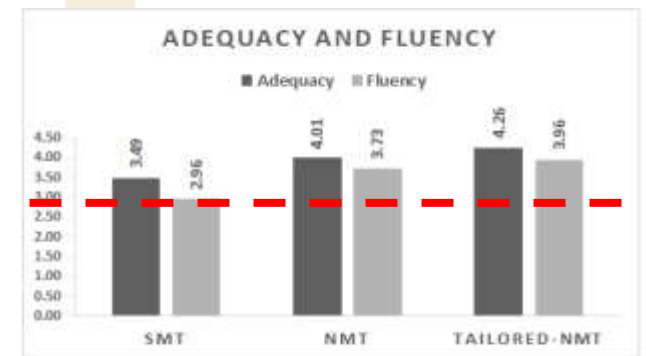

Figure 7. Weighted average of adequacy and fluency rating per system

c. Preserve the Original Meaning – Status quo, mitigation and the challenges

- "No matter how good machines have become, relying on their output without having it checked by a human translator can be risky."
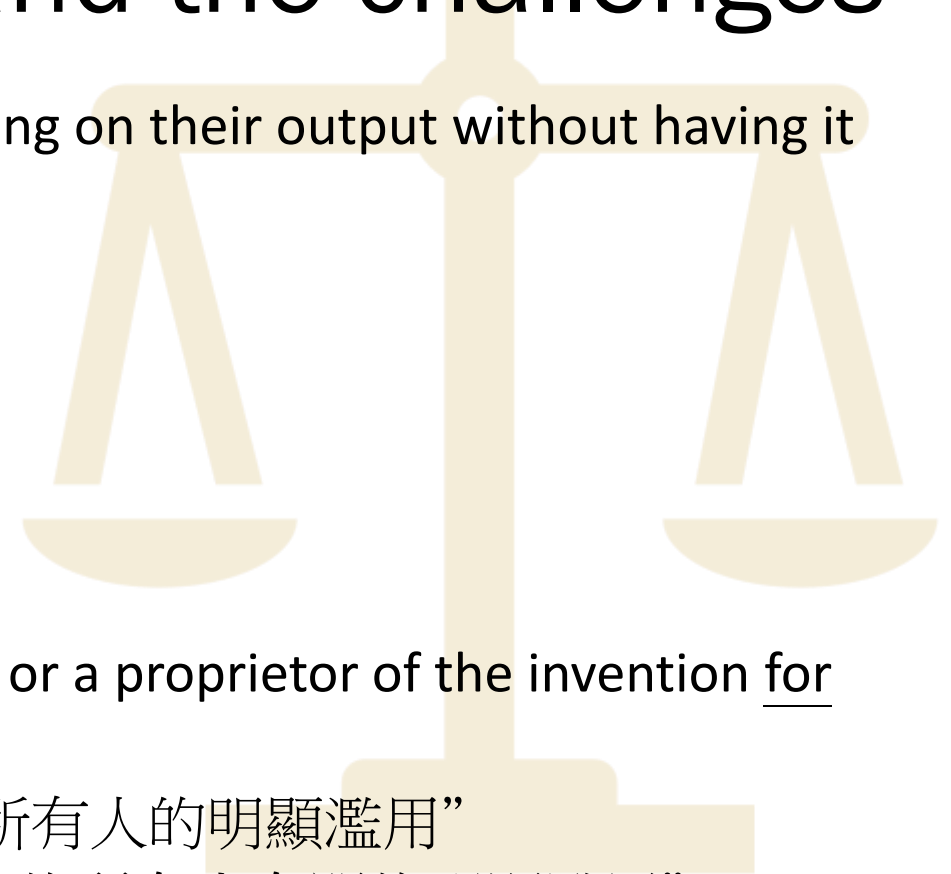
Source: "Non-prejudicial disclosure"

Translation by Big Name #1 : "非偏见性披露"

Reference Translation : "不具损害性的披露"

Source: "an evident abuse in relation to the applicant or a proprietor of the invention for the time being"

Translation by Big Name #1 : "目前對申請人或發明所有人的明顯濫用"

