



翻譯學院
SCHOOL OF TRANSLATION
香港恒生大學
THE HANG SENG UNIVERSITY
OF HONG KONG



深度學習研究與應用中心
DEEP LEARNING RESEARCH & APPLICATION CENTRE
香港恒生大學
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AI VS Human Translation: The Inevitable Replacement?

Dr Sai-cheong SIU

Director, Deep Learning Research and Application Centre

Associate Professor, School of Translation

The Hang Seng University of Hong Kong

Artificial Intelligence

- New Translation Algorithms
- New Translation Applications

AI and People

Impact of AI on Translation and Communication

- What does translation technology mean for your business?
- What are the roles of AI and human translators in multilingual communication?



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Outline

- **Overview:** Translation Industry and Translation Technology
- **Types of Translation Technology:** Automatic Translation and More
- **AI for Translation:** Strengths, Weaknesses and the Way Forward



About Us

Private
University

5 Schools
(Business, Communication, Decision
Sciences, Humanities and Social Science,
and Translation)

The Hang Seng University of Hong Kong

Undergraduate and
Postgraduate Programmes



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School of Translation

1. Bachelor of Translation with Business
2. Master of Arts in Translation (Business and Legal)
3. Master of Arts in Translation (Computer-aided Translation)
4. Minor in European Studies



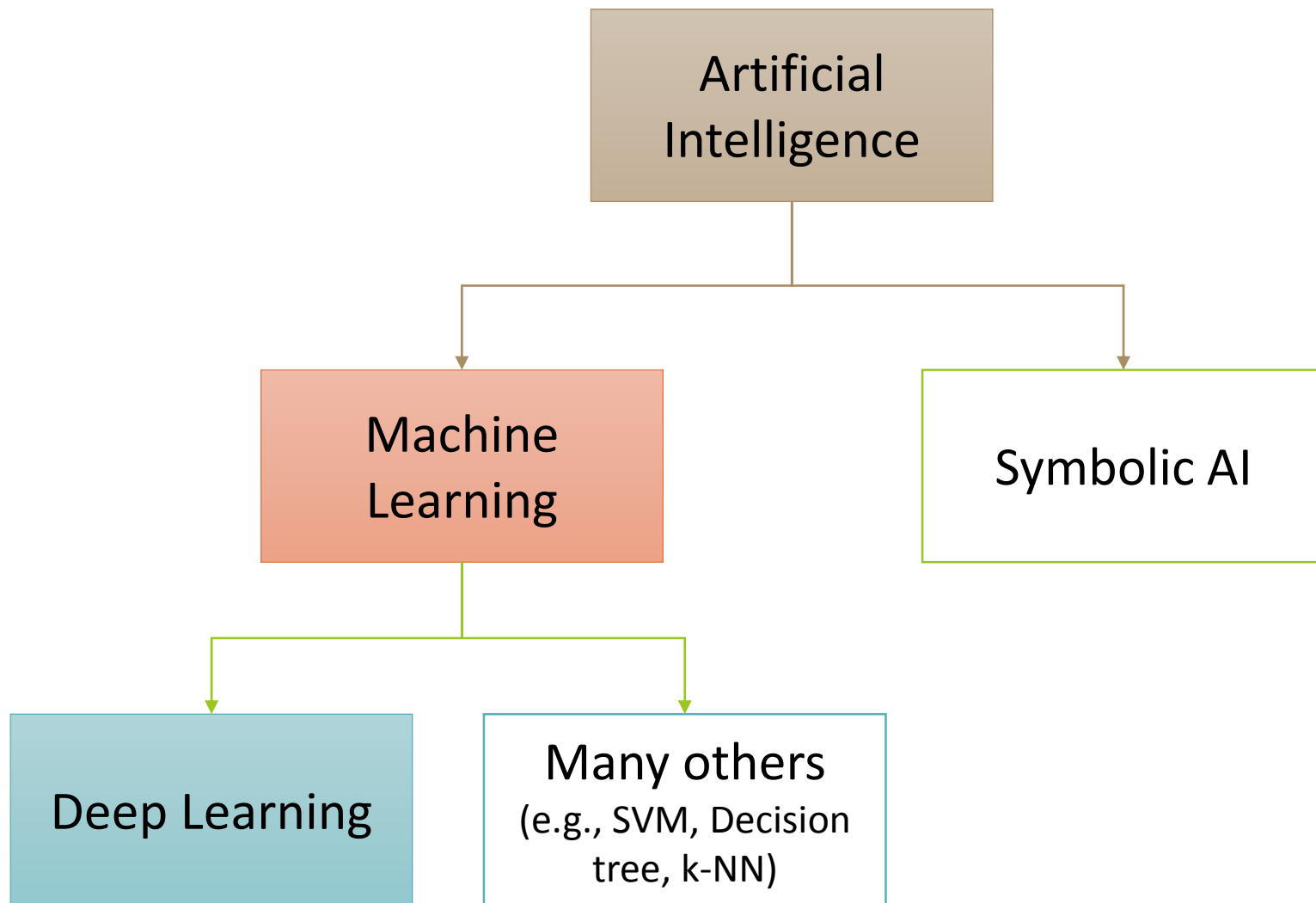
Deep Learning Research and Application Centre



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Deep Learning

- Deep Learning technology, which is based on neural networks and large training datasets, has shown great success in many applications.



Deep Learning

AlphaGo

Speech
recognition

Sentiment
analysis

Summarization

Chatbot

Stock price
prediction

Image
classification

Object
detection

Self-driving cars
and many more



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Deep Learning Research and Application Centre

- Funding of HK\$6.8 million
- Hardware: Graphics processing unit (GPU)-accelerated hardware for much faster training and decoding
- Software: PyTorch, Tensorflow, Keras, Transformer...
- Projects involving deep neural networks



Projects (<https://dlc.hsu.edu.hk/>)

- Machine translation (e.g., automatic translation of listing documents; recent funding: HK\$1.4 million)
- Smart retail
- English proofreading
- Weather analysis, forecast and communication
- Detection of fake news
- Financial analysis



Overview:

Translation Industry and Translation Technology

What do translators mean for your business? What does a translator do?

Translation

Interpreting

Localization

Bilingual
Editing and
Writing

Many more
(e.g., transcription,
certification, term
management...)



