

# AI and Neural Machine Translation

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# Specialists in Global Content Creation and Technology

## SDL WORKS WITH:

MORE THAN 40 OF THE WORLD'S  
LARGEST TRAVEL BRANDS

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6 OF THE TOP 10 AIRLINES

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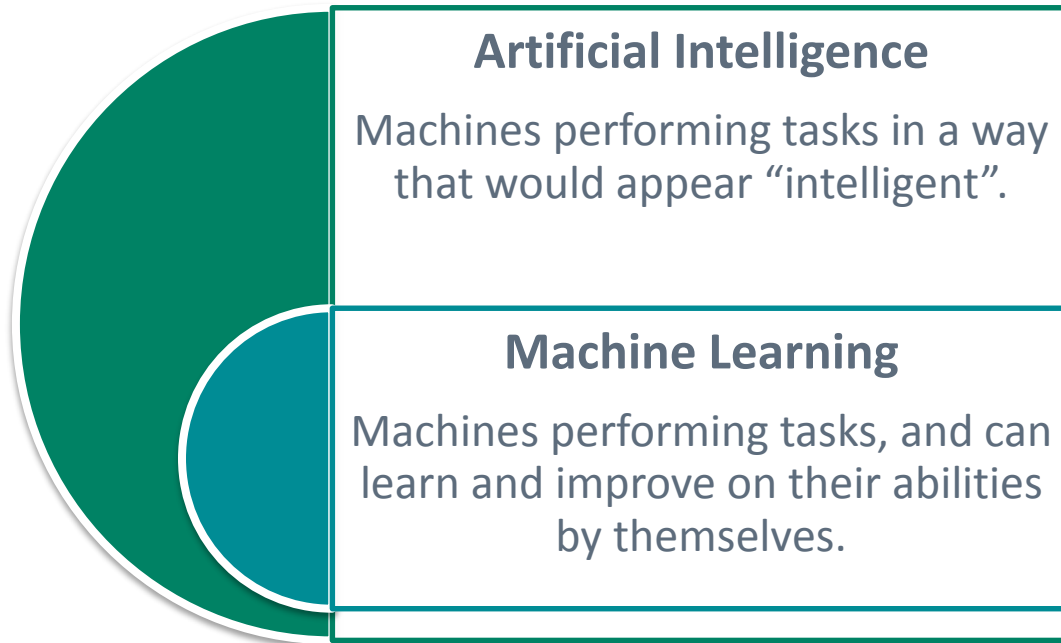
5 OF THE TOP 10 LARGEST  
HOTEL CHAINS

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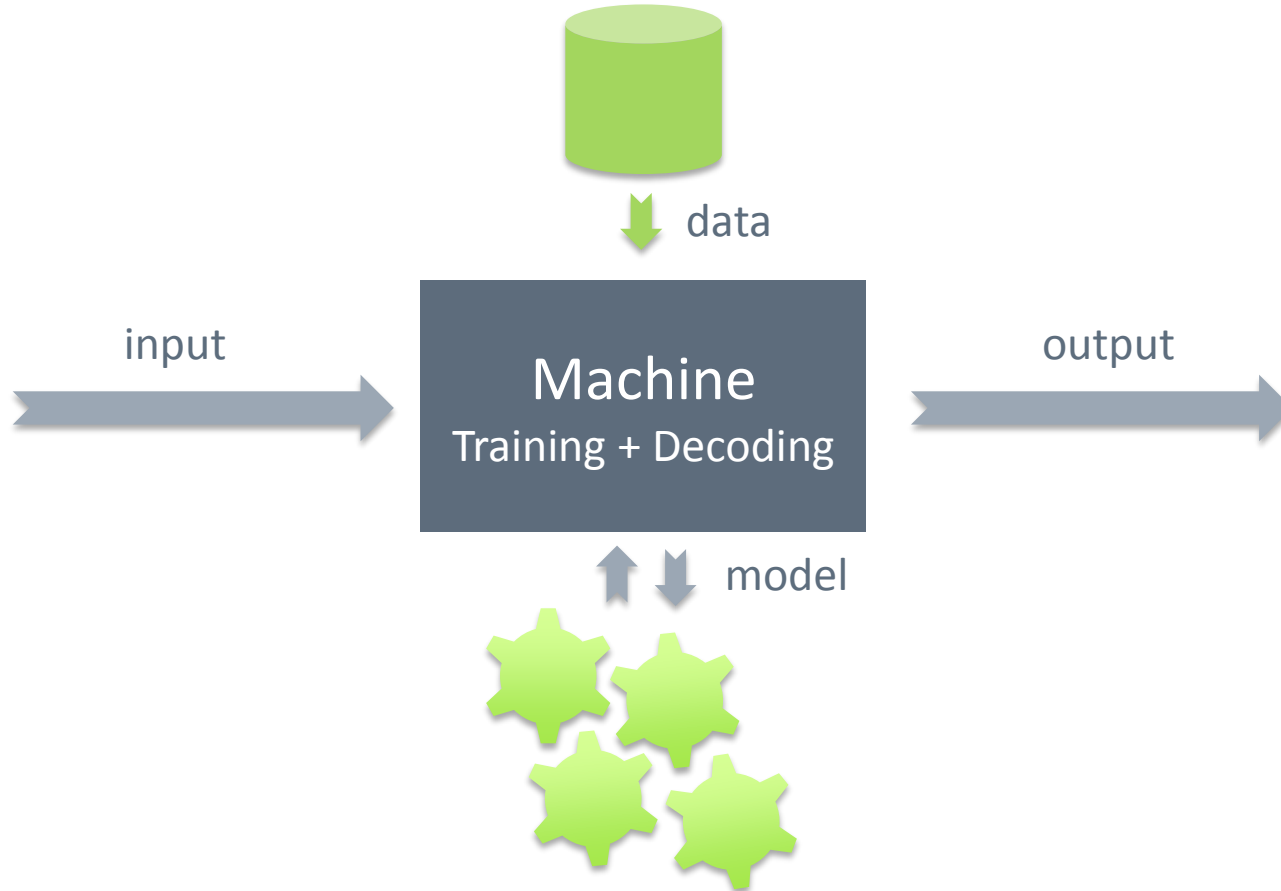
6 OF THE WORLD'S 15 MOST POPULAR  
TRAVEL WEBSITES



