# MD IMBESAT HASSAN RIZVI

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## EMPLOYMENT

**Robert Bosch Centre for Cyber-Physical Systems, Indian Institute of Science (IISc)** *Oct 2020 – Present*
- *Technical (Research) Associate*

  - Working on Human-Robot Interaction (HRI) for social robots.

  - Enabled (i) two-way remote speech communication with phoneme segmentation based lip synchronization and (ii) Wav2Vec2 based speech to text conversion followed by NLP based action identification and execution on social tele-robot *"Asha"*. Part of the work is open sourced as *sonorus* pypi package and *imperio* github repository.

  - Our team *"Aham"* (Asha) is one of the finalists in the International Conference on Social Robotics (ICSR), 2021 (Competition track) and is among the thirty eight semi-finalists in the ANA Avatar XPRIZE competition.

  - Working towards enabling language (NLP) based instruction execution through reinforcement learning (RL).

**Hewlett-Packard (HP) Inc.** *Jul 2017 – Oct 2020*
- *Senior Machine Learning Engineer (Data Scientist III)* *Nov 2019 – Oct 2020*
- *Machine Learning Engineer (Data Scientist IIIA)* *Jul 2017 – Oct 2019*

  - *Printer part failure prediction for minimal intervention cost* – We introduced sequence-based definition of precision and recall specific to the class of problems for intervention along with an LSTM based learning procedure using multiple-instance learning based hybrid loss.

  - *Identifying the relative importance of customer issues on product ratings* – Used self-attention based LSTM network to identify key phrases within a customer review followed by identifying the overall importance of these phrases in determining product ratings.

## EDUCATION

**Indian Institute of Science (IISc), Bangalore**
- *Reinforcement and Deep Reinforcement Learning – Crediting Course* *Aug 2021 – Present*
- *M.Tech from the Department of Computational and Data Sciences (CDS) – (CGPA : 6.1 / 8.0)* *Jul 2015 – Jun 2017*

  *Thesis work* – on combinatorial approaches to non-isomorphic graph generation of potential drug molecules by preserving local information-theoretic indices of activity linked nodes in molecular graphs, and chemical properties prediction of hydrocarbons. Project funded by departments under *Ministry of Science & Technology, Government of India (GoI)*.

**Indian Institute of Technology - IIT (ISM), Dhanbad** *Jul 2008 – Jun 2012*
- *B.Tech in Mechanical Engineering – (CGPA : 7.83 / 10.0)*

  *Senior year project* – developed a mathematical model for thermal properties of nano-fluids based on a linear conductivity gradient across the interfacial layer between the nano-particles and the base fluid, and solving the resulting steady state heat conduction differential equation.

## ONLINE COURSES

**Tokyo Data Science (TokyoDS)** *Apr 2019 – Mar 2020*
- *Deep Learning and Data Science Track*

  *Topics include* – Mathematics for machine learning, gradient based optimization techniques, computer vision (CV), natural language processing (NLP), reinforcement learning (RL), generative adversarial networks (GANs), variational autoencoders (VAEs) and causal inference.

## PUBLICATIONS

⚯ Google Scholar Profile

### In Submission

- Vivek Khetan*, **Md Imbesat Hassan Rizvi***, Jessica Huber, Paige Bartusiak, Bogdan Sacaleanu, Andrew Fano. **MIMICause : Defining, identifying and predicting types of causal relationships between biomedical concepts from clinical notes.** arXiv:2110.07090 [cs.CL]

*Equal contribution

- Adrian Ahne, Vivek Khetan, Xavier Tannier, **Md Imbesat Hassan Rizvi**, Thomas Czernichow, Francisco Orchard, Charline Bour, Andrew Fano and Guy Fagherazzi. **Identifying causal associations in tweets using deep learning: Use case on diabetes-related tweets from 2017–2021.** arXiv:2111.01225 [cs.CL]

## Conference Papers

- Himanshu Tiwari, Shameed Sait, **Md Imbesat Hassan Rizvi** and Niranjan Damera-Venkata. **Identifying the Relative Importance of Customer Issues on Product Ratings through Machine Learning.** In *Proceedings of the ACM Symposium on Document Engineering 2018 (DocEng '18).*

## Journal Papers

- Chandan Raychaudhury, **Imbesat Hassan Rizvi** and Debnath Pal. **Predicting gas phase entropy of select hydrocarbon classes through specific information-theoretical molecular descriptors.** *SAR and QSAR in Environmental Research.* Taylor & Francis. Vol. 30, Issue 7, pp. 491–505, 2019.

