

# Monica Munnangi

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CONTACT INFORMATION	2228F, Floor 22 177 Huntington, Boston MA - 02115 USA	Voice: <a href="https://people.northeastern.edu/monica-munnangi/">khoury.northeastern.edu/people/monica-munnangi/</a> Webpage: <a href="https://monicamunnangi.github.io/">monicamunnangi.github.io/</a> E-mail: <a href="mailto:monicamunnangi23@gmail.com">monicamunnangi23@gmail.com</a>
RESEARCH INTERESTS	Machine Learning, Clinical Natural Language Processing for Healthcare, Retrieval for Large Language Models, Retrieval Augmented Generation	
EDUCATION	<b>Khoury College of Computer Sciences, Northeastern University</b> <i>Doctor of Philosophy in Computer Science</i>	Boston, MA Sep 2021 - Present
	<b>CICS, University of Massachusetts Amherst</b> <i>Masters of Science in Computer Science</i>	Amherst, MA Sep 2018 - May 2020
	<b>Vellore Institute of Technology</b> <i>Bachelor of Science in Computer Science and Engineering</i>	Chennai, IN Aug 2014 - May 2018
PUBLICATIONS	Y. Shah, M. Munnangi, et al., <b>Chest Tube Detection on Chest X-Ray Images Using Convolutional Deep Neural Network</b> , <i>Poster at European Congress of Radiology, Vienna 2020</i>	
RESEARCH EXPERIENCE	<b>Zak Lab</b> , Harvard Medical School <i>Lead - Matthew McDermott</i>	Boston, MA Sep 2023 - Present
	<ul style="list-style-type: none"><li>Working on retrieval augmented generation for clinical task prediction.</li></ul>	
	<b>Semantic Scholar</b> , Allen Institute for AI <i>Research Intern, Ph.D.</i>	Seattle, WA May 2023 - Sep 2023
	<ul style="list-style-type: none"><li>Working on few shot domain adaptation with LLMs in biomedical and scientific domain. Benchmarking IE results on these datasets with state-of-the-art methods for inference with LLMs.</li><li>Working on methods to improve inference performance of LLMs in knowledge intensive domains.</li></ul>	
	<b>Clinical NLP Lab</b> , Khoury College of Computer Sciences <i>Advisor - Byron Wallace and Silvio Amir</i>	Boston, MA Sep 2021 - May 2026
RESEARCH EXPERIENCE	<ul style="list-style-type: none"><li>Working on zero shot and few shot predictions of large language models in the clinical domain.</li><li>Research interests lie in the areas of clinical natural language processing, multi-modal learning, learning from limited labeled data.</li></ul>	
	<b>Krishnaswamy Lab</b> , Yale School of Medicine <i>Advisor - Smita Krishnaswamy</i>	New Haven, CT Jul 2020 - Jun 2021
	<ul style="list-style-type: none"><li>Worked on classification and regression problems with recurrent neural networks on time series data of ICU patients and visualizing the patterns in data with sophisticated techniques.</li><li>Worked on a natural language processing model to classify patient physician communication and to improve message triage.</li></ul>	
RESEARCH EXPERIENCE	<b>Information Fusion Lab</b> , University of Massachusetts Amherst <i>Advisor - Madalina Fiterau</i>	Amherst, MA Feb 2020 - May 2020
	<ul style="list-style-type: none"><li>Implemented a novel forecasting framework which utilizes a CNN to extract features from a patient's brain MRIs which we then fused with patient data and use RNN to track progression.</li><li>Showed that the inclusion of these customised/patient-specific features increases the F1-score of 0.4644, with recall at 0.4974 and precision of 0.4355 of forecasting the disease stages.</li></ul>	

**GE Healthcare**  
*Data Scientist Intern*

Waukesha, WI  
May 2019 - Aug 2019

- Developed a neural network to identify the presence of a chest tube in an Pneumothorax patient's X-Ray, trained the model on 8000 images and fine tuned on the pre-trained VGG architecture.
- Our results have surpassed the SOTA with 0.95 accuracy and this model is in production now which is helping radiologists prioritize high risk patient cohort using PyTorch framework.
- Developed a solution using VGG architecture to separate obstructing radiopaque objects in a chest X Ray image from non-obstructing radiopaque objects with 14,000 images and achieved an accuracy of 0.89 to help reduce the number of redundant X-Rays.

**Quantiphi Solutions**, University of Massachusetts Amherst  
*CS 696DS - Independent Study*

Amherst, MA  
Jan 2019 - May 2019

- Used time series ICU data of over 40,000 patients and computed baselines, logistic regression and random forests to predict the onset of Sepsis as early as six hours.
- Benchmarked and compared our model results to baselines such as random forests, regression and validated the results where we have achieved an F1 score of 0.82.

