

# Sabit Hassan | CURRICULUM VITAE

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## EDUCATION

<b>PhD in Computer Science</b> <i>Supervised by: Asst. Prof. Malihe Alikhani</i>	<i>University of Pittsburgh</i>	2021–2026 (expected)
<b>BSc in Computer Science</b> <i>GPA: 3.79/4.0, Minors: Mathematics and History</i> <i>Thesis: Interactive Evaluation and Training of Classifiers under Limited Resources,</i> <i>Supervised by: Prof. Bhiksha Raj and Assoc. Teach. Prof. Saquib Razak</i>	<i>Carnegie Mellon University</i>	2014–2018

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## HONORS AND AWARDS

<b>Outstanding Academic Achievement Award</b>	<i>Carnegie Mellon University Qatar</i>	May 2018
<b>University Honors</b>	<i>Carnegie Mellon University</i>	May 2018
<b>SCS College Honors</b>	<i>Carnegie Mellon University</i>	May 2018
<b>History Honors</b>	<i>Phi Alpha Theta</i>	May 2018
<b>Carnegie Mellon Dean's List (5 semesters)</b>	<i>Carnegie Mellon University</i>	Apr 2015–Apr 2018

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## RESEARCH

**Research Assistant** *Qatar Computing Research Institute, Doha, Qatar* Oct 2019–Jun 2021  
*Arabic Language Technologies Group, Supervised by: Dr. Kareem Darwish*

- Trained and deployed SVM and BERT models for emotion, sentiment, offensiveness, hate speech, spam, adult content and dialect identification [1] (<https://asad.qcri.org/>).
- Collected novel datasets and trained ML/DL models for offensiveness [14] and adult content detection [2], dialect identification [3], tweets related to Covid-19 [4] and spam detection [5].
- Trained ensemble of ML/DL models for Arabic (**2nd** place) and English offensiveness detection at SemEval 2020 [6] and Arabic offensiveness detection at OSACT 2020 [7] (**1st** place).
- Automatically collected a corpus of English–Arabic parallel tweets [8].
- Trained SOTA Arabic/Spanish emotion detection models using transformers and explored several cross-lingual approaches for Arabic/Spanish emotion detection while utilizing English data [12].
- Trained Arabic BERT model from scratch and analyzed key factors impacting performance [13].
- Reviewed papers at SemEval 2020.

**Research Associate** *Carnegie Mellon University Qatar, Doha, Qatar* May 2018–Aug 2019  
*MADAR Project, Supervised by: Prof. Nizar Habash and Asst. Teach. Prof. Houda Bouamor*

- Collected a dataset of tweets (21 countries) and trained ML/DL models for Arabic dialect ID.
- Co-organized the MADAR Shared Task on fine-grained Arabic dialect ID at WANLP 2019 [9].

*Minicomplexity Project, Supervised by: Assoc. Teach. Prof. Christos Kapoutsis*

- Characterized Polynomial-size Oracle Hierarchy for small one-way finite automata.
- Proved properties of the hierarchy: i) strictness of the hierarchy, ii) upper and lower bounds for each level, and iii) restrictions under which the Oracle Hierarchy coincides with the existing Polynomial-size Alternating Hierarchy [10].

**SCS Honors Undergraduate Thesis** *Carnegie Mellon University* Aug 2017–Apr 2018  
*School of Computer Science, Supervised by: Prof. Bhiksha Raj and Assoc. Teach. Prof. Saquib Razak*

- Proposed clustering method for reducing training time of *Active Learning*.
- Proposed stratification methods and allocation algorithms for simultaneous evaluation of False Acceptance Rate and False Rejection Rate of classifiers.
- Proposed a stratification method that uses learned relationship between feature vectors and classifier labels and dynamic allocation methods that reduce bias in *Active Testing* [11].

**Student Researcher** *Carnegie Mellon University Qatar, Doha, Qatar* May 2017–Aug 2017  
*Qatar Student Initiated Undergraduate Research Project, Supervised by: Bhiksha Raj*

- Awarded competitive funding to conduct research on reducing cost of classifier evaluation and human labeling.

