Salman Al Farisi 陳成文

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Astronomy master student at National Tsing Hua University researching galactic archaeology under supervision of Prof. Andrew P. Cooper. Previously earned a Bachelor of Science degree in Astronomy from the Bandung Institute of Technology in 2020, graduating with high distinction and awarded for best academic performance improvement in second year.

Research Interest

- Galactic archaeology
- Galactic dynamics, formation, and evolution
- Dark matter
- Computational astrophysics

Education

National Tsing Hua University — Hsinchu City, Republic of China
Master of Science in Astronomy — August 2024 – present
Supervisor: Assoc. Prof. Andrew P. Cooper

Bandung Institute of Technology (ITB) — Bandung, Indonesia
Bachelor of Science in Astronomy, GPA: 3.03/4.00 — July 2016 – October 2020
Supervisor: Assoc. Prof. M. Ikbal Arifyanto
Thesis: "The Implementation of Convolutional Neural Network for SDSS Apogee to Determine Stellar T_{eff}, *log(g)*, and *[Fe/H]*"
Summer Schools:

- **Bandung Institute of Technology**. *Summer School of Galaxies and Cosmology.* September 2020.
- **University of Amsterdam & Telkom University**. *Machine Learning Summer School (MLSS) Indonesia 2020*. August 2020.

Research Experience

Institute of Astronomy, National Tsing Hua University — Hsinchu City, Republic of China
Finding substructures in Milky Way halo with DESI MWS — September 2024 – present
Research supervisor: Assoc. Prof. Andrew P. Cooper
Identifying substructure in stellar halo from Dark Energy Spectroscopic Instrument Milky Way Survey (DESI MWS; Cooper et al., 2022) observation, based on the kinematical data from simulations of stellar cluster orbit and stream generation. Testing various potential models of the milky way to identify robust stream generation. We are currently cataloging substructures within DESI tiles to explore more detailed analysis for each substructure that might be related to merger and stripping history.

Astronomy Study Program, Bandung Institute of Technology — Bandung, Indonesia
Research Assistant of B-emission Star Spectral Data Analysis — July 2020 – January 2021
Research Supervisor: Assoc. Prof. M. Ikbal Arifyanto, Assoc. Prof. Hakim L. Malasan

Studied and processed the Bosscha Observatory Be Star data to determine the rotational velocity parameter using stellar spectra. I assisted Dr. Ikbal's experiment with various machine learning techniques to predict the parameters and visualize the raw data into spectra plots. By using neural networks, we achieved a mean squared error of 4533 and a mean average percentage error of 19%. Gained skills and experiences in stellar astrophysics, data analysis, GPU computing, and machine learning.

Research Assistant of Online Olympiad Competition Platform July 2020 – January 2021

Research Supervisor: Assoc. Prof. Chatief Kunjaya, Assoc. Prof. Hakim L. Malasan

Implemented symbolic programming and rule-based essay answer checker software, developing the translation from physical documents into code-readable format with mathematical context. Experimented machine learning algorithm and integrated into previous software to be used in astronomy olympiad. Gained skills and experiences in Java, symbolic programming, and machine learning.

Thesis Research July 2019 – October 2020

Research Supervisor: Assoc. Prof. M. Ikbal Arifyanto

Title: *The Application of Convolutional Neural Network into APOGEE Spectra to Determine Stellar Parameters T_{eff}, log(g), and [Fe/H]*

Conducted a detailed analysis of SDSS APOGEE spectra (observation and synthetic) and associated stellar parameters, developed a data pipeline for 16 million data points. By extending the StarNet model (Fabbro, 2018), produced three distinct hybrid neural network architectures modification. Model was trained with the Tensorflow library in the Google Cloud GPU instance. Parameters are estimated across diverse stellar populations within APOGEE test data with average absolute percentage error of 0.41% for surface temperature, 2.32% for surface gravity, and 0.44% for metallicity. The research poster was presented at the Machine Learning Summer School (MLSS) Indonesia 2020. Gained skills and experience in galactic astrophysics, data analysis, GPU computing, and machine learning.

Robotics Unit, Institut Teknologi Bandung Bandung, Indonesia

Dago Hoogeschool in Indonesian Humanoid Soccer Robot Contest 2018 January 2018 - July 2018

Research Supervisor: Dr. Widyawardana Adiprawita

Improved computer vision using color detection and contour identification using sobel edge detection, running in a single-board computer with Intel NUC i5 processor. The research was published at the 6th Indonesian Symposium on Robotics Systems and Control 2018. Gained skills in robotics, programming, and computer vision.

