

Emmanuel Rieno Bobba Pratama

Data Scientist

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I am a Physics graduate transitioning into Data Science. I bring a strong analytical foundation in modeling complex systems and statistics. Skilled in Python and Machine Learning, with a focus on translating technical data into actionable business insights and practical solutions.

TECHNICAL SKILLS

- Languages:** Python, Swift, SQL.
- Machine Learning & AI:** Supervised/Unsupervised Learning, Time Series, CNNs, NLP, Frequency-Severity Modeling, Transfer Learning, Human-in-the-Loop (HITL) Architectures.
- Frameworks:** Scikit-learn, TensorFlow/Keras, Pytorch, CatBoost, LightGBM.
- Analytical Tools:** NumPy, Pandas, Git Workflows (CI/CD).
- Mathematical Modeling:** Information Theory, Stochastic Modeling.
- iOS Development:** SwiftData, CoreML, High-Performance Math (Accelerate Framework), Vision & AVFoundation

PROFESSIONAL EXPERIENCE

Apple Developer Academy @BINUS | Junior iOS Developer

February - December 2025

- Conducted user research, product discovery, usability testing, and iterative prototyping to align with real user needs while strengthening collaboration skills in agile workflows (scrum, sprint reviews).
- Key Projects:**
 - Tona (Intelligent Skin Tone Analysis): Led the engineering of a high-fidelity skin analysis pipeline using the Vision Framework and custom image processing (Gaussian Mixture Models, CIELAB gating). Architected a SwiftData persistence layer and achieved a 40% accuracy increase in foundation matching by integrating a Human-in-the-Loop feedback loop.
 - byeFraud (Fintech Phishing Detection): Delivered an end-to-end Phishing URL Detection system for fintech security. Engineered a feature pipeline (lexical analysis, TF-IDF) and trained a LightGBM classifier achieving ~99% accuracy, integrated with Cisco Umbrella whitelists to eliminate false positives.
 - MuVo (Real-Time Pronunciation Coach): Engineered an interactive iOS coach with granular feedback. Developed an audio processing pipeline (Librosa, PyDub) for phoneme-level scoring and architected a "Hybrid Validation" system cross-referencing Phoneme Error Rates (PER) with Speech-to-Text outputs.
 - CoBo (Collab Space Booking App): Co-developed a centralized booking application to replace insecure paper systems. Implemented core booking logic and accessibility features, reducing unintended booking exploitation by ~90% and significantly improving data security.

Advanced Physics Laboratory | Assistant Lecturer

August 2023 - June 2024

- Assisted students in understanding complex concepts through experiments on radioactive decay and thermal radiation.
- Collaborated with a team to troubleshoot and optimize experimental setups.
- Maintained experimental error margins below 10% by enforcing rigorous safety protocols and precision measurement standards.

Badan Riset dan Inovasi Nasional (BRIN) | Scientific Research Intern

February - April 2023

- Characterized NaI(Tl) detector efficiency by conducting 24 controlled experiments over 136 hours to analyze radionuclide variations.
- Performed rigorous calibration and background compensation to minimize systematic errors and ensure data integrity.
- Validated high-precision radiation measurement data against theoretical models with near-zero error rates.

PROJECTS

Car Insurance Claim Prediction & Risk Quantification

August - December 2025

- Developed an expected loss modeling system combining CatBoost classification and regression to jointly predict claim likelihood and severity, capturing 47% of losses within the top 10% highest-risk policyholders.
- Addressed class imbalance and heavy-tailed insurance data through targeted preprocessing and transformation strategies, ensuring reliable generalization.
- Enabled explainable, regulation-compliant pricing strategies, simulating 5–7% portfolio loss ratio improvement through risk-based premium adjustments.

EDUCATION

University of Indonesia (Universitas Indonesia) — Bsc. of Physics (GPA: 3.26/4.00)

July 2020 - June 2024

- **Focus:** Medical Physics, with an emphasis on radiation, imaging, and computational models to improve diagnosis and treatment.

Age Estimation in Pediatric Populations Using CNN from Panoramic Radiography

October 2023 - May 2024

- Built a production-ready deep learning system to estimate chronological age from panoramic dental radiographs, achieving 0.69 MAE / 1.04 RMSE, outperforming traditional Demirjian methods (0.8–1.5 years MAE) on Indonesian pediatric data (478 images, 463 patients, ages 3–16).
- Designed a leakage-free validation pipeline using Stratified Group K-Fold to enforce patient-level separation (no hemijaw crossover), ensuring real-world generalization; 83% of predictions within ± 1 year clinical accuracy.
- Implemented an EfficientNet-B3 model with CBAM attention, optimized for regression using Smooth L1 loss, delivering <300 ms inference and clinically interpretable Grad-CAM visualizations aligned with forensic odontology markers (root apices, third molar development).

Application of Convolutional Neural Networks for Brain Tumor Classification

April - July 2023

- Developed a multi-class deep learning model to diagnose distinct brain tumor pathologies including glioma, pituitary, and meningioma using the WHO MRI dataset.
- Implemented transfer learning techniques by fine-tuning the final layers of the VGG16 architecture to optimize feature extraction for medical imagery.
- Achieved an overall classification accuracy of 96% across four distinct categories demonstrating the effectiveness of automated diagnostic systems.

ORGANIZATIONAL EXPERIENCE

Physics Department Student Association | Staff of Secretariat Data and Information Bureau

February 2022 - February 2023

- Managed the archiving of physical and digital records, contributing to a 92.5% success rate in achieving bureau project objectives.
- Produced and standardized hundreds of internal/external correspondences and legal documents to ensure administrative compliance.
- Streamlined the licensing document filing process for students and bureaus within the Faculty of Mathematics and Natural Sciences.