DOST

R&D MAKING CHANGE HAPPEN

DOST ARTIFICIAL INTELLIGENCE PROGRAMS AND TECHNOLOGIES

AI for a better normal

JUNE 2021

FORTUNATO T. DE LA PEÑA

SECRETARY
DEPARTMENT OF SCIENCE AND TECHNOLOGY

This year, we celebrate the 63rd anniversary of DOST and as part of our celebration, I would like to welcome everyone to the Launching of the DOST AI Programs and Technologies dubbed—AI for a Better Normal!

Since 1958, the DOST has worked on building the country's research and development capabilities, building structures and capitalizing on human resource development in identified priority areas in the fields of agriculture, health, energy, industry and emerging technologies, among others. In the 90's, our agency has devoted our initiatives to technology transfer and commercialization.

Like any goals and objectives, action plans are needed to make each research and development project focused. Artificial Intelligence (AI), an area under emerging technology, is one of these. AI has been included among our R&D priorities since 2016. It is seen as one of the important technologies that will guide and prepare us in what we call the fourth industrial revolution. But while AI is considered a powerful tool for continued progress, it can also disrupt the traditional models and processes we know currently. Hence, there is need to develop our capability in this area to ensure that it will provide maximum economic and social benefits for the people.

We will present the results of some of the R&D efforts on AI that brought positive impacts to both the social and environmental aspects of our lives. You can find more information about the projects on AI that DOST developed and supported over the years in the DOST website and in this e-book.

In closing, I would like to reassure all of you that amidst our current situation, we at the DOST together with our partner institutions in the public and private spheres, will continue to strengthen and encourage R&D focused on providing immediate, timely and relevant scientific solutions in this time of health crisis and beyond.

Allow me to also thank our friends from the media for they are vital instruments in ensuring that scientific discoveries, research-based solutions and innovations reach the widest audiences from the city to rural communities across the country. As we all rally towards recovery and renewed vigor for our country, let us work together for R&D that makes positive change happen. Thank you once again and Mabuhay po tayong lahat!

ROWENA CRISTINA L. GUEVARA

UNDERSECRETARY FOR RESEARCH AND DEVELOPMENT, DEPARTMENT OF SCIENCE AND TECHNOLOGY

Artificial Intelligence or AI is the science and engineering of building smart machines capable of performing tasks that typically require human intelligence. With the exponential growth in the volume of data, AI becomes both an opportunity and a necessity. The Philippines needs to leverage its AI Programs holistically and cohesively to reap the socio-economic benefits that AI has to offer.

It is our aspiration to improve the connectivity and provide universal and affordable access to the public. DOST has acquired High Performance Computing (HPC) machines for mission-driven AI projects. To develop our workforce, DOST created training on data science and AI. There are over 24 thousand scholars under Smarter Philippines through Data Analytics R&D, Training and Adoption (SPARTA) Program. These interventions aim to accumulate a critical mass of researchers developing AI capabilities and solutions that are better and faster.

In R&D, we are happy to report that DOST has supported numerous programs and projects in AI that have applications in industry, agriculture and natural resources, health and disaster risk reduction. This book contains the details of DOST's programs and technologies in AI.

For the industries, we use machine learning for faster processing of data in electronics. Even in the infrastructure sector, AI is very useful for better design of buildings to mitigate risk and increase safety. In Agriculture, AI was used to develop technologies that detect, map diseases and improve crop yield. Another application of AI is in the creation of decision support tools which can greatly help our farmers, local government agencies and policy makers.

AI offers huge opportunities in the health sector. Several AI technologies have also been deployed to combat Covid-19 such as the eHATID LGU, computer vision application for physical distancing, and FASSSTER for monitoring and predicting spread of Covid-19.

Through R&D, DOST aspires to aid various government stakeholders develop data-driven AI-enabled solutions that will help enhance government functions and delivery of its services to the FIlipino people.

AI is bound to change our lives. We need to continuously promote R&D and its useful outputs to ensure that all Filipinos benefit from science. That's why we are pushing for the legislation of the Science for Change Program Bill. In this bill, Artificial Intelligence is identified as a priority in developing human resources capable of doing R&D that will translate AI opportunities to the industry for socio-economic development.

SANCHO A. MABBORANG

UNDERSECRETARY FOR REGIONAL OPERATIONS, DEPARTMENT OF SCIENCE AND TECHNOLOGY

Let me extend my warmest appreciation to everyone who joined us in today's launch of our AI initiatives.

