Empowering Students with **Data Science**

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Data Scientist

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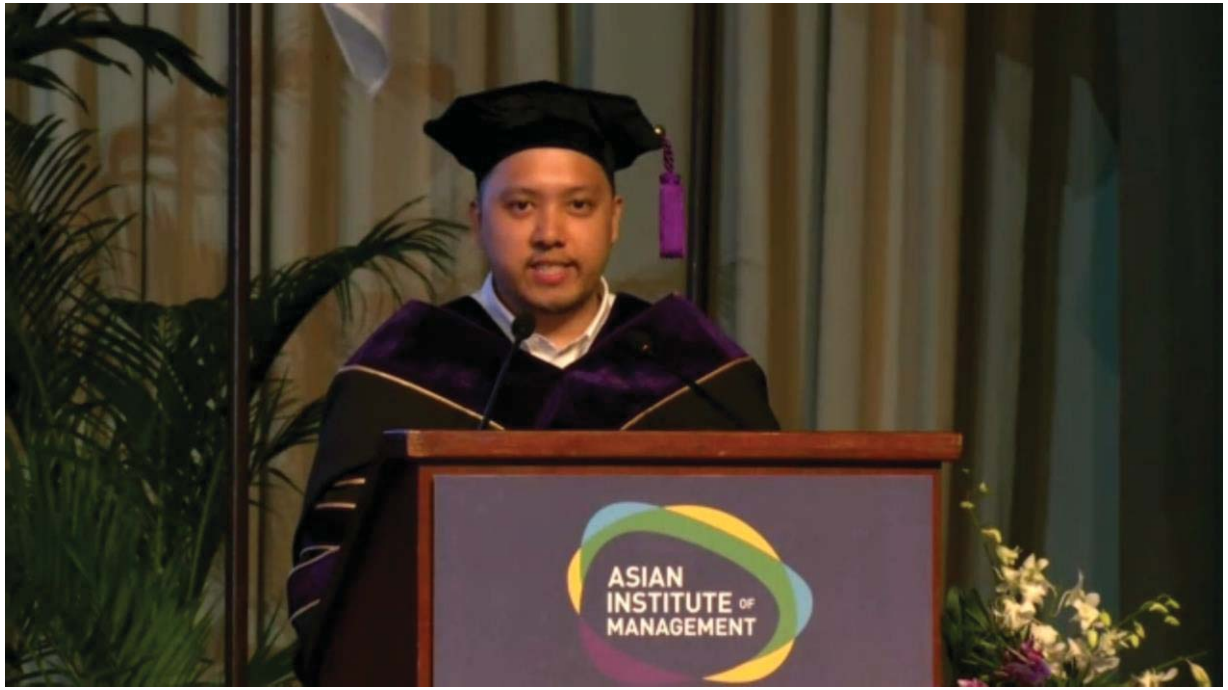
Aboitiz School of Innovation, Technology, and Entrepreneurship

Asian Institute of Management



ANALYTICS, COMPUTING, AND COMPLEX SYSTEMS LABORATORY (ACCeSs)


ASIAN INSTITUTE OF MANAGEMENT
GRADUATION CEREMONY
8 December 2023
PICC Plenary Hall
iMBA 2023
MDM 2023
MIB 2023
MSDS 2023


ASIAN INSTITUTE OF MANAGEMENT



How did I get here? 

