Badr ALKHAMISSI
AI Researcher

@ badr@khamissi.com   +201006520789

https://bkhmsi.github.io   github.com/bkhmsi   linkedin.com/in/bkhmsi   scholar.google.com/bkhmsi

I am passionate about building sample efficient intelligent systems that can solve complex machine learning tasks and at the same time reveal insights about the inner workings of biological agents. Such systems do not only pave a way for solving long-standing societal problems but also shed light on what it means to be human. Please see website for a more detailed resumé.

EDUCATION

September 2020 – September 2019 | **Goldsmiths, University of London, MASTER OF SCIENCE, London, UK**
> MSc. in Computational Cognitive Neuroscience - Pass with Distinction.
> Thesis: Episodic Meta-Reinforcement Learning on the Two-Step and Harlow Tasks (Grade: 90%).

June 2018 – September 2014 | **The American University in Cairo, BACHELOR OF SCIENCE, Cairo, Egypt**
> BSc. in Computer Science - Summa Cum Laude. **GPA 4.0**
> President's Cup and Mohamed El Beleidy Academic Award for class valedictorian.
> Mohammed Bin Abdulkarim A. Allehedan Award for highest performing STEM student.
> Academic Achievement Scholarship.
> Thesis: Video Search using Natural Language.

July 2017 | **Tsinghua University, DEEP LEARNING SUMMER SCHOOL, Beijing, China**
> Thorough training in deep learning, covering many applications in Computer Vision, NLP, Knowledge Graph, Social Media Analysis, Multimodal Analysis and Robotics.
> Outstanding Performance Award in Deep Learning Summer School at Tsinghua University.

December 2016 – August 2016 | **Stony Brook University, SEMESTER ABROAD, New York, United States**
> Best Junior Award in Stony Brook ACM Regional Qualification Contest.
> Abdallah Jum'ah Study Abroad Scholarship.

June 2014 – September 2011 | **Manor House School, INTERNATIONAL GENERAL CERTIFICATE OF SECONDARY EDUCATION, Cairo, Egypt**
> Outstanding Cambridge Learner Award in AL Computing.

RESEARCH AND INDUSTRIAL EXPERIENCE

November 2022 – November 2021 | **AI Resident, META AI, Seattle, US**
> Conducting Research in NLP. Written 6 first-author papers + 1 co-author paper. (See Publications)

NLP | Hate Speech | Responsible AI | Reasoning | Arabic NLP | FAIR

October 2021 – October 2020 | **Research Intern, SONY AI, Tokyo, Japan (Remotely)**
> Published 2 papers in collaboration with DeepMind and 1 paper with Sony CSL. (See Publications)

Meta-learning | Reinforcement learning | Symbolic Alchemy

September 2019 – April 2019 | **Applied Scientist, MICROSOFT ADVANCED TECHNOLOGY LAB IN CAIRO, Cairo, Egypt**
> Part of the LUIS Applied Science Team and the Machine Teaching Innovation Group.
> Research in Cross-Lingual Model Transfer.
> Best Mentor Award.
> First Place in MS ATLC Hackathon.

NLU | NLP | MT | Keras | Tensorflow | PyTorch | Python | C#

March 2019 – January 2018 | **Machine Intelligence Researcher, VKANSEE, Cairo, Egypt**
> Research in fingerprint matching, spoofing and quality analysis through deep learning.
> Optimize implementations for speed and space to suit embedded devices with restricted resources.

Computer Vision | Few-Shot Learning | Keras | Tensorflow | Python | C++ | QT

September 2018 – June 2018 | **Software Engineer, MICROSOFT ADVANCED TECHNOLOGY LAB IN CAIRO, Cairo, Egypt**
> Researching the applicability of multilingual bot-interaction through Machine Translation.
> Mentoring Summer Intern.
> Developed Node CLI tool for MS Language Generation, part of Bot-Framework tools.
> Incorporate Machine Translation into MS Bot-Framework.