Industrial Experience

Ajari Technologies Jakarta, Indonesia

Senior Machine Learning Engineer April 2024 - July 2024

Developed facial recognition system for government training platform based on the convolutional neural network (CNN) and spatial embedding using vector database. Speed up the processing rate of the previous algorithm from 2 seconds to 0.1 seconds with parallelization using Nvidia Triton inference. Beside that, I also developed a document summarization service using a large language model (LLM).

MicroSec Singapore, Singapore

Security Software Engineer February 2023 - April 2024

Developed the infrastructure for a machine learning-based IoT agent for advanced threat detection and anomaly identification. Integrated post-quantum cryptography algorithms for certificate authority. Furthermore, conducted penetration testing on the Windows and Debian software packages before production.

Allure AI Jakarta, Indonesia

Chief Data Officer December 2020 - February 2023

Coordinated machine learning research for skin analyzer and recommendation system for skincare products. Successfully reduced costs by 80% and delivery time by 50% by optimizing AWS infrastructure. Co-founded the startup after winning Intel hackathon in 2020. Additionally, I served as the interim CTO.

Chatbiz.id Bandung, Indonesia

Software Engineer Intern June 2018 - August 2018

Developed the user analytics and prediction pipeline and endpoint using API with Django and Docker.

Teaching Assistant Experience

Computational Science Program, ITB Bandung, Indonesia

Teaching Assistant for Data Mining in Science July 2020 - July 2021

Lecturer: Assoc. Prof. Mochamad Ikbal Arifyanto and Dr. Finny Oktariani

Astronomy Program, ITB Bandung, Indonesia

Teaching Assistant for Physics of Galaxy January 2020 - July 2020

Lecturer: Assoc. Prof. Mochamad Ikbal Arifyanto

Teaching Assistant for Computational Astrophysics course July 2019 - December 2019

Lecturer: Dr. Mohammad Irfan Hakim

Publication

Yusuf, Hisham L., et al., 2018. Dago Hoogeschool dalam Kontes Robot Sepak Bola Indonesia Humanoid 2018 [Dago Hoogeschool in Indonesian Humanoid Soccer Robot Contest 2018]. The 6th Indonesian Symposium on Robotics Systems and Control (ISRSC): 171-175.

Presentation

University of Amsterdam & Telkom University Online

Machine Learning Summer School 2020 poster presentation August 2020

Poster title: The Utilization of Deep Learning in Spectroscopic Survey for Astrophysical Parameter Determination.

Presented the research progress and machine learning application in astronomy to audiences from the computer science field in MLSS.

Bandung Institute of Technology Bandung, Indonesia

Workshop on Utilization of Virtual Observatory and Data Analysis (WUVODA) instructor November 2019

Presented the workshop hands-on of machine learning in astronomy using scikit-learn library on Gaia observation data (co-instructor with M. Rafiul Ilmi) to 20 students from various universities as preparation for the hackathon session for participants.

Honors and Awards

National Tsing Hua University scholarship awardee September 2024 - present

Second prize of Intel computer vision hackathon December 2020

Indosat Ooredoo machine learning track scholarship awardee April - June 2020

Final participant of National University of Singapore (NUS) Hack&Roll hackathon 2020	January 2020
Google Cloud Platform computing grant, accumulated to $600	July 2019 - July 2020
Karya Salemba Empat academic scholarship awardee 2019	January - July 2019
Third prize in National Robotics Competition 2018	July 2018
Third prize in Regional Robotics Competition 2018	April 2018
The Rising Star Award for best academic improvement 2018, Astronomy Study Program, ITB	April 2018

Participations

Astropy - Open source development contributor	January 2023 - present

Skills

Astronomical simulations, machine learning, distributed programming, cloud computing, numerical simulations.
Astronomy tools: Astropy, Gala, Galpy, Agama
Survey data: DESI, SDSS, Gaia
Programming languages: C, C++, Python, Javascript, Fortran, R, Go, Julia, SQL, Shell script.
Frameworks: Docker, Kubernetes, GCP, AWS, CI/CD pipelines

Languages

English: Proficient user. IELTS CEFR level C1; Scored 7.5 (2021), 7 (2023)
Bahasa Indonesia: Native proficiency