- Chandan Raychaudhury, **Md. Imbesat Hassan Rizvi** and Debnath Pal. **Combinatorial Design of Molecule using Activity-Linked Substructural Topological Information as Applied to Antitubercular Compounds.** *Current Computer-Aided Drug Design.* Bentham Science. Vol. 15, Issue 1, pp. 67–81, 2019.

- Ayush Jain, **Imbesat Hassan Rizvi**, Subrata Kumar Ghosh and P.S. Mukherjee. **Analysis of nanofluids as a means of thermal conductivity enhancement in heavy machineries**, *Industrial Lubrication and Tribology*, Emerald Group Publishing. Vol. 66, No. 2, pp. 238–243, 2014.

- **Imbesat Hassan Rizvi**, Ayush Jain, Subrata Kr. Ghosh and P. S. Mukherjee. **Mathematical modelling of thermal conductivity for nanofluid considering interfacial nano-layer.** *Heat and Mass Transfer.* Springer-Verlag. Vol. 49, Issue 4, pp. 595–600, 2013.

## Book Chapters

- **Md. Imbesat Hassan Rizvi**, Chandan Raychaudhury and Debnath Pal. **Combinatorial Drug Discovery from Activity-Related Substructure Identification.** In: Mohan C. (eds) *Structural Bioinformatics: Applications in Preclinical Drug Discovery Process.* Challenges and Advances in Computational Chemistry and Physics. Springer, Cham. Vol. 27, pp. 71–108, 2019.

# TUTORING, SERVICES AND VOLUNTEERING

- *Teaching Assistant*, Computational Data Science, Indian Institute of Science (IISc) — *July 2021 – Present*
- *Reviewer*, ML Reproducibility Challenge 2020 — *Feb 2021 – Mar 2021*
- *Grading & Master's Thesis Supervision Assistantship*, UpGrad Education Pvt. Ltd. — *Oct 2020 – Present*
- *Volunteer*, International Conference on Learning Representations (ICLR) — *Apr 2020*

# TECHNICAL SKILLS

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|---|---|
| **Programming:** | Python, Java, C++, Matlab, CUDA, MPI, Open-MP |
| **Software & Frameworks:** | PyTorch, Keras, Robot Operating System (ROS), Docker, Scikit-Learn, XGBoost, Flask |

# SCHOLARSHIPS, HONOURS AND ACHIEVEMENTS

## Scholarships

- *Graduate Student Scholarship, Indian Institute of Science (IISc), Bangalore* — *Jul 2015 – May 2017*
- *Merit-cum-means Scholarship, Indian Institute of Technology – IIT (ISM), Dhanbad* — *Jul 2008 – May 2012*

## Honours and Achievements

- *Secured rank of 99 (top 0.06 percentile) in the all India Graduate Aptitude Test in Engineering (GATE) which is a test for country-wide admissions to graduate engineering programs in India.* — *Mar 2013*
- *$2^{nd}$ Prize recipient, Poster Competition, Society of Petroleum Engineers (SPE), Bangalore Section* — *Sep 2009*
- *Secured a position among the top 2 percentile in the Indian Institute of Technology (IIT) entrance examination which is conducted country-wide for undergraduate admissions to prestigious IIT(s).* — *Jun 2008*
- *Amul Vidya Bhushan Award – by Amul Foundation for academic excellence* — *Jun 2008*
- *Hindustan Pratibha Samman – by HT Media Ltd. for academic excellence* — *Jun 2008*
- *Secured an All India Rank of 131 (top 6 percentile) in National Science Olympiad (NSO)* — *2003*