Dennis Robert, M.B.B.S., M.M.S.T.

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LinkedIn Medium GitHub Google Scholar

SUMMARY

Profile

- Physician Data Scientist with overall experience of ~13 years.
- Bachelor of Medicine and Surgery (MBBS) graduate with a post-graduation in Medical Science & Technology (MMST) focusing on Biostatistics and Computational Epidemiology.
- About 10 years of industrial experience in Pharma, Medical AI/ML CAD (computer-aided detection) and Consulting and 3 years of experience in general clinical practice.
- Experience as an independent contributor, technical/scientific mentor and people manager.
- Published more than 30 scientific articles including multiple peer-reviewed research articles in Q1 journals.
- Author and maintainer of two R packages with more than 17,000 downloads as of September 2024.
- **Primary areas of expertise**
    - Medical AI CAD validation research study protocol design and statistical analysis (Clinical Development)
    - Real-World-Data/Evidence (RWD/RWE) study design and statistical analysis

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Medical AI/ML Experience

Clinical development and postmarketing (postapproval) studies

- Study protocol, statistical analysis plan (SAP), analysis and reporting for AI/ML CAD validation studies.
- Clinical performance assessment of AI/ML CAD devices for FDA 510(k) submissions.
- Standalone diagnostic accuracy studies, multi-reader multi-case (MRMC) studies, interventional studies.

Pre-clinical development (Model development)

- Experienced in AI/ML algorithm/model development using structured RWD.

RWD Experience

- Comparative effectiveness research, incidence & prevalence studies, treatment journey, line of therapy derivation.
- Cohort building, propensity matching, multivariable regression, survival analysis.
- Descriptive and inferential statistical analysis.

Programming Experience

- R (Expert)
- Python (Project Experience
- SQL (Project Experience)
- SAS (Exposure)

Major Academic Achievements

- Khorana Scholarship (2013)
- Kerala State Rank 4 and AIR 144 for All India Pre-Medical Entrance Examination (AIPMT, currently known as NEET)

EDUCATION

IIT Kharagpur **Kharagpur, India**
MMST – Masters in Medical Science and Technology Graduation: July 2014
Relevant Coursework: Courses on Biostatistics, Data Science, Epidemiology

Government Medical College Kottayam **Kottayam, India**
MBBS – Bachelor of Medicine and Bachelor of Surgery Graduation: February 2010
Relevant Coursework: Courses on Clinical Medicine, Surgery, Pre- and Para-clinical subjects

SKILLS

Classical Biostatistics

- Statistical Analysis Plan (SAP) development
- Diagnostic accuracy, MRMC study analysis
- RWD comparative effectiveness research
- Survival (Time-to-event) analysis

Deep Learning/Classical ML

(Training data type: Structured clinical data)

- Logistic and regularized regression methods
- Random forests, GBM
- Feed-forward neural networks, RNN, LSTM

Technical/Programming

- R (Expert)
- Python (Project Experience)
- Impala/SQL (Project experience)
- SAS (Exposure)

Functional

- Medical domain knowledge
- RWD sources: TRUVEN, OPTUM, CPRD, OMOP CDM
- Medical Ontologies: ICD, NDC, HCPCS, etc.

Epidemiology

- Clinical research study protocol design
- Scientific manuscript writing for peer-reviewed publication

Soft Skills

- Collaborative ways of working with multi-disciplinary cross-functional teams
- Scientific oral presentations

PROFESSIONAL EXPERIENCE

Qure.ai **Bangalore, India**

Director of Clinical Research Apr 2024 – Present
Clinical Research Scientist Aug 2022 – Mar 2024
Clinical Research Scientist Jun 2021 – Nov 2021

- Overall supervision of AI/ML CAD clinical research scientific activities including people management.
- Clinical study protocol and statistical analysis plan (SAP) development for Medical AI/ML CAD evaluation studies; Multi-Reader Multi-Case (MRMC) studies, standalone diagnostic accuracy studies, interrupted time series studies, cluster randomized controlled trials.
- Planned, analyzed, and reported clinical research studies that led to multiple FDA 510(k) clearances.
- Wrote and reviewed manuscripts and published them in multiple peer-reviewed journals and conferences.
- Developed an R package for sizing MRMC studies; available in CRAN - MRMCsamplesize
- Stakeholder engagement during conceptualization, execution, analysis, and reporting of research studies.
- Scientific review of manuscripts from external research groups studying Qure's Medical AI/ML algorithms.