This is a journey that's taken me about **14 years**…



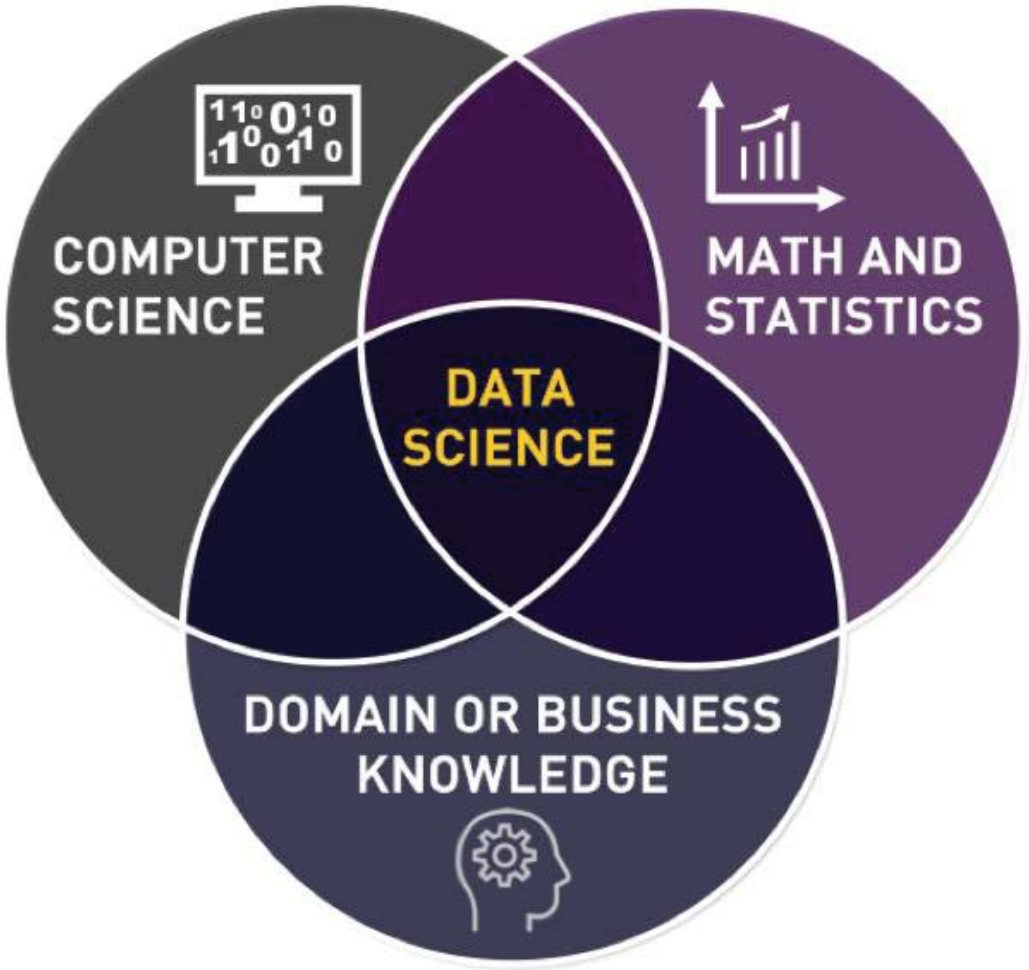
BS Computer Science
MS Computer Science

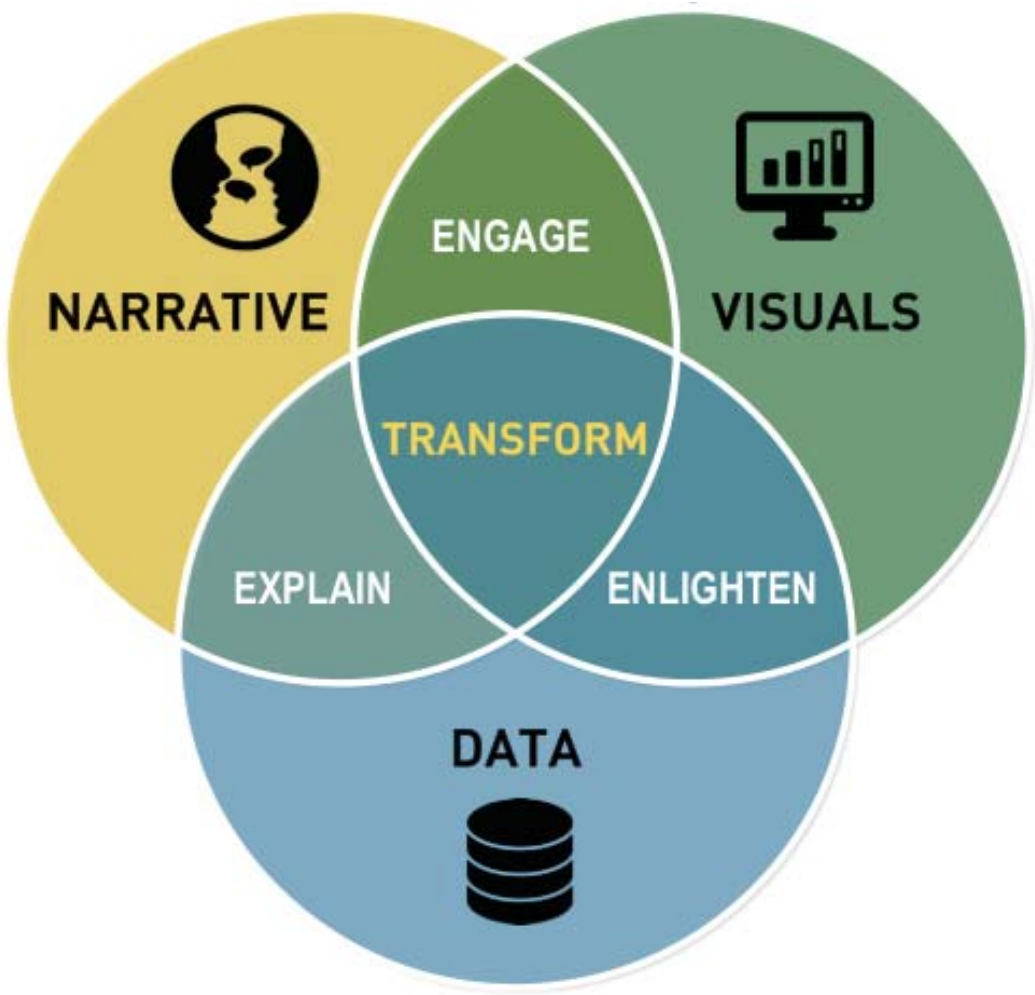


MS Actuarial Science



PhD Data Science

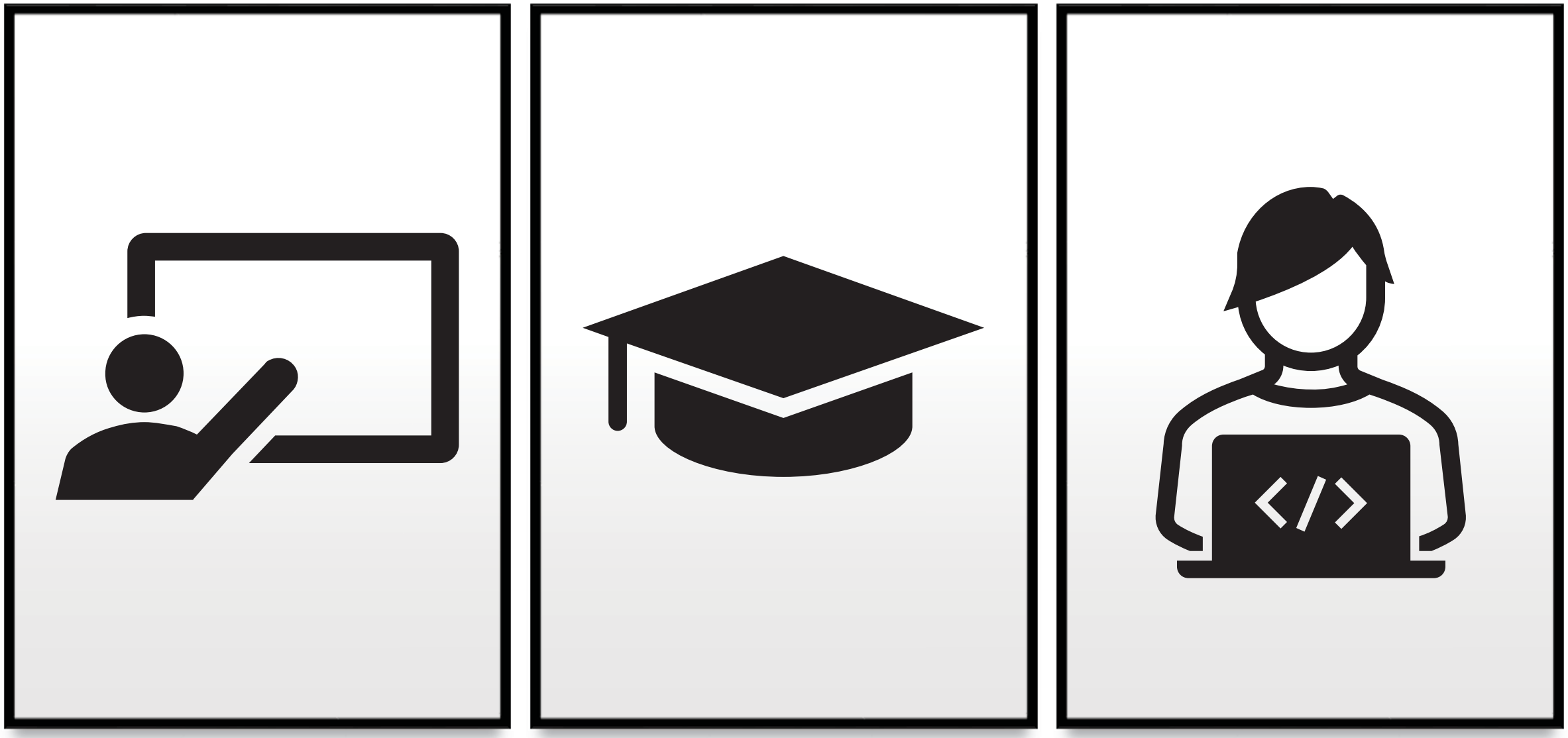




Drew Conway, “The Data Science Venn diagram”, 2013.

Brent Dykes, “Effective Data Storytelling”, 2019.

While at AIM, I wore quite a few hats…



Teacher
(Adjunct Faculty)

Student
(PhD in DS)

Practitioner
(Data Scientist)

ASIAN INSTITUTE OF MANAGEMENT

ABOITIZ
SCHOOL OF INNOVATION,
TECHNOLOGY, & ENTREPRENERUSHIP

ACCESS@AIM
HOUSES 1.2 PETAFLOPS
AI SUPERCOMPUTER
FASTEST IN PH
TOP 5 IN ASEAN
HOUSING DATA SCIENTISTS

Analytics, Computing, and Complex Systems Laboratory

ALL PIONEERING PROGRAMS

2017
7 COHORTS TO DATE
AIM'S **WINNINGEST** PROGRAM

Master in Innovation & Business



2018
6 COHORTS SINCE 2018
1000+ BRANDS IN THE PHILIPPINES

Master in Entrepreneurship



2023
FIRST TRANSNATIONAL DUAL-DEGREE PROGRAM IN THE PHILIPPINES

BSc. in Data Science and Business Ad



2018 (PT and FT)
7 COHORTS TO DATE \ MOST SOUGHT-AFTER GRADUATES
>200% ++ SALARY INCREASE

MSc. in Data Science



2020 (Full Time)
ATTRACT MOST BRILLIANT DATA SCIENTISTS
3 COHORTS TO DATE
FIRST GRADUATE 2023

Ph.D. in Data Science



Program Launch: AIM-UH Bauer *Dual Degree* Program

AIM: Bachelor of Science in Data Science and Business Administration (BS DSBA)

UH Bauer: Bachelor of Business Administration (BBA) Management Information Systems

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Fastest Supercomputer in the PH



A 1.2 **PETAFLOPS** (PFLOPS) computer system is capable of performing about one quadrillion (10^{15}) floating-point operations per second.



Supercomputer at ACCeSs@AIM donated by Stan Shih of Acer.

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TECHNOLOGY, & ENTREPRENERUSHIP



$10 Million Aboitiz Donation

About 38,000 results (0.38 seconds)