Reference Translation : "與申請人或該項發明當其時的所有人有關的明顯濫用"

d. Confidentiality
- Translation of confidential documents

- Machine translation requires upload of
    1. Training documents
    2. Documents to be translated

- Problems:
    - Both types of document can contain confidential information
    - Upload to third party service provider may not be allowed
    - Takes time to establish non-disclosure agreement with IT giants
    - Risk of leakage of sensitive information

- Examples:
    - Legal, finance, medical, patents, etc.
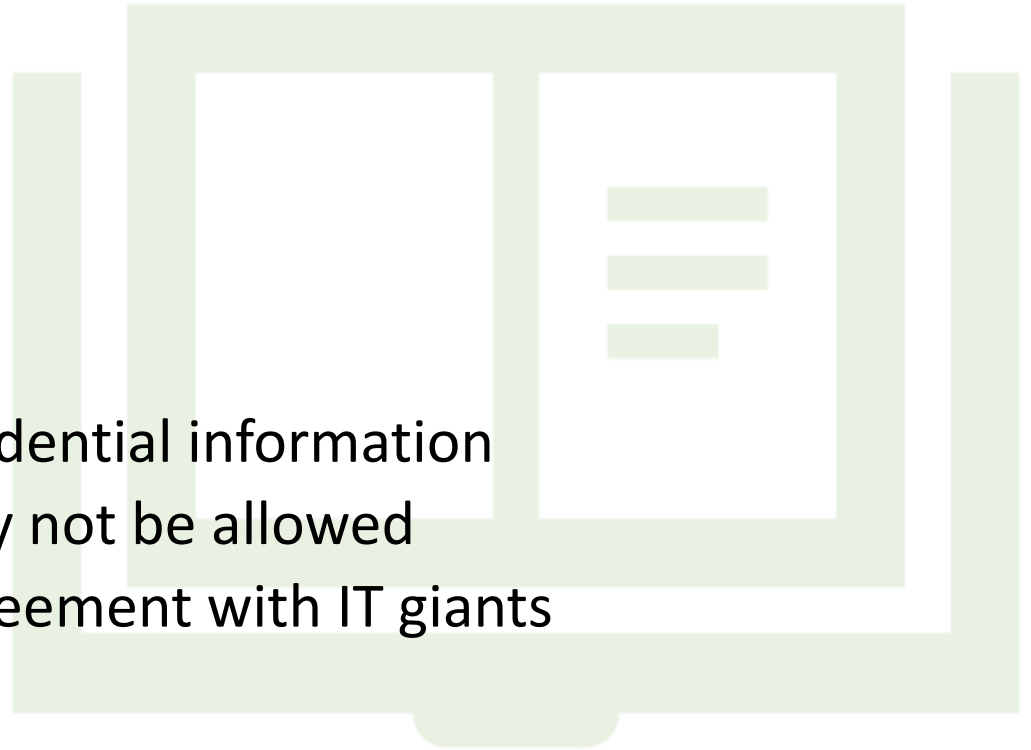
Making of domain specific machine translation model

- Challenges
  - Tens of millions of bilingual sentence pairs are required to train a language model (Quantity)
  - Quality of the input data have significant impact on the output accuracy of the translated text
- How to determine the input translation is "good"?
- How to determine bilingual pair is "correct"?
- How to determine which domain is the document?

Good Inputs?

釋義

在本條例中 ——

工作時數 (hours worked) ——見第4條；

工作經驗學員 (work experience student)指 ——

    (a)   修讀經評審課程的學生；或

    (b)   居於香港，並修讀非本地教育課程的學生，
而該學生正根據某僱傭合約受聘，且在該合約開始時，仍
未滿26歲；

工資 (wages)除第6條另有規定外，其涵義與《僱傭條例》(第57
章) 中該詞的涵義相同；

工資期 (wage period) ——見第5條；

主席 (chairperson)指委員會的主席；

委員 (member)指委員會的委員；

2. **Interpretation**
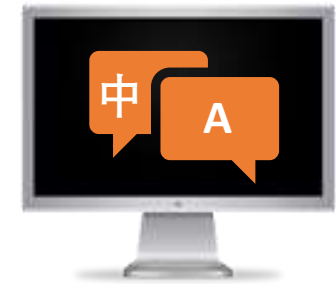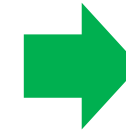
In this Ordinance—

accredited programme (經評審課程) means a full-time programme
that—

    (a)   is provided by an education institution specified in Schedule 1;