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Translation
Volume

Turnaround
Time

Text types

Translation



Language
Services

Linguistic
and Cultural
Issues

Technical
Knowledge

Project
Management



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It's more than
Gxxxle Translate

Translation Technology

Electronic tools
for Translation



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Types of Translation Technology

Translation Technology

Electronic
Dictionaries

Translation
Memories

Terminology
Databases

Automatic
Translation



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Electronic Dictionaries

General
Dictionaries

Specialised
Dictionaries



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Example: HSUHK Business Translation Index



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HSUHK Business Translation Index

[Home](#) [About Us](#) [Feedback](#) [Contact Us](#) [中文](#)

<http://www.hsuhkbt.com/>

Type and Search

economics

Go

Record 1: 經濟學

Multilingual Terms/Expressions

(en)	Economics	0 0
(fr)	Sciences économiques	0 0
(jp)	経済学	0 0
(zh-cn)	经济学	0 0
(zh-hk)	經濟學	0 0
(zh-tw)	經濟學	0 0

Additional Information (Powered by TranXLab and Wikipedia)

(en) Economics (*ˈiːkənəmiks*, *ˈiːkəz*) ^[1] ^[2] ^[3] is the social science that studies the production, distribution, and consumption of goods and services. ^[4]

Source: [Wikipedia](#) (under the [CC-BY-SA](#) License)

(zh-hk) 經濟學是一門對產品和服務的生產、分配以及消費進行研究的社會科學。西方語言中的「經濟學」一詞源於古希臘的 οἰκονομία (英語: [oikonomia](#)) ^[1] ^[2]。

Source: [Wikipedia](#) (under the [CC-BY-SA](#) License)

(fr) Les sciences économiques (ou la science économique ou encore l'économie) est une discipline des sciences humaines et sociales qui étudie de façon scientifique le fonctionnement de l'économie c'est-à-dire la description et l'analyse de la production, des échanges et de la consommation des biens et des services.

Source: [Wikipedia](#) (under the [CC-BY-SA](#) License)

この記事では経済学（けいぎがく、英: economics）について解説する。経済学の原語であるeconomicsという語彙は、新古典派経済学者 アルフレッド・マーシャルの名著『経済学原理』（英: *Principles of Economics*, 1890年）によって誕生。普及



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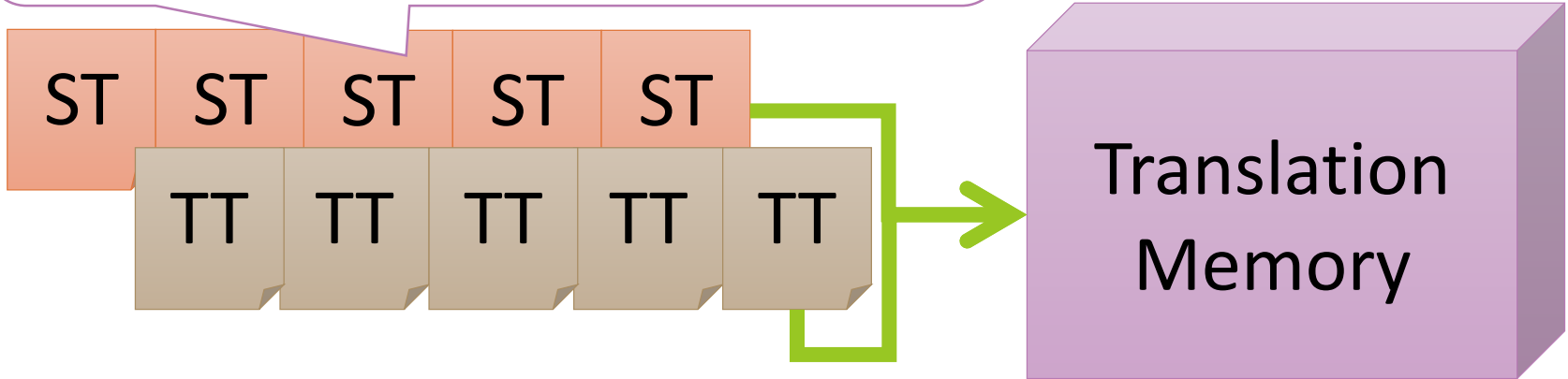


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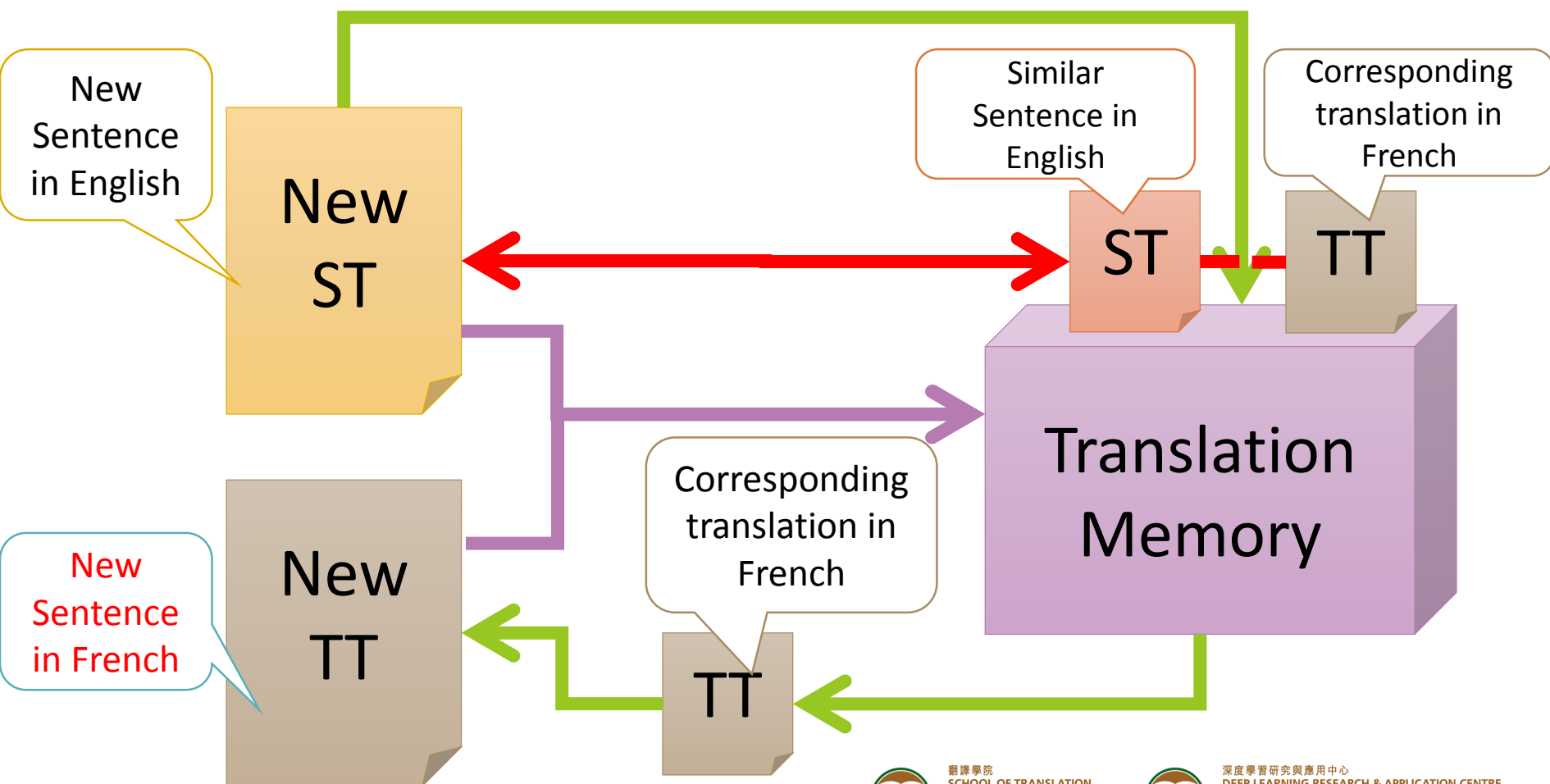
Translation Memory (TM)