We all have seen how AI has helped in dealing with the COVID-19 pandemic. Aligned with this endeavor, the DOST Regional Offices across the country has been tirelessly working with the Regional IATFs to provide AI-powered disease modelling and surveillance platforms which continuously aids in formulating science-based decisions and policies to control this pandemic. With its success, more AI-powered solutions were developed and deployed through the DOST Regional Offices to monitor real-time allocation of medical supplies and establish telepresence terminals for COVID-19 response teams.

Beyond the pandemic, the DOST envisions the critical role of Artificial Intelligence in paving the way towards a better normal for every Juan and Juanas.

As we continue celebrating the DOST's 63rd Anniversary and the milestone achieved throughout the years, we would like to assure you that the DOST remains committed to serving the Filipino people through the opportunities present in this digital age and AI-driven economy. And I enjoin everyone, — our fellow scientists, researchers, industry stakeholders and the like — to join us in this exciting transformation. Let us remain united in realizing this vision for an inclusive and AI-powered innovation in the country.

Mabuhay at Magandang Agham sa ating lahat!

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ARTIFICIAL INTELLIGENCE

$62.0 B worldwide spending on AI for human-centric industries

HEALTHCARE

Eradicate diseases and provide personalized healthcare services

$ 4.5 T
Global wellness market, 2021

EDUCATION

Accelerate life-long learning and improve education quality and accessibility

$ 6.0 B
Global AI education by 2024

EMPLOYMENT

Display repetitive jobs and focus work on management, creative, and high-touch skills

$ 11.8 B
AI in Asia Pacific Market in 2019

Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions.

According to ATOS[1], a leading company in digital transformation, Worldwide spending on artificial intelligence is expected to reach 62 billion USD in 2021. Human-centric industries, such as financial services, retail and healthcare are expected to be the biggest spenders, closely followed by asset-intensive industries, manufacturing, energy & utility, transport etc. Artificial intelligence is spreading fast and will have a far-reaching impact.

The Philippines needs to leverage its AI Programs holistically and cohesively to reap the socio-economic benefits that AI has to offer.

[1]ATOS. https://atos.net/en/artificial-intelligence

ARTIFICIAL INTELLIGENCE

A 10-year Framework for Artificial Intelligence R&D in PHL

AI Landscape

- Data-driven AI applications are beneficial to stakeholders
- Academe as the main partner of government in R&D
- Industry focuses on practical solutions using their own resources
- Fragmented funding of AI programs and projects

1. Universal and affordable access to AI infrastructure

2. Upskilling the workforce

3. Science-based solutions for socio-economic opportunities

4. Unprecedented innovation for the industry sector

5. Enhanced Policy Support and Stakeholder Engagement

AI R&D Priorities

Artificial Intelligence

- Intelligent Conversational Agents
- Non Commercial Purposes
- Convergence of AI and Humanities
- AI Infrastracture

Applications

- Industry 4.0
- Government Services
- Delivery of Education
- Health Services
- Other Services

Internet of Things

- Human
- Home
- Retail
- Environments
- Offices
- Factories
- Worksites
- Vehicles
- Cities

AI Robotics

- Applications in Manufacturing
- Disaster Response

Cybersecurity and Encryption

- Cyber Physical Security
- AI Policies

Components

National Infrastracture	Capacity Building	R&D	Policies

National AI R&D Centers · Mission-driven AI Laboratories · Broadening AI curriculum · Recruitment and training programs · Stakeholder engagement

ARTIFICIAL INTELLIGENCE

This framework of AI for R&D is an overview of the DOST AI R&D Program Framework for 2019 to 2029. It specifies the current status of AI in the country, our aspirations, and R&D priorities to bridge the needs and gaps.

To achieve all these aspirations and priorities, here are the components or pillars which we have already invested in:

