

COURSE OVERVIEW IT0037 Machine Translation

Course Title Machine Translation

Course Date/Venue

Session 1: July 06-10, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai UAE Session 2: October 20-24, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

AWA

Course Reference

IT0037

Course Duration/Credits Five days/3.0 CEUs/30 PDHs





This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a detailed and up-to-date overview of Machine Translation. It covers the scope of machine translation (MT) and the differences between human and machine translation; the types of machine translation approaches and linguistic challenges in machine translation; the rule-based machine translation (RBMT), statistical machine translation (SMT), neural machine translation (NMT) and encoder-decoder architecture in NMT; the attention mechanism in NMT and transformer models in machine translation; and the pre-trained language models for translation.



Further, the course will also discuss the data collection and preprocessing for MT, training large-scale MT models and evaluating machine translation output; handling lowresource languages in MT and the bias and ethical issues in machine translation; the domain adaptation for machine translation, real-time and low-latency machine translation and multimodal machine translation (MMT); the speech-tospeech machine translation and federated and privacypreserving MT models; and the Export MT Models for Deployment (ONNX, TensorFlow Lite) and run machine translation in a web application.



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During this interactive course, participants will learn the API-based translation using google translate and deepL; the difference between cloud versus edge deployment for MT services; the AI-powered human-machine collaboration in translation and neural-symbolic hybrid approaches in MT; the AI's role in preserving endangered languages and advancements in AI-powered speech translation; how AI helps human translators improve accuracy; and the automated post-editing for faster translation workflows and AI in game and website localization.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain a comprehensive knowledge on machine translation
- Discuss the scope of machine translation (MT) and the differences between human and machine translation
- Identify the types of machine translation approaches, linguistic challenges in machine translation and rule-based machine translation (RBMT)
- Recognize the statistical machine translation (SMT), neural machine translation (NMT) and encoder-decoder architecture in NMT
- Describe attention mechanism in NMT, transformer models in machine translation and pre-trained language models for translation
- Illustrate data collection and preprocessing for MT, training large-scale MT models and evaluating machine translation output
- Handle low-resource languages in MT and identify bias and ethical issues in machine translation
- Determine domain adaptation for machine translation, real-time and low-latency machine translation and multimodal machine translation (MMT)
- Illustrate speech-to-speech machine translation and federated and privacypreserving MT models
- Export MT Models for Deployment (ONNX, TensorFlow Lite) and run machine translation in a web application
- Apply API-based translation using google translate and deepL and differentiate cloud versus edge deployment for MT services
- Discuss AI-powered human-machine collaboration in translation, neural-symbolic hybrid approaches in MT, AI's role in preserving endangered languages and advancements in AI-powered speech translation
- Explain how AI helps human translators improve accuracy and identify automated post-editing for faster translation workflows and AI in game and website localization

Exclusive Smart Training Kit - H-STK®



Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK**[®]). The **H-STK**[®] consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.



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Who Should Attend

This course provides an overview of all significant aspects and considerations of Machine Translation for AI/ML engineers and data scientists, project managers in translation and localization, language professionals (translators, interpreters), computational linguists, localization and internationalization specialists, researchers in NLP and linguistics, students of linguistics, AI, or translation studies and other technical staff.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.



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Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Mr. Abdel Aziz Issa Safi, MSc, BSc, is a Senior IT & Instrumentation & Communications Engineer with extensive years of experience in the Water & Electricity and Utilities. He specializes in Artificial Intelligence, Machine learning, Deep Learning, Cybersecurity, Artificial Intelligence & Cybersecurity, Robotics, Natural Language Processing (NLP), AI for Data Science. CompTIA, Network+, **Network** Configuration & Management, Network Monitoring, Network Design &

Implementation, Systems & Networks Protection, Network Fundamentals & Troubleshooting, Advanced Networking Technology, Operating System Installation & Upgrading, IP Installation & Networking, Ethical Hacking (CEH V.10), Access Control Management, Software, Hardware, Modeling, Simulation & Design, WiMax Broadband Wireless, SDH Networks, IPT Avaya Network, WAN & Satellite Communication, Wireless Technology RC-400, Detection System Using Machine Learning, Certified Computer Forensics, Certified Secure Computer User (CSCU), Computer-Based Office Administration & Organization, ICDL, MS Office & Excel, Security Protocols & Best Practices, Security Awareness & Training, Security Audits, Security Policies & Procedures Development, Risk Management, Resource Management, Leadership & Management, Vendor Management, Operations Management, Finance Management, Communication Skills, Strategic Thinking, Continuous Learning & Development and Team Building.

During his career life, Mr. Abdel has gained his practical and field experience through his various significant positions and dedication as the **Network & System Administrator**, **Information Security Specialist**, **Network Engineer**, **Computer Networks & Cybersecurity Technical Practitioner**, **Sales & Computer Technician**, **Lecturer**, **Practitioner** and **Instructor/Trainer** for Saudi Arabia Culture Mission, Applied Science University and Microtech for Computers, just to name a few.