GlaxoSmithKline (GSK) **Bangalore, India**

RWD Manager Nov 2021 – Aug 2022

- Led a 5-member team of RWD (Real-World-Data) Programmers, senior data scientists, and a clinical coder
- Scientific mentoring and performance management of reportees.
- Review study protocols and SAPs from internal stakeholders for seamless project execution.
- Delivered over 30 RWD projects using RWD sources such as TRUVEN, OPTUM, and CPRD.

Deloitte **Bangalore, India**

Senior Clinical Data Scientist II Sep 2019 – Jun 2021
Senior Clinical Data Scientist I Sep 2017 – Aug 2019
Clinical Data Scientist Nov 2015 – Aug 2017

- Independently developed statistical and AI predictive classification algorithms that powered the backend engine of an RWD analytics platform (for Pharma clients) with a multi-million-dollar portfolio.
- Developed deep learning algorithm-based proof-of-concepts for binary classification tasks using RWD data in OMOP CDM format with minimal supervision at a time when deep learning was still in nascent stages (2017).
- Contributed to the UI/UX design of the RWD Analytics platform using medical domain expertise.
- Routinely worked with developers, data engineers, and with QA team during the software product lifecycle.

- Completed multiple data science projects and Proof-Of-Concepts (POCs) for Pharma and Provider clients.
- Conducted over ten training sessions on RWD, Biostatistics, and Medical AI/ML.
- Developed an R package for facilitating semi-automated covariate selection for comparative RWD observational data analysis based on the High-Dimensional-Propensity-Score (HDPS) algorithm which has been downloaded from CRAN more than 10,000 times. Available in CRAN – autoCovariateSelection

ResMed **Bangalore, India**
Clinical Specialist Jan 2015 – Oct 2015

- Responsible for leading clinical engagement of stakeholders in South India, Sri Lanka, and Maldives.
- Conducted systematic review on topics about sleep and respiratory medicine and was responsible for generating quality scientific presentations for medical device products.
- Provided clinical training pertinent to ResMed-manufactured medical devices to internal (sales and marketing team) as well as external (respiratory physicians, intensivists, respiratory therapists, and nurses) stakeholders.

BC Roy Technology Hospital, IIT Kharagpur **Kharagpur, India**
Medical Officer Jul 2011 – May 2014

- Evening outpatient and casualty management of hospital as a general practitioner as part of mandatory requirements for the completion of post-graduation course (MMST)

KEY ACADEMIC AND PROFESSIONAL ACHIEVEMENTS

- Awarded **Khorana Scholarship** for students showing outstanding promise in medical research.
- Ranked 144 in India among more than hundred thousand candidates from all over India in AIPMT exam, the then most competitive and objective medical entrance examination in India: **AIR 144, Kerala State Rank 4**
- Secured 3rd Rank in MG University Kerala for the First Professional MBBS examination.
- Golden Helix Award for Innovation and Outstanding Performance in Deloitte (2020).
- Multiple awards for performance during professional career.

R PACKAGES

- Robert D (2020). autoCovariateSelection: Automated Covariate Selection Using HDPS Algorithm. R package v 1.0.0. [Link]
- Robert D (2023). MRMCsamplesize: Sample Size Estimations for Planning Multi-Reader Multi-Case (MRMC) Studies Without Pilot Data. R package v1.0.0 [Link]

INVITED TALKS

- Artificial Intelligence and Data Science, Panel Discussion, Education 21c, Kerala, Nov 2020
- Artificial Intelligence in Healthcare, NATCON 2019, Government Medical College Trivandrum, Nov 2019
- Clinical Trials: Introduction: Webinar, IIM Ahmedabad, Jun 2017

