Dr Goh Han Leong (PhD in Engineering)
Head of Data Science & AI (Synapxe)
Adjunct Senior Lecturer (NUS, Master in Business Analytics)

Nationality: Singaporean

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SUMMARY

Academics		• Adjunct Senior Lecturer (2023 – Current) • Doctor of Philosophy in Engineering, NUS (2006) • Bachelor of Electrical Engineering, NUS (2002)
Total Years of Experience in Data Science and Analytics		15 + years in AI/Machine Learning and Analytics roles, of which 3+ years spent as Head of Department in Synapxe, leading a team of 29 data scientists
Technology Leadership		Thought leader in Healthcare analytics and hands on experience in implementing large scale analytics solutions with 10+ international publications, Journal Guest Editor and 20+ public speaking
AI Domain Expertise		• Machine Learning (e.g. lightGBM) for structured data • NLP ad Large Language Models (LLMs) • Deep Learning for Imaging & Video Analytics
BI & Data Visualization		• Problem Solving and Design Thinking • Statistical Analytics • Python, R and Tabulea
Cloud Computing & Analytics Platform		• AWS, AZURE • Data Robots and H2O • Teradata and Databricks

- 15+ years of experience in applying and improving machine learning algorithms to support various business initiatives to deliver value, of which **3+ years spent as Head of Department (HOD)** leading a team size of **29 data scientists**.

- Experience working on **end-to-end machine learning solutions development & deployment:** Requirement gathering, design, model development, sharing insights to business partners, testing, model deployment, Machine Learning operations (MLops) , feedback mechanism

- Strong proficiency in **Generative AI** (e.g LLMs), **Deep learning** in imaging/video analytics and **Machine learning**. Implemented and deployed several Nation-wide AI application like ASAR and SecuredGPT for public healthcare.

- Drive education and evangelization of data sciences and AI for Healthcare

  - **Adjunct Senior Lecturer at National University of Singapore**
  - **SCS AI & Robotics Chapter Exco Member**
  - **Enterprise Singapore's Technical Committee on AI Member**
  - **Guest Editor for Frontier Medical Technology Journal**

PROFESSIONAL EXPERIENCE

SYNAPXE   **(2015 – present)**
Senior Principal Data Scientist (HOD)

- **Role:** Responsible in providing technology leadership and strategic oversight for the development of data analytics in public health care. This position involves working with government agency, acute hospital, and tertiary institution in Singapore to implement innovative approaches around managing and improving healthcare services through data analytics. The role also provides consultancy to senior management in the data science approach for an agile and rapid development of data insights solutions.

- **Leadership:** Head of Department for Data Science and AI, responsible for building up Synapxe as the Center of Excellence in AI for Public Healthcare Institutions. Project Director for national wide data analytics applications.

- **Technical Achievements:** Large Language Models (LLMs) for Natural Languages Processing (NLP) for unstructured text data, Deep Learning for video analytics and medical imaging, Machine Learning for structured data in databases. Data Visualisation for dashboarding.

- **Important Projects:**

    o "Secure GPT" a GPT-based platform to automate tasks and transform clinician workflows. Development of a custom-built platform using Azure OpenAI Service that will provide a secure infrastructure for large language model development and will serve as a common platform for accelerating the development of generative AI applications.
    https://www.straitstimes.com/singapore/health/moh-agency-microsoft-to-develop-ai-tool-for-healthcare-workers-in-s-pore

    o "Active Surveillance System for Adverse Reactions to Medicines and Vaccines (ASAR)", nationwide NLP solution to detect adverse drug event on all the acute hospital A&E and discharge summary unstructured clinical notes.
    https://www.hsa.gov.sg/docs/default-source/default-document-library/hsa_annual-report_202223.pdf

    o "Community Acquired Pneumonia and Covid-19 AI Predictive Engine (CAPE)", an Artificial Intelligence tool based on chest x-ray to predict severity of pneumonia in patients (including COVID-19 patients).
    https://www.singhealth.com.sg/news/tomorrows-medicine/new-ai-tool-developed-amidst-pandemic-predicts-severity-of-pneumonia

- "Hospital Multiple Admission prediction model", first national predictive model to be implemented in Singapore. Represented and share findings in media and ministerial forums which included Permanent Secretaries from various ministry. Presented to Deputy Prime Minster Teo during his visit to IHiS.