AIM gets P500-M Aboitiz donation for data science | BusinessMirror
https://businessmirror.com.ph › Features › Education
May 13, 2019 - THE Asian Institute of Management (**AIM**) has received from the **Aboitiz** Group over P500 million in **donation** to be used for the school's program on data science and innovation. The **AIM** last Wednesday secured the amount from the **Aboitiz** Group, through the **Aboitiz** Foundation Inc., in support of its data science initiatives.

Aboitiz Group donates P500M- fund to help AIM students | Inquirer News
https://newsinfo.inquirer.net › Latest News Stories
May 8, 2019 - **Aboitiz** Group donates P500M- fund to help **AIM** students ... **Aboitiz** Foundation chairman Erramon I. **Aboitiz** said the **donation** was made in ...

Aboitiz Group funds P500-M new innovation school at AIM » Manila ...
https://news.mb.com.ph/.../aboitiz-group-funds-p500-m-new-innovation-school-at-ai...
May 9, 2019 - The **Aboitiz** Group, through its corporate foundation **Aboitiz** Foundation, Inc., made a historic **donation** amounting to over half a billion pesos ($10 million) to the Asian Institute of Management (**AIM**) Scientific Research Foundation, Inc. to help address the demand for skills and talent in data science and innovation in ...

Aboitiz Group Gives Half a Billion Pesos to AIM - Esquire Philippines
https://www.esquiremag.ph/.../aboitiz-group-donates-10-million-asian-institute-of-ma...
May 8, 2019 - The philanthropic arm of the **Aboitiz** Group has **donated** $10 million or more than half a billion pesos to the Asian Institute of Management (**AIM**) ...

Aboitiz Group endows new AIM institute | BusinessWorld
https://www.bworldonline.com/aboitiz-group-endows-new-aim-institute/
May 8, 2019 - THE **ABOITIZ** GROUP said Wednesday it is **donating** P500 million to the Asian Institute of Management (**AIM**) to support the growth of data ...

Why Data Science? 

Data Science is a skill that's in **demand**! 