# Definition: Artificial Intelligence and Machine Learning



# Machine Learning





## ARTIFICIAL INTELLIGENCE

Searching & Planning

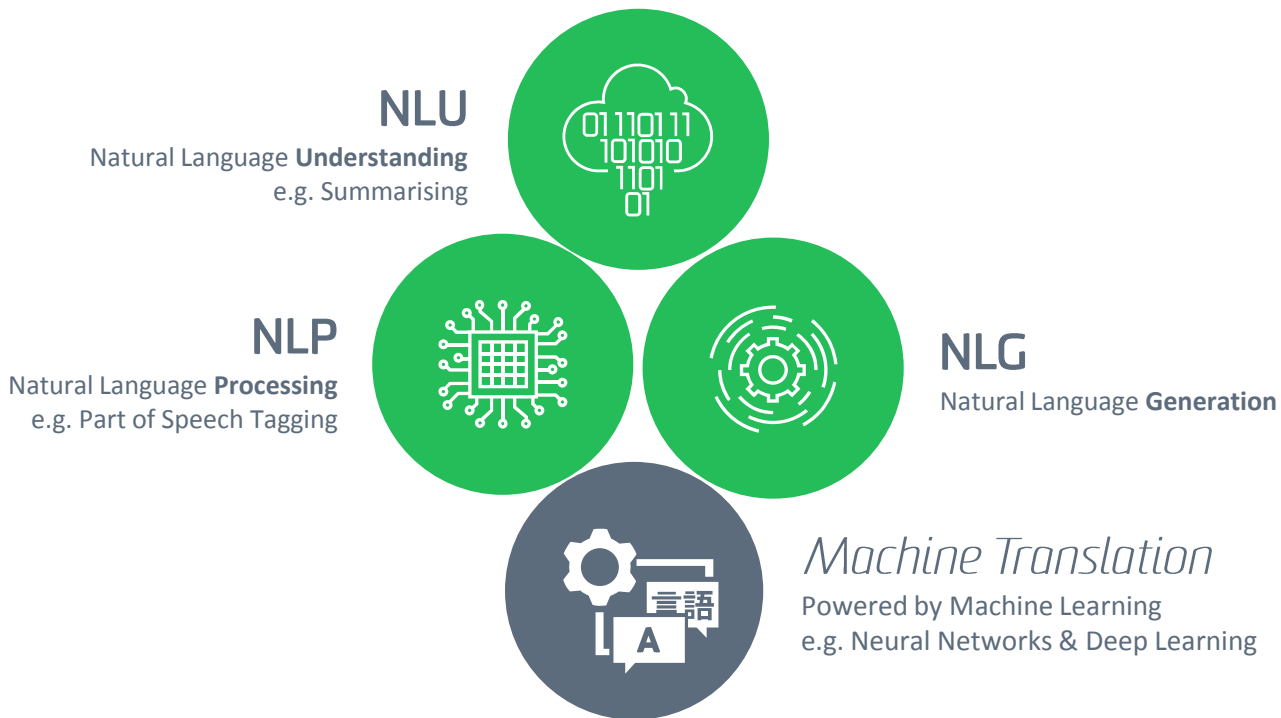
Reasoning & Knowledge Representation

Perception (Vision, Hearing, Touch)

Motion & Manipulation (Actuators, Robotics)

Natural Language Processing

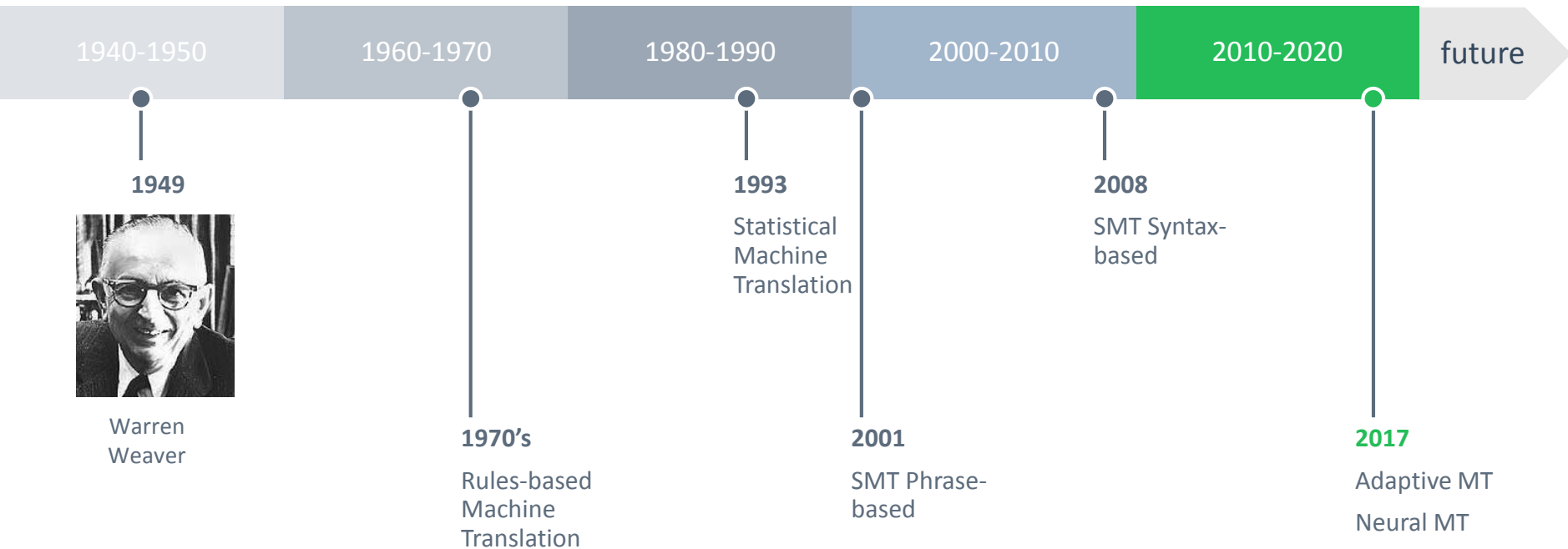
# SDL Machine Learning Expertise is in Language



