

# Hassan Soliman

MASTER'S (M.Sc.) IN CS · SOFTWARE (AI/ML) ENGINEER

18, Ursulinen Straße, 66111, Saarbrücken, Germany

☎ (+49) 1782554815

✉ hassanmahmoudsd@gmail.com

🏠 Web Page

🐙 Github

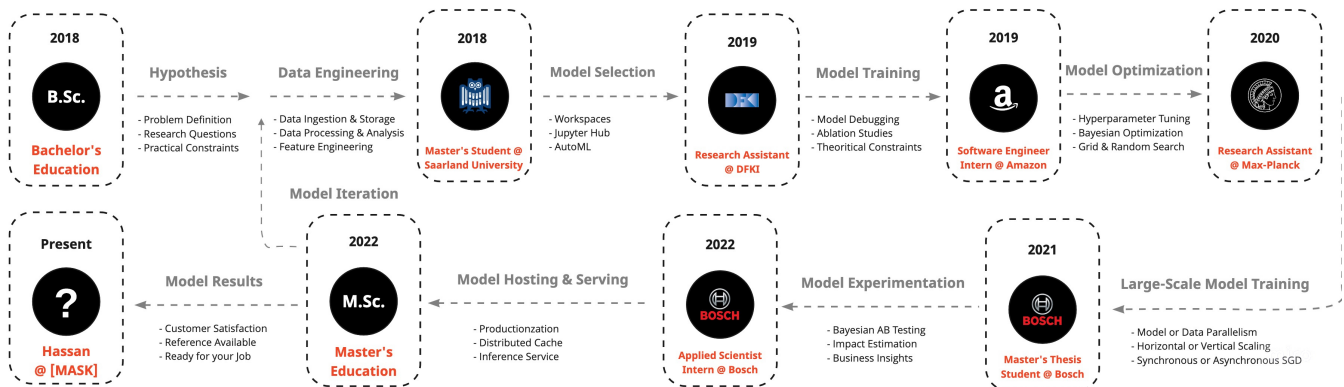
🌐 LinkedIn

🎓 Google Scholar

“Teaching machines to teach themselves”

## Summary

### Software (ML) Mindset Pipeline



## Experience

### Bosch Center for AI (BCAI)

Renningen, Germany

APPLIED SCIENTIST INTERN

May. 2022 - Aug. 2022

- Joined NLP & Semantic Reasoning group, and Utilized my master thesis output in Neural Entity Linking for a real use case in a top project.
- Refactored, tested & documented my code, and worked on training & evaluating the developed ML system on large-scale domain-specific data.
- Model performance is evaluated by comparing with the existing classical system, and achieved a 77% end-to-end recall at the top 3 entities.

MASTER'S THESIS STUDENT

Jun. 2021 - Jan. 2022

- Joined NLP & Semantic Reasoning group, collaborated with research scientists & engineers, and worked on Cross-domain Neural Entity Linking.
- Utilized a state-of-the-art model to make it easy-to-extend-domain, and experimented which data & information sources are best for fine-tuning.
- Achieved an Average Precision gain of 9% for the top-1 entity, and submitted a paper in RepL4NLP workshop at ACL 2022 venue.

### Max-Planck-Institut für Informatik

Saarbrücken, Germany

RESEARCH ASSISTANT

Nov. 2020 - May. 2021

- Joined Database & Information Systems group, and created a prototype for a model that finds diverse peer groups for an entity.
- Implemented a baseline model on the set expansion for an entity that exploits Wiki lists as a source of knowledge.
- Accomplished a 3x faster runtime of the underlying algorithm using efficient sparse matrix multiplication approach.

### Amazon EU SARL

Luxembourg, Luxembourg

SOFTWARE DEVELOPMENT ENGINEER INTERN

Aug. 2019 - Feb. 2020

- Joined Fulfillment Acceleration team, and owned a web application simulation tool by working on it as a Full-stack, using AWS cloud platform.
- Worked in an Agile environment as a system admin to maintain the server hosting team's tools, and acted as technical support for the team.
- Developed a tool for data visualization on maps, and provided workshops for the Business Analysts & Intelligent team members.

### German Research Center for Artificial Intelligence (DFKI)

Saarbrücken, Germany

RESEARCH ASSISTANT

Jan. 2019 - Aug. 2019

- Focused on a (QA) model, which formalizes answer planning to support fair dialogues under mixed motives. Model was already built & deployed.
- Contributed to the evaluation of the QA model, and implemented a model to detect fair dialogues using ensemble methods of decision trees.
- Helped to show quantitatively that 69.2% of the dialogues by the QA model are perceived as fair, and reported the results in a draft paper.