ST = Sentence in English

TT = Sentence in French



Translation Memory (TM)



What does TM mean for your business?



Translation
Speed



Translation
Cost



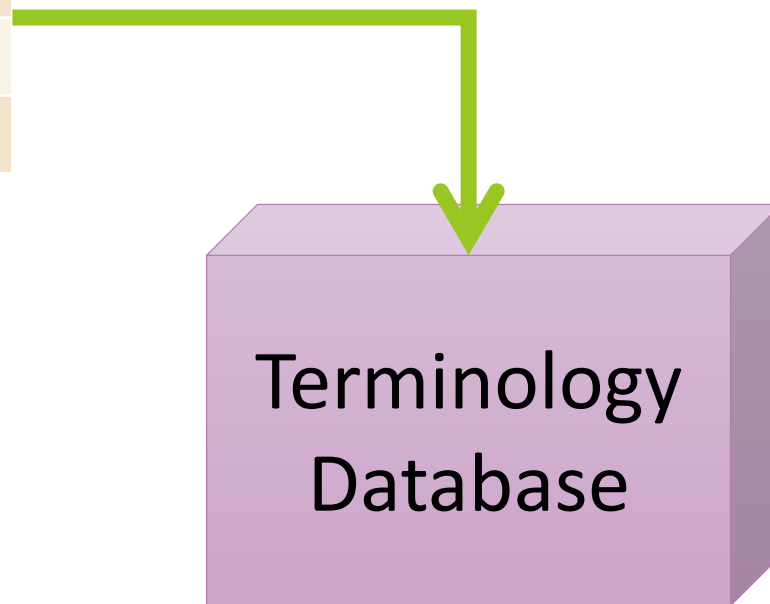
Translation
Style



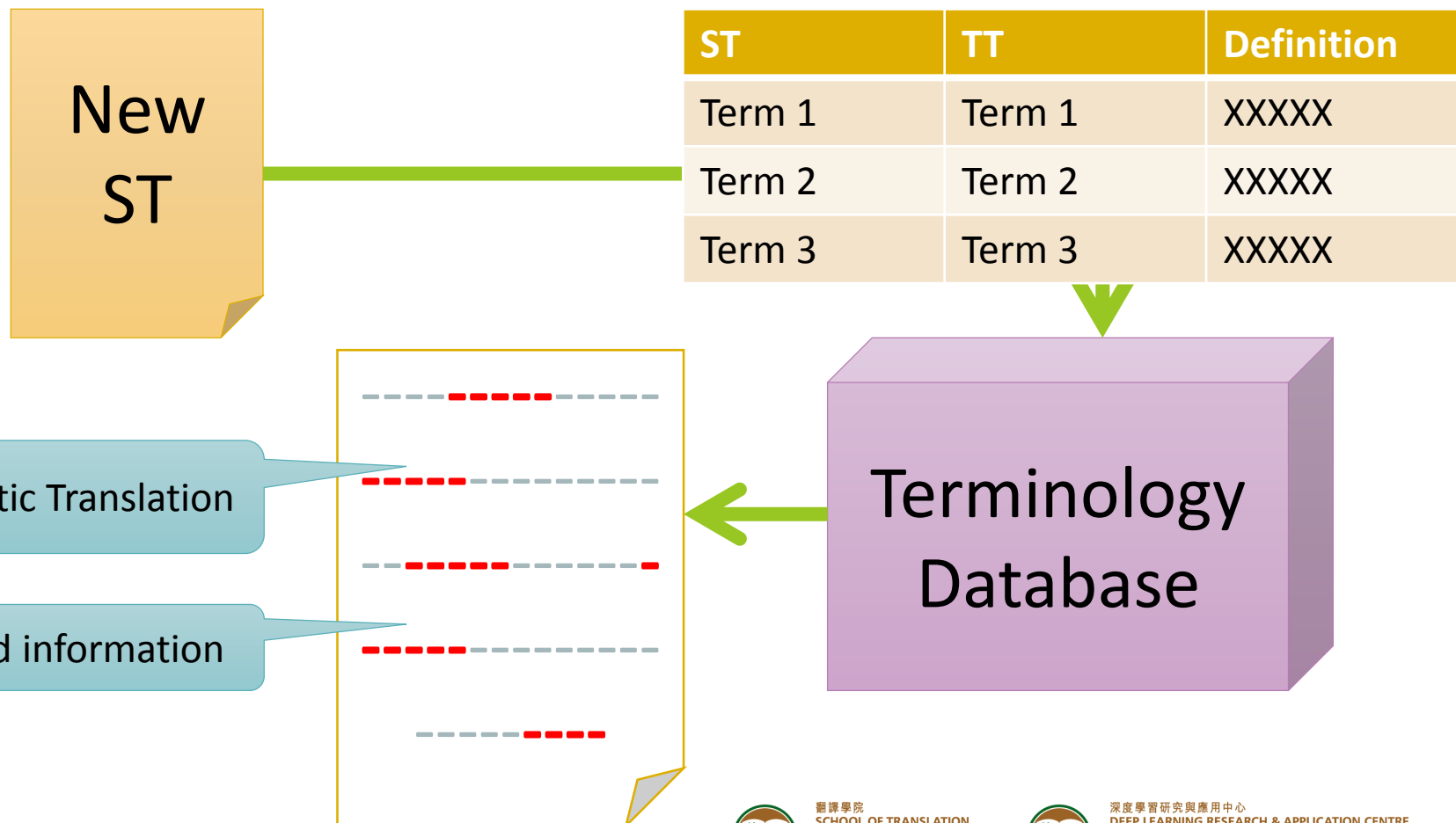
Translation
Flexibility

Terminology Database (Termbase)

ST	TT	Definition
Term 1	Term 1	XXXXX
Term 2	Term 2	XXXXX
Term 3	Term 3	XXXXX



Terminology Database (Termbase)



What do Termbases mean for your business?

