Shruthi Chari

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HEADLINE

PhD candidate with demonstrated experience in explainable AI and clinical NLP using LLMs and Knowledge Representation Techniques.

EDUCATION

Rensselaer Polytechnic Institute   Troy, NY
Doctor of Philosophy in Computer Science   *July 2024 (Expected)*
· Research Interests: Explainable AI, Applied AI, Knowledge Representation, LLMs & Clinical NLP
· Relevant Courses: AI for Conservation, Design of Experiments, Data Mining
· GPA: 3.78/4.00

Rensselaer Polytechnic Institute   Troy, NY
Master of Science in Computer Science   *May 2019*
· Research Interests: Clinical AI, Ontologies & Healthcare Informatics
· Relevant Courses: NLP, Deep Learning, Ontologies, Programming Languages
· GPA: 3.84/4.00

PES Institute of Technology   Bangalore, India
Bachelor of Engineering in Computer Science   *May 2015*
· Relevant Courses: Operating Systems, Data Structures, Algorithms
· GPA: 9.18/10.00

EXPERIENCE

Rensselaer Polytechnic Institute, Research Assistant   Aug. 2023 - Present; Troy, NY
Advised by Prof. DL. McGuinness, Prof. O. Seneviratne, Dr. HO. Santos and Dr. J. McCusker

· As a part of the IARPA HIATUS project and my PhD thesis:
  – Investigating methods to represent text explanations using ML outputs in authorship attribution setting using our Explanation Ontology (EO).
  – Extracting explanations from knowledge graphs (KGs) using foundation models.
  – Developing a multi-step framework to go from user question to natural language explanation along EO supported explanation types.

Rensselaer Polytechnic Institute, Research Assistant   Aug. 2019 - Aug. 2023; Troy, NY
Advised by Prof. DL. McGuinness, Prof. O. Seneviratne, Dr. AK Das and Dr. DM. Gruen

· As a part of the HEALS initiative and my PhD thesis:
  – Designed EO to structure and support the creation of different explanation types from the dependencies in the system, user, and interface spaces.
  – Supported explainer methods from IBM's AIX-360 toolkit within the EO.
  – Represented explanations in KGs using the EO vocabulary, across seven different exemplar use cases spanning food, healthcare and finance domains.

Center for Computational Health, IBM Research, Research Extern   Troy, NY
Hosted by Dr. P. Chakraborty   *May 2021 – Sept. 2021*

· As a part of the clinical explainability thrust of the IBM-RPI initiative Health Empowerment by Analytics, Learning and Semantics (HEALS) and my PhD thesis:

– Lead an effort to generate contextual explanations from medical guidelines, with a focus on type-2 diabetes guidelines, to explain risk predictions on patients' claims data.

– Benchmarked large language models (LLMs) for clinical QA setup.

– Augmented LLMs with domain ontologies to improve semantic coherence of answers with the questions.

– Mentored students to build a user-friendly dashboard integrating QA insights alongside predicted results of patients.

– Helped in conducting clinician interviews to assess the usability of the dashboard.

IBM Research, Intern   May 2019 - Aug 2019; Yorktown Heights, NY
Hosted by Dr. Ching-Hua Chen

· Implemented semantic methods to align patient's temporal physical activity data to population descriptions in behavior change literature, with the goal of suggesting relevant studies.
· Built a HealthKit ontology to model physical activity data in a personal knowledge graph (KG).
· Reused the Study Cohort Ontology (SCO) to model population descriptions in a literature KG.
· Developed a prototype explainable natural language explanation for the match between patients and populations from the KGs.

Rensselaer Polytechnic Institute, Research Assistant   May 2018 - May 2019; Troy, NY
Advised by Prof. Deborah L. McGuinness, Prof. O. Seneviratne and Dr. AK Das

· As a part of the IBM-RPI HEALS initiative and my Masters thesis:
  – Designed the SCO to represent descriptions of study populations found in research studies.
  – Used SCO to represent study populations in knowledge graphs, for studies cited in the pharmaceutical and cardiovascular comorbidities chapters of the ADA Standards of Medical Care 2018.
  – Enabled study applicability analyses supported via SPARQL queries on the SCO KGs to:
    – Support cohort similarity visualizations, to determine similarity between patient and treatment arms.
    – Design queries on the SCO KG to determine study match and study quality, and to identify study limitations.