**Independent Studies** *Carnegie Mellon University* Jan 2016–Apr 2018  
*Minicomplexity, Supervised by: Assoc. Teach. Prof. Christos Kapoutsis*

- Conducted Independent Studies for 3 semesters on Complexity Theory and Minicomplexity. Initially studied general complexity theory and then focused on complexity of finite automata

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## TEACHING

**Graduate Teaching Assistant** *University of Pittsburgh, Pittsburgh, PA* Aug 2021–  
I led recitations, held office hours and graded homeworks for the following courses:

- Algorithm Implementation (CS 1501)

**Course Assistant** *Carnegie Mellon University Qatar, Doha, Qatar* Jan 2016–May 2018  
I held office hours and graded homeworks for the following courses:

- CMUQ Freshman Edge Summer Program
- Great Theoretical Ideas in Computer Science (15–251)
- Parallel and Sequential Data Structures and Algorithms (15–210)
- Fundamentals of Programming and Computer Science (15–112)
- Concepts of Mathematics (21–127)

**Summer Internship Mentor** *Qatar Computing Research Institute, Doha, Qatar* May 2020–Jul 2020

- Taught interns use of machine learning in NLP tasks
- Aided interns in building web interface for Twitter author profiling

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## COURSEWORK

Relevant courses that I have taken during my PhD:

- **CS 2731:** Introduction to NLP

- **CS 2710:** Foundation of AI

Relevant courses that I have taken during my bachelors:

- **11-785:** Introduction to Deep Learning
- **10-601:** Introduction to Machine Learning
- **15-451:** Algorithm Design and Analysis
- **15-440:** Distributed Systems

- **15-437:** Web Application Development
- **15-453:** Formal Language, Automata and Computability
- **21-484:** Graph Theory

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## PROJECTS

**FARASA** *Qatar Computing Research Institute, Doha, Qatar* 2020–2021  
*Arabic Language Technologies Group, Supervised by: Dr. Kareem Darwish*

- Assisted in frontend development of FARASA toolkit (<https://farasa.qcri.org/>)
- Implemented API quota allocation for users
- Managed SQL database of requests and users

**Early Warning Simulation** *Qatar Computing Research Institute, Doha, Qatar* 2020–2021  
*Arabic Language Technologies Group, Supervised by: Dr. Kareem Darwish*

- Developed a system that crawls newspapers articles and identifies level of antagonism against Qatar
- Developed frontend for the early warning simulation system
- Managed MongoDB database of newspapers articles that contain antagonism against Qatar

**Road Surface Identification** *Carnegie Mellon University* Spring 2018  
*Course: Introduction to Deep Learning (11-785)*

- Collected a dataset of mobile sensor data while driving over different road surfaces
- Trained CNN, LSTM models for identifying type of road surface from mobile sensor data
- Proposed a hybrid HMM-LSTM model for road surface identification

**Remote Method Invocation Library** *Carnegie Mellon University* Fall 2017  
*Course: Distributed Systems (15-440)*

- Implemented concurrent Remote Method Invocation library over distributed file system.

**Distributed K-Means** *Carnegie Mellon University* Fall 2017  
*Course: Distributed Systems (15-440)*

- Used MPI and MapReduce to implement distributed K-Means and performed analysis of performance under different configurations.

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## COMMUNITY AND LEADERSHIP

- **Member**, Student Academic Committee
- **Member**, Academic Review Board
- **Best Technical Award**, CMUQ Hackathon
- **Best Design Award**, CMUQ Hackathon
- **Runner up**, CMU Brainhub NeuroHackathon
- **Runner up**, CMU Qatar Programming Contest
- **Head of Challenges**, The Hack Games
- **Tutor**, Language Bridge Program
- **Volunteer**, International Volunteer HQ, CS4Qatar, BotBall CMU Qatar

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## SKILLS

- **Programming**: Python, JavaScript, Java, C++, C, SML, MATLAB
- **Machine Learning, Deep Learning and NLP**: Tensorflow, Keras, Pytorch
- **Web Development**: Django, Flask, Angular JS, Bootstrap
- **Others**: ROS, Hadoop, LaTeX, Git
- **Languages**: English, Bengali