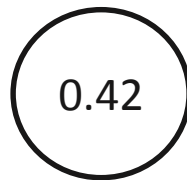
# Language is Hard!

<b>Monolingual</b>	<b>40%</b> of world's population speaks only 1 language
<b>Bilingual</b>	<b>43%</b> of world's population speaks 2 languages fluently
<b>Trilingual</b>	<b>13%</b> of world's population speaks 3 languages fluently
<b>Multilingual</b>	<b>3%</b> of world's population speaks 4 languages fluently
<b>Polyglot</b>	<b>&lt; 1%</b> of world's population speaks 5 languages fluently

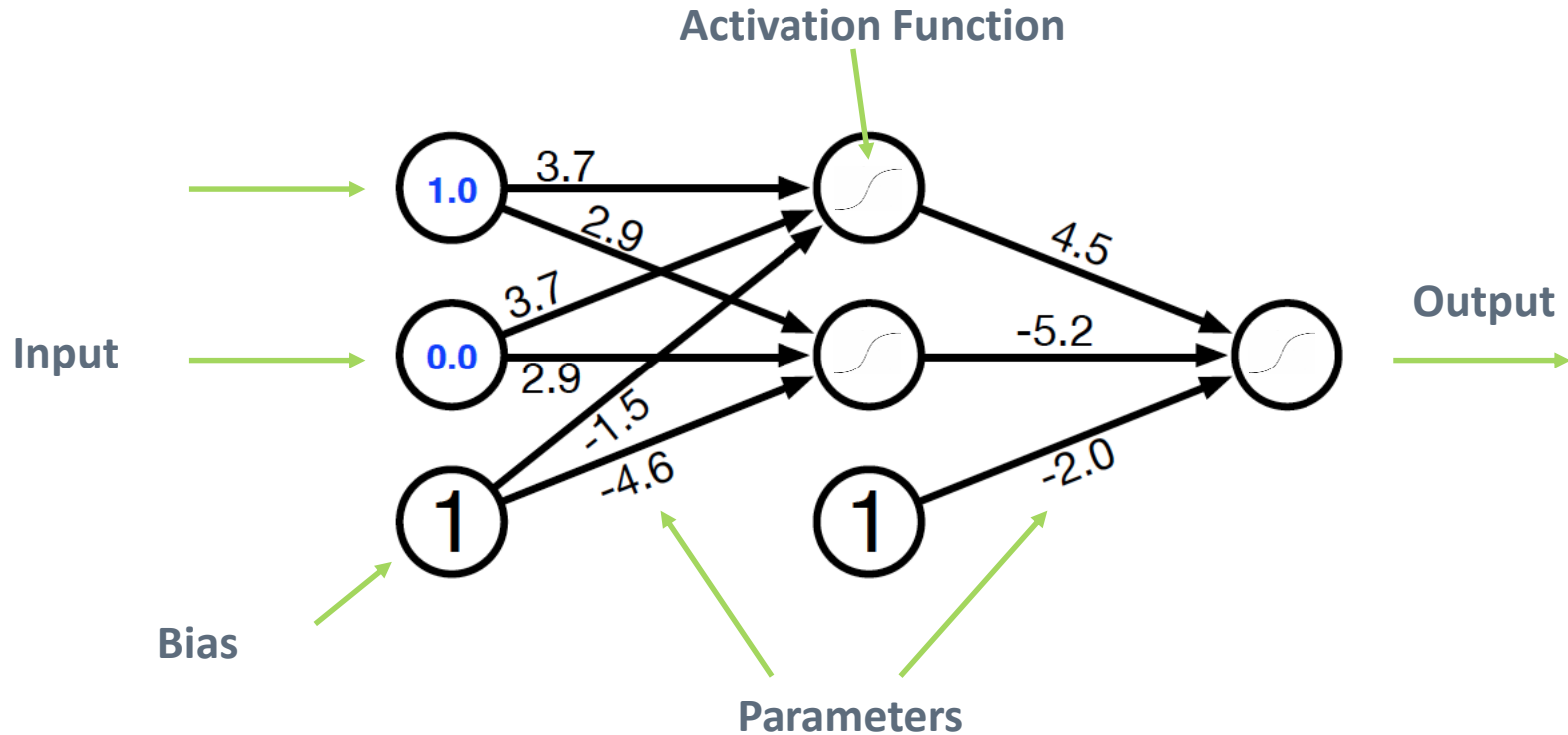
# Potted History of Machine Translation



# What is a Neuron?



# A Neural Network



# Neural Machine Translation

Input  
Text



ENCODER

-0.2  
-0.1  
0.1  
0.4  
-0.3  
1.1  
4.3  
-0.2  
0.5  
0.9  
1.3  
3.4  
-5.3  
-6.2  
4.8  
9.3  
3.4  
...  
2.6  
4.9  
0.1  
2.6  
8.3  
-7.3  
5.1  
1.5  
0.6  
9.3  
-6.2  
2.9  
1.4  
-1.3