SKILLS

Programming	(Proficient) Python, Java, OWL, RDF/XML, LaTeX;
	(Familiar) C, Shell, PHP, JQuery, Groovy, Javascript
Frameworks	Pytorch, Protégé, Git, SPARQL, Flask, Ubuntu, Docker,
	Amazon EC2, Google Colab, SQL, CUDA

SELECTED PUBLICATIONS

1. **An Ontology-Enabled Approach For User-Centered and Knowledge-Enabled Explanations of AI Systems**
   Shruthi Chari
   In Doctoral Consortium@ ISWC 2023 (in press); 2023.

2. **Semantically enabling clinical decision support recommendations**
   Oshani Seneviratne, Amar K. Das, <u>Shruthi Chari</u>, Nneka N. Agu, Sabbir M. Rashid, Jamie P. McCusker, Jade DS Franklin, Mia Qi, Kristin P. Bennett, Ching-Hua Chen, James A. Hendler, Deborah L. McGuinness
   J. of Biomedical Semantics, In Press, 2023

3. **Explanation Ontology: A General-Purpose, Semantic Representation for Supporting User-Centered Explanations**
Shruthi Chari, Oshani Seneviratne, Mohamed Ghalwash, Sola Shirai, Daniel M. Gruen, Pablo Meyer, Prithwish Chakraborty, Deborah L. McGuinness
Semantic Web J., In Press, 2023

4. **Informing clinical assessment by contextualizing post-hoc explanations of risk prediction models in type-2 diabetes**
Shruthi Chari, Prasant Acharya, Daniel M. Gruen, Olivia Zhang, Elif K. Eyigoz, Mohamed Ghalwash, Oshani Seneviratne, Fernando S. Saiz, Pablo Meyer, Prithwish Chakraborty, Deborah L. McGuinness
Artificial Intell. Medicine J., 102498; 2023

5. **[Best Paper] Leveraging Clinical Context for User-Centered Explainability: A Diabetes Use Case**
Shruthi Chari, Prithwish Chakraborty, Mohamed Ghalwash, Oshani Seneviratne, Elif K. Eyigoz, Daniel M. Gruen, Fernando S. Saiz, Ching-Hua Chen, Pablo Meyer, Deborah L. McGuinness
KDD Applied Data Science in Healthcare (DSHealth) Workshop; 2021 [Best Workshop Paper]

6. **Semantic Modeling for Food Recommendation Explanations**
Ishita Padhiar, Oshani Seneviratne, Shruthi Chari, Dan Gruen, Deborah L McGuinness
In Proc. of 2021 IEEE 37th International Conference on Data Engineering Workshops (ICDEW)

7. **[Best Paper] Explanation Ontology: A Model for User-Centric Explainable AI**
Shruthi Chari, Oshani Seneviratne, Daniel M. Gruen, Morgan Foreman, Amar K Das, Deborah L. McGuinness
In International Semantic Web Conference (pp. 228 - 243); 2020 [Best paper award]

8. **Foundations of Explainable Knowledge-Enabled Systems**
Shruthi Chari, Oshani Seneviratne, Daniel M. Gruen, Deborah .L McGuinness
Knowledge Graphs for eXplainable AI – Foundations, Applications and Challenges. Studies on the Semantic Web, pp 23 - 48; 2020

9. **Directions for Explainable Knowledge-Enabled Systems**
Shruthi Chari, Oshani Seneviratne, Daniel M. Gruen, Deborah .L McGuinness
Knowledge Graphs for eXplainable AI – Foundations, Applications and Challenges. Studies on the Semantic Web, pp 245 - 261; 2020

10. **Knowledge Extraction of Cohort Characteristics in Research Publications**
Jade DS Franklin,Shruthi Chari, Morgan Foreman, Oshani Seneviratne, Jamie P. McCusker, Amar K. Das, Deborah L. McGuinness
In Proc. of 2020 AMIA Annual Symposium; 2020

11. **Making Study Populations Visible through Knowledge Graphs**
Shruthi Chari, Mia Qi, Nneka N. Agu, Oshani Seneviratne, Jamie P McCusker, Kristin P. Bennett, Amar K. Das, Deborah L. McGuinness
In International Semantic Web Conference (pp. 53-68). Auckland, New Zealand; 2019

12. **Semantically-targeted analytics for reproducible scientific discovery**
Alexander New, Shruthi Chari, Mia Qi, Sabbir M. Rashid, John S. Erickson, Deborah L. McGuinness, Kristin P. Bennett
In Automatic Information and Data Reuse, pp 1 - 4. Pittsburgh, PA; 2019