Visual Studio | C# | NodeJS | JavaScript | TypeScript | Python | .NET | MT

Fall '15 & '17 & Spring '16	**Undergraduate Teaching Assistant, THE AMERICAN UNIVERSITY IN CAIRO, Cairo, Egypt** › Teaching assistant for Deep Learning and Programming Fundamentals courses. › Hold regular office hours to help students. › Give sessions and workshops to assist students with their coursework. `C++` `Python` `Tensorflow` `Keras` `SFML`
Winter '16 & Summer '15	**Software Development Engineer Intern, MICROSOFT ADVANCED TECHNOLOGY LAB IN CAIRO, Cairo, Egypt** › Supporting full-text search for MS Language Understanding Intelligent Service (LUIS) utterances. › Migrating existing LUIS database from Azure to MS SQL Server and adjusting LUIS features that uses this database accordingly. › Design and implement the application import/export feature on LUIS. › Developing different applications (iOS, Windows Phone and an Office Extension) that utilizes LUIS. `C#` `F#` `Swift` `Objective-C` `iOS` `Windows Phone` `.NET` `Visual Studio` `Xcode`

📖 PUBLICATIONS & CONFERENCES

SHADOW-CAVE MODELS: HOW PLATO'S ALLEGORY ILLUMINATES THE LIMITATIONS OF LARGE LANGUAGE MODELS   PREPRINT
🔗 Paper
A short paper that highlights the limitations of LLMs in the context of Plato's allegory.

`First Author` `LLMs` `Philosophy` `NLP` `Independent`

OPT-R: EXPLORING THE ROLE OF EXPLANATIONS IN FINETUNING AND PROMPTING FOR REASONING SKILLS OF LARGE LANGUAGE MODELS   UNDER REVIEW AT NL-REASONING/ACL 2023
Under Review
Investigating the dimensions of finetuning, prompting, and scale to understand the role of explanations on reasoning skills.

`First Author` `NLP` `Reasoning` `Meta AI`

ALERT: ADAPT LANGUAGE MODELS TO REASONING TASKS   ACCEPTED AT ACL 2023
🔗 Paper
ALERT provides a test bed to asses any language model on fine-grained reasoning skills, which spans over 20 datasets and covers 10 different reasoning skills

`NLP` `Reasoning` `Meta AI`

ARAPOET: CONTROLLED ARABIC POETRY GENERATION WITH A TWIST   IN SUBMISSION
🔗 Paper
Finetuning a monolingual Arabic model and a multilingual one then combining them at decode time for controlled poetry generation.

`First Author` `NLP` `Creative AI` `Meta AI`

TOKEN: TASK DECOMPOSITION AND KNOWLEDGE INFUSION FOR FEW-SHOT HATE SPEECH DETECTION   ACCEPTED AT EMNLP 2022
🔗 Paper
Few-shot Hate Speech detection through task decomposition and knowledge infusion that is more generalizable and robust.

`First Author` `Oral Presentation` `Hate Speech` `NLP` `Efficient NLP` `Responsible AI` `Meta AI`

DEPTH-WISE ATTENTION (DWATT): A LAYER FUSION METHOD FOR DATA-EFFICIENT CLASSIFICATION   ACCEPTED AT NEURIPS/ENLSP 2022
🔗 Paper   🔗 Poster
Few-shot Hate Speech detection through task decomposition and knowledge infusion that is more generalizable and robust.

`First Author` `Poster Presentation` `NLP` `Efficient NLP` `Meta AI`

META AI AT ARABIC HATE SPEECH 2022: MULTITASK LEARNING WITH SELF-CORRECTION FOR HATE SPEECH CLASSIFICATION
ACCEPTED AT OSACT5/LREC 2022
🔗 Paper   🏆 Best Paper Award   🐦 Tweets
We tackle the Arabic Fine-Grained Hate Speech Detection shared task and demonstrate significant improvements over reported baselines for its three subtasks.