SCIENTIFIC BLOGS

1. The mathematical relationship between the survival function and hazard function. Towards Data Science, Dec 2021. [Link]
2. Five confidence intervals for proportions that you should know about. Towards Data Science, Aug 2020. [Link]
3. Demystifying the binomial distribution. Towards Data Science, Jul 2020. [Link]
4. Demystifying the p-value. The Startup, Jun 2020. [Link]
5. How deadly is COVID-19. Medium, Apr 2020. [Link]

PUBLICATIONS

Peer-reviewed journal publications

1. Kumar A, Patel P, **Robert D**, Kumar S, Khetani A, Reddy B, Srivastava A, Accuracy of an artificial intelligence-enabled diagnostic assistance device in recognising normal chest radiographs: A service evaluation, BJR|Open, 2024; tzae029, doi:https://doi.org/10.1093/bjro/tzae029
2. **Robert D**. Peer Review Report For: testCompareR: an R package to compare two binary diagnostic tests using paired data [version 1; peer review: 1 approved with reservations]. Wellcome Open Res 2024, 9:351 doi:https://doi.org/10.21956/wellcomeopenres.24690.r97075
3. Duncan S, McConnachie A, Blackwood J, Stobo D, Maclay J, Wu O, Germeni E, **Robert D**, Bilgili B, Kumar S, Hall M, Lowe DJ. Radiograph accelerated detection and identification of cancer in the lung (RADICAL): a mixed methods study to assess the clinical effectiveness and acceptability of Qure.ai artificial intelligence software to prioritise chest X-ray (CXR) interpretation. BMJ Open 2024;14:e081062. doi: https://10.1136/bmjopen-2023-081062
4. **Robert D**, Ridhi S, Soren P, Kumar M, Pawar S, Reddy B. Comparing the Output of an Artificial Intelligence Algorithm in Detecting Radiological Signs of Pulmonary Tuberculosis in Digital Chest X-Rays and Their Smartphone-Captured Photos of X-Ray Films: Retrospective Study. JMIR Form Res. 2024 Aug 21;8:e55641. doi:https://doi.org/10.2196/55641. PMID: 39167435.
5. Garza-Frias E, Kaviani P, Karout L, Fahimi R, Hosseini S, Putha P, Tadepalli M, Kiran S, Arora C, **Robert D**, Bizzo B, Dreyer KJ, Kalra MK, Digumarthy SR. Early Detection of Heart Failure with Autonomous AI-Based Model Using Chest Radiographs: A Multicenter Study. Diagnostics (Basel). 2024 Jul 30;14(15):1635. doi:https://doi.org/10.3390/diagnostics14151635. PMID: 39125511; PMCID: PMC11311468.
6. Chiramal JA, Johnson J, Webster J, Nag DR, **Robert D**, Ghosh T, Golla S, Pawar S, Krishnan P, Drain PK, Mooney SJ. Artificial Intelligence-based automated CT brain interpretation to accelerate treatment for acute stroke in rural India: An interrupted time series study. PLOS Glob Public Health. 2024 Jul 24;4(7):e0003351. doi: https://doi.org/10.1371/journal.pgph.0003351 PMID: 39047001.