    (b)   is a learning programme of a kind described in section 1, 2 or 3 of Schedule 3 to the Accreditation of Academic and Vocational Qualifications Ordinance (Cap. 592); and

    (c)   if provided by a school registered or provisionally registered under the Education Ordinance (Cap. 279), is at the level of post secondary education (within the meaning of that Ordinance);

assessment-opting PWD (選擇受評估殘疾人士) means a PWD

Many commonly acquirable data are NOT USABLE, Need to filter out!

Strong and Effective Collaboration

High quality translated materials from marketing and legal service agencies

Model training / retraining

Model testing & tuning

Deploy the model
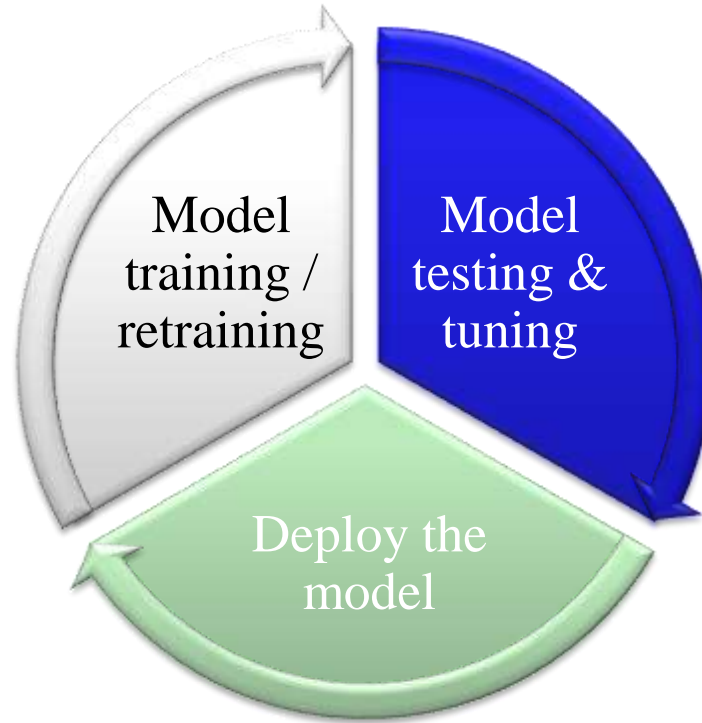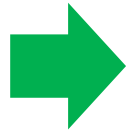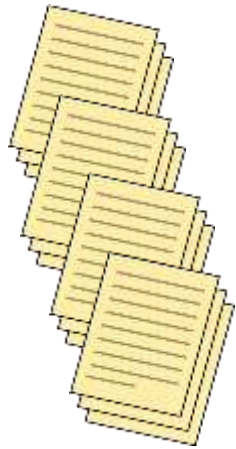
Machine Translation service
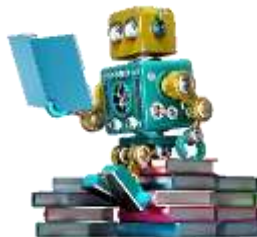
- Neural Translation
- Machine Learning
- Artificial Intelligence

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BLEU Score

BLEU Score (in percentage)	Interpretation
< 10	Almost useless
10 - 19	Hard to get the gist
20 - 29	The gist is clear, but has significant grammatical errors
30 - 40	Understandable to good translations
40 - 50	High quality translations
50 - 60	Very high quality, adequate, and fluent translations
> 60	Quality often better than human

(Source: https://cloud.google.com/translate/automl/docs/evaluate)