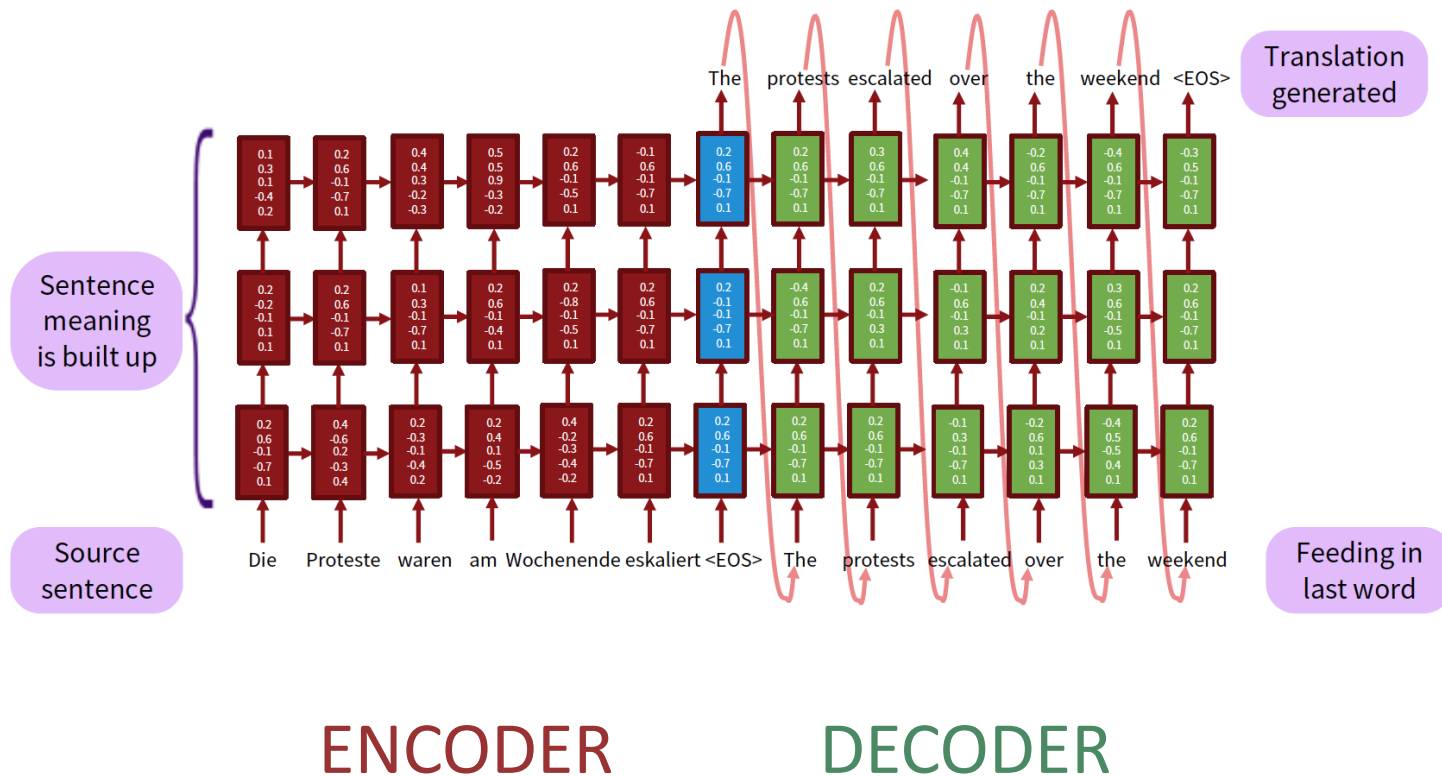


DECODER

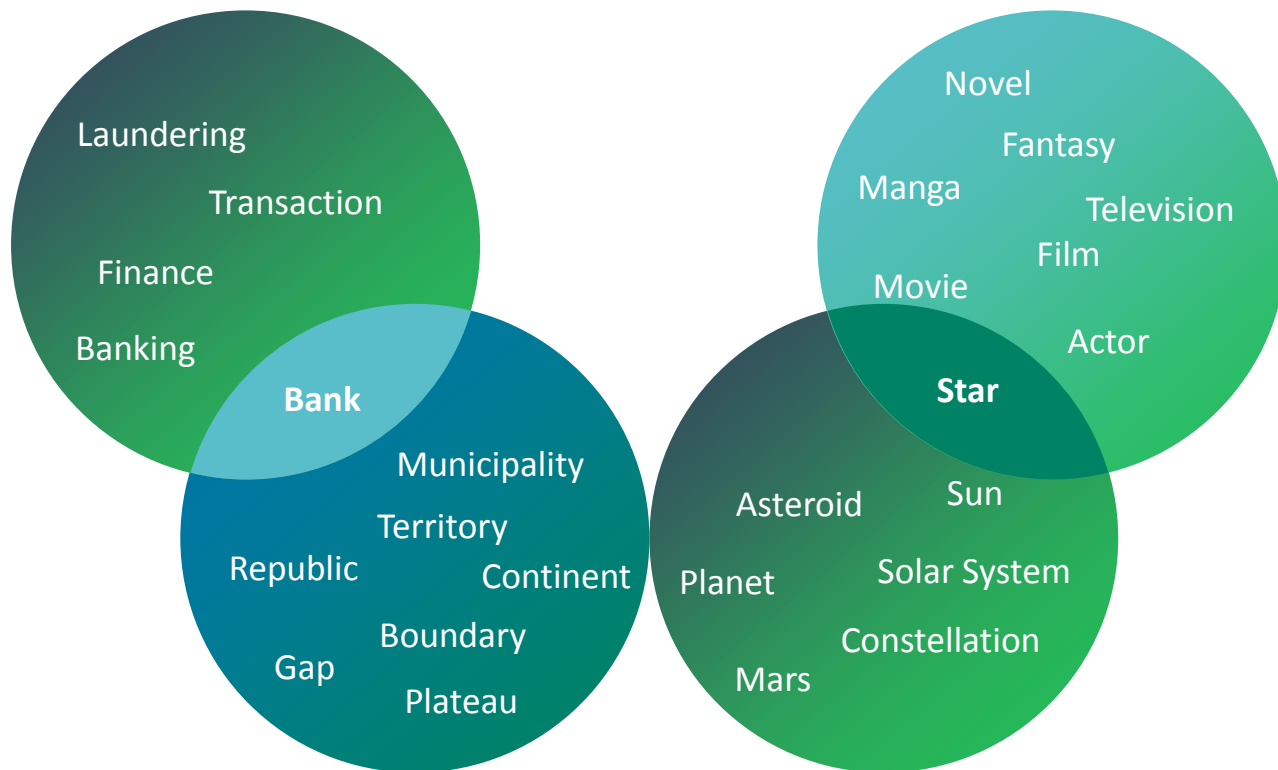


Output  
Text

# NMT: Deep Recurrent Neural Network (RNN)



# NMT: Word Representations and Word Embedding



# There are still a lot of issues to solve in NMT

	Production Grade SMT	General NMT	Production Grade NMT
<b>Fluency</b> Naturally sounding translation output	● ●	● ● ● ●	● ● ● ●
<b>Translation Speed / Cost</b> The hardware requirements to deliver production grade throughout	● ● ●	●	● ● ●
<b>Adequacy</b> Meaning is of the source sentence is correctly transferred to the translation output	● ● ● ●	● ●	● ● ● ●
<b>Coverage</b> All of the words in the source sentence are covered by the model and will be translated	● ● ● ●	● ●	● ● ● ●