7. Vimalesvaran K, **Robert D**, Kumar S, Kumar A, Narbone M, Dharmadhikari R, Harrison M, Ather S, Novak A, Grzeda M, Gooch J, Woznitza N, Hall M, Shuaib H, Lowe DJ. Assessing the effectiveness of artificial intelligence (AI) in prioritising CT head interpretation: study protocol for a stepped-wedge cluster randomised trial (ACCEPT-AI). BMJ Open. 2024 Jun 16;14(6):e078227. doi: https://doi.org/10.1136/bmjopen-2023-078227 PMID: 38885990; PMCID: PMC11184206.
8. Fu H, Novak A, **Robert D**, Kumar S, Tanamala S, Oke J, Bhatia K, Shah R, Romsauerova A, Das T, Espinosa A, Grzeda MT, Narbone M, Dharmadhikari R, Harrison M, Vimalesvaran K, Gooch J, Woznitza N, Salik N, Campbell A, Khan F, Lowe DJ, Shuaib H, Ather S. AI assisted reader evaluation in acute CT head interpretation (AI-REACT): protocol for a multireader multicase study. BMJ Open. 2024 Feb 12;14(2):e079824. doi:https://doi.org/10.1136/bmjopen-2023-079824. PMID: 38346874; PMCID: PMC10862304.
9. Vijayan S, Jondhale V, Pande T, Khan A, Brouwer M, Hegde A, Gandhi R, Roddawar V, Jichkar S, Kadu A, Bharaswadkar S, Sharma M, Vasquez NA, Richardson L, **Robert D**, Pawar S. Implementing a chest X-ray artificial intelligence tool to enhance tuberculosis screening in India: Lessons learned. PLOS Digit Health. 2023 Dec 7;2(12):e0000404. doi:https://doi.org/10.1371/journal.pdig.0000404 PMID: 38060461; PMCID: PMC10703224.
10. Thazhathedath Hariharan H, **Robert D**, Surendran AT. A Methodological Rectification in the Global Hunger Index. Econ Polit Wkly. 2022;57(14):14-17. https://www.epw.in/journal/2022/14/commentary/methodological-rectifi-cation-global-hunger-index.html
11. Thazhathedath Hariharan H, Surendran AT, Haridasan RK, Venkitaraman S, **Robert D**, Narayanan SP, Mammen PC, Siddharth SR, Kuriakose SL. Global COVID-19 Transmission and Mortality-Influence of Human Development, Climate, and Climate Variability on Early Phase of the Pandemic. Geohealth. 2021 Oct 1;5(10):e2020GH000378. doi:https://doi.org/10.1029/2020GH000378 PMID: 34693183; PMCID: PMC8519396.
12. Arya BK, Bhattacharya SD, Sutcliffe CG, Kumar Niyogi S, Bhattacharyya S, Hemram S, Moss WJ, Panda S, Saurav Das R, Mandal S, **Robert D**, Ray P. Impact of Haemophilus influenzae Type B Conjugate Vaccines on Nasopharyngeal Carriage in HIV-infected Children and Their Parents from West Bengal, India. Pediatr Infect Dis J. 2016 Nov;35(11):e339-e347. doi:https://doi.org/10.1097/inf.0000000000001266 PMID: 27753766.
13. Arya BK, **Robert D,** Das Bhattacharya S, Mukhopadhyay J. A framework for web based geographical information systems for country wide antimicrobial resistance monitoring. Health Policy and Technology. 2013;2(2):85-93. doi: https://doi.org/10.1016/j.hlpt.2013.03.005

