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Balu Bhasuran

Visiting Assistant Professor, School of Information, Florida State University

Professional summary

Experienced researcher and educator specializing in clinical informatics, biomedical text mining, and machine learning applications in healthcare. My current work centers on Clinical NLP, Machine Learning, and Generative AI. With over 10 years of experience, I have developed various classification and prediction models using biomedical and clinical data. My interests include machine learning based prediction models, knowledge graphs, causal inference, literature-based discovery, network visualization, and ensuring fairness and explainability in machine learning models.

Employment history

VISITING ASSISTANT PROFESSOR, POSTDOCTORAL RESEARCHERJul 2023 - Present
Florida State UniversityTallahassee, FL

LIS 5916 – Issues in Information Studies: Natural Language Processing and Text Mining for Information Technology Professionals

Role: Instructor

LIS 4761 – Data Mining and Analytics: Role: Teaching assistant

Supervised investigation of LLMs response to patient-centric lab test result-related questions.

Investigation into Retrieval augmented Generation (RAG) based LLM systems for patient-centric questions

Development of a machine learning prediction model for pediatric transplantation rejection and HIV prediction using EHR and transplant registry data

Investigation of LLMs repones to clinical case report-based differential diagnosis using lab test data.

Investigation of the role of seasonality in lab test results of Alzheimer's and Dementia patients using EHR data.

POSTDOCTORAL RESEARCHERJan 2020 - Jul 2023
University of California, San FranciscoSan Francisco, CA

Orchestrated training and clinical testing of early diagnosis model for rare disease using electronic health records from UCSF and UCLA

Formulated a natural language processing algorithm to identify NASH patients from clinical notes

Invented a text classification algorithm for Mayo endoscopic sub-scores using clinical notes

Co developed an algorithm for adverse drug event extraction from clinical notes

JUNIOR AND SENIOR RESEARCH FELLOWJul 2014 - Jun 2018
DRDO-BU Center for Life SciencesIndia

Developed and utilized machine learning models for High-Altitude Diseases research

Innovated in text mining techniques for biomedical data

Authored three webservers for efficient information extraction, securing Indian Copyright

Education

PHD, COMPUTATIONAL BIOLOGYSep 2014 - Dec 2020
Bharathiar UniversityIndia

Thesis: Biomedical Text Mining Approaches: Applications in Disease Entity Recognition, Gene-Disease Association Extraction and Knowledge Discovery

Topics: Information Extraction, Biomedical Informatics

MASTERS, COMPUTER APPLICATIONSOct 2010 - Mar 2013
Mahatma Gandhi UniversityIndia

Thesis: Data Mining to predict efficient allocations in electrical grids

Relevant Coursework: Data structures, Algorithm Analysis and Design

Skills

Natural Language Processing, Machine Learning, Biomedical Informatics, Clinical Data Analysis, Predictive Analytics, Algorithm Development, Curriculum Development, Academic Research, Course Design, Student Assessment, Team Collaboration, Communication.

Links

Personal Website: balubhasuran.github.io, GitHub: github.com, Google Scholar: scholar.google.co.in, LinkedIn: www.linkedin.com.

Additional information

PATENTS

Methods for improving the diagnosis of rare diseases using electronic health records data and systems for same

Inventor: Vivek RUDRAPATNA, Balu BHASURAN, WO2024049873A1 WIPO (PCT)

Identification of Medical Intervention Related Adverse Events from Clinical Notes

Inventor: Vivek Rudrapatna, Rebecca Racz, Mahalakshmi Parakala, Madhumita Sushil, Ludwig Dana, Balu Bhasuran, Anna Silverman, James Buchanan

PCT/US2024/028389, U.S. provisional patent application serial no. 63/465,382 **filed** May 10, 2023

SOFTWARE COPY RIGHTS

- Indian Copy Right, Computer Software, SW-15957/2023, D-NER: Disease Name Recognizer from Literature
- Indian Copy Right, Computer Software, SW-15958/2023, DisGeReExt: Disease Gene Relation Extractor from Literature
- Indian Copy Right, Computer Software, SW-15974/2023, GD Miner: Gene-Disease Association Mining From Literature

AWARDS

- American Transplant Congress Pediatric Poster Award Winner, 2024
- Best paper award, Data Mining, International Conference on Innovative Computing and Communication (ICICC-2018)
- Best poster award, Text Mining, International Symposium on Computational Biology and Bioinformatics (BioIndica- 2016)
- Best poster award, Text Mining, Fifth Edition of National Workshop on Computer Vision, Image Processing Techniques and Data Analytics, 2015