<b>User Constraints</b> Respect Terms and Brands, correctly handle formatting/tags	● ● ● ●	●	● ● ● ●

# SDL is working hard to solve these issues

Source

شورشیان اسلامگرای سومالی می گویند برای بیرون راندن نیروهای  
اشغالگر از کشور می جنگ

Open Source NMT

Somalia's **Islamist rebels** say fighting to expel **troops troops**  
from **کشور**

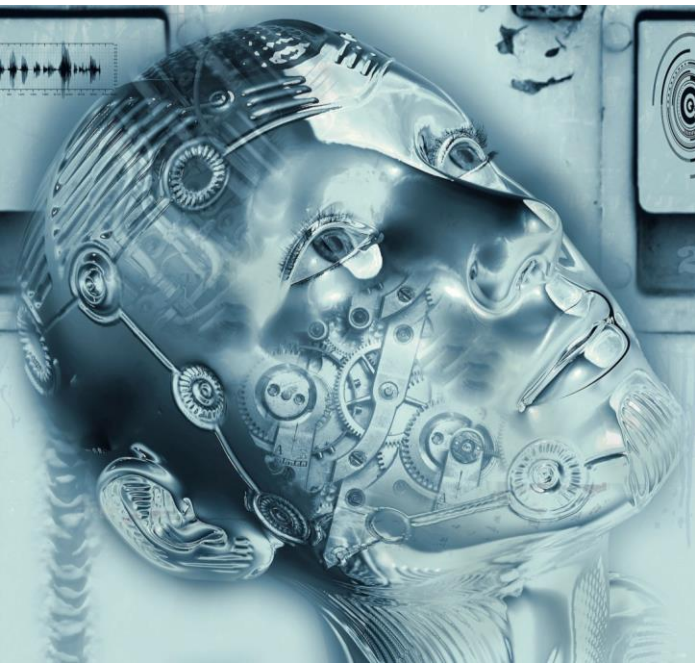
Consumer Grade NMT

Somali **insurgents** say they **are fighting the country** to expel  
**occupation forces**

SDL NMT

Somali **Islamist rebels** say they are **fighting to expel the**  
**occupying forces from the country**

# Neural MT Takeaways



The NMT architecture captures meaning and models interlingua, leading to significant translation quality improvement