Mr. Abdel has a Master's degree in Computer Science, a Bachelor's degree in Information Technology & Computing and a Diploma in Computer Technology. Further, he is a Certified Ethical Hacker, a Microsoft System Center IT Professional (MCITP), a Microsoft System Center Configuration Manager (SCCM) and has numerous academic certifications on Hardware & Software Maintenance, CCNA (Cisco Certified Network Associate), Cisco Wireless LANs, Oracle 10g, Mac Certificate from Modern Systems Co. (OSX, Technical and Server), FortiAnalyzer, FortiGate UTM and Data Center Design Professional (DCDP). He has further published journals and delivered numerous trainings, courses, workshops, seminars and conferences globally.



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Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures

20% Practical Workshops & Work Presentations

30% Hands-on Practical Exercises & Case Studies

20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

US\$ 5,500 per Delegate + **VAT**. This rate includes H-STK[®] (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

Registration & Coffee
Welcome & Introduction
PRE-TEST
What is Machine Translation?
Definition and Scope of Machine Translation (MT) • Differences Between
Human and Machine Translation • Historical Evolution of Machine Translation
Key Applications of Machine Translation
Break
Types of Machine Translation Approaches
Rule-Based Machine Translation (RBMT) • Statistical Machine Translation
(SMT) • Neural Machine Translation (NMT) • Hybrid Machine Translation
Models
Linguistic Challenges in Machine Translation
Polysemy and Ambiguity in Translation • Syntax and Grammar Complexity
Across Languages • Morphological Variations and Word Order Differences •
Idioms, Cultural Nuances, and Context Dependency
Rule-Based Machine Translation (RBMT)
How RBMT Works: Lexicon, Grammar Rules, and Syntax Trees • Strengths and
Weaknesses of RBMT • Case Study: Early MT Systems Using RBMT • Why
RBMT Is Less Common Today
Break
Introduction to Statistical Machine Translation (SMT)
How SMT Works: Phrase-Based and Word-Based Models • Language and
Translation Models in SMT • Training SMT Models with Parallel Corpora •
Limitations of SMT Compared to Neural Methods



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1330 - 1420	Hands-On: Setting Up a Basic Machine Translation Model
	Installing Python and NLTK for Text Processing • Loading and Preprocessing
	Parallel Corpora • Using Google Translate API for Basic Translation Tasks •
	Evaluating Translations Using BLEU Score
1420 - 1430	Recap
	Using this Course Overview, the Instructor(s) will Brief Participants about the
	Topics that were Discussed Today and Advise Them of the Topics to be Discussed
	Tomorrow
1430	Lunch & End of Day One

Day 2

0730 – 0830	Neural Machine Translation (NMT)
	How NMT Differs from SMT and RBMT • Basics of Deep Learning for
	Translation • Sequence-to-Sequence (Seq2Seq) Models in NMT • Advantages
	and Challenges of NMT
	Encoder-Decoder Architecture in NMT
0830 - 0930	How the Encoder Captures Input Sentence Meaning • The Role of the Decoder in
0000 0000	Generating Output • Importance of Context Vector in Translation Quality •
	Shortcomings of Basic Encoder-Decoder Models
0930 - 0945	Break
	Attention Mechanism in NMT
	Limitations of Basic Seq2Seq Models Without Attention • How Attention Helps
0945 – 1130	Improve Translation Performance • Introduction to Bahdanau and Luong
	Attention Mechanisms • Case Study: Attention-Based Translation in Google
	Translate
	Transformer Models in Machine Translation
1130 - 1230	Introduction to the Transformer Architecture • Multi-Head Self-Attention and
	Positional Encoding • Why Transformers Replaced RNNs for Translation • Case
	Study: Google's BERT and OpenAI's GPT in Translation
1230 - 1245	Break
	Pre-Trained Language Models for Translation
	How Models Like BERT, GPT, and T5 Enhance Translation • Zero-Shot and
1245 - 1330	<i>Few-Shot Translation with Pre-Trained Models</i> • <i>Multilingual Translation with</i>
	Facebook's M2M-100 and Google's T5 • Case Study: DeepL versus Google
	Translate versus OpenAI's GPT
	Hands-On: Training a Simple NMT Model
1330 - 1420	Installing TensorFlow and Keras for NMT • Building a Seq2Seq Model for
1000 1120	Translation • Implementing Attention for Better Translation Quality •
	Evaluating the Model with BLEU and METEOR Scores
	Recap
1420 - 1430	Using this Course Overview, the Instructor(s) will Brief Participants about the
	Topics that were Discussed Today and Advise Them of the Topics to be Discussed
	Tomorrow
1430	Lunch & End of Day Two