CERTIFICATIONS

- Microsoft Certified Professional (MCP) in Microsoft .NET Framework Application Development Foundation
- Developing Enterprise Applications using VC#.Net, NIIT, New Delhi, India
- National Eligibility Test (UGC .NET) in Computer Science and Applications for Assistant Professor, Govt.of India

RESEARCH AND TRAVEL GRANTS

National Institute of Health Jul ’24 – Dec ’24

Principal Data Scientist, Prediction of Health Outcomes and Adverse Events in Pediatric Organ Transplantation in Florida

Grant number R21LM013911

AHRQ Mar’24-Feb’29

Principal Data Scientist, LabGenie, a web-based tool intended to improve patients’ engagement in managing and acting upon their lab test results.

Merck Aug ’22 – Jul ’23

Principal Data Scientist Patient trajectories and risk prediction in patients with nonalcoholic steatohepatitis disease. Grant number UL1 TR001872

Alnylam Jan ’21 – Jul ’22

Principal Data Scientist, Reducing diagnostic delays in Acute Hepatic Porphyria disease. Grant number: K99LM014099, UL1 TR001872, UL1TR001881

US Food and Drug Administration (FDA) Feb ’21 – Aug ’22

Collaborator, Improving adverse event detection related to biologic immunosuppressant use – a pilot study of the BERT deep learning model adapted to real-world clinical notes.

Defense Research and Development Organization (DRDO)

Data Mining and Text mining to Identify Enzymes that are potential candidates for high altitude diseases. Jul ’14-Jun’ 18

MENTORSHIP AND THESIS COMMITTEE

Undergraduate Research Opportunity Program (UROP),
FSU Aug’23 – Apr ’24

LLM evaluation in differential diagnosis and lab test result-related questions

Rotation and PhD students June ’19 – present

Deep Learning for MRI Based Alzheimer’s Disease Dementia Classification

Comparative Effectiveness of Ustekinumab and Vedolizumab in TNF-exposed Pediatric Patients with Ulcerative Colitis

Web application development for visualization of lab test results

ROLES

Review Board Member, Graduate Studies Academic Regulations and Procedures, University of Nizwa 2023 – 2025

Guest Editor, Information, MDPI

Transformative Technologies in Healthcare: Harnessing Machine Learning, Deep Learning and Large Language Models in Health Informatics

Publication Chair

The 12th IEEE International Conference on Healthcare Informatics (IEEE ICHI 2024), Orlando, Florida, USA, June 3rd-6th, 2024

JOURNAL REVIEWING

1. npj Digital Medicine, Nature
2. npj Health Systems, Nature
3. The Lancet Digital Health, Lancet
4. Journal of the American Medical Informatics Association (JMIA), Oxford
5. Bioinformatics, Oxford
6. NAR Genomics and Bioinformatics, Oxford
7. Biology Methods & Protocols, Oxford
8. European Heart Journal - Digital Health, Oxford
9. BMJ Health & Care Informatics, BMJ (British Medical Journal)
10. BMJ Open, BMJ (British Medical Journal)
11. Artificial Intelligence in Medicine (AIIM), Elsevier
12. IEEE Journal of Biomedical and Health Informatics (JBHI), IEEE
13. Journal of Medical Internet Research (JMIR), JMIR
14. Knowledge Based Systems, Elsevier
15. Journal of Healthcare Informatics Research (JHIR), Springer Nature
16. Scientific Reports, Springer Nature

17. Gene, Elsevier
18. PLoS ONE, PLOS
19. BMC Cancer, BioMed Central
20. BMC Bioinformatics, BioMed Central
21. BMC Medical Informatics and Decision Making, BioMed Central
22. BMC Cardiovascular Disorders, BioMed Central
23. Artificial Intelligence Review, Springer Nature
24. Journal of Biomedical Semantics, Springer Nature
25. In Silico Pharmacology, Springer Nature
26. Discover Applied Sciences, Springer Nature
27. Journal of Rare Diseases, Springer Nature
28. International Journal of Machine Learning and Cybernetics, Springer Nature
29. Medical Oncology (MO), Springer Nature
30. Discover Data, Springer Nature
31. Journal of Cannabis Research, BioMed Central
32. Biotechnology and Applied Biochemistry, Wiley
33. Journal of Biomolecular Structure and Dynamics, Taylor & Francis
34. Frontiers in Artificial Intelligence
35. Frontiers in Psychiatry
36. Frontiers in Research Metric and analysis
37. Frontiers in Big Data
38. Heliyon
39. Smart Health, Elsevier
40. Clinical and Experimental Medicine, Elsevier
41. Italian Journal of Animal Science, Springer
42. Clinical epidemiology, Taylor & Francis Group
43. Applied Sciences, MDPI
44. Big Data and Cognitive Computing, MDPI
45. Mathematics, MDPI
46. Data, MDPI
47. Informatics, MDPI
48. Information, MDPI
49. AI, MDPI
50. Healthcare, MDPI
51. Future Internet, MDPI
52. Forecasting, MDPI
53. Electronics, MDPI
54. Machine Learning and Knowledge Extraction, MDPI
55. Computers, MDPI
56. International Journal of Environmental Research and Public Health, MDPI
57. Journal of Applied Bioinformatics & Computational Biology, SciTechnol
58. Artificial Intelligence in Health, ACS
59. Computers, Materials & Continua, Tech Science Press
60. International Journal of Medical Sciences