01

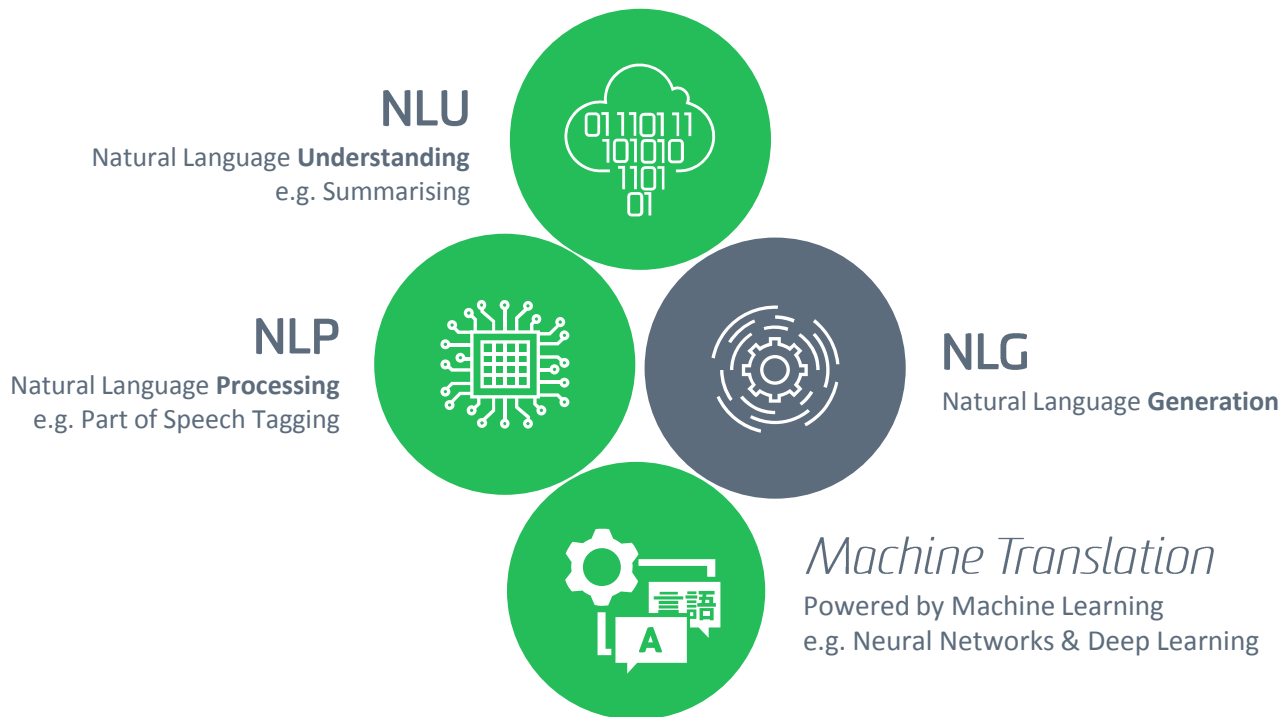
Transition from SMT to NMT opens significant innovation opportunities

02

NMT is a revolution, not an evolution

03

# Beyond MT: Natural Language Generation in Content



# The Travel “Inventory” Description

## Hotel Sherlock Holmes

221B Baker Street, London, United Kingdom

### Location

Hotel Sherlock Holmes is within walking distance of the Sherlock Holmes Museum. Other nearby attractions include Chessington World of Adventures Resort, Monument to the Great Fire of London and Travel Extras - Airport Parking & Attractions.

### Hotel facilities

Hotel Sherlock Holmes provides complimentary wireless Internet access, a 24-hour business center, multilingual staff, and tour/ticket assistance. This property features restaurants, a snack bar/deli, and a sauna. Other amenities include conference rooms, self parking, and a fitness center.

### Room Facilities

All soundproofed rooms offer satellite TV and minibars. Guests will also find hair dryers, free wired Internet, and room service.

Descriptions comprised of “attributes”  
(facilities and amenities)



100-word copy + 8 translations  $\cong$  \$5  
x 100,000 hotels  $\cong$  \$0.5M



# Facilities & Amenities codes to natural language

BETA

51.523777,-0.1607256  
HAC79 HAC345 HAC76 RES19  
HAC286 BUS39 HAC24 HAC91  
HAC103 HAC184  
RMA144 RMA207 RMA69 RMA210  
HAC77 RMA50



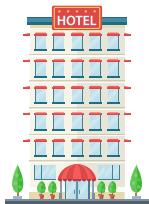
SDL\*

Natural Language  
Generation



YOU

Facilities &  
Amenities  
database



## Hotel Sherlock Holmes

221B Baker Street, London, United Kingdom

### Location

Hotel Sherlock Holmes is within a 10/15 minute walk of The Sherlock Holmes Museum. Other nearby attractions include Chessington World of Adventures Resort, Ripley's Believe It or Not! London and Monument to the Great Fire of London.

### Hotel facilities

Hotel Sherlock Holmes provides complimentary wireless Internet access, a 24-hour business center, multilingual staff, and tour/ticket assistance. This property features restaurants, a snack bar/deli, and a sauna. Other amenities include conference rooms, self parking, and a fitness center.

### Room Facilities

All soundproofed rooms offer satellite TV and minibars. Guestrooms also feature room service, hair dryers, and complimentary high-speed (wired) Internet access

# Natural Language Generation + MT

## Hotel Sherlock Holmes

221B Baker Street, London, United Kingdom

### Location

Hotel Sherlock Holmes sijaitsee 10 minuutin kävelymatkan päässä Sherlock Holmes -museosta. Muita lähellä sijaitsevia nähtävyyksiä ovat muun muassa Chessington World of Adventures Resort, Ripley's Believe It or Not! Lontoo ja monumentti Lontoon Great Fire.

### Hotel facilities

Hotel Sherlock Holmes tarjoaa ilmaisen langattoman internetyhteyden, 24h-bisneskeskuksen, kielitaitoisen henkilökunnan ja retkipalvelun. Tämä majoituspaikka tarjoaa ravintoloita, välipalabaari/deli ja sauna. Muita mukavuuksia ovat konferenssihuoneet.

