

Shruthi Chari

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EDUCATION

Doctor of Philosophy (Ph.D) Computer Science | Rensselaer Polytechnic Institute, Troy, NY **May 2019 – Present**

Relevant Courses: Deep Learning, Data Mining, Design of Experiments

GPA:3.77

Master of Science(MS) Computer Science | Rensselaer Polytechnic Institute, Troy, NY **Sep 2017 - May 2019**

Relevant Courses: Ontologies, Machine Learning, Programming Languages

GPA:3.84

Bachelor of Engineering(B.E.) Computer Science | PES Institute of Technology, Bangalore **May 2015**

Relevant Courses: Operating Systems, Natural Language Processing, Linear Algebra

GPA: 3.7/4

TECHNICAL SKILLS

Programming Languages: Proficient: Python, Java, OWL, RDF/XML, PHP, JQuery Familiar: C, Groovy, Javascript

Frameworks and Tools: BERT, Protégé, Git, SPARQL, Flask, Magento, Ubuntu, Docker, Amazon EC2, Spring, SQL

EXPERIENCE

Rensselaer Polytechnic Institute, Troy, NY | Graduate Research Assistant **May 2018 – Present**

- As a part of the IBM-RPI initiative Health Empowerment by Analytics, Learning and Semantics (HEALS), developing computational expert systems to assist clinicians in their decision-making, particularly with medical literature
- Currently, investigating approaches to support user-centered explanations from model explanations

Center for Computational Health, IBM Research | Extern **May 2021 – Sep. 2021**

- As a part of a multi-thrust clinical explainability project, lead an effort (along with mentors) to improve question answering over medical guidelines, with a focus on type-2 diabetes guidelines
- Worked with other student interns and mentors from IBM and RPI, to create a working demo of the different thrusts in the project combining clinical feedback, knowledge-augmented question-answering (QA), risk prediction, and a user-facing dashboard prototype

IBM Research, Yorktown Heights, NY | Intern **May 2019 – August 2019**

- Investigated and 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) and 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

Rensselaer Polytechnic Institute, Troy, NY | Graduate Teaching Assistant **Sep 2017 – May 2018**

- Conducted labs, proctored and graded an introductory freshman course CS1100, being taught in Python
- Held recitations and graded exams for a sophomore course CS2200, a foundation to mathematics behind CS

CloudInfra, Bangalore | Software Engineering Intern **Dec 2016 - Jun 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, Bangalore | Software Engineer **Jul 2015 - Nov 2016**

- Provided support on the internal provisioning tool, to add multiple SSL certificates for the same IP/port combination. Reworked the restrictions of the existing SSL module, by refactoring and adding to the Grails and Java codebase
- Increased the accuracy(~5%) of machine resource usage calculations, by remodelling to use connected site limits
- Collaborated with the NetOps team, to add provisioning support for VLAN connections on network devices

Cisco Systems India Private Limited, Bangalore | Intern **Feb 2015 - Jun 2015**

- Modularised the processing and future development of account flows, by utilising Apache Chain to decouple various tiers of accounts of the existing WebEx middleware suite

Aryaka Networks India Private Limited, Bangalore | Engineering Intern **Jun 2014 - Jul 2014**

- Developed a resource estimation feature in Groovy and Java, for the internal provisioning tool. Modelled a scenario that determines the feasibility of the addition of sites at various levels in the hierarchy of the network infrastructure

ACADEMIC PROJECTS

Context-based Explanations of Risk Prediction Models

Jan 2021 – Aug 2022

- Designed a multi data source - including from patient data, coding schemes and guidelines, QA model to provide context-based explanations in the risk prediction of chronic kidney disease, a comorbidity of type-2 diabetes.
- Implemented a knowledge-augmented QA approach leveraging large language models (LLMs) over diabetes guidelines. Applied the QA model against various biomedical LLMs and coding schemes.
- Helped another student present these context-based explanations on a prototype dashboard, that we developed, to evaluate the usefulness of our approach with an expert panel of clinicians.