- "FungiAi", the use of AI to reduce the Turn Around Time for fungal identification in mycology down to 2 days, similar to bacteria culture. Presentation to Senior Minister of State Dr Janil Puthucheary on AI for Mycology

- **Key Outcomes:**

  - Lead the team to develop more than 80 Machine Learning/AI models, out of which 7 is deployed in public healthcare institution with > 500,000 users.

  - 2 National Awards, 1 industry Awards, 11 international Publications and more than 20 Public Speaking on Health AI.

SINGTEL   **(2013 – 2015)**
Project manager, living analytics r&d lab

- **Role:** The position is part of a team that is responsible in providing technology leadership and strategic oversight for the development of data analytics in SingTel. This position serves as the primary interface with the clients both internally and externally with the development team. The role also provide consultancy in the project management approach for varieties of initiatives in the area of machine learning and big data analysis to achieve productisation of Telcos data for geo-analytics such as footfall and segmentation.

- **Key Contribution in SingTel:**

  o Co-authored a conference paper at SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2015) "Traffic measurement and route recommendation system for mass rapid transit (mrt)"
  o Foster a 1 year analytics contract with Urban Redevelopment Board
  o Project presentation to 2nd Minister of State(MTI) on the F1 Analysis

LAND TRANSPORT AUTHORITY (LTA)   **(2006 – 2013)**
Senior manager, mobility solutions

- **Role:** The position is responsible for providing technology leadership and strategic oversight for mobility solutions for Land Transport. The role also serves as the primary technical advisor for the approach and implementation of real-time data system, machine to machine communication and cellular sensing technology and maintains oversight of real-time data sensing within multiple domains to achieve a holistic strategy and synergy across platforms.

- **Key Contribution in LTA:**

  o Lead the research team in LTA-IBM collaboration to develop bus arrival prediction algorithms
  o Conceptualized and implement data mining modules to monitor and audit the performance of public transport performance
  o LTA, EDB, IDA, IBM, Cisco Systems, ST Electronics, 3M: Memorandum of Collaboration on Singapore Urban Transport Solution.
  o Assist LTA CIO in formulation and implementation of Singapore Urban Transport Solution Masterplan.
  o LTA-IBM: Memorandum of Collaboration on GREEN IT
  o Administrate $50 million Land Transport Innovation Fund

QUALIFICATIONS

- Doctor of Philosophy in Engineering, National University of Singapore (2006)
  Major/Area of expertise: Mobile Computing & Wireless Sensor Network

- Bachelor of Electrical Engineering, National University of Singapore (2002)
  Major/Area of expertise: Industrial Control & Communication

ADDITIONAL INFORMATION

Public Speaking

- 2023 – Speaker for iAIM2023 international conference on AI in medicine
  (https://iaim2023.sg/wp-content/uploads/2023/08/FINAL_iAIM-PROG-BOOKLET-2.pdf)

- 2023 – Speaker for HealthTEC Connect III
  (https://www.healthtec.sg/healthtec-connect-iii/)

- 2023 – Speaker for AI Health Summit 2023 by MOH and SingHealth
  (https://www.singhealthacademy.edu.sg/pages/aihealthsummit2023/ai-health-summit-2023-speakers.aspx)

- 2023 – Speaker for IEEE EMBS-NUS iHealthTech Forum
  (https://public-forum.embs.org/iht-datascience-healthcare-forum/speakers/)

- 2023 – Speaker for OpenGov Event 'Expansion of Data Analytics for Advanced Smart Healthcare'
  (https://opengovasia.com/events/expansion-of-data-analytics-for-advanced-smart-healthcare/)