Harvard Business Review

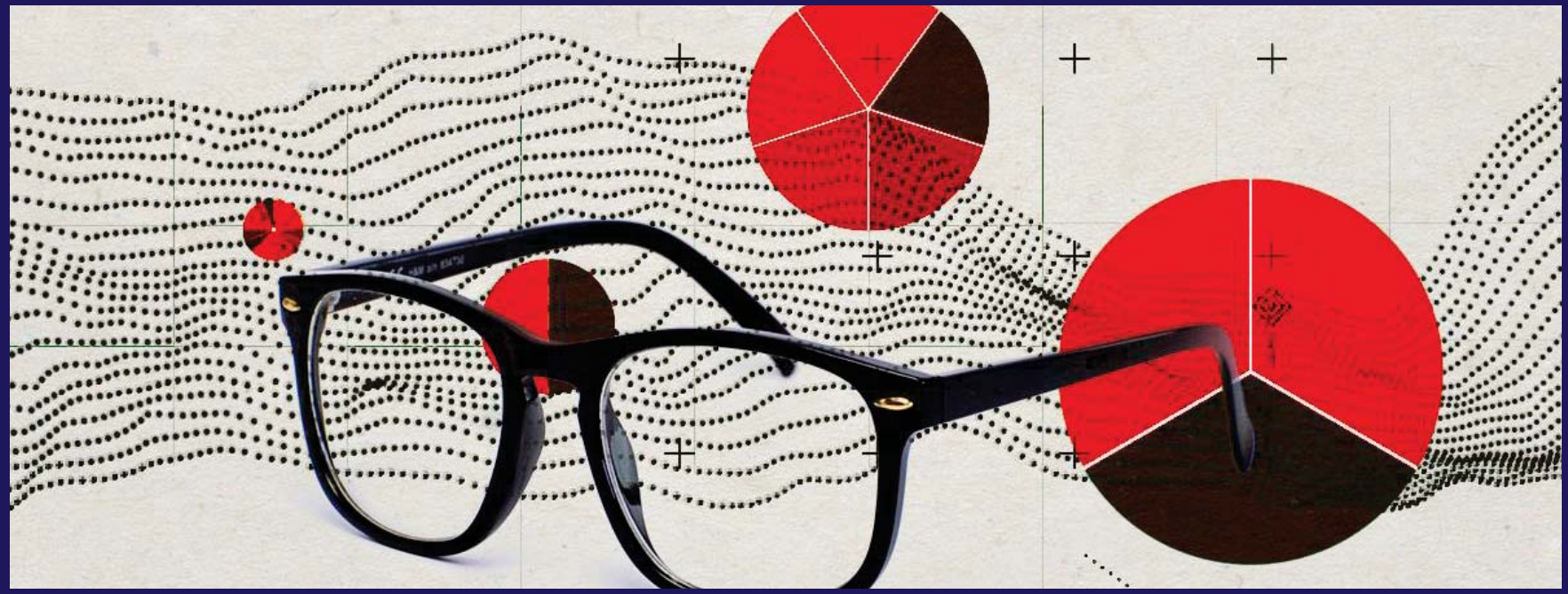


Data Scientist: The Sexiest Job of the 21st Century

by Thomas H. Davenport and D.J. Patil

October 2012

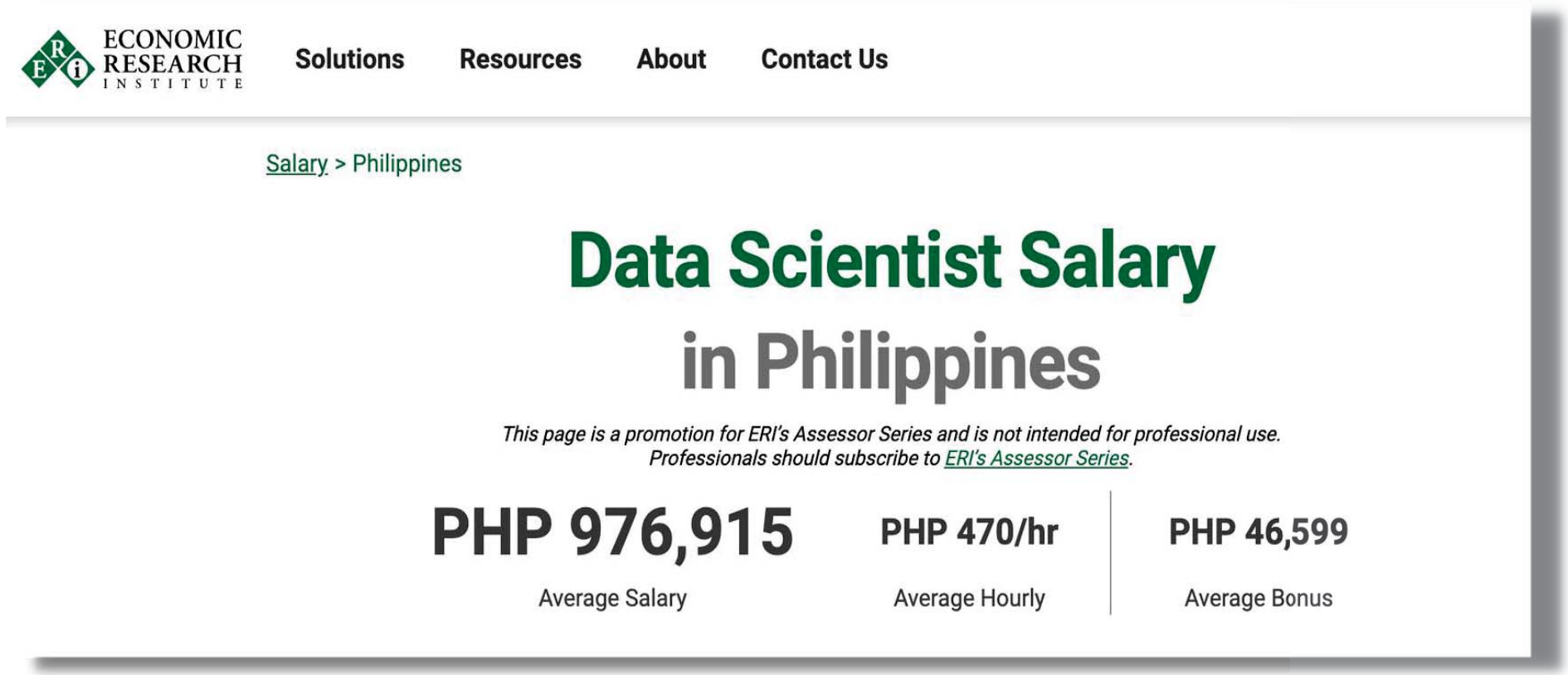
Harvard Business Review



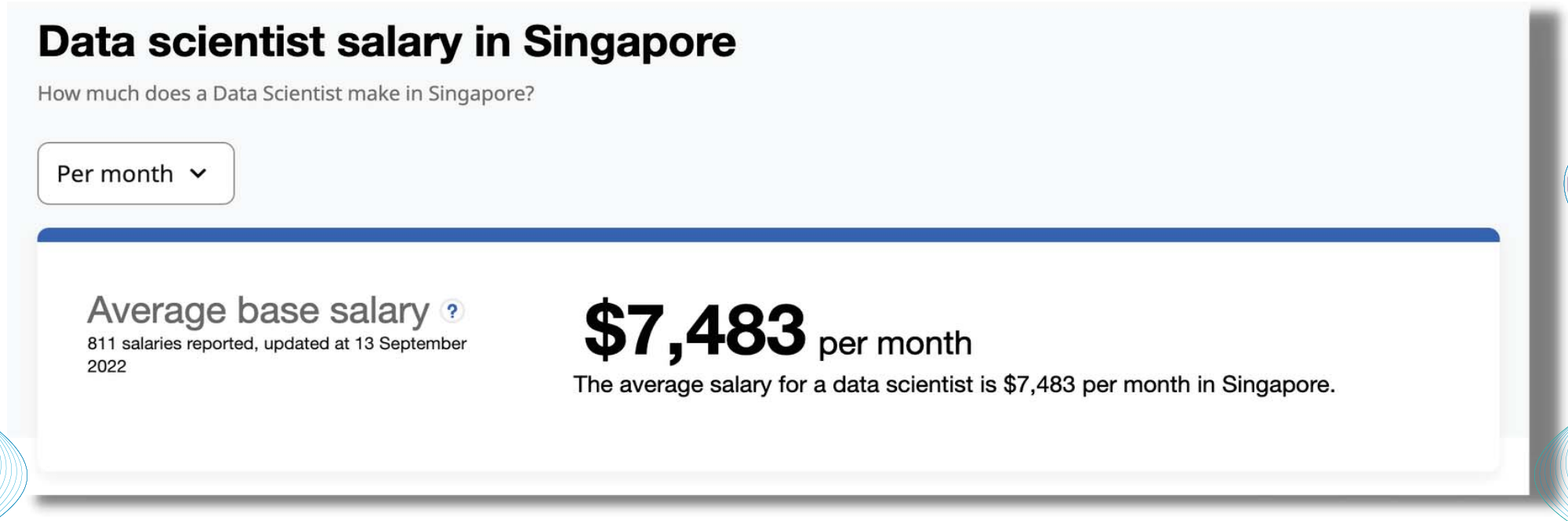
Is Data Scientist Still the Sexiest Job of the 21st Century?