CONFERENCE REVIEWING

61. American Medical Informatics Association, Annual Symposium 2024
62. American Medical Informatics Association, Clinical Informatics 2024
63. AIME 2024: 22nd International Conference of AI in Medicine, 2024
64. The IEEE/ACM international conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE),2024

65. American Medical Informatics Association, Annual Symposium 2023
66. 9th International Conference on Smart Computing and Communication (ICSCC 2023)

PEER-REVIEWED PUBLICATIONS

1. Bhasuran B, Jin Q, Xie Y, Yang C, Hanna K, Costa J, Shavor C, Han W, Lu Z, He Z. Preliminary analysis of the impact of lab results on large language model generated differential diagnoses. npj Digital Medicine. 2025 Mar 18;8(1):166.
2. Bhasuran B, Schmolly K, Kapoor Y, Jayakumar NL, Doan R, Amin J, Meninger S, Cheng N, Deering R, Anderson K, Beaven SW, Wang B, Rudrapatna VA. Reducing diagnostic delays in acute hepatic porphyria using health records data and machine learning. J Am Med Inform Assoc. 2024 Jul 1:ocae141. doi: 10.1093/jamia/ocae141. Epub ahead of print. PMID: 38946554.
3. He Z, Bhasuran B, Jin Q, Tian S, Hanna K, Shavor C, Arguello LG, Murray P, Lu Z. Quality of Answers of Generative Large Language Models Versus Peer Users for Interpreting Laboratory Test Results for Lay Patients: Evaluation Study. J Med Internet Res. 2024 Apr 17;26:e56655. doi: 10.2196/56655. PMID: 38630520; PMCID: PMC11063893.
4. Bhasuran, Balu, et al. "Predicting HIV Diagnosis Among Emerging Adults Using Electronic Health Records and Health Survey Data in All of Us Research Program." 2024 IEEE International Conference on Bioinformatics and Biomedicine (BIBM). IEEE, 2024.
5. Silverman AL, Bhasuran B, Mosenia A, Yasini F, Ramasamy G, Banerjee I, Gupta S, Mardirossian T, Narain R, Sewell J, Butte AJ, Rudrapatna VA. Accurate, Robust, and Scalable Machine Abstraction of Mayo Endoscopic Subscores From Colonoscopy Reports. Inflamm Bowel Dis. 2024 Mar 26:izae068. doi: 10.1093/ibd/izae068. Epub ahead of print. PMID: 38533919.
6. Silverman AL, Sushil M, Bhasuran B, Ludwig D, Buchanan J, Racz R, Parakala M, El-Kamary S, Ahima O, Belov A, Choi L, Billings M, Li Y, Habal N, Liu Q, Tiwari J, Butte AJ, Rudrapatna VA. Algorithmic Identification of Treatment-Emergent Adverse Events From Clinical Notes Using Large Language Models: A Pilot Study in Inflammatory Bowel Disease. Clin Pharmacol Ther. 2024 Jun;115(6):1391-1399. doi: 10.1002/cpt.3226. Epub 2024 Mar 8. PMID: 38459719; PMCID: PMC11090709.
7. Patel PV, Zhang A, Bhasuran B, Ravindranath VG, Heyman MB, Verstraete SG, Butte AJ, Rosen MJ, Rudrapatna VA; ImproveCareNow Pediatric IBD Learning Health System. Real-world effectiveness of ustekinumab and vedolizumab in TNF-exposed pediatric patients with ulcerative colitis. J Pediatr Gastroenterol Nutr. 2024 May;78(5):1126-1134. doi: 10.1002/jpn3.12169. Epub 2024 Mar 14. PMID: 38482890; PMCID: PMC11065561.
8. Bhasuran B, Manoharan S, Iyyappan OR, Murugesan G, Prabahar A, Raja K. Large Language Models and Genomics for Summarizing the Role of microRNA in Regulating mRNA Expression. Biomedicines. 2024 Jul 10;12(7):1535. doi: 10.3390/biomedicines12071535. PMID: 39062108; PMCID: PMC11274411.
9. Han, Wenshan, Balu Bhasuran*, Victorine Muse, Soren Brunak, Lifeng Lin, Karim Hanna, Yu Huang, Jiang Bian, and Zhe He. "Assessing the Seasonality of Lab Tests Among Patients with Alzheimer's Disease and Related Dementias in OneFlorida Data Trust." medRxiv (2024): 2024-03. Accepted in AMIA 2024 Annual Symposium
10. Yadav, A., Balu Bhasuran & Oviya, I. R. (2023, November). A Novel Approach for Classifying DNA Barcodes Using Ensemble NLP Models. In 2023 International Conference on Research Methodologies in Knowledge Management, Artificial Intelligence and Telecommunication Engineering (RMKMATE) (pp. 1-5). IEEE.
11. Kunchapu, Abhiram, I. R. Oviya, and Balu Bhasuran. "Precision Enhanced Breast Cancer Prediction Using Deep Learning Models." In 2023 International Conference on Artificial Intelligence for Innovations in Healthcare Industries (ICAIIHI), vol. 1, pp. 1-6. IEEE, 2023.
12. Balu Bhasuran*, and Jeyakumar Natarajan. "DisGeReExT: a knowledge discovery system for exploration of disease–gene associations through large-scale literature-wide analysis study." Knowledge and Information Systems (2023): 1-25
13. Balu Bhasuran*. BioBERT and Similar Approaches for Relation Extraction. Methods Mol Biol. 2022;2496:221-235. doi: 10.1007/978-1-0716-2305-3_12. PMID: 35713867.
14. Balu Bhasuran*. Combining Literature Mining and Machine Learning for Predicting Biomedical Discoveries. Methods Mol Biol. 2022;2496:123-140. doi: 10.1007/978-1-0716-2305-3_7. PMID: 35713862.
15. Natarajan, Jeyakumar, Balu Bhasuran*, and Gurusamy Murugesan. "Big Data Analytics: A Text Mining Perspective and Applications in Biomedicine and Healthcare." In Big Data Applications in Industry 4.0, pp. 367-408. Auerbach Publications, 2022.