TEACHING/  
ADVISING  
EXPERIENCE

Teaching Assistant for **Unsupervised Machine Learning and Data Mining** and assisted Prof. Pavlu Virgil at Northeastern University in Spring 2023 semester.

Teaching Assistant for **Unsupervised Data Mining** and assisted Prof. Pavlu Virgil at Northeastern University in Fall 2022 semester.

Teaching Assistant for **Unsupervised Data Mining** and assisted Prof. Pavlu Virgil at Northeastern University in Fall 2022 semester.

Co-advised a cohort of graduate students for a project titled Naik, A. et al. **Leveraging knowledge distillation for efficient on-device deployment of deep learning models in medical imaging** published in Society for Imaging Informatics in MCMI in Medical Imaging, Nov 2020.

Teaching Assistant for the course **Database Management Systems** and assisted Prof. Muralidhar A. at Vellore Institute of Technology in the Fall 2017 semester.

PROJECTS

**Semi-supervised Named Entity Recognition for Clinical data**  
*CS 685 - Advanced NLP*

UMass Amherst  
Mar 2020 - Apr 2020

- The aim of the project was to make annotations for named entity recognition faster by using semi-supervised learning techniques exclusively for clinical data.

**Auto Generation of Image Captions for Medical Images**  
*CS 682 - Neural Networks*

UMass Amherst  
Oct 2019 - Nov 2019

- We worked on automatic image captioning for medical images, used the IU chest X-Ray images which have 3965 unique patient reports and images. We have achieved a 0.168020 BLEU-1 score for the dataset.

PROFESSIONAL  
EXPERIENCE

**DoctorC (Simplify Wellness Pvt. Ltd)**  
*Software Developer Intern*

Hyderabad, IN  
Jan 2018 - Apr 2018

- Enhanced user experience on iOS with development of key interface changes using Xcode and React Native which improved usability by 25% and worked on a REST API service.

**Autochat.io**  
*Software Developer Intern*

Hyderabad, IN  
Sep 2017 - Dec 2017

- Created an English learning bot using telegram API, helps correct syntactic and semantic errors.
- Developed and deployed chat bots for E-commerce applications which improved user interface.

#### **Pixelvide Solutions Pvt. Ltd**

*Software Developer Intern*

Hyderabad, IN

May 2017 - Jul 2017

- Designed, wire-framed, prototyped and developed corporate website using HTML5, CSS and JavaScript which is currently in production.

ACADEMIC SERVICE	<ul style="list-style-type: none"> <li>• Communications chair (Organizing Committee) Conference on Health, Inference and Learning (CHIL), 2024</li> <li>• Program Committee at Human-centered LLMs workshop, ACL 2024</li> <li>• Logistics co-chair (Organizing Committee) for CHIL, 2023</li> <li>• Reviewer: ML4H 2020, 2021, 2022, 2023</li> <li>• Program Committee at User-centered Natural Language Processing Workshop, WWW 2022</li> <li>• Student reviewer at Northeastern University's CS PhD Admissions Committee 2022</li> </ul>
AWARDS AND GRANTS	<ul style="list-style-type: none"> <li>• Student Grant for NeurIPS 2020 and EMNLP 2020</li> <li>• Central Board of Secondary Education Excellence award for outstanding performance (AISSE).</li> <li>• City topper, Science Olympiad Foundation - National Science Olympiad 2012</li> </ul>
SKILLS AND TOOLS	<ul style="list-style-type: none"> <li>• <b>Languages</b> : Python, R, JavaScript, HTML, CSS, SQL, <math>\text{\LaTeX}</math></li> <li>• <b>Libraries and Frameworks</b> : TensorFlow, PyTorch, Sklearn, Numpy, Pandas, ReactNative, Angular</li> <li>• <b>Applications and Tools</b> : Docker, DataMiner, Jira</li> </ul>
VOLUNTARY WORK	<ul style="list-style-type: none"> <li>• Volunteer at NAACL 2022</li> <li>• Volunteer at the Un-workshop in Woman in ML (WiML) at ICML, 2020 and NeurIPS, 2020.</li> <li>• Part of an event at DESIRE Society, Hyderabad - served children affected with HIV/AIDS.</li> <li>• Lead Volunteer of student led organization - Orange Leaf, Hyderabad</li> </ul>
LEADERSHIP EXPERIENCE	<ul style="list-style-type: none"> <li>• Student representative for the School of Computer Science and Engineering, VIT University.</li> <li>• Publicity and marketing head, responsible for managing the online and offline marketing events at VIT Chennai with over 5000 participants from more than 30 universities.</li> <li>• School and literacy captain, responsible for managing the cohort of school cabinet, conduct and manage the events conducted in school for the academic year (2011- 2012).</li> </ul>