by Thomas H. Davenport and D.J. Patil

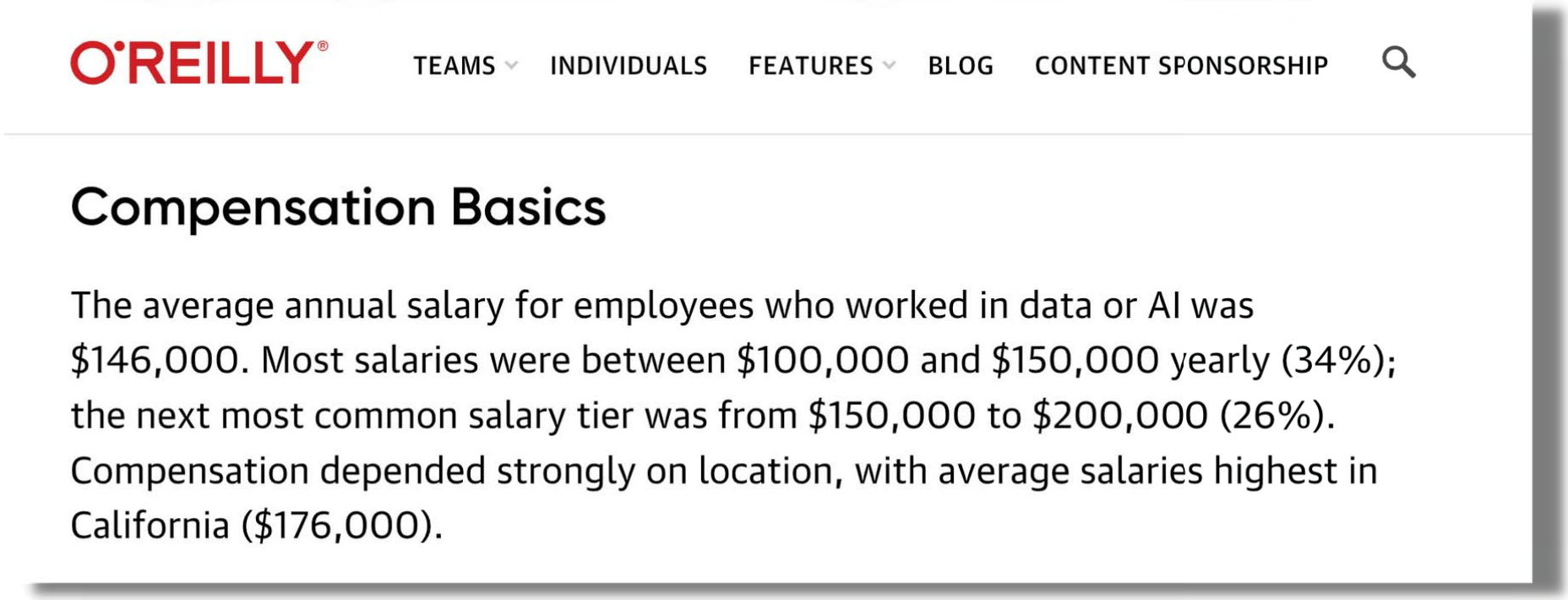
July 2022



₱81,409.58 per month



₱310,251.18 per month



₱677,148.00 per month

limited to respondents in the United States and the United Kingdom

Data Science lets you solve **impactful** problems! 

