Dr. Dennis Robert, MBBS., MMST.

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SUMMARY

Profile

- Physician turned Data Scientist with an overall experience of 12+ years.
- 9+ years of industrial experience in scientific role spanning Medical AI software device, Pharmaceutical and Healthcare IT consulting industries, and about 3 years of experience in General Clinical Practice.
- Experience as both an independent contributor and a people manager.
- *Primary areas of interest: Medical AI, Real-World-Data (RWD)*

Medical AI/ML Experience

- Study design and analysis of Medical AI evaluation studies including those for FDA 510(k) submissions.
- AI/ML model development using structured Real-World-Data (RWD).

Real-World-Data (RWD) Experience

- RWD (Truven, Optum, CPRD) analysis – descriptive and inferential statistical analysis
- Comparative Effectiveness Research (CER), Rapid Data Queries (RDQ), Incidence and Prevalence studies

Major Academic Achievements

- Khorana Scholarship
- Medical Entrance: AIR 144, Kerala State Rank 4

Programming

- R (Expert)
- Python (Project Experience)

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

PROFESSIONAL EXPERIENCE

Qure.ai **Bangalore, India**
Clinical Research Scientist *Aug 2022 – Present*

- Design, statistical analysis and reporting of clinical research studies evaluating Medical AI diagnostic assistance software devices including for the purpose of regulatory submissions (FDA, CE).
- Designed protocol and statistical analysis plan (SAP) for multiple research studies such as Multi-Reader Multi-Case (MRMC) studies, diagnostic accuracy studies, and Cluster Randomized Trials.
- Wrote manuscripts which resulted in multiple peer-reviewed research publications and conference abstracts.
- Developed an R package for sizing MRMC studies.
  Available in CRAN - MRMCsamplesize
- Stakeholder engagement during conceptualization, execution, analysis and reporting of research studies.
- Review of manuscripts documenting original research involving organization's Medical AI software devices.
- Planned, executed and reported analysis of standalone and MRMC studies that lead to four FDA 510(k) clearances.

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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 as *RWD Manager for Vaccines and Data Science*.
- 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, CPRD.

Deloitte **Bangalore, India**

Senior Clinical Data Scientist *Nov 2015 – Jun 2021*

- 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 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 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 and analysis on topics pertaining to sleep and respiratory medicine and was responsible for generating quality scientific documents and presentations for the 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)

SKILLS

Biostatistics

- SAP development
- MRMC statistical analysis
- Statistics for Medical AI evaluations
- RWD Comparative Effectiveness Research
- Survival (Time-to-event) analysis

Deep Learning and Classical ML

Project Experience

- Logistic and regularized regression
- Random Forests
- Feed-forward neural networks, RNN, LSTM

SKILLS

Technical

- R (Expert)
- sparklyr (Project Experience)
- Python: pandas, sklearn, keras, tensorflow (Project Experience)
- Impala/SQL (Project experience)

Functional

- Medical domain knowledge
- RWD sources: TRUVEN, OPTUM, CPRD, OMOP CDM
- Medical ontologies/vocabularies: ICD, NDC, LOINC, CPT, HCPCS, SNOMED, MedDRA, CPRD Read

Epidemiology

- Clinical research protocol design
- Desk research, literature review
- Scientific manuscript writing

Soft Skills

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

KEY ACADEMIC AND PROFESSIONAL ACHIEVEMENTS

- **AIR 144, Kerala State Rank 4:** Ranked 144 in India among more than hundred thousand candidates from all over India in AIPMT, the then most competitive and objective medical entrance examination in India.
- Recipient of **Khorana Scholarship**.
- Secured 3rd Rank in MG University Kerala for the First Professional MBBS examination.
- Golden Helix Award for Innovation and Outstanding Performance in Deloitte.
- Multiple peer-reviewed scientific publications (6) and conference abstracts (11).
- Authored two CRAN R packages with more than 10,000 downloads.
- Received multiple performance appreciation awards in Deloitte and GSK.

INVITED TALKS

- Artificial Intelligence and Data Science, Panel Discussion, Education 21c, Kerala (2020)
- Artificial Intelligence in Healthcare, NATCON, Government Medical College Trivandrum (2019)
- Clinical Trials: Introduction, Session for PGPx batch, IIM Ahmedabad (2017).

SELECTED PUBLICATIONS

See Google Scholar for complete list

Selected Journal Publications

1. Howell Fu, Alex Novak, **Dennis Robert**, Shamie Kumar, Swetha Tanamala, Jason Oke, et.al. AI Assisted Reader Evaluation in Acute CT Head Interpretation (AI-REACT): Protocol for A Multi-Reader Multi-Case Study. BMJ Open. 2024 Feb 12;14(2): e079824. doi: 10.1136/bmjopen-2023-079824. PMID: 38346874; PMCID: PMC10862304
2. Shibu Vijayan, Vaishnavi Jondhale, Tripti Pande, Amera Khan, Miranda Brouwer, Asha Hegde, Ravdeep Gandhi, Venkatesh Roddawar, Shilpa Jichkar, Aniruddha Kadu, Sandeep Bharaswadkar, Mayank Sharma, Nathalie Vasquez, Lucky Richardson, **Dennis Robert**, Saniya Pawar. 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: 10.1371/journal.pdig.0000404. PMID: 38060461; PMCID: PMC10703224.
3. **Dennis Robert**, Saigopal Sathyamurthy, Preetham Putha. MRMCsamplesize: An R Package for Estimating Sample Sizes for Multi-Reader Multi-Case Studies. medRxiv. Published online 2023. doi:10.1101/2023.09.25.23296069 [PREPRINT]

Selected Conference Abstracts

1. **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, Vienna, February 2024. ECR 2024.

2. 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, November 2023.
3. 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. ECR 2023 Book of Abstracts. Insights Imaging 14 (Suppl 4), 217 (2023). RPS 1705-5, https://doi.org/10.1186/s13244- 023-01522-6
4. **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), Agra, February 2023.
5. 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, October 2017.

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: Dr. Atul Kumar, MBBS., PhD.

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 MD., PhD.

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, PhD.

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 Project and synchronizing the program with the data acquisition unit CED 1401 MICRO3.
  Guide: Prof. Asha Kishore, MD., DM.

Government Medical College Kottayam **Kottayam, India**
House Surgeon, Department of Neurology *Nov 2008 – Nov 2009*

- Compulsory rotatory residential internship (CRRI) as part of the mandatory requirements to obtaining MBBS degree and medical registration in various clinical and para-clinical departments for a period of 12 months.