

# Housam Babiker

---

|                            |  |  |
|----------------------------|--|--|
| <b>CONTACT INFORMATION</b> | Department of Computing Science   housamkhalifa.github.io   University of Alberta, Edmonton, Canada  | Email: khalifab@ualberta.ca              |
| <b>RESEARCH INTERESTS</b>  | Research interests include a broad area of Explainable Artificial Intelligence (XAI), Machine Learning, Deep Learning, Reinforcement Learning, and their applications in real-world problems.  |  |
| <b>EDUCATION</b>           | <b>PhD in Artificial Intelligence</b><br>University of Alberta   | Sep. 2016 - Feb 2023<br>Edmonton, Canada |
|                            | <ul style="list-style-type: none"><li>• Academic Supervisor: Prof. Randy Goebel</li></ul> Research project: Building a self-explainable deep neural network. Unlike traditional XAI techniques that employ post-hoc techniques to explain a black box. My work focuses on building deep interpretable models. Interpretable models are better because they can provide faithful explanations. In order to build such a model, we need to focus on constrained optimization problems, i.e., the predictive power is subject to the quality of the explanations. During my Ph.D., I worked on different problems to improve the levels of abstraction, such as feature attribution, contrastive explanations, rationale-based models, hierarchical explanations, and knowledge distillation. |  |
|                            | <b>MSc in Information Technology</b><br>Multimedia University  | 2013 - 2015<br>Melaka, Malaysia          |
|                            | Thesis title: Design and Evaluation of a Shoulder Surfing Resistant Authentication System.   |  |
|                            | <b>Bachelor in Information Technology</b><br>Multimedia University   | 2007 - 2011<br>Melaka, Malaysia          |
|                            | <ul style="list-style-type: none"><li>• Thesis title: Face recognition using local graph structure.</li></ul>  |  |
| <b>WORK EXPERIENCE</b>     | <b>Graduate Research Assistant</b><br>Department of Computing Science, University of Alberta   | Sep 2016 - Present<br>Edmonton, Canada   |
|                            | <ul style="list-style-type: none"><li>• Carrying out research on the development of XAI techniques for deep learning at the XAI lab under the supervision of Prof. Randy Goebel.</li><li>• Supervisor: rgoebel@ualberta.ca</li></ul>   |  |
|                            | <b>Machine Learning Engineer</b><br>AltaML.  | Dec. 2019 - Now<br>Edmonton, Canada      |
|                            | <ul style="list-style-type: none"><li>• Developed NLP models for legal domains, constructions (e.g., predictive models, semantic search, model in the loop, keyword extraction) and presented the findings to senior executive management.</li><li>• Developed NLP models to understand the legal cases in order to segment them in meaningful contexts.</li><li>• Worked on models compression to improve the inference speed (e.g., quantization, TensorRT).</li><li>• Provided regular progress reports to manager both verbally and in writing, and turned data into further actionable decisions.</li></ul>   |  |

**Research Assistant**

Department of Family medicine

Oct. 2018 - Feb. 2019

University of Alberta, Canada

- Developed a tool to extract medical information from Electronic Medical Records.
- Contact: Marjan.Abbasi@albertahealthservices.ca

**Research Assistant**

Information security lab, Multimedia University

2013 - 2015

Edmonton, Canada

- Research on biometrics, computer vision and image processing.
- Supervisor: lau.siong.hoe@mmu.edu.my

**RESEARCH  
ARTICLES**

9. **Housam Babiker**, Mi-Young Kim, Randy Goebel, Learning to Generate Hierarchical Explanations (submitted). Proceedings of the Conference on Empirical Methods in Natural Language Processing (**ACL**) (20 pages) 2023.
8. **Housam Babiker**, Mi-Young Kim, Randy Goebel Locally Distributed Activation Vectors for Guided Feature Attribution in **COLING 2022**(Acceptance rate: 33%).
7. **Housam Babiker**, Mi-Young Kim, Randy Goebel Neural Networks with Feature Attribution and Contrastive Explanations in **ECML 2022**(Acceptance rate: 26%).
6. Mi-Young Kim, Shahin Atakishiyev, **Housam Babiker**, Nawshad Farruque, Randy Goebel, Osmar R. Zaiane, Mohammad-Hossein Motallebi, Juliano Rabelo, Talat Syed, Hengshuai Yao, Peter Chun. A Multi-Component Framework for the Analysis and Design of Explainable Artificial Intelligence. Machine Learning and Knowledge Extraction, Special Issue on Advances in Explainable Artificial Intelligence - MDPI, 3, pp900-921, 2021.
5. **Housam Babiker**, Mi-young Kid and Randy Goebel. DISK-CSV: Distilling Interpretable Semantic Knowledge via Class Semantic Vector. The 16th conference of the European Chapter of the Association for Computational Linguistics (**EACL**) 2021. Accepted. April 21-23, Kyiv, Ukraine (Acceptance rate: 24.7%).
4. **Housam Babiker**, Mi-young Kid and Randy Goebel. RANCC: Rationalizing Neural Networks via Concept Clustering. The 28 International Conference on Computational Linguistics (**COLING**) 2020. December 8-13 Barcelona, Spain (Acceptance rate: 32.9%).
3. **Housam Babiker** and Randy Goebel. An Introduction to Deep Visual Explanation. Neural Information Processing Systems (NeurIPS-Workshop) 2017. Long Beach, USA.
2. **Housam Babiker** and Randy Goebel. Using KL-divergence to focus Deep Visual Explanation. Neural Information Processing Systems (NeurIPS-Workshop) 2017 Symposium on Interpretable Machine Learning 2017, Long Beach, USA.
1. **Housam Babiker**, Randy Goebel, and, Irene Cheng. Facial expression using SVM classifier on salient mic-macro patterns. Proc. International Conference on Image Processing (**ICIP**), Beijing, China, 2017.ith symmetric local graph structure (slgs). Expert Systems with Applications. 41(14)6131-6137 2014.