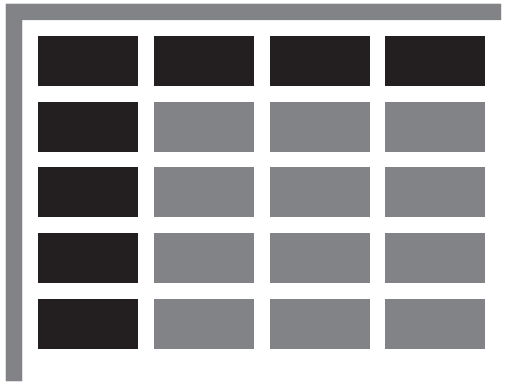
Automated Vehicle Assessment

Can we automate the assessment of repossessed motorcycles using AI?









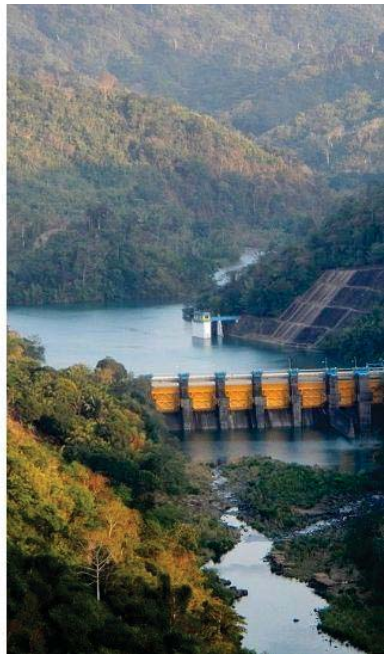


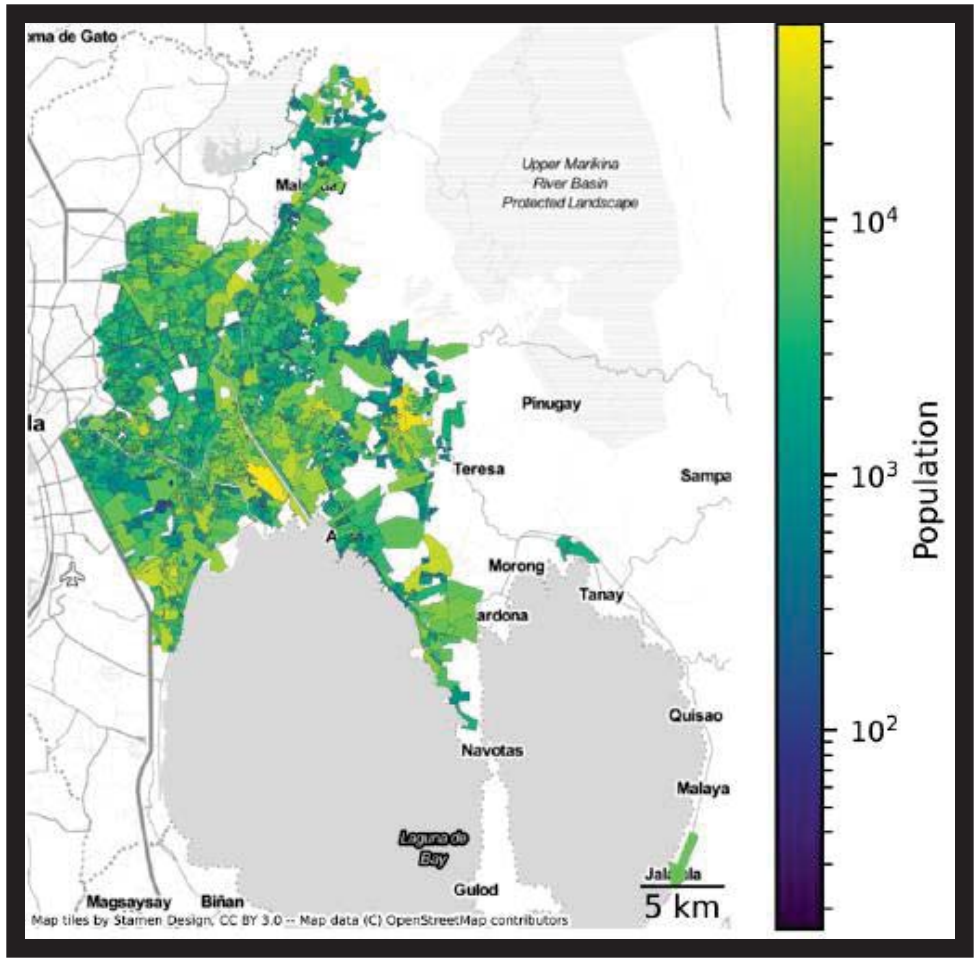
Dam Water Level Forecasting

How can we forecast the water level of the Angat-Ipo-La Mesa Dam system?









MANILA WATER
CARE IN EVERY DROP

Fraud Detection and Risk Mitigation

Amodia, Domingo, Soriano, Orencia, Monterola

Can we build algorithms to speed-up the detection of anomalies at the BSP?