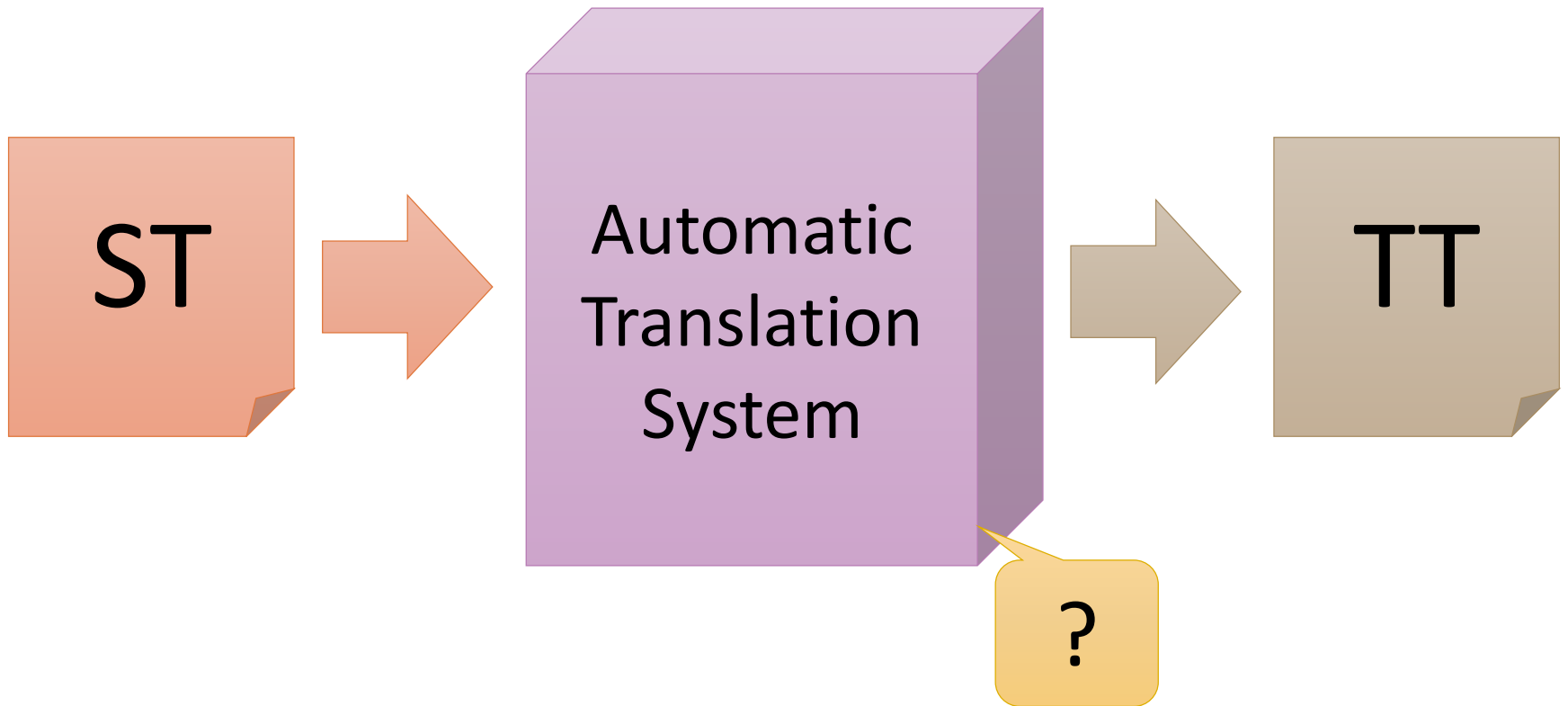


Accuracy



Consistency

Machine Translation (MT)