**TEACHING**

- **CMPUT 174: Intro. to the Found. of Computation I** Fall 2017  
Prof. Jörg Sander and Sadaf Ahmed's teaching assistant (TA) at the University of Alberta.

- **CMPUT 414: Introduction to Multimedia Technology,** *Fall 2019*  
Prof. Anup Basu's TA for the senior undergraduate level course at the University of Alberta
- **CMPUT 101: Introduction to Computing,** *Fall 2016*  
Prof. Janelle Harms's TA for the senior undergraduate level course at the University of Alberta

#### OTHER TALKS

- **Research Poster at AI Week** *May 2022*  
Presented a paper entitled "Self-explainable models in natural language processing" at AI Week in Edmonton, Canada.
- **COLING 2020, Barcelona** *Dec. 2020*  
Presented a paper entitled "RANCC: Rationalizing Neural Networks via Concept Clustering"(Online).
- **ICIP 2027, China** *Sept. 2017*  
Presented a paper entitled "acial expression using SVM classifier on salient mic-macro patterns"(ICIP, Beijing, China).
- **Reverse EXPO** *Feb. 2017*  
Presented a poster of the "An Introduction to Deep Visual Explanation" article to the audience of diverse background in Edmonton, Canada.

#### ACADEMIC SERVICE

- Reviewer for the Journal of Artificial Intelligence Research (JAIR), EMNLP 2020, ICDM 2020, ECML-PKDD 2020,2022.
- Local Arrangement Chair, The 2017 IEEE International Conference on Systems, Man, and Cybernetics. Oct 5-Oct 8. Banff, Canada.
- Maintaining the Explainable AI (XAI) lab website <https://sites.ualberta.ca/~amiixai/>.

#### TECHNICAL STRENGTH

- **Programming:** Python, C++, SQL, Matlab.
- **Frameworks:** Tensorflow, PyTorch, Keras, NLTK, OpenCV, Scikit-Learn, Pandas.
- **Databases:** MySQL

#### HONORS & AWARDS

- **Mary Louise Imrie Graduate Student Award 2022.**
- **Highest performance on task 4 of the COLIEE competition 2018,** Japan.
- **GSA Travel Award 2017,** university of Alberta.
- **Multimedia university research scholar Award.**
- **Dean List,** Multimedia University.
- 2013 Infineon-MMU Technical Poster Session, Infineon, **Champion.**
- 2014 Infineon-MMU Technical Poster Session, Infineon, **Champion.**
- 2015 Infineon-MMU Technical Poster Session, Infineon, **1st Runner up.**

- Pecipta by Ministry of Education (MOE), **Best of the Best Award**, International Conference and Exposition on Innovation of Institution of Higher Learning, Nov-2013, Kuala Lumpur Convention Centre, Malaysia.
- Pecipta by Ministry of Education (MOE), **Gold Award**, International Conference and Exposition on Innovation of Institution of Higher Learning, Nov-2013, Kuala Lumpur Convention Centre, Malaysia.
- **Korean Invention Academy Award**, Malaysia, International Conference and Exposition on Innovation of Institution of Higher Learning, Nov-2013, Kuala Lumpur Convention Centre.
- **ITEX Silver Award**, Malaysia, Invention Innovation Technology Exhibition (ITEX) 2013 by MINDS.
- WIC- **Gold Medal**, Seoul, South Korea, World Invention Innovation Contest (WIC) 5-6-June. 2015.
- **ITEX Silver Award**, Invention Innovation Technology Exhibition (ITEX) 2015 by MINDS, Kuala Lumpur Convention Centre, Malaysia.
- Pukyong National University, South Korea, **scholarship for Master of Science (declined)**.
- Multimedia university, **graduate research assistant for PhD, (Declined)**.
- C++ programming Competition, **2nd Runner up**, multimedia university, Melaka, Malaysia.