`First Author` `Oral Presentation` `Best Paper` `Hate Speech` `NLP` `ArabicNLP` `Responsible AI` `Meta AI`

A REVIEW OF LANGUAGE MODELS AS KNOWLEDGE BASES   UNDER REVIEW AT JAIR 2022
🔗 Paper   🐦 Tweets
We present a set of aspects that we deem a LM should have to fully act as a KB, and review the recent literature with respect to those aspects.

`First Author` `Survey` `NLP` `Meta AI`

Epiphenomenal representations of abstract rules in a connectionist model of the Delayed Match to Sample task
Accepted at COSYNE 2022

 Paper   Poster

We show that abstract rule representations do not guide a biologically inspired artifical agent in solving the DMS task.

First Author | CogSci | Neuroscience | Sony AI | DeepMind

How to Learn and Represent Abstractions: An Investigation using Symbolic Alchemy   Accepted at AutoML/AutoML 2022

 Paper   Poster

First steps toward using Symbolic Alchemy to identify design choices that enable agents to learn various types of abstraction.

First Author | Meta-RL | Neuroscience | Sony AI | DeepMind

The Emergence of Abstract and Episodic Neurons in Episodic Meta-RL   Accepted at NeurIPS/MemARI 2022 & ICLR/Learning-to-Learn 2021

 Paper   Poster

We analyze the reinstatement mechanism introduced by Ritter et al. (2018) to reveal two classes of neurons that emerge in the agent's working memory (an epLSTM cell) when trained using episodic meta-RL.

First Author | Spotlight | Meta-RL | Neuroscience | Sony AI | DeepMind

Adapting MARBERT for Improved Arabic Dialect Identification   Accepted at EACL/WANLP 2021

 Paper   Demo   Poster   github.com/mohamedgabr96/NeuralDialectDetector

We tackle the second Nuanced Arabic Dialect Identification (NADI) shared task and succeed in achieving state-of-the-art results on all of its four subtasks.

First Author | Oral Presentation | ArabicNLP | NLP

Deep Diacritization: Efficient Hierarchical Recurrence for Improved Arabic Diacritization   COLING/WANLP 2020

 Paper   Demo   github.com/bkhmsi/deep-diacritization

We propose a novel architecture for automatically restoring Arabic diacritics that outperforms previous SOTA methods.

First Author | Oral Presentation | Main Paper | ArabicNLP | NLP

Deep Spiking Neural Networks with Resonate-and-Fire Neurons   Preprint

 Paper

We explore a new Spiking Neural Network (SNN) formulation with Resonate-and-Fire neurons (RAF).

First Author | Neuroscience | SNN

Program Committee Member (Reviewer)

Multilingualism and Cross-Lingual NLP Track at ACL 2023. ENLSP Workshop at NeurIPS 2022. Language Modeling and Analysis of Language Models Track at EMNLP 2022. Main Track and Late-Breaking Workshop at AutoML 2022. I (Still) Can't Believe It's Not Better! Workshop at NeurIPS 2021. Meta-Learn Workshop at NeurIPS 2021. Learning to Learn Workshop at ICLR 2021. Meta Learn Workshop at NeurIPS 2020.

Oral Presentation

EMNLP 2022. MemARI at NeurIPS 2022. OSACT5 at LREC 2022. WANLP at EACL 2021. WANLP at COLING 2020.

Poster Presentation

ENLSP at NeurIPS 2022. AutoML Workshop at AutoML 2022. Learning to Learn at ICLR 2021.

🖥 Selected Projects

Egyptians in AI Research   March 2023 - Present

 Website   Blog Post   github.com/bkhmsi/egyptians-in-ai

Website dedicated to showcasing the profiles of prominent Egyptian researchers in the field of Artificial Intelligence.

AI | Community

Episodic Meta-RL on the Two-Step and Harlow Tasks   June 2020 - August 2020

 Blog Post   github.com/bkhmsi/Meta-RL-TwoStep-Task   github.com/bkhmsi/Meta-RL-Harlow

MSc. Dissertation. Reproduces the results of animal behavior and artificial agents on both the Two-Step and Harlow tasks using an episodic meta-RL model that combines 3 RL systems inspired from the machine learning and neuroscience literature.