Methods

Rule-based Approach

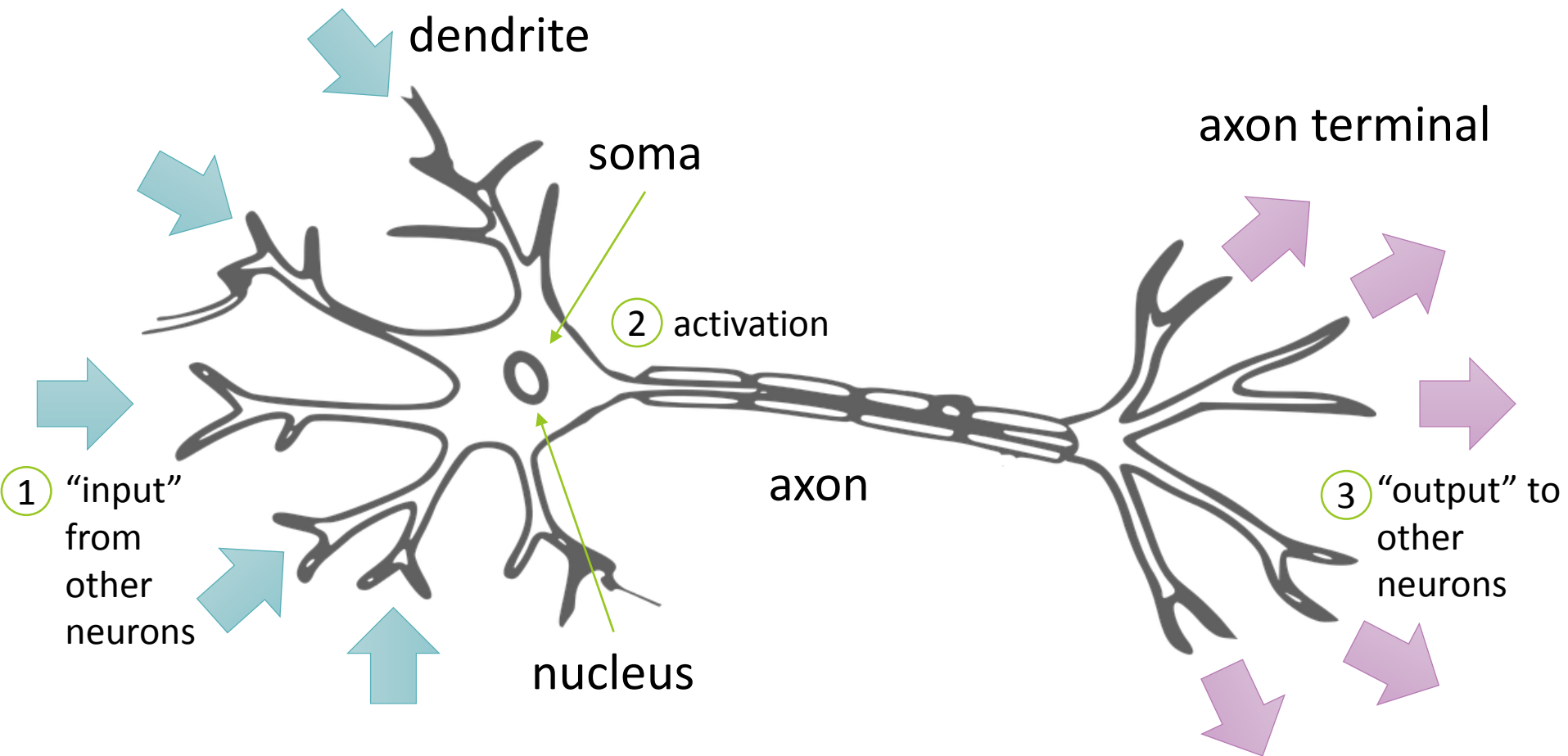
Example-based Approach

Statistical Approach

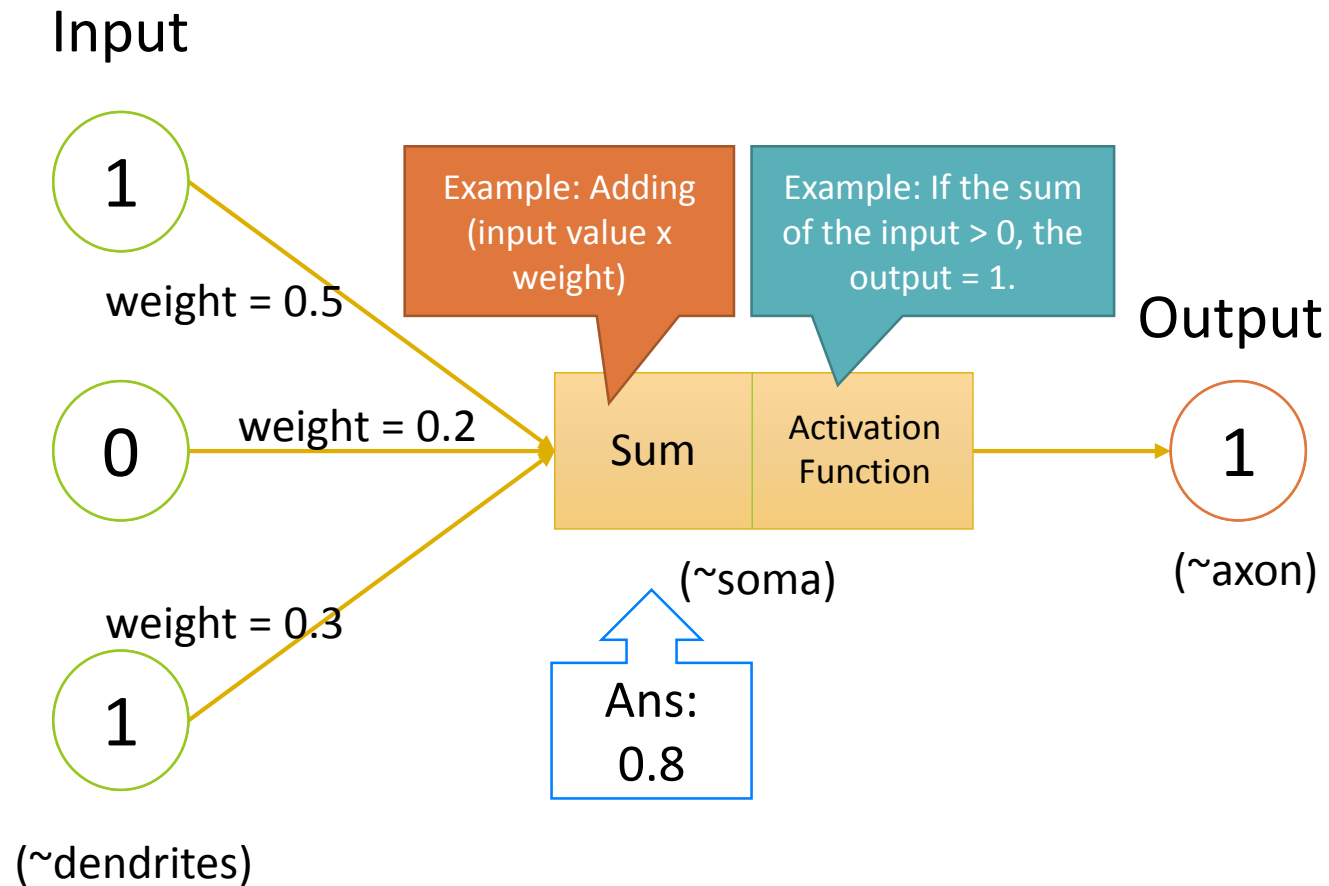
Deep Learning Approach



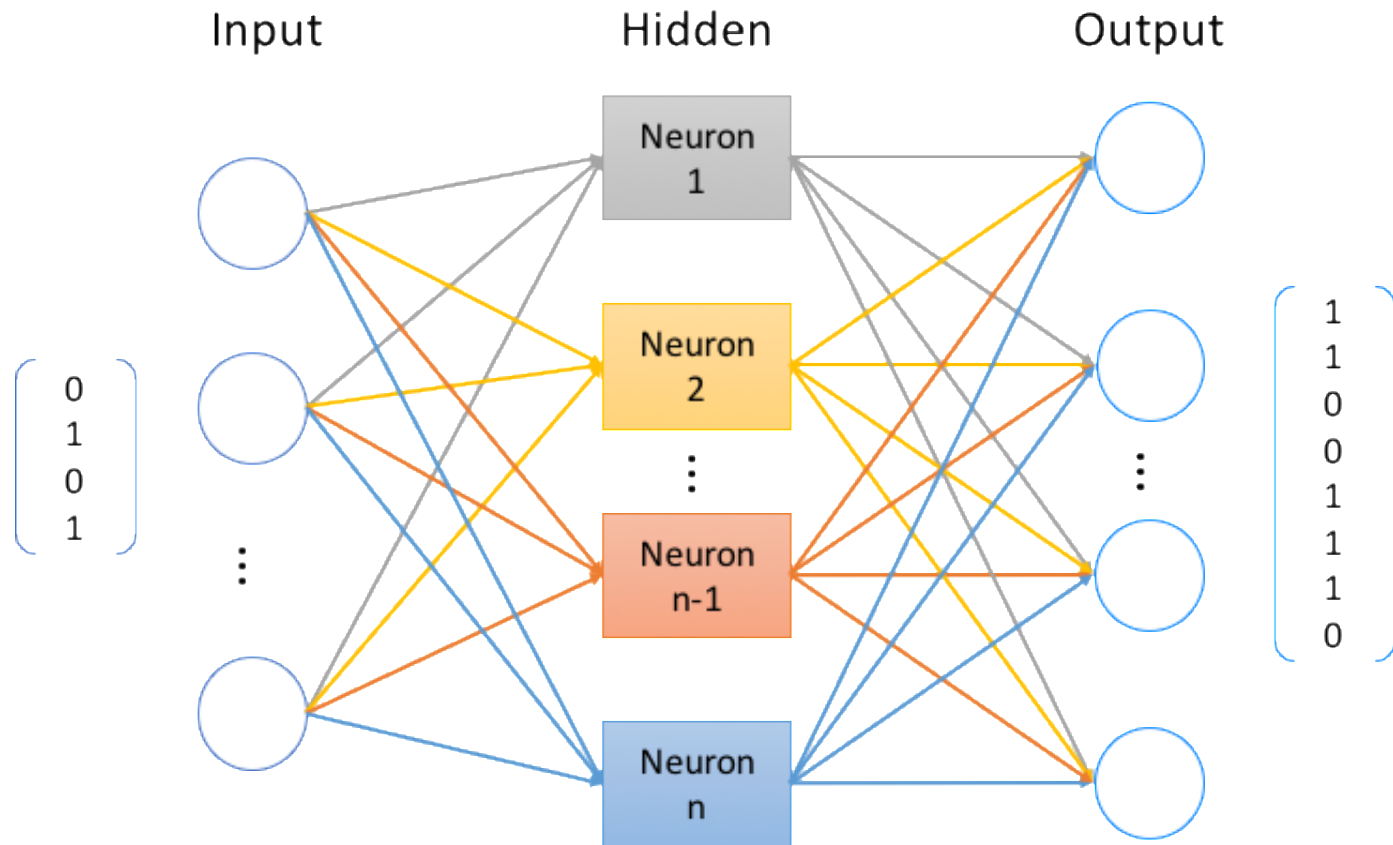