- 2022 – Speaker for SGCR WIRES 2022 CONGRESS
  (https://sgcr.sg/speakers-2022/)

- 2022 – Moderator for Healthcare AI Firechat for World AI Show
  (https://tresconglobal.com/conferences/ai/singapore/speakers)

- 2022 – Panelist for Asia Tech x Singapore - AI in Healthcare Industry
  (https://www.youtube.com/watch?v=LxKZG0eAXsc)
  (https://asiatechxsg.com/speakers/680baaff-1b98-4174-919a-d7bf687ccc26/)

- 2022 – Speaker at 6th Annual Singapore OpenGov Leadership Forum 2022
  (https://opengovasia.com/events/singapore-opengov-leadership-forum-2021-2/)

- 2021 – Panelist for Govinsider on "Data-Driven Government"
  (https://www.festival-of-innovation.com/)

- 2021 – Panelist for Chattham House (international think tank) on "AI for Health Event Series"
  (https://www.chathamhouse.org/events/all/research-event/ai-health-event-series-conference)

- 2021 – Published Govinsider Article on "AI Futures: How AI is augmenting Singapore's healthcare" (https://govinsider.asia/ai/ai-futures-how-ai-is-augmenting-singapores-healthcare-goh-han-leong-ihis/)

- 2021 – Panelist on "Big data and predictive analytics in healthcare" @ aixgov (https://www.aixgov.com/)

- 2021 – Global Speaker at "AI and Robotics in Hospital and Healthcare" (http://claridenglobal.com/conference/ai-robotics-hospital-healthcare-sg/global-speakers/)

Technical Skills

- Generative AI: LLMs on Azure and AWS. Prompt engineering, parameter efficient fine tuning and LLMs models evaluation

- Deep Learning AI: Natural Language Processing, Imaging, Synthetic Data and Structured Data Predictive Modeling

- Conventional Machine Learning Algorithms and models such as K-nearest Neighbor, Naive Bayes, Decision Tree, Support Vector Machine, k-means cluster, Random Forest, XGB model, Time series analysis, association rule, network analysis

- Scripting Language: SQL, R, Python

- Extensive hands-on experience in operationalizing AI application and Machine Learning Operations (MLops) and Trusted AI

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Achievements

Scholarship: A*star Graduate Fellowship 2002 – 2006

Award & Accolade:

- National Commendation Medal (COVID-19) in 2022. This is awarded to individuals who performed outstandingly during the COVID-19 pandemic.

- Predictive Model for Admission Prevention project won the Public Sector Transformation Awards 2018 and National Health IT Excellence Awards 2018.

- Silver Award, Best Ideator for PS21 ExCEl 2012

- Gold award for National Innovation Quality Circles Convention 2012

- MOT minister innovation award 2012 (Distinguished)

- Gold award for National Innovation Quality Circles Convention 2011

- Silver award for LTA e-ideas 2010

- Gold award for National Innovation Quality Circles Convention 2008

- MOT minister innovation award 2008 (Distinguished)

- Marquis Who's Who in Science and Engineering 10th Anniversary (2008-2009) Edition

- STARTUP@Singapore competition: NUS INTRO Awards (2005)

- Defense Science Award Competition Category 2005, Tan Kah Kee Young Inventors' Awards

- Open Award Competition Category 2004, Tan Kah Kee Young Inventors' Awards

Publications

- John Abisheganaden, Kheng Hock Lee, Lian Leng Low, Eugene Shum, Han Leong Goh, Christine Gia Lee Ang, Andy Wee An Ta, and Steven M. Miller, "Singapore's Hospital to Home Program: Raising Patient Engagement Through AI", in Management and Business Review Journal. (https://mbrjournal.com/AI-Customer-Engagement-issue/)

- John Abisheganaden, Kheng Hock Lee, Lian Leng Low, Eugene Shum, Han Leong Goh, Christine Gia Lee Ang, Andy Wee An Ta, Steven M. Miller, "Lessons learned from the hospital to home community care program in Singapore and the supporting AI multiple readmissions prediction model" (https://onlinelibrary.wiley.com/doi/full/10.1002/hcs2.44)