16. Maroli N, Balu Bhasuran, Natarajan J, Kolandaivel P. The potential role of procyanidin as a therapeutic agent against SARS-CoV-2: a text mining, molecular docking and molecular dynamics simulation approach. J Biomol Struct Dyn. 2022 Feb;40(3):1230-1245. doi: 10.1080/07391102.2020.1823887. Epub 2020 Sep 22. PMID: 32960159; PMCID: PMC7544928.
17. Sabenabanu Abdulkadhar, Balu Bhasuran, and Jeyakumar Natarajan. "Multiscale laplacian graph kernel combined with lexico-syntactic patterns for biomedical event extraction from literature." Knowledge and Information Systems (2020) 1-31
18. Maroli N, Kalagatur NK, Balu Bhasuran, Jayakrishnan A, Manoharan RR, Kolandaivel P, Natarajan J, Kadirvelu K. Molecular Mechanism of T-2 Toxin-Induced Cerebral Edema by Aquaporin-4 Blocking and Permeation. J Chem Inf Model. 2019 Nov 25;59(11):4942-4958. doi: 10.1021/acs.jcim.9b00711. Epub 2019 Nov 5. PMID: 31644276.
19. Balu Bhasuran & Natarajan, J. (2019). Distant supervision for large-scale extraction of gene–disease associations from literature using DeepDive. In International Conference on Innovative Computing and Communications: Proceedings of ICICC 2018, Volume 2 (pp. 367-374). Springer Singapore.
20. Subramanian D, Balu Bhasuran, Natarajan J. Genomic analysis of RNA-Seq and sRNA-Seq data identifies potential regulatory sRNAs and their functional roles in Staphylococcus aureus. Genomics. 2019 Dec;111(6):1431-1446. doi: 10.1016/j.ygeno.2018.09.016. Epub 2018 Oct 7. PMID: 30304708.
21. Balu Bhasuran, Natarajan J. Automatic extraction of gene-disease associations from literature using joint ensemble learning. PLoS One. 2018 Jul 26;13(7):e0200699. doi: 10.1371/journal.pone.0200699. PMID: 30048465; PMCID: PMC6061985.
22. Balu Bhasuran*, Subramanian D, Natarajan J. Text mining and network analysis to find functional associations of genes in high altitude diseases. Comput Biol Chem. 2018 Aug;75:101-110. doi: 10.1016/j.compbiolchem.2018.05.002. Epub 2018 May 2. PMID: 29763853.
23. Murugesan G, Abdulkadhar S, Balu Bhasuran, Natarajan J. BCC-NER: bidirectional, contextual clues named entity tagger for gene/protein mention recognition. EURASIP J Bioinform Syst Biol. 2017 Dec;2017(1):7. doi: 10.1186/s13637-017-0060-6. Epub 2017 May 5. PMID: 28477208; PMCID: PMC5419958.
24. Balu Bhasuran, Murugesan G, Abdulkadhar S, Natarajan J. Stacked ensemble combined with fuzzy matching for biomedical named entity recognition of diseases. J Biomed Inform. 2016 Dec;64:1-9. doi: 10.1016/j.jbi.2016.09.009. Epub 2016 Sep 12. PMID: 27634494.