500 accounts

2000 items per account

40 person-hours per account

20,000 person-hours per month

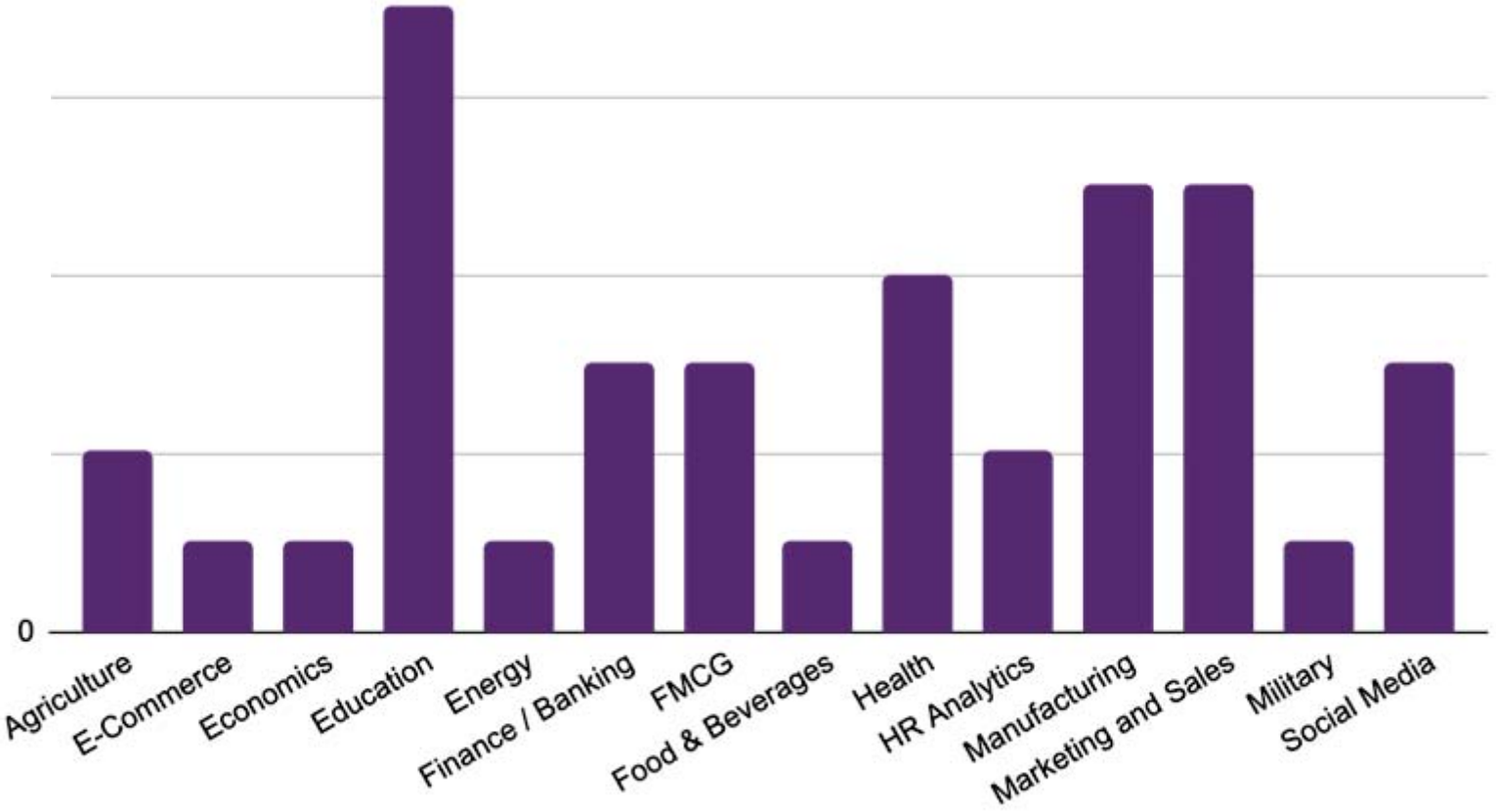
Artificial Intelligence ↓ **Network Science**

11 MINUTES



Maximizing ROI with Data Science and AI

We have completed **62 data science and R&D projects.**
Stakeholders reported a combined *potential* revenue/savings of **USD $108M** from project results.



AI in Agriculture

AVOID SPOILAGE of feeds

$1.94 Million

cost reduction

AI in Manufacturing

MACHINE-HUMAN interface optimization

$1.50 Million

savings, involving 10 products/annum

AI in Healthcare

MACHINE-HUMAN interface optimization

$300,000

savings, for 10 diseases/annum

ASITE Sponsors and Partners

64 companies and organizations

This includes sponsored capstone projects and R&D work with ACCeSs@AIM and our students from MSDS, MSIB/MIB, PhDinDS.



Data Science and Artificial Intelligence applications cuts across fields.



Real Estate



Banking and Financial Services



Surveillance



Retail and E-commerce



Education



Space Exploration



Agribusiness



Urban Planning



Manufacturing



Healthcare



Logistics and Transportation

Data Science lets you pursue your **passions**... 

Improving PH Education

How can we improve the state of education in the Philippines in a data-driven way?



Improving PH Education through Counterfactuals

Pira-piraPISA

Programme for International Student Assessment

Motivation

80% of PH learners below global competency

Lowest Average Scorers in PISA 2018

READING
MATH
SCIENCE

Skills of 15 year-olds in OECD* countries

Problem Statement

Given the results of PISA 2018

What education features does the Philippines need to improve to have an impact in the academic performance of its students?

*Organisation for Economic Co-operation and Development

Methodology

PISA 2018 Student Questionnaire Dataset

Socioeconomic Factors

Learning Conditions

Subject Proficiency

Data Collection & Preparation

Preprocess the data

PISA Prediction Modelling

Predict the Philippines's PISA performance

PISA Model Explanation

Explain why the Philippines's performance is **this instead of that**

Conclusions & Recommendations

What does this mean for the Philippines?

Prediction Model

One Student

- Subject Proficiency
- Learning Conditions
- Socioeconomic Factors

→ Random Forest Model →

Performance Clusters

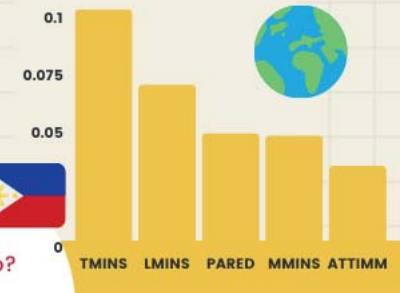
- CLUSTER 1
- CLUSTER 2
- CLUSTER 3
- CLUSTER 4

Given a student's features, predict how they performed.

Global Importance

- ✓ Total learning minutes per week
- ✓ Parents' highest education
- ✓ Attitude towards immigrants

Top 5 global feature importances



But are these important to the Philippines too?

Counterfactual Explanation

What features does the Philippines have to change for the model to label it as a cluster 4 country?

Philippines → Indonesia

Subject Proficiency
Learning Conditions
Socioeconomic Factors

CLUSTER 4

Nearest ASEAN neighbor in a different cluster

Features that need to be changed the most (%) for the better:

TOP STUDENT	AVERAGE STUDENT	BOTTOM STUDENT
PERCEIVED TEACHER INTEREST	INTERCULTURAL COMMUNICATION	PERCEIVED COMPETITIVENESS
TEACHER SUPPORT	AWARNESS OF GLOBAL ISSUES	PERCEIVED TEACHER INTEREST
UNDERSTANDING OTHER PERSPECTIVES	SELF-EFFICACY ON GLOBAL ISSUES	READING DIFFICULTY
SELF-EFFICACY TO GLOBAL ISSUES	RESPECT FOR OTHER CULTURES	EFFORT WILLING TO INVEST
purpose issue	**global mindedness** issue	**motivation** issue

Smart Targeting for Cash Aid Disbursement

How do we improve the targeting of cash assistance programs in the Philippines?