Preprints

1. Aljasmi AAM, Ghonim H, Fahmy ME, Nair A, Kumar S, **Robert D**, et al. (2024). Post-Deployment Performance of a Deep Learning Algorithm for Normal and Abnormal Chest X-Ray Classification: A Study at Visa Screening Centers in the United Arab Emirates. Available at SSRN: https://dx.doi.org/10.2139/ssrn.4867545
2. Pettet G, West J, **Robert D**, Khetani A, et al. (2024) Evaluation of an artificial intelligence-based software device for detection of intracranial haemorrhage in teleradiology practice. Research Square (Research Square). June 2024. doi: https://doi.org/10.1007/s00234-022-03075-9
3. Govindarajan A, Agarwal A, Chattoraj S, **Robert D**, et al. Identification of Hemorrhage and Infarct Lesions on Brain CT Images using Deep Learning. arXiV. arXiv:2307.04425. July 2023. doi:https://doi.org/10.48550/arXiv.2307.04425
4. **Robert D**, Sathyamurthy S, Putha P. MRMCsamplesize: An R Package for Estimating Sample Sizes for Multi-Reader Multi-Case Studies. medRxiv. Published online 2023. doi:https://doi.org/10.1101/2023.09.25.23296069

Conference abstracts

1. Abishek Patil, **Dennis Robert**, Anshul Kumar Singh, Akshay V, Rashi Chamadia, Saigopal Sathyamurthy, Charu Arora, Preetham Putha, Aditya Daftary. Can Deep Learning and Large Language Model Based Chest Radiograph Interpretation Improve the Performance of Radiologists in Triaging and Reporting of Normal and Abnormal Studies? A Multi-Reader Multi-Case Study. Oral Presentation. RSNA, Chicago, Dec 2024.
2. George Talama, Eunice Nahache, Peter Mwamlima, Davy Nkosi, James Mpunga, Tisungane Mwenyekulu, **Dennis Robert**, Joseph Njala, Hitler Sigauke, Mackenzie Chivwara, Sam Phiri, Joep J van Oosterhout. Experiences with chest X-ray screening and artificial intelligence software in TB screening and diagnosis at Health Facility level in Malawi. Oral Presentation. UNION, Bali, Nov 2024.
3. Kavitha Vimalesvaran, Satish Golla, Jeyakumar Gowsikan, **Dennis Robert**, Ayan Kumar, Shamie Kumar, Rahul Dharmadhikari, Haleema Al Jazzaf, Aysha Luis, Robert Dunk, Mariapola Narbone, Sarim Ather, Alex Novak, Mark Hall, Haris Shuaib, David Lowe. Integration of Calibration in AI Research Pipelines: Insights from a Multi-Center CT Head Prioritisation Study. Annual Meeting of the Society for Imaging Informatics in Medicine (SIIM) 2024, USA, Jun 2024. [Link]
4. **Dennis Robert**, Swetha Tanamala, Manoj Tadepalli, Sri Anusha Matta, Saigopal Sathyamurthy, Anshul Kumar Singh, Bunty Kundnani, Riddhi Shah, Harshithaa Varatharajan. Artificial Intelligence-based assistance improves physicians' accurate lung nodule detection using chest radiographs: A Multi-Reader Multi-Case study. European Congress of Radiology (ECR) 2024, Austria, Feb 2024.
5. Abhishek Patil, **Dennis Robert**, Charu Arora, Syed Pasha, Anshul Chauhan, Anagh Purkar, Anshul Kumar Singh, Saigopal Sathyamurthy, Preetham Putha, Aditya Daftary. Impact of an AI-based workflow in interpretation of chest radiographs. Oral Presentation, RSNA, USA, Nov 2023.
6. Emiliano Garza, Mannudeep Kalra, **Dennis Robert**, Sai Kiran, Charu Arora, Manoj Tadepalli, Preetham Putha et. al. Autonomous AI-based CXR interpretation for predicting congestive heart failure: A multicenter study. Oral Presentation, RSNA, USA, Nov 2023.
7. **Dennis Robert**. An R Package for Estimating Sample Sizes for Multi-Reader Multi-Case (MRMC) Studies. Poster Presentation, R/Medicine, Virtual, June 2023. [Link]
8. Souvik Mandal, **Dennis Robert**, Rohit Chouhan, Prakash Vanapalli, Vikash Challa, Saigopal Sathyamurthy, Amit Chouksey, Preetham Putha, Ankit Modi. Using an artificial intelligence algorithm to improve radiologists' performance in detecting pulmonary nodules in chest-CT scans: a multi-reader multi-case study. Oral presentation, European Congress of Radiology (ECR) 2023, Vienna, March 2023. Insights Imaging 14 (Suppl 4), 217 (2023). RPS 1705-5. [Link]
9. **Dennis Robert**, Smriti Ridhi, Pitamber Sore, Saniya Pawar, Preetham Putha. Performance comparison of an artificial intelligence-based algorithm between digital-ray images and mobile photos of x-ray films in detecting signs of tuberculosis. Oral Presentation, National Conference of Tuberculosis and Chest Diseases (NATCON 2022), India, Feb 2023.
10. Kristin Feeney, **Dennis Robert**, Prerna Patil, Sergey Charkin, Dan Housman, Yuval Koren, Xia Haiping, Jinlei Liu. Building Deep Learning Models with the OMOP CDM. Poster, 2017 OHDSI Symposium, USA, Oct 2017. [Link]
11. **Dennis Robert**, Bikas K Arya, Mausom Mallick, Sangeeta Das Bhattacharya, Swapan Kumar Niyogi, Shekhar Chakrabarty, Sutapa Mandal, Subhashish Bhattacharyya. Association between baseline plasma HIV viral load and nasopharyngeal pneumococcal colonization in children with HIV infection. Poster, 9th International Symposium on Pneumococci and Pneumococcal Diseases (ISPPD-9), India, March 2014. Volume: pneumonia 2014 Mar 9-13; 3:1-286.