PREPRINTS

25. Balu Bhasuran, Gurusamy Murugesan, and Jeyakumar Natarajan. "Literature Based Discovery (LBD): Towards Hypothesis Generation and Knowledge Discovery in Biomedical Text Mining." arXiv preprint arXiv:2310.03766 (2023). (Under review at ACM Computing Surveys), 2024
26. Wang, X., Ouyang, H., Bhasuran, B., Luo, X., Hanna, K., Lustria, M. L. A., & He, Z. (2024). Lab-AI--Retrieval-Augmented Language Model for Personalized Lab Test Interpretation in Clinical Medicine. arXiv preprint arXiv:2409.18986.
27. Jin, Q., Wan, N., Leaman, R., Tian, S., Wang, Z., Yang, Y., ... & Lu, Z. (2024). Demystifying Large Language Models for Medicine: A Primer. arXiv preprint arXiv:2410.18856.

CONFERENCE ABSTRACTS

28. He Z, Bhasuran B, Jin Q, Tian S, Hanna K, Lu Z. USING INFORMATICS AND GENERATIVE AI TO SUPPORT OLDER ADULTS'UNDERSTANDING OF LAB TEST RESULTS. Innovation in Aging. 2024 Dec 31;8(Suppl 1):109.
29. Balu Bhasuran, Shadera Slatter, Gail Fernandes, Boshu Ru, Joe Yang, Xiao Zhang, Ravi Shankar, Jin Ge, and Vivek Rudrapatna. NASHDetection: A Natural Language Processing Method for Identifying Patients With Non-Alcoholic Steatohepatitis Using Clinical Notes.Official journal of the American College of Gastroenterology| ACG, 2023.
30. Balu Bhasuran, Shadera Slatter, Gail Fernandes, Boshu Ru, Joe Yang, Xiao Zhang, Ravi Shankar, Jin Ge, and Vivek Rudrapatna. Uncontrolled Diabetes and Hypertension Are Associated With the Risk of New-Onset Cirrhosis in Patients With Nonalcoholic Steatohepatitis Official journal of the American College of Gastroenterology| ACG, 2023.
31. Anna L Silverman, Madhumita Sushil, Balu Bhasuran, Dana Ludwig, James Buchanan, Rebecca Racz, Mahalakshmi Parakala, Samer El-Kamary, Ohenewaa Ahima, Artur Belov, Lauren Choi, Monisha Billings, Yan Li, Nadia Habal, Qi Liu, Jawahar Tiwari, Atul Butte, and Vivek Rudrapatna. Algorithmic identification of treatment-emergent adverse events from clinical notes using large language models: A pilot study in inflammatory bowel disease. Official journal of the American College of Gastroenterology| ACG, 2023.

32. Silverman, Anna L., Balu Bhasuran, Arman Mosenia, Fatema Yasini, Saransh Gupta, Narbe Mardirossian, Rohan Narain, Justin L. Sewell, Atul Butte, and Vivek A. Rudrapatna. "Accurate, Robust, And Scalable Abstraction Of Mayo Endoscopic Subscores From Colonoscopy Reports." In GASTROENTEROLOGY, vol. 162, no. 7, pp. S618-S619. 1600 John F Kennedy Boulevard, Ste 1800, Philadelphia, Pa 19103-2899 Usa: Wb Saunders Co-Elsevier Inc, 2022.