## Education

### Saarland Informatics Campus, Saarland University

Saarbrücken, Germany

MASTER OF SCIENCE IN COMPUTER SCIENCE

Oct. 2018 - Present

- Total GPA: 1.40 / 1.00** (Excellent) | Thesis: Cross-Domain Neural Entity Linking

📄 Transcript

### Faculty of Engineering, Alexandria University

Alexandria, Egypt

BACHELOR OF SCIENCE IN COMPUTER AND COMMUNICATION ENGINEERING

Sep. 2013 - Sep. 2018

- Total GPA: 3.96 / 4.00** (Excellent) | Thesis: Egyptian Car License Plate Information Detection | Final Batch Ranking: 1st

📄 Transcript

## Publications

### ACL 2022 RepL4NLP Workshop

Dublin, Ireland

THE 7TH WORKSHOP ON REPRESENTATION LEARNING FOR NLP (REPL4NLP-2022)

📺 Video Presentation

- Hassan Soliman**, Heike Adel, Mohamed H. Gad-Elrab, Dragan Milchevski, and Jannik Strötgen. 2022. A Study on Entity Linking Across Domains: Which Data is Best for Fine-Tuning?. In Proceedings of the 7th Workshop on Representation Learning for NLP, ACL, 184–190, Dublin, Ireland

## Skills

<b>Fields</b>	Software Engineering, Machine Learning, Deep Learning, Natural Language Processing, Large-scale Language Modelling, Neural Information Retrieval, Natural Language Understanding, Neural Machine Translation
<b>Technologies</b>	Scikit-Learn, Keras, Pytorch, Tensorflow, Pandas, NumPy, Leaflet, Django, Streamlit, Flask, Jira, Git, Airflow, Kubernetes
<b>Programming</b>	Python, R, Java, C++/C (languages ordered from the most used to the least)   Linux Familiarity (Unix Operating Systems)
<b>Web &amp; DBs</b>	PHP, Laravel, Java Spring, Javascript, jQuery, Bootstrap, Angular.js   SQL, MySQL, Redshift, DynamoDB
<b>Languages</b>	Native Arabic, Fluent English, Pre-Intermediate German

## Preprints

### Effective General-Domain Data Inclusion for Machine Translation by Vanilla Transformers

Python, Numpy

MASTER'S COLLEGE PROJECT

 Paper

- Built and trained a Transformer model architecture from scratch on the German-English translation task applications of WMT'13.
- Utilized a general-domain dataset from IWSLT'16 TED talks to help improve performance of the Transformer model, achieving a 25.8 BLEU score.

### Offensive Language Detection & Classification on Twitter

Python, Classical ML, Sklearn

MASTER'S COLLEGE PROJECT

 Paper

- Trained a classifier to detect offensive tweets from Twitter using Support Vector Machines, after performing iterative experiments & analysis.
- Achieved a Binary Accuracy of 74% in classifying offensive tweets, and received the highest score among all participant teams.

### Data Augmentation using Feature Generation for Volumetric Medical Images

Python, Tensorflow, Matplotlib

MASTER'S COLLEGE PROJECT

 Paper

- Proposed using U-net and ACGAN as a learning framework for feature generation of medical images of two complex types of brain tumors.
- Deployed a classifier pipeline to test & validate the quality of the generated features.

## Theses

### Cross-Domain Neural Entity Linking

Python, Pytorch, Transformer

MASTER'S THESIS PROJECT

 Thesis

- Contributed to a single system that enables simultaneous linking of named entities to a general-domain KB (Wikipedia) & a domain-specific KB.
- Utilized Semantic Search by learning a joint vector space for these KBs from different domains using contextual-aware embeddings by BERT.
- Experimented with four different domain-specific KBs, and achieved an increase of up to 20% in Mean Average Precision for the top-10 entities.
- Helped in writing an invention report for my thesis contribution, which is submitted as a patent application, and received an Incentive-Prämie.

### Egyptian Car License Plate Information Detection

Python, Tensorflow, CNN, Keras

BACHELOR'S THESIS PROJECT

 Thesis

- Implemented an application which extracts license information from car images in Egypt, using product life cycle stages.
- Collected datasets for various kinds of car plates in Egypt in various conditions, and applied different Data Transformation (ETL) techniques.
- Utilized pre-trained CNN models for fine-tuning for Object Detection, Localization, Semantic Segmentation, and OCR for the letters & numbers.

## Projects

### Better Diet to fight COVID-19

Python, R, Data Visualization

MASTER'S COLLEGE PROJECT

 Report

- Analysed food consumption from all countries to investigate a relationship between country food culture & their recovery rate, using Analytics.
- Implemented three Random Forest models and benchmarked the results to report the best one, and displayed figures using Seaborn library.

### TF-IDF-based Information Retrieval

Python, TF-IDF, NLTK

MASTER'S COLLEGE PROJECT

 Report

- Built a system that takes an query as input and returns a certain number of relevant documents, using various statistics.
- Implemented a second step to retrieve and rank relevant sentences from the relevant documents, achieving a Mean Reciprocal Rank of 0.393.

### Udacity Deep Learning Nanodegree

Python, Tensorflow, Keras, Pandas

PROGRAM PASSING PROJECTS

 Certificate

- Studied and worked on 5 main scientific modules:- Vanilla NN, CNN, RNN, GAN, and Reinforcement Learning.
- Submitted related projects to each module with an excellent impact, which can be found on my online portfolio under the "Projects" section.

## Accomplishments

2018 **Udacity Foundation**, Deep Learning Nanodegree

Global Institute

2018 **Alexandria University**, First Class Honor Degree

Egypt

## Activities

### Microsoft Student Partner Technical Club

Alexandria, Egypt

TECHNICAL & MEDIA MEMBER

Dec. 2015 - Oct. 2018

- Provided technical support & acted as a mentor during events e.g. Hackathons, and involved in marketing & media plans for events in the club.