Semantic Modeling of Cohort Descriptions

June 2018 – May 2019

- Designed an ontology-enabled prototype system (built the SCO ontology) to model descriptions of study populations found in research studies cited in the pharmaceutical and cardiovascular comorbidities chapters of the ADA Standards of Medical Care 2018 in RDF KGs
- Through the knowledge representation of the populations descriptions, we enabled study applicability analyses (supported via SPARQL queries) such as cohort similarity visualizations, to determine similarity between patient and treatment arm at a glance, and supported clinically-relevant population analysis scenarios to determine study match and study quality, and to identify study limitations

Visualization of Cancer Characterization

Jan 2018 - April 2018

- 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
- Collaborated on gathering data for the evaluation. Enhanced extracted SEER (Surveillance, Epidemiology, and End Results Program) patient data by automatically appending gender-specific patient names from a NLTK name corpus

Machine Translation Using Deep Learning

Jan 2015 - May 2015

- Built a language tool in Python and Flask to translate English to Hindi, using an Interlingua technique. The translation from source to Predicate Logic was achieved by a MLP and non-linear transformations
- Converted the Predicate logic expression to a Hindi sentence by using a rule based grammar model

Bringing Semantic Data to the Common Man: "LODMedics"

Jul 2014 - Sep 2014

- Built a drug search web tool that tapped into augmented DailyMed archives and crawled WebMD information. Converted DailyMed XML data dumps to RDF form using XSLT scripts, extracted the triples using Apache Jena
- Built a recommender system in PHP, to suggest related medicines based on the treated symptoms and ingredients

ACTIVITIES AND ACHIEVEMENTS

- Awarded the **best paper award** at the *KDD Applied Data Science in Healthcare (DSHealth) Workshop, 2021* for the paper on "Leveraging Clinical Context for User-Centered Explainability: A Diabetes Use Case"
- Awarded the **best resource paper** at the *International Semantic Web Conference (ISWC) – 2020* for the paper on "Explanation Ontology: A Mode of Explanations for User-Centered AI"
- Featured as a **Spotlight paper in, and, were one of the best paper nominees** at the *International Semantic Web Conference (ISWC) – 2019*
- Adjudged **one amongst the top 6 of 108 posters**, presented at the *MIT-IBM AI Research Week - 2019*
- Received a research grant to attend the *International Semantic Web Summer School (ISWS) – 2018*
 - Our research task force team (task: "Linked Data Validity against Common Sense") was awarded the **best presentation and best research report** award
- Member of the organizing committee for MIT Media Labs event (2012) and #code Hackathon(2012-2014)

REVIEWER

- AMIA Annual Symp. '21, '22
- Semantic Web J. '22
- Intl. Conf. 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
- XAI J. '21

- Journal of Web Semantics '21
- AI for Social Good Workshop at AAAI '20

PUBLICATIONS

Book Chapters

S Chari, O Seneviratne, DM Gruen, DL McGuinness. "Foundations of Explainable Knowledge-Enabled Systems." In Ilaria Tiddi, Freddy Lecue, Pascal Hitzler (eds.), Knowledge Graphs for eXplainable AI -- Foundations, Applications and Challenges. Studies on the Semantic Web, pp 23 - 48; 2020

S Chari, O Seneviratne, DM Gruen, DL McGuinness. "Directions for Explainable Knowledge-Enabled Systems." In Ilaria Tiddi, Freddy Lecue, Pascal Hitzler (eds.), Knowledge Graphs for eXplainable AI -- Foundations, Applications and Challenges. Studies on the Semantic Web, pp 245 - 261; 2020

Journal

S Chari, O Seneviratne, M Ghalwash, S Shirai, DM Gruen, P Meyers, P Chakraborty, DL McGuinness; "Explanation Ontology: A General-Purpose, Semantic Representation for Supporting User-Centered Explanations"; Semantic Web J., 2022, Under Review

S Chari, P Acharya, DM Gruen, O Zhang, EK Eyigoz, M Ghalwash, O Seneviratne, FS Saiz, P Meyers, P Chakraborty, DL McGuinness; "Context-based explanations of Risk Prediction Models"; Artificial Intell. Medicine J., 2021, Under Review

Masters Thesis

S Chari. "Semantic Modeling of Cohort Descriptions," *Diss. Rensselaer Polytechnic Institute, 2019*

Conference Papers

S Chari, O Seneviratne, DM Gruen, M Foreman, AK Das, DL McGuinness. "Explanation Ontology: A Model for User-Centric Explainable AI." *In International Semantic Web Conference* (pp. 228 - 243); 2020 [Best paper award]