Biological Neuron



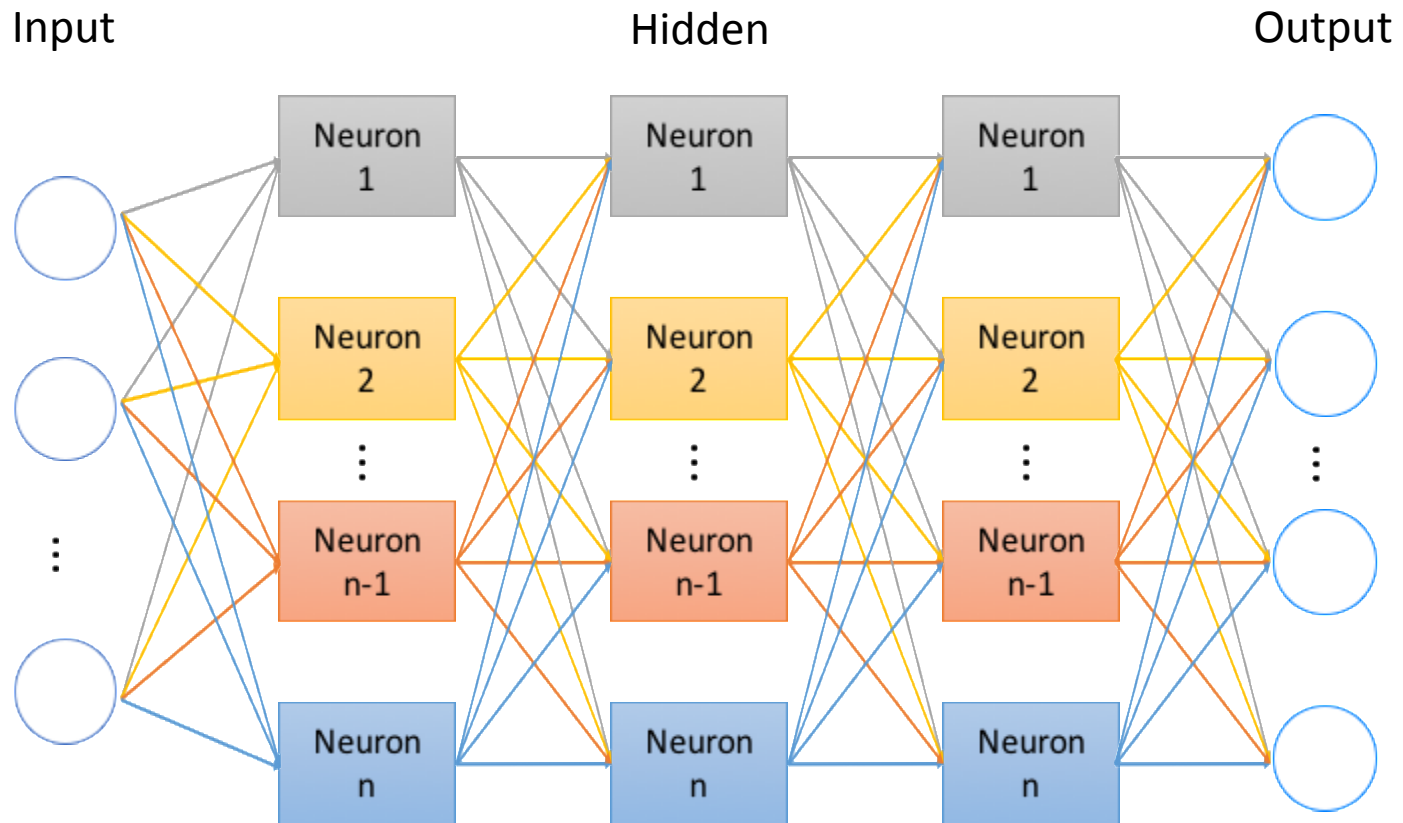
Artificial Neuron



Artificial Neural Network: Many Neurons

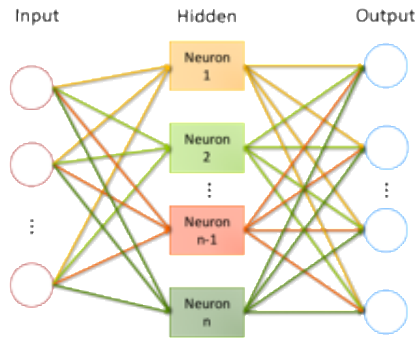


Deep Learning: Multiple Hidden Layers

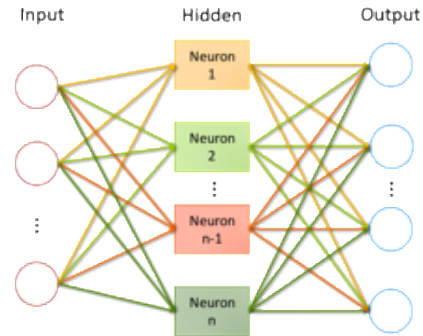