Kaikissa äänieristetyissä huoneissa on huonepalvelu, hiuksetkuivaus ja ilmainen WiFi.

## Hotel Sherlock Holmes

221B Baker Street, London, United Kingdom

### Location

Das Hotel Sherlock Holmes befindet sich in einem 10/15-minütigen Spaziergang vom Sherlock Holmes Museum. Zu den weiteren Attraktionen in der Umgebung gehören die Chessington World of Adventures Resort, Ripley's Believe It Or Not! London and monument to the great brand of London.

### Hotel facilities

Das Hotel Sherlock Holmes bietet kostenloses WLAN, ein 24-Stunden-Businesscenter, ein Personal und eine Tour/Ticket-Hilfe. In diesem Hotel finden Sie ein Restaurant/Bakery/Deli und eine Sauna. Zu den weiteren Annehmlichkeiten zählen Konferenzräume, einen Parkplatz und ein Fitnesscenter.

### Room Facilities

Zimmer bieten Sat-TV und Minibar. Die Zimmer verfügen über einen Haartrockner, Haartrockner und kostenfreies WLAN (LAN).

## Hotel Sherlock Holmes

221B Baker Street, London, United Kingdom

### Location

معلم الجذب Sherlock Holmes حوالي 10 دقائق مشيا على الأقدام عن متحف Sherlock Holmes يقع فندق .  
Cheshington World of Adventures Resort 'Ripley's want it or not ! الأخرى القريبة تشمل متحف  
لندن والنصب التذكاري لنيران لندن الكبرى.

### Hotel facilities

خدمة إنترنت لاسلكي مجانية، ومركز لرجال الأعمال يعمل على مدار 24 ساعة Hotel Sherlock Holmes يوفر فندق  
ساعة، وموظفين متعددي اللغات، بالإضافة إلى خدمة حجز التذاكر/التذاكر. هذه الملكية تحتوي على مطاعم وبار  
أطعمة خفيفة/إيلي وساونا. المرافق الأخرى تتضمن غرف مؤتمرات وموقف سيارات ذاتيا ومركز لياقة بدنية.

### Room Facilities

تحتوي جميع الغرف العازلة للصوت على تلفزيون مع قنوات فضائية وميني بار. غرف النزلاء تحتوي أيضا على  
خدمة غرف ومجفف شعر وإنترنت عالي السرعة مجاني (سلكي).

45 Languages

# Relevancy: Real-Time Content Generation

Creating **Vacation** text...

The Hotel Sherlock Holmes features complimentary wireless internet, tour/ticket assistance and a 24-hour front desk.



Creating **Business** text...

The Hotel Sherlock Holmes features meeting rooms, a business centre and free Wi-Fi in public areas.



# ***Relevant*** content is more important than “personalised”



## **Relevant content positions the brand as a *trusted advisor***

The key is to be authentic and trustworthy; with the end goal of being believable.



## **Relevant content *adds value* to the conversation**

Adding value can potentially create customer advocacy and position the company as a trusted advisor.



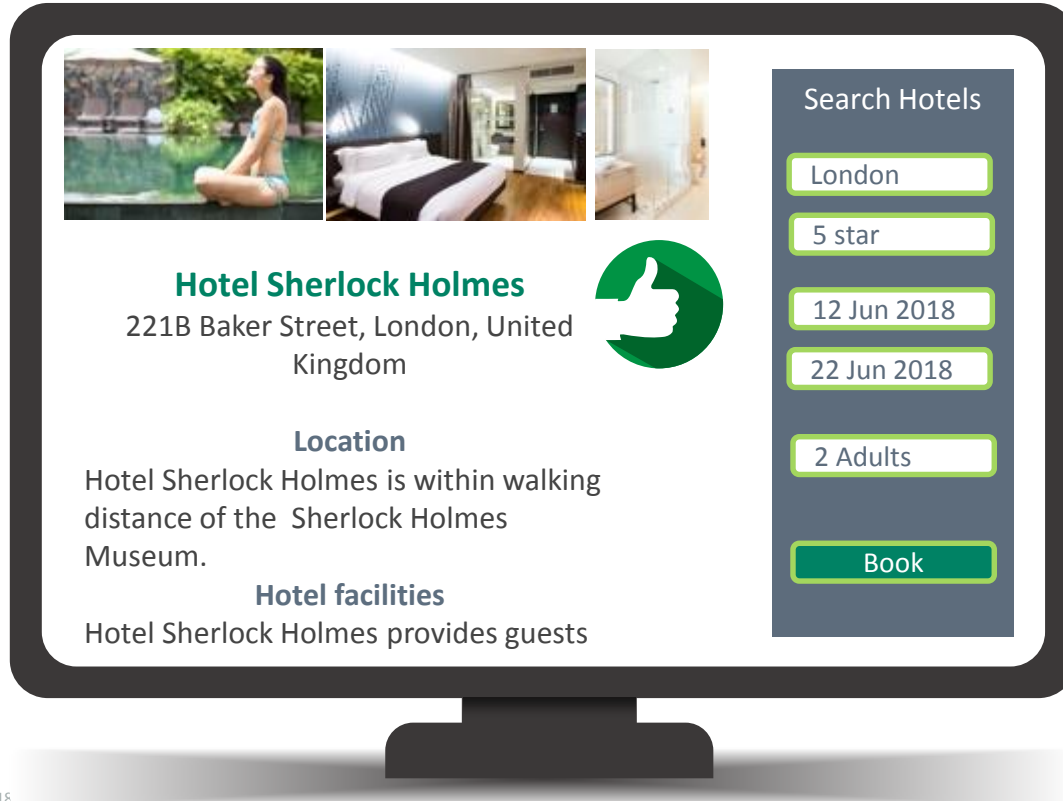
## **Relevant content is considered *authentic* and, importantly, *believable***

Being authentic is an expectation that consumers already have today; and they are holding business accountable.