12. Bikas K Arya, Sangeeta Das Bhattacharya, Swapan Kumar Niyogi, Subhasish Bhattacharyya, Sutapa Mandal, **Dennis Robert**, Ranjan Saurav Das. Pneumococcal carriage in HIV infected mothers and children in West Bengal. Poster, 9th International Symposium on Pneumococci and Pneumococcal Diseases (ISPPD-9), India, March 2014. Volume: pneumonia 2014 Mar 9-13; 3:1-286.
13. Bikas K Arya, **Dennis Robert**, Sangeeta Das Bhattacharya, Jayanta Mukhopadhyay. A framework for web based geographical information systems for country wide antimicrobial resistance monitoring. Oral Presentation, IEEE International Conference on Point of Care Technologies (IEE PoCHT), India, Jan 2013.
14. Jennifer Gerber, Dominique Derreumaux, Amoolya Krishnamoorthy, **Dennis Robert**, Emmanuel Aris, et.al. COVID-19 Vaccine and Booster uptake in pregnant women in the US: A Retrospective Real-World-Data Descriptive Observational Study using Truven Commercial Claims Data. Poster, GSK R&D Days, Virtual, Jun 2022. [INTERNAL ORGANIZATIONAL CONFERENCE, GSK]
15. **Dennis Robert**, Nikola Andric, Robert Coopersmith. Application of Novel Cluster Analysis Techniques for Hypothesis Generation and Acceleration of Biomarker Identification in Life Sciences and Healthcare Industry using Databricks as the Data Science Platform. Poster, Deloitte Analytics Summit, India, May 2017. [INTERNAL ORGANIZATIONAL CONFERENCE, Deloitte]

INTERNSHIPS AND POST-GRADUATE THESIS

Asian Institute of Telesurgery (AITS) IRCAD **Lukang, Taiwan**
Research Fellow, Medical Imaging Lab Jun 2014 – Nov 2014

- Assisted in the software development of an augmented reality CAD system for laparoscopic surgical procedures (C++, VTK)
- Guide: Atul Kumar, M.B.B.S., Ph.D.

IIT Kharagpur **Kharagpur, India**
MMST Final Year Student, PG Thesis Aug 2013 – May 2014

- Thesis Title: Two contrasting approaches for the analysis of longitudinal studies: Pneumonia Prevention in Children with HIV Infection and Wisconsin Sleep Cohort Study
- Short Description: The focus of the thesis was statistical modeling of longitudinal clinical data with a focus towards mixed effects modelling for longitudinal data and cross- sectional analysis at different time points of longitudinal data and comparison between the two approaches. It was shown that the mixed effects modelling is more robust and provided more clinically meaningful insights for longitudinal data.
- Guide: Prof. Sangeeta Das Bhattacharya M.D., Ph.D.

University of Wisconsin – Madison **Madison, USA**
Khorana Scholar, Department of Biostatistics May 2013 – Aug 2013

- Mathematical modelling of longitudinal data using mixed effects models. Used Wisconsin Sleep Cohort study data to investigate the association between alcoholism and sleep stage duration.
- Guide: Prof. Mari Palta, Ph.D.

Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) **Trivandrum, India**
Intern, Department of Neurology Dec 2012

- Developing a MATLAB Program for the preparatory task of a Transcranial Magnetic Stimulation clinical trial and synchronizing the program with the data acquisition unit CED 1401 MICRO3
- Guide: Prof. Asha Kishore, M.D., D.M.

REFERENCES

References will be provided upon reasonable request