ASIAN INSTITUTE OF MANAGEMENT

A MACHINE LEARNING 2 PROJECT

MSDS 2023 T3 LT 4 Chua, Del Carmen, Escalante, Lugod, Pintor, Yap

Where's My AI-YUDA?

A NOVEL FRAMEWORK OF USING MACHINE LEARNING & EXPLAINABLE AI FOR PROXY MEANS TEST (PMT)

*How can we improve the targeting of the **poor** so that scarce resources for social assistance programs are **effectively allocated**?*

PROBLEM STATEMENT

METHODOLOGY

DATASET
Family Income and Expenditure Survey (FIES) + Labor Force Survey (LFS)

DATA CLEANING
147,717 Households, 57 Features

MODEL TRAINING
StandardScaler(), RandomUnderSampler(), LightGBM

MODEL VALIDATION
Recall, F-Beta Score

EXPLAINABILITY
Shapley Additive Explanations SHAP

RESULTS

AI-YUDA		PREVIOUS PMT MODELS Fernandez (2007)
86.9%	Recall	70.3%
45.6%	Precision	76.4%
73.6%	F-Beta Score	71.4%

PHP 7.34M **Exclusion Cost** PHP 16.6M

892 more families reached by AI-YUDA amounting to PHP 9.22M.

EXPLAINABILITY

What makes a Filipino household poor?

- *Educational Attainment?*
- *Access to Technology?*
- *Region of Residence?*
- *Housing Quality?*
- *Employment?*
- *Family Size?*

FIND OUT WITH US!

FRIDAY, 17 MARCH 2023

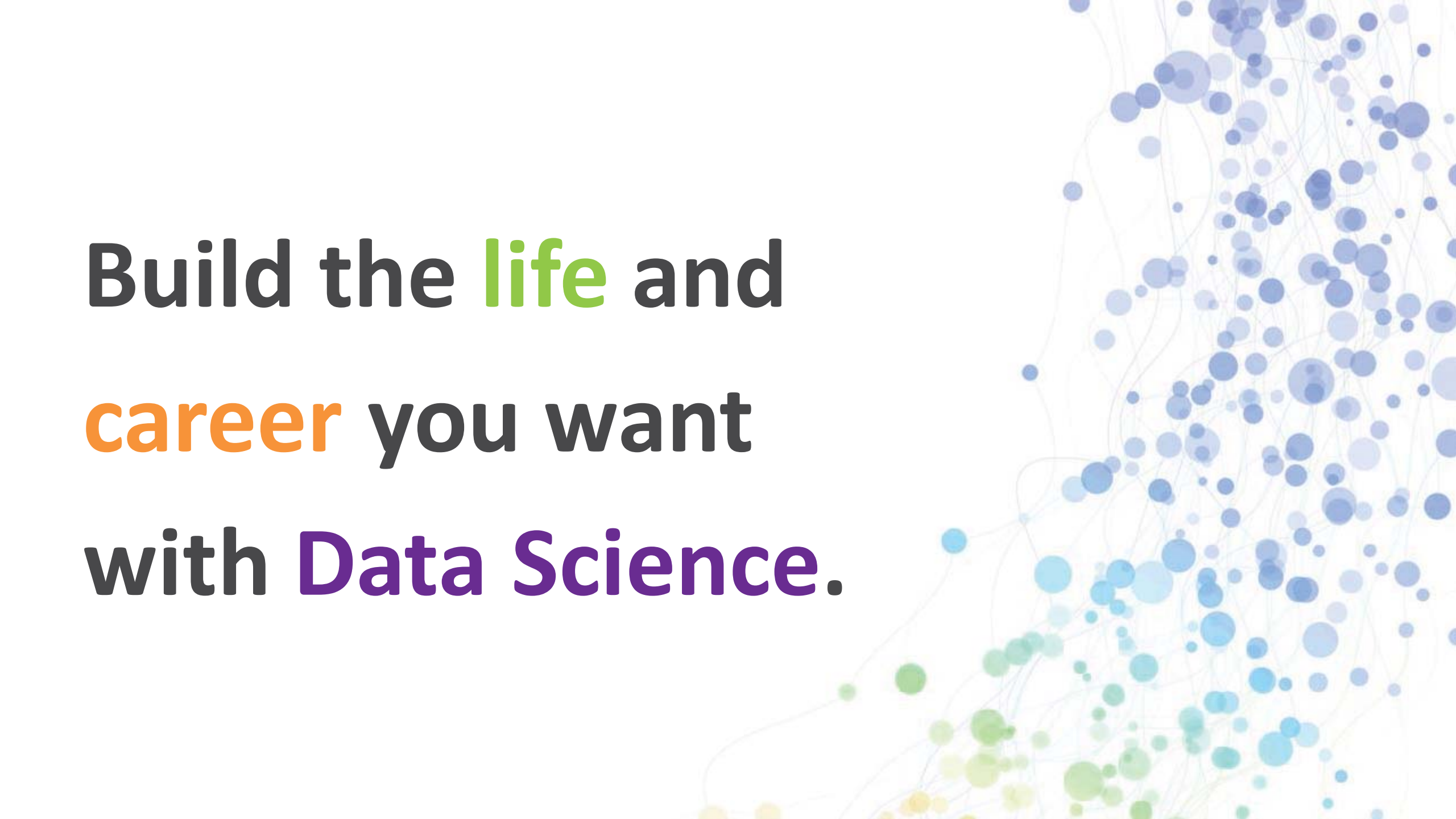
Fuller Hall, Asian Institute of Management
and online via Zoom


MSDS Master of Science in Data Science
DECODING THE BLACK BOX: UNLEASHING THE POWER OF


REC
Time
SHAP
Presenter View - Compan...


AIM


FRANCIS
VANESSA
OTEPH
JAM
ERIKA
AJ


Build the life and
career you want
with Data Science.