Do words really  
matter anymore?




# The 3 key conversion factors in travel e-commerce



- Images & videos
- Social Proof (reviews)
- Digital Experience

**What about the words?**

A close-up photograph of a person's hands holding a smartphone over a wooden table. The person is wearing a silver-toned metal watch on their left wrist. A semi-transparent speech bubble with a green-to-blue gradient is positioned over the upper part of the hands. The background is softly blurred, showing more of the wooden surface and the person's arm.

**Words are the  
primary data  
set for SEO**

# Language dictates purchasing and advocacy behavior

90%

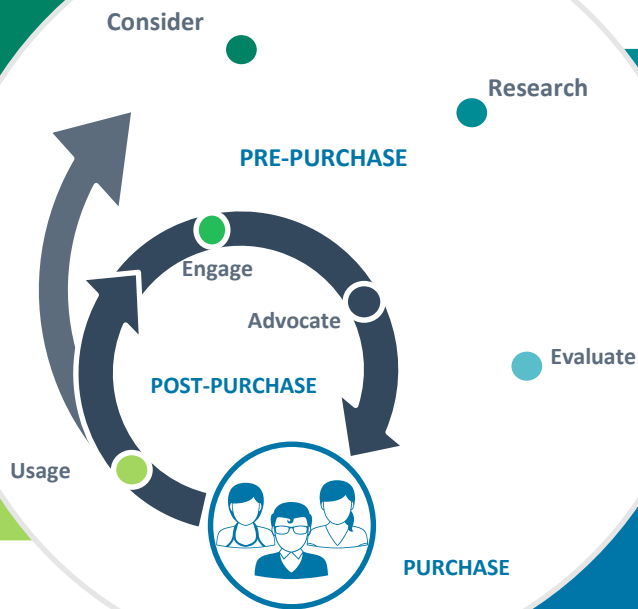
choose a native language when available

70+

languages are supported by Twitter and Facebook

78%

more likely to buy if user instructions are in their language



82%

more likely to buy if promotional material is in their language

81%

more likely to buy if technical documentation is in their language

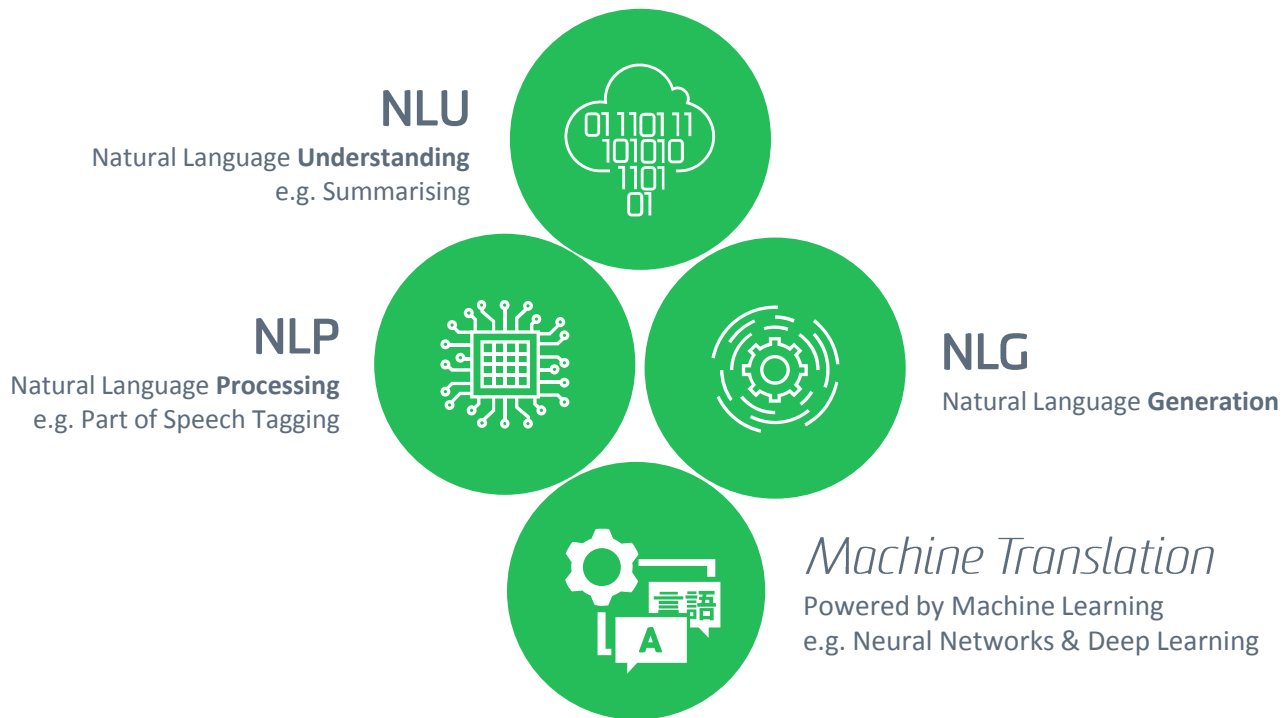
60%

in Japan and France will not buy from a site in another language

# Voice-commerce: The 'new web'



# A Revolution for Human Understanding



# SDL\*

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## Software and Services for Human Understanding

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