JDS Franklin, **S Chari**, M Foreman, O Seneviratne, JP McCusker, AK Das, DL McGuinness. "Knowledge Extraction of Cohort Characteristics in Research Publications." *In Proc. of 2020 AMIA Annual Symposium* (in press); 2020

S Chari, M Qi, NN Agu, O Seneviratne, JP McCusker, KP Bennett, AK Das, DL McGuinness. "Making Study Populations Visible through Knowledge Graphs." *In International Semantic Web Conference* (pp. 53-68). *Auckland, New Zealand; 2019*

O Seneviratne, S Rashid, **S Chari**, JP McCusker, K Bennett, JA Hendler, DL McGuinness. "Knowledge Integration for Disease Characterization: A Breast Cancer Example." *In International Semantic Web Conference* (pp. 223-238). *Monterrey, California; 2018*

Workshop Papers

S Chari, P Chakraborty, M Ghalwash, O Seneviratne, EK Eyigoz, DM Gruen, FS Saiz, CH Chen, PM Rojas, DL McGuinness; "Leveraging Clinical Context for User-Centered Explainability: A Diabetes Use Case"; KDD Applied Data Science in Healthcare (DSHealth) Workshop; 2021

JDS Franklin, **S Chari**, M Foreman, O Seneviratne, JP McCusker, AK Das, DL McGuinness. "Identifying Ontology Concepts of Study Cohort Terms via NCBO Annotator." *In Proc. of In SeWeBMeDa@ ISWC*; 2020

NN Agu, N Keshan, **S Chari**, O Seneviratne, SM Rashid, JP McCusker, AK Das, DL McGuinness. "G-PROV: Provenance Management for Clinical Practice Guidelines." *In SeWeBMeDa@ ISWC 2019*, pp. 55-67. 2019.

O Seneviratne, AK Das, **S Chari**, NN Agu, SM Rashid, C Chen, JP McCusker, JA Hendler, and DL McGuinness. "Enabling Trust in Clinical Decision Support Recommendations through Semantics." *In SeWeBMeDa@ ISWC*, pp. 55-67. 2019.

A New, **S Chari**, M Qi, SM Rashid, JS Erickson, DL McGuinness, KP Bennett. "Semantically-targeted analytics for reproducible scientific discovery." *In Automatic Information and Data Reuse*, pp 1 - 4. Pittsburgh, PA; 2019

Posters

O Zhang, S Chari, FS Saiz, DM Gruen, P Acharya, O Seneviratne, P Meyer, DL McGuinness, P Chakraborty; "Understanding Clinician Workflows to Design AI Risk Prediction Models"; AMIA Inf. Summ., Apr 2022

S Chari, O Zhang, P Acharya, FS Saiz, M Ghalwash, EK Eyigoz, O Seneviratne, DM Gruen, PM Rojas, P Chakraborty, DL McGuinness; "Towards Providing Clinical Context for a Diabetes Risk-Prediction Use Case via User-centered Explainability"; MCBK Symp., Jul 2021

S Chari, P Chakraborty, O Seneviratne, M Ghalwash, DM Gruen, D Sow, DL McGuinness; "Towards Clinically Relevant Explanations for Type-2 Diabetes Risk Prediction with the Explanation Ontology"; AMIA Symp. Poster 2021

S Chari, P Chakraborty, O Seneviratne, M Ghalwash, DM Gruen, D Sow, DL McGuinness; "Explanation Ontology in Action: A Clinical Use-Case"; Posters and Demo Track, 19th International Semantic Web Conference 2020.

S Chari, O Seneviratne, DM Gruen, M Foreman, AK Das, DL McGuinness. "Supporting User-centric explanation types for clinical reasoning." In MCBK, 2020.

O Seneviratne, SM Rashid, **S Chari**, JP McCusker, K P. Bennett, J Hendler, and D L. McGuinness. "Ontology-enabled Breast Cancer Characterization." In *International Semantic Web Conference (P&D/Industry/BlueSky)*. 2018.

S Chari, S Ramakrishnan, K Mahesh. "LODMedics: Bringing Semantic Data to the Common Man" *In: 13th International Semantic Web Conference, ISWC, Rovereto, Italy; 2014*

K Mahesh, **S Chari**, S Ramakrishnan. "LODScape: Ontology-Based Multiple-LOD Object Browser" *In: Proc. 12th International Semantic Web Conference, ISWC, Semantic Web Challenge, 21-25 October 2013, Sydney, Australia*