Python | PyTorch | Meta-RL | RL | EMRL | Neuroscience

Video Segment Retrieval by Text Queries   September 2017 - May 2018

 Video   Poster   github.com/bkhmsi/forget-me-not

Undergraduate Thesis Project. Proposes a framework for searching long untrimmed videos for segments that logically correlate with a natural language query.

Python | PyTorch | Tensorflow | Keras | Computer Vision | NLP

Sketch Inversion using Deep Convolutional Neural Networks   May 2017
🔗 Poster   🐙 github.com/bkhmsi/sketchback
Synthesising photo-realistic images from pencil sketches of human faces and architectural drawings of buildings.

Python | Tensorflow | Keras | Computer Vision

Korastak.com   June 2016 - Present
🔗 korastak.com
Notes-sharing platform with the goal of democratizing the studying experience for students in Egyptian universities.

NodeJS | AngularJS | Firebase | HTML | CSS

🅰 Languages

Arabic	● ● ● ● ●
English	● ● ● ● ●
French	● ○ ○ ○ ○

☰ Skills

Proficient	Python, PyTorch, TF, Keras, C++, JS, NodeJS, C#, Java, SQL, Matlab, HTML, CSS
Prior Exp	Swift, Obj-C, F#, Elm, VB, PHP, Verilog, Ruby, iOS Dev, Android Dev, Windows Phone Dev, Alexa Dev, Unity, Arduino

🏆 Other Awards

> Best Paper Award for the Fine-Grained Hate Speech Detection Shared Task in Arabic.
> First place in all four categories of the second NADI shared task. '21
> Dean's list from Fall '14 till Spring '18 - The American University in Cairo '14 - '18
> Computer Science Exemplary Student - The American University in Cairo '18
> Highest-GPA Award for Expected to Graduate - The American University in Cairo '18
> Shortlisted in Dell EMC's Graduation Project Competition - The American University in Cairo '18
> Third Place Amazon Innovation Hackathon - The American University in Cairo '18
> Highest-GPA Award for Juniors - The American University in Cairo '17
> Second Prize in Amazon Alexa Hackathon - The American University in Cairo '17
> High Achiever in CS1101 Course - The American University in Cairo '15

➕ Activities and Volunteering

> Keynote speaker at the 3rd Localization Day organized by the Egyptian Association for Globalization and Language Solutions.
> Guest speaker on the Mada Masr Podcast (April 6th 2023 Episode).
> Speaker at the NeurIPS 2021 Egypt Meetup hosted by LyRise.
> Gave a talk at the Goldsmiths Computational Cognitive Neuroscience Career Event.
> Led website development track for the ACL-6060 D&I Initiative.
> Official Author of Towards Data Science.
> Volunteered in the organization of the 28th International Conference on Computational Linguistics (COLING'2020).
> Participated in giving a tutorial on multilingual embeddings at IndabaX'19 Egypt.
> Participated in several competitive programming contests including Google Hash Code, Facebook Hacker Cup and more. Qualified to ACM ECPC representing AUC, June '15 - June '18.
> Associate Head of the Computer Science and Engineering Association academics. committee at AUC, responsible for organizing academic events and workshops, Spring '17
> Co-Founded Creative Coding Cairo under FabLab Egypt. Organize monthly meet-ups for the community, Juyl '16 - Sep '17.
> Developed a Database System for Doum Cultural Foundation using MS Access VB and SQL. Managing their website and their digital presence. Volunteer in organizing some of their workshops and cultural events, Cairo, September '12 - May '16.
> Member of the CISV Egyptian delegation. Participated in organizing a summer camp in Paris, June '10.
> A member of the children jury delegation of long and short films in Cairo International Film Festival for Children; our role was to select a winner for each prize in the film festival, '07, '08, '10.