Domain Specific – Better Quality

Machine Translation Model	BLEU Score – NMT by Big Name #1	BLEU Score – Domain Specific Model by LSCM	Diff. (+/-)	% Increase
		Comparing with Big Name #1		
English -> S. Chinese	24.49	38.81	14.32	58.47%
S. Chinese -> English	29.43	41.88	12.45	42.30%
English -> T. Chinese	23.49	38.86	15.37	65.43%
T. Chinese -> English	30.81	43.46	12.65	41.06%
English -> Italian	57.75	61.89	4.14	7.17%
Italian -> English	57.1	63.84	6.74	11.80%
English -> Spanish	38.01	43.04	5.03	13.23%
Spanish -> English	37.22	42.79	5.57	14.97%

Average Quality Improved   **31.80%**

Examples on English / Traditional Chinese

"The Government implements these constitutional provisions by striving to maintain a low and simple tax regime and exercising fiscal prudence."

1. 政府通過努力維持低稅制和簡單的稅收制度和審慎財政來執行這些憲法規定。

2. 政府執行呢啲憲法規定，努力維持低而簡單嘅稅制，並實行審慎嘅財政。

3. 政府致力維持低稅率和簡單稅制，以及審慎理財，以落實這些憲制規定。

Examples on English / Traditional Chinese

"The Government implements these constitutional provisions by striving to maintain a low and simple tax regime and exercising fiscal prudence."

4 • 政府通过努力维持低税率和简单的税制，并采取审慎的财政措施来执行这些宪法规定。

5 • 政府通過努力維持低稅率和簡單稅制以及審慎理財來實施這些憲法規定。

6 • 政府致力維持低稅率及簡單稅制，並審慎理財，以履行這些憲制規定。

By Domain Specific MT

Examples on English / Traditional Chinese

"The third goal of the Scheme is to promote the wider application and development of e-payment, so as to pave the way for the digital transformation of Hong Kong's economy."

1 • 該計劃的第三個目標是推動電子支付的更廣泛應用和發展，為香港經濟的數字化轉型鋪路。

2 • 該計劃嘅第三个目標係促進電子支付嘅更廣泛應用和發展，為香港經濟的數字化轉型鋪平道路。

3 • 该计划的第三个目标是推动电子支付的更广泛应用和发展，为香港经济的数字化转型铺平道路。

Examples on English / Traditional Chinese

"The third goal of the Scheme is to promote the wider application and development of e-payment, so as to pave the way for the digital transformation of Hong Kong's economy."

4 • 该计划的第三个目标是促进电子支付的广泛应用和发展，为香港经济的数字化转型铺路。

5 • 該計畫的第三個目標是促進電子支付的廣泛應用和發展，為香港經濟的數位轉型鋪平道路。

6 • 該計畫的第三個目標是推動電子支付更廣泛應用和發展，為香港經濟的數碼轉型鋪路。

By Domain Specific MT

Examples on English / Simplified Chinese

"Any notice or other communication shall be delivered by courier or registered mail, e-mail or any other means that records the sending of the communication."

2 • 任何通知或其他通信应通过快递或注册邮件、电子邮件或记录通信发送的任何其他方式发送。

6 • 任何通知或其他通讯均应以快递或挂号邮件、电子邮件或其他记录发送信息的方式发送。

By Domain Specific MT

Examples on Simplified Chinese / English

"塑料制高容量数银机 | 型号 20454 | 详见装箱单"

1
- Plastic high-capacity silver counter | Model 20454 | See the packing list for details

2
- Plastic high-capacity silver machine | Model 20454 | See packing slip for details

6
- plastic high-capacity coin counting machine | model 20454 | see packing list for details

By Domain Specific MT

Encouraging Feedback

- "The translated text in Italian is very good." – from pilot user

- "Indeed, I must tell you that the quality of the Italian translation is better than (two Big Names) and other similar applications. It may be due to the fact that we have been contributing a higher share of economic topics, compared to other applications and, therefore, this type of economic articles are really superior, and beyond expectations." – from pilot user

Ending Remarks

"Some good results have been achieved, like the references above"

"Good for first-draft translation, close to human appreciable writing"

"Good for factual-report writing styles"

"Before (perhaps never) AI machine translation can be trained on par with human writer, subject experts are most needed for proofreading, post-editing to produce accurate translation for serious communication"

Thank you and look forward to ever-improving Machine Translation technologies and wider adoption of them!