Neural Machine Translation (NMT)

ST



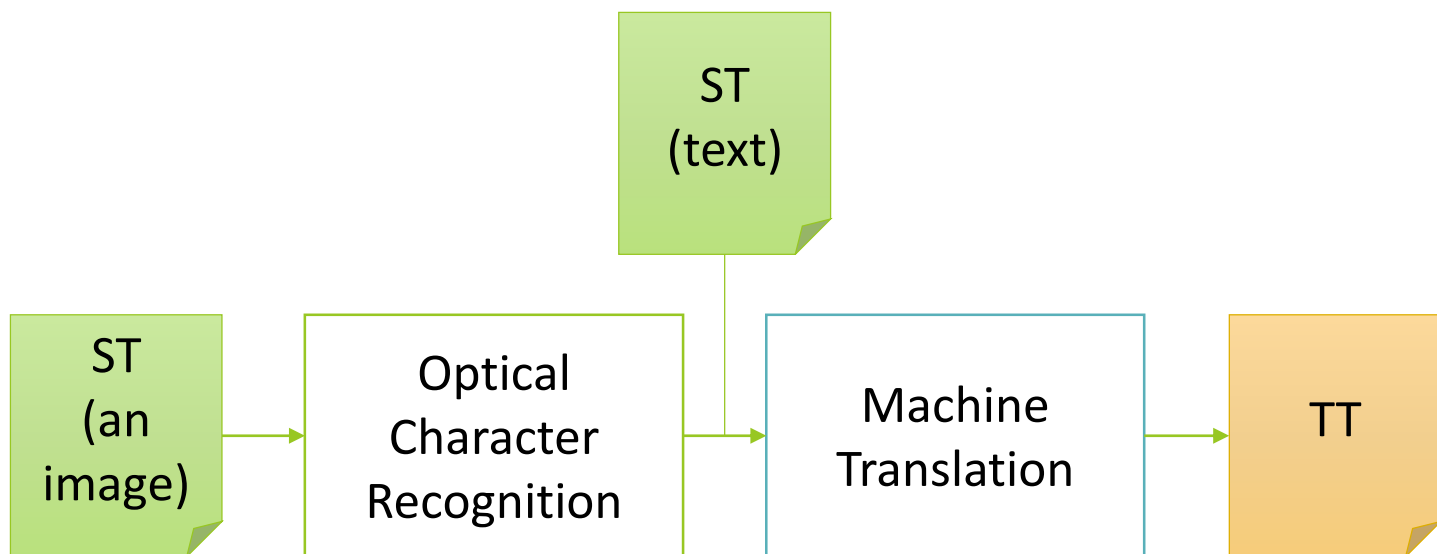
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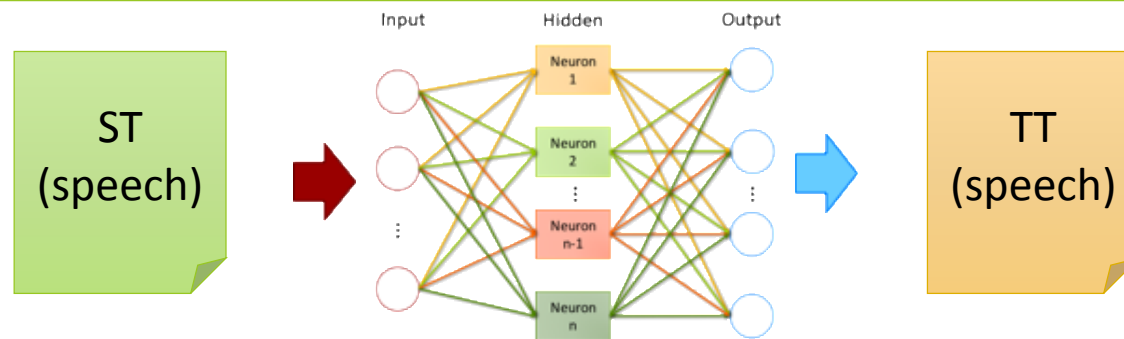
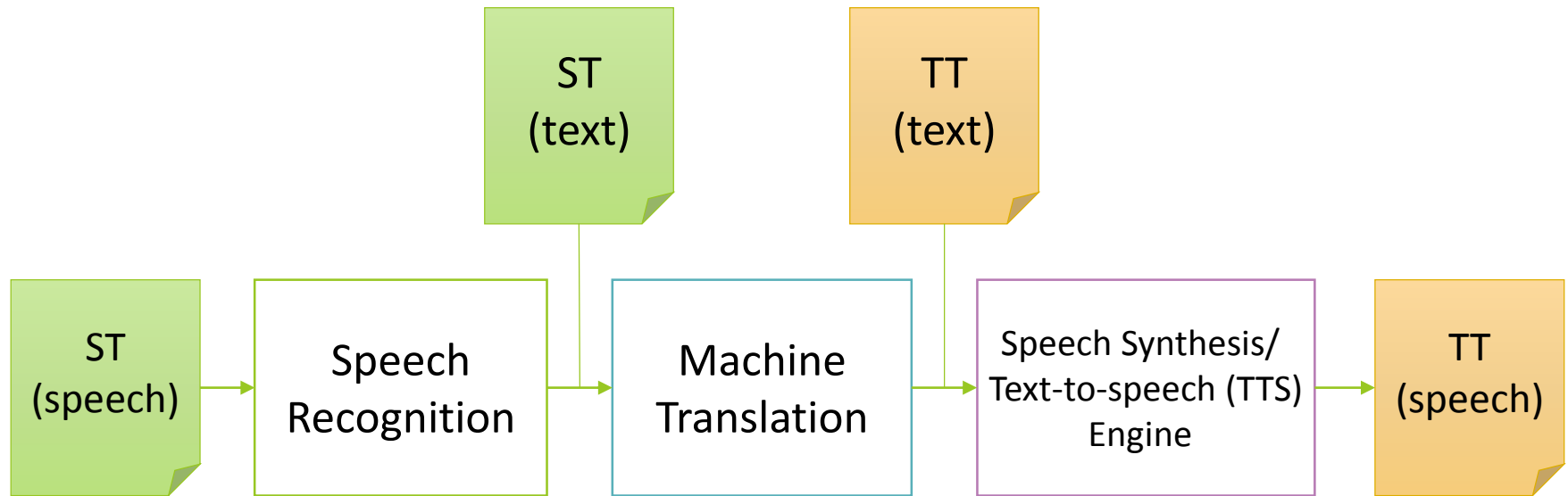
TT