- Ta, AWA, Goh, HL, Ang, C, Koh, LY, Poon, K, Miller, SM. "Two Singapore public healthcare AI applications for national screening programs and other examples." Health Care Sci. 2022; 1– 17. https://doi.org/10.1002/hcs2.10

- Lin Zou, Han Leong Goh, Charlene Jin Yee Liew, Jessica Lishan Quah, Gary Tianyu Gu, Jun Jie Chew, Mukundaram Prem Kumar, Christine Gia Lee Ang, Andy Wee An Ta, "Ensemble image explainable AI (XAI) algorithm for severe community-acquired pneumonia and COVID-19 respiratory infections," in IEEE Transactions on Artificial Intelligence, doi: 10.1109/TAI.2022.3153754

- Jessica Quah, Charlene Jin Yee Liew, Lin Zou, Xuan Han Koh, Rayan Alsuwaigh, Venkataraman Narayan, Tian Yi Lu, Clarence Ngoh, Zhiyu Wang, Juan Zhen Koh, Christine Ang, Zhiyan Fu and Han Leong Goh, Chest radiograph-based artificial intelligence predictive model for mortality in community-acquired pneumonia, BMJ Open Respiratory Research 2021;8:e001045. doi: 10.1136/bmjresp-2021-001045

- Hanleong Goh, Charlene Liew, Jessica Quah, Tian Yi Lu, Jenny Zou, Clarence Ngoh, Beverly Wang, Juan Zhen Koh, Christine Ang, Narayan Venkataraman, Zhiyan Fu and Andy Ta, "AI prognostication tool for severe community-acquired pneumonia and covid-19 respiratory infections" Knowledge Discovery and Data Mining (KDD2020)

- Wee An Ta, Han Leong Goh, Chuen Seng Tan, Yan Sun, Khin Chaw Yu Aung, Zsin Woon Teoh, Kelvin Bryan Tan, Zheng Yi Lau, John Arputhan Abisheganaden, Kheng Hock Lee, Sweet Fun Wong, Wai Leng Chow, Pranav Vinod Kumar, Zi Chao Choong, Xue Yi Ng, Gia Lee Ang, Kien Leong Chan, Jin Shui Lim, Cheng Ooi Low, "Development and implementation of nationwide predictive model for admission prevention: System architecture & machine learning", 2018 IEEE EMBS International Conference on Biomedical & Health Informatics (BHI).

- Thomas Holleczek, Han Leong Goh, Antonatos Spyridon, Dang The Anh, Yunye Jin, Shanyang Yin, Samantha Low and Amy Shi-Nash, "Traffic measurement and route recommendation system for mass rapid transit (mrt)" SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2015)

- K.Z Tang, H.L Goh, K.K Tan, and T.H Lee, "Knowledge-Based Control via the Internet", International Journal of Control, Automation, and Systems *Vol. 2, No. 2, June 2004*

- H.L. Goh and K.K. Tan, "Complete mobile email management" Computers & Electrical Engineering, *vol. 31, Issue 3, May 2005, Pages 241-261*
  (Top 25 article) http://top25.sciencedirect.com/?journal_id=00457906

- H.L. Goh, K.K. Tan, "Simulation Using Handheld Devices",
  International Journal of Engineering Education, Vol. 26, No. 1, pp. 1093- 1101, November 2005.

- K.K. Tan, H.L. Goh, "Development of a Mobile Spreadsheet-based PID Control Simulation System", IEEE Transaction on Education, *vol. 49, Issue 2, pp. 199-207, May 2006*

- H.L. Goh, K.K. Tan and S.N. Huang, "Bluewave: Development of Wireless Protocol for Industrial Automation", IEEE transaction on Industrial Automation, *vol. 2, issue 4, pp.221-230, Nov. 2006*