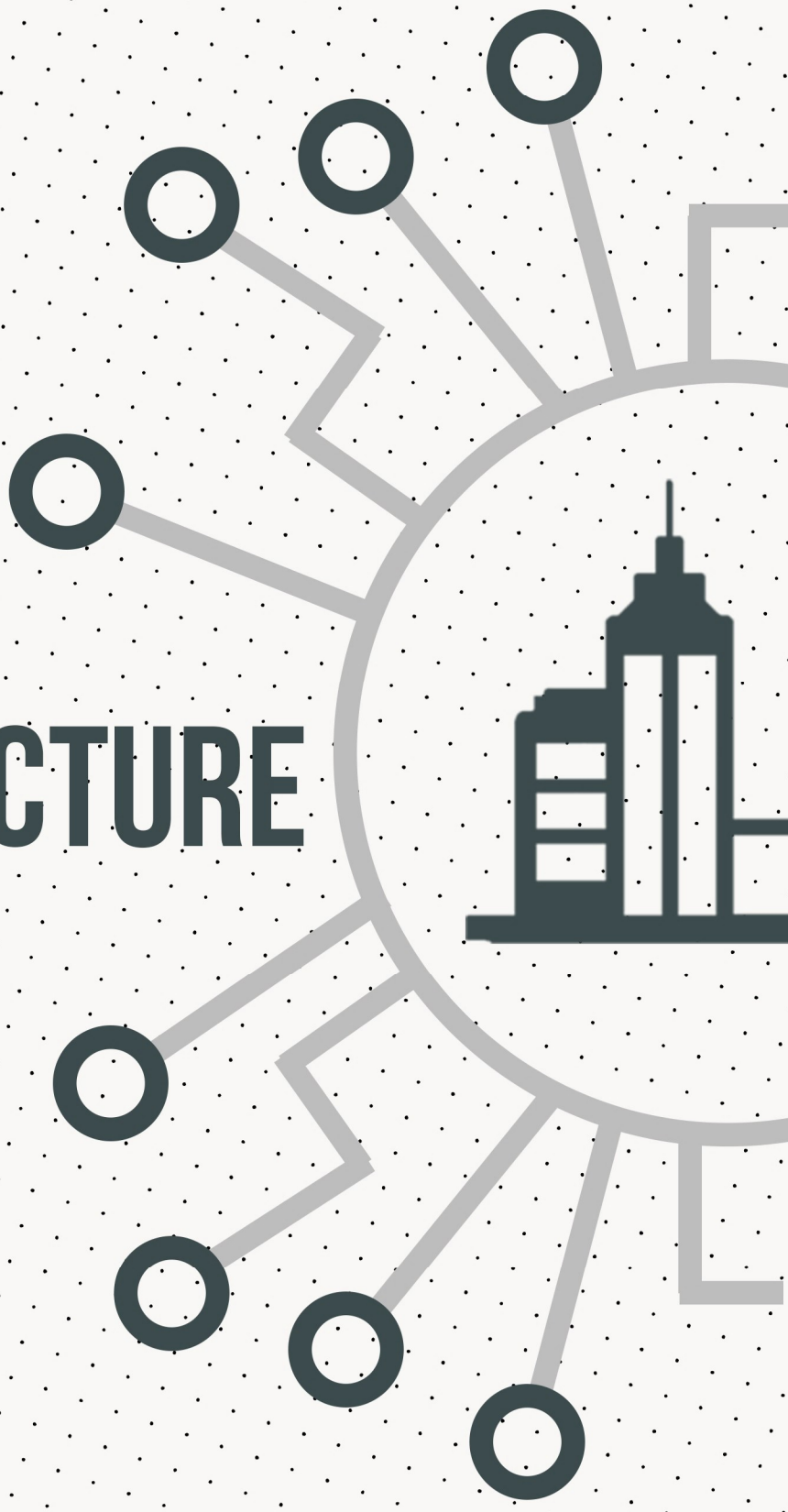
National Infrastructure
Through the DOST funded capability building project, AI R&D Centers with HPCs shall be established and will cater to Mission Driven AI R&D Programs

Capacity Building
Foundations were already initially conducted by PCIEERD thru trainings and online learnings, but will still enhance to address broadening AI curriculum, recruitment and training programs and training thru R&D

Research and Data
These are the mission driven programs which will stimulate practitioners, researchers and students to produce unique applications thru AI and Data Analytics

Policies and Stakeholder
Engagement gap assessment and complementing other government initiatives to come up with a National AI Roadmap and strategy

INFRASTRUCTURE



INFRASTRUCTURE

High Performance Computing (HPC) machines

The Philippines lacks various support infrastructures to support the development of the sector. For instance, the Philippines has the slowest internet speed in the Asia Pacific region; its average internet speed is 5.5 megabytes per second (MBPD) (CPBRD, 2016).

The issue of network connectivity is one symptom of a more significant problem of inadequate technology infrastructure for R&D, raising consumer awareness and market promotion.

It is therefore our aspiration to improve the connectivity and provide universal and affordable access to the public. Currently, DOST has acquired nine (9) High Performance Computing (HPC) machines for distribution to selected higher education institutions for their new mission-driven AI projects.