Image Translation



Speech Translation



Other Tools

Corpora and
Concordancers

Localization
Tools

Translation
Servers

Checkers

Tool for
summarization

Computer-
aided Editing
Tools



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AI for Translation: Strengths, Weaknesses and the Way Forward

Strengths

Speed

Gist
Translation

Translation
Draft

Translation of
Repetitive
Elements

Term
Consistency

Language
Learning



Weaknesses

Accuracy

Ambiguity

Limited
Context

Cultural
Issues

Limited Text
Types

Lack of
Reasoning



The Way Forward

Collaboration

Modes

Tools

Skills

Identifying ways of collaboration
for different translation activities



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Levels of User-Computer Interaction



Human
Translation



Machine-
aided/assisted
Human
Translation (MAHT)



Human-
aided/assisted
Machine
Translation (HAMT)



Machine
Translation (MT)



The Way Forward

Collaboration

Modes

Tools

Skills

Designing tools for different types of translation:
Facilitating human-human interaction and human-
computer interaction



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Tools

Language
Professionals

Translation
Researchers

General Public

General
Translation

Domain-
specific
Translation

Other
Language
Services



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Integrated Tools for Translation of Financial Documents

Significance of financial translation: IPO documents as an example

Largest IPO Centre:
US\$36.5 billion in
2018

Integral Part of
Initial Public
Offerings

Bilingual
Prospectuses

IPO documents are usually prepared by lawyers and accountants in English and need to be translated to Chinese as required by HKEX. The translation task, usually handled by printing companies, is costly and labor-intensive.

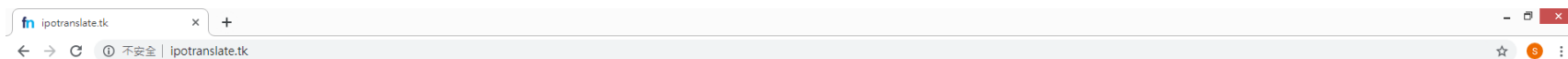


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Tool 1: IPO Translate



IPO Translate (English-Chinese Translation)

Source Text

Hong Kong Exchanges and Clearing Limited, The Stock Exchange of Hong Kong Limited and Hong Kong Securities Clearing Company Limited take no responsibility for the contents of this Prospectus, make no representation as to its accuracy or completeness, and expressly disclaim any liability whatsoever for any loss howsoever arising from or in reliance upon the whole or any part of the contents of this Prospectus.

A copy of this Prospectus, having attached thereto the documents specified in "Appendix V — Documents Delivered to the Registrar of Companies and Available for Inspection" to this Prospectus, has been registered by the Registrar of Companies in Hong Kong as required by section 342C of the Companies (Winding Up and Miscellaneous Provisions) Ordinance (Chapter 32 of the Laws of Hong Kong). The Securities and Futures Commission and the Registrar of Companies in Hong Kong take no responsibility for the contents of this Prospectus or any other document referred to above.

Load Sample

Translate

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Translation 1

香港交易及結算有限公司、香港聯合交易所有限公司及香港證券結算有限公司就本招股章程的內容概不承擔任何責任，概不就其準確性或完整性表示任何聲明，並明確概不就本招股章程所載的全部或任何部分產生的任何虧損而產生的任何損失承擔責任。

Translation 2

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Translation 1

本招股章程的副本連同本招股章程「附錄五—送呈公司註冊處處長及備查文件」所載文件所附的文件，已根據公司（清盤及雜項條文）條例第342C條（香港法例第32章）的規定於香港公司登記。

Translation 2

本招股章程副本連同本招股章程「附錄五—送呈公司註冊處處長及備查文件」所述文件，已根據公司（清盤及雜項條文）條例（香港法例第32章）第342C條的規定由香港公司註冊處處長登記。

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Translation 1

證券及期貨事務監察委員會及香港公司註冊處處長概不就本招股章程或上文所述任何其他文件的內容負責。

Translation 2

證券及期貨事務監察委員會及香港公司註冊處處長對本招股章程或上述任何其他文件的內容概不負責。



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Tool 2: FinTranX

Feature 1

Deep Learning
Technology

Feature 2

Domain-specific
Machine
Translation

Feature 3

Tool Integration
for Interaction

1. Automatic Translation: Generation of translation draft
2. Translation Memory: Reuse of previous translations
3. Terminology Databases: Translation of terms
4. External Databases: Online research

The Way Forward

Collaboration

Modes

Tools

Skills

Developing skills for better
collaboration in the era of AI-
aided Translation



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Language Skills

Reading, Writing,
Listening and
Speaking



Translation Skills

Translation Methods
and Translation
Theories



Evaluation

Editing

Project
Management

Tool Operation
and
Customization

Database
Management

AI and
Machine
Learning



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AI VS Human Translation: Inevitable Collaboration

Language professionals familiar with AI
Language professionals **NOT** familiar with AI

Thank you very much!

- Email: scsiu@hsu.edu.hk



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