Day 3

0730 – 0830 Where to Find Parallel Corpora for MT Training • Tokenization, Lemmatization, and Sentence Splitting • Cleaning Noisy Data to Improve Translation Quality • Aligning Parallel Sentences in Different Languages	0730 - 0830	Data Collection & Preprocessing for MT Where to Find Parallel Corpora for MT Training • Tokenization, Lemmatization, and Sentence Splitting • Cleaning Noisy Data to Improve Translation Quality • Aligning Parallel Sentences in Different Languages
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0830 - 0930	Training Large-Scale MT Models
	Required Hardware and Computing Resources • Using GPUs and TPUs for
	Faster Model Training • Distributed Training for Large Datasets • Fine-Tuning
	Pre-Trained Models for Domain-Specific Translation
0930 - 0945	Break
	Evaluating Machine Translation Output
0045 1120	BLEU Score: How It Measures Translation Accuracy • METEOR Score:
0945 - 1150	Addressing BLEU's Limitations • TER (Translation Edit Rate) and Other
	Evaluation Metrics • Human Evaluation vs. Automated Metrics in MT
	Handling Low-Resource Languages in MT
	Challenges in Translating Underrepresented Languages • Transfer Learning and
1130 - 1230	Meta-Learning for Low-Resource MT • Building Synthetic Parallel Corpora with
	Data Augmentation • Case Study: Google's Translation Efforts for Low-Resource
	Languages
1230 - 1245	Break
	Bias and Ethical Issues in Machine Translation
1245 1220	Gender and Cultural Bias in MT Systems • Challenges in Fair and Inclusive
1245 - 1550	Translations • Ensuring Data Diversity in Training Models • Ethical
	Considerations in AI-Based Translation Services
	Hands-On: Evaluating and Fine-Tuning an NMT Model
1330 1420	Using Hugging Face Transformers for Translation • Fine-Tuning a Pre-Trained
1550 - 1420	Model with Domain-Specific Data • Comparing BLEU Scores Across Different
	Models • Testing MT Output for Bias and Fluency
1420 - 1430	Recap
	Using this Course Overview, the Instructor(s) will Brief Participants about the
	Topics that were Discussed Today and Advise Them of the Topics to be Discussed
	Tomorrow
1430	Lunch & End of Day Three

Day 4

0730 - 0830	Domain Adaptation for Machine Translation
	Why Generic MT Models Fail in Specialized Domains • Adapting MT for
	Medical, Legal, and Technical Domains • Transfer Learning for Domain-Specific
	Translation • Case Study: Medical Text Translation Challenges
	Real-Time and Low-Latency Machine Translation
	Challenges in Deploying MT for Live Conversations • How Speech-to-Text and
0830 - 0930	Text-to-Speech Work in Real-Time MT • Reducing Latency in Transformer-
	Based MT Systems • Case Study: AI-Powered Translation in International
	Conferences
0930 - 0945	Break
0945 - 1130	Multimodal Machine Translation (MMT)
	Understanding Text, Image, and Speech-Based MT • Using Vision and Audio
	Context for Better Translations • Neural Models for Translating Videos and
	Subtitles • Case Study: AI-Powered Translation for Social Media Content
	Speech-to-Speech Machine Translation
1130 - 1230	How Speech Recognition and MT Work Together • AI-Based Voice Cloning for
	Natural Sounding Translations • Overcoming Accents and Dialectal Variations
	in Speech MT • Case Study: Real-Time Voice Translation Apps Like Google
	Translate & Skype



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1230 - 1245	Break
1245 - 1330	Federated & Privacy-Preserving MT Models
	Decentralized Learning for Secure MT Models • Privacy Challenges in AI-Based
	Translation Services • Encrypted Federated Learning for Language Models •
	Case Study: Privacy-Focused MT for Secure Communications
1330 - 1420	Hands-On: Implementing Speech-to-Text & Speech Translation
	Setting Up Google's Speech API for Speech Recognition • Converting Speech
	Input to Text and Translating It • Implementing TTS (Text-to-Speech) for
	Speech Output • Deploying a Real-Time Speech Translation Pipeline
1420 - 1430	Recap
	Using this Course Overview, the Instructor(s) will Brief Participants about the
	Topics that were Discussed Today and Advise Them of the Topics to be Discussed
	Tomorrow
1430	Lunch & End of Day Four

Day 5

	Deploying a Machine Translation Model
0730 - 0930	Exporting MT Models for Deployment (ONNX, TensorFlow Lite) • Running
	Machine Translation in a Web Application • API-Based Translation Using
	Google Translate and Deep L • Cloud vs. Edge Deployment for MT Services
0930 - 0945	Break
	Future Trends in Machine Translation
0045 1120	AI-Powered Human-Machine Collaboration in Translation • Neural-Symbolic
0945 - 1150	Hybrid Approaches in MT • AI's Role in Preserving Endangered Languages •
	Advancements in AI-Powered Speech Translation
	AI-Powered Localization and Post-Editing
1120 1220	How AI Helps Human Translators Improve Accuracy • Automated Post-Editing
1150 - 1250	for Faster Translation Workflows • AI in Game and Website Localization • Case
	Study: AI-Assisted Localization in Netflix and YouTube
1230 - 1245	Break
1245 - 1300	Hands-On Final Project: Building a Machine Translation App
	Choosing a Dataset for Training • Fine-Tuning an Existing MT Model •
	Deploying the Model as an API • Testing Real-World Translation Performance
1300 - 1315	Course Conclusion
	Using this Course Overview, the Instructor(s) will Brief Participants about the
	Course Topics that were Covered During the Course
1315 - 1415	POST TEST
1415 - 1430	Presentation of Course Certificates
1430	Lunch & End of Course



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Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-



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