13. **Knowledge Integration for Disease Characterization: A Breast Cancer Example**
Oshani Seneviratne, Sabbir Rashid, Shruthi Chari, Jamie P McCusker, Kristin P. Bennett, James A. Hendler, Deborah L. McGuinness.
In International Semantic Web Conference (pp. 223-238). Monterrey, California; 2018

AWARDS AND HONORS

Fellowships and Scholarships
· Nominated from RPI as one of the two candidates for the Schmidt Science fellowship.
· Research grant to attend the International Semantic Web Conference (ISWC) – 2023, 2018
· Research grant to attend the International Semantic Web Summer School (ISWS) – 2018

Conferences
· Best Workshop Paper at KDD Applied Data Science in Healthcare (DSHealth) Workshop, 2021
· Best Resource Paper at International Semantic Web Conference (ISWC), 2020
· One of the Top 6 Best Posters at MIT-IBM AI Research Week, 2019
· Best Presentation and Best Research Report Award at Intl. Semantic Web Summer School (ISWS), 2018.

SERVICE & LEADERSHIP

Reviewer
· Artificial Intelligence in Medicine (AIM) Journal '23
· International Semantic Web Conference (ISWC) '21, '22, '23
· AMIA Annual Symposium '21, '22
· Semantic Web J. '22
· International Conference on AI in Medicine '22
· Semantic Web meets Health Data Management Workshop at ESWC '22
· Heterogeneous Graph and Deep Learning Workshop at KDD '21
· Knowledge Infused Learning Workshop at KGC '21
· Artificial Intelligence '21
· Journal of Web Semantics '21
· AI for Social Good Workshop at AAAI '20

Organization Leadership
· Co-lead a team at the NLM Pubmed Hackathon, 2022.
· Social Media Chair, Comp. Science Graduate Council, RPI, Aug. 2021 - May 2023
· Member of the organizing committee for MIT Media Labs event (2012) and code Hackathon(2012-2014)

Undergraduate Mentorship
· Runmin Lu, Sep. 2021 - Dec. 2021
· Prasant Acharya, May 2021 - Aug 2021
· Ishita Padhiar, Jan. 2021 - May 2021
· Jade Franklin, May 2019 - Dec. 2019

Teaching
· Teaching Assistant for Foundations of Comp. Science, RPI, Spring 2018
· Teaching Assistant for Computer Science 101: Python, RPI, Fall 2017

OTHER EXPERIENCE

Rensselaer Polytechnic Institute, Research Assistant   Troy, NY
Advised by Prof. Oshani Seneviratne and Prof. Deborah L. McGuinness   *Jan 2018 - May 2018*

· As a part of the IBM-RPI (HEALS) initiative:
  – Designed an interactive web tool using the Whyis framework, to visualize impact on patient's stage change, treatments/tests between AJCC 7th and 8th edition of guidelines.

– Enhanced evaluation data - Surveillance, Epidemiology, and End Results Program (SEER) patient data, with gender-specific patient names from a Natural Language Toolkit (NLTK) name corpus.

CloudInfra, Software Engineering Intern   Bangalore, India
Hosted by New Melchizedec Sundaraj   *Dec 2016 – Jul 2017*

· Reengineered the integration of search results(retrieved from the client) into the in-house developed Magento extension, Expertrec; to allow for the extension to co-exist with other plugins on a client's search results page.
· Built a rule engine in Python to parse NLP queries for search, mainly handled price intent queries.

Aryaka Networks India Private Limited, Software Engineer   Bangalore, India
NOS Engineering Team   *Jul 2015 - Nov 2016*

Cisco Systems India Private Limited, Software Engineering Intern   Bangalore, India
Webex IT   *Jan 2015 - Jun 2015*

Aryaka Networks India Private Limited, Software Engineer Intern   Bangalore, India
NOS Engineering Team   *Jun 2014 - Aug 2014*

PES Institute of Technology, Bachelors Thesis   Bangalore, India
Advised by Prof. Ramamoorthy Srinath   *Jan 2015 - May 2015*

· Title: Machine Translation Using Deep Learning

PES Institute of Technology, Research Assistant   Bangalore, India
Advised by Prof. Kavi Mahesh   *June 2012 - May 2014*

· Knowledge Analytics and Ontology Engineering (KAnOE) Lab