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## PUBLICATIONS

Published/Accepted:

- [1] **Hassan, S.**, Mubarak, H., Abdelali, A., & Darwish, K. (2021, April). ASAD: Arabic Social Media Analytics and unDerstanding. In *Proceedings of the Demonstrations of the 16th Conference of the European Chapter of the Association for Computational Linguistics* (pp. 113–118)
- [2] Mubarak, H., **Hassan, S.**, & Abdealali, A. (2021, April). Adult Content Detection on Arabic Twitter: Analysis and Experiments. In *Proceedings of the Sixth Arabic Natural Language Processing Workshop* (pp. 136–144)

- [3] Abdelali, A., Mubarak, H., Samih, Y., **Hassan, S.**, & Darwish, K. (2021, April). QADI: Arabic Dialect Identification in the Wild. In *Proceedings of the Sixth Arabic Natural Language Processing Workshop* (pp. 1-10)
- [4] Mubarak, H., & **Hassan, S.** (2021, April). ArCorona: Analyzing Arabic Tweets in the Early Days of Coronavirus (COVID-19) Pandemic. In *Proceedings of the 12th International Workshop on Health Text Mining and Information Analysis* (pp. 1-6)
- [5] Mubarak, H., Abdelali, A., **Hassan, S.**, & Darwish, K. (2020, October). Spam Detection on Arabic Twitter. In *International Conference on Social Informatics* (pp. 237-251). Springer, Cham.
- [6] **Hassan, S.**, Samih, Y., Mubarak, H., & Abdelali, A. (2020, December). ALT at SemEval-2020 task 12: Arabic and English offensive language identification in social media. In *Proceedings of the Fourteenth Workshop on Semantic Evaluation* (pp. 1891-1897). [2nd place in Arabic subtask A]
- [7] **Hassan, S.**, Samih, Y., Mubarak, H., Abdelali, A., Rashed, A., & Chowdhury, S. A. (2020, May). ALT submission for OSACT shared task on offensive language detection. In *Proceedings of the 4th Workshop on Open-Source Arabic Corpora and Processing Tools, with a Shared Task on Offensive Language Detection* (pp. 61-65). [1st place in subtask A]
- [8] Mubarak, H., **Hassan, S.**, & Abdelali, A. (2020, May). Constructing a bilingual corpus of parallel tweets. In *Proceedings of the 13th Workshop on Building and Using Comparable Corpora* (pp. 14-21).
- [9] Bouamor, H., **Hassan, S.**, & Habash, N. (2019, August). The MADAR Shared task on Arabic Fine-Grained Dialect Identification. In *Proceedings of the Fourth Arabic Natural Language Processing Workshop* (pp. 199-207). [co-organizer]
- [10] Anabtawi, M., **Hassan, S.**, Kapoutsis, C., & Zakzok, M. (2019, March). An Oracle Hierarchy for Small One-way Finite Automata. In *International Conference on Language and Automata Theory and Applications* (pp. 57-69). Springer, Cham.
- [11] **Hassan, S.**, Shaar, S., Raj, B., & Razak, S. (2018, December). Interactive Evaluation of Classifiers Under Limited Resources. In *2018 17th IEEE International Conference on Machine Learning and Applications (ICMLA)* (pp. 173-180). IEEE.

**Pre-print/Under Review:**

- [12] **Hassan, S.**, Shaar, S., & Darwish, K. (2021). Cross-lingual Emotion Detection. *arXiv preprint arXiv:2106.06017*
- [13] Abdelali, A., **Hassan, S.**, Mubarak, H., Darwish, K., & Samih, Y. (2021) Pre-Training BERT on Arabic Tweets: Practical Considerations. *arXiv preprint arxiv:2102.10684*
- [14] Mubarak, H., **Hassan, S.**, & Chowdhury, S. (2021) Emojis as Anchors to Detect Arabic Offensive Language and Hate Speech (Submitted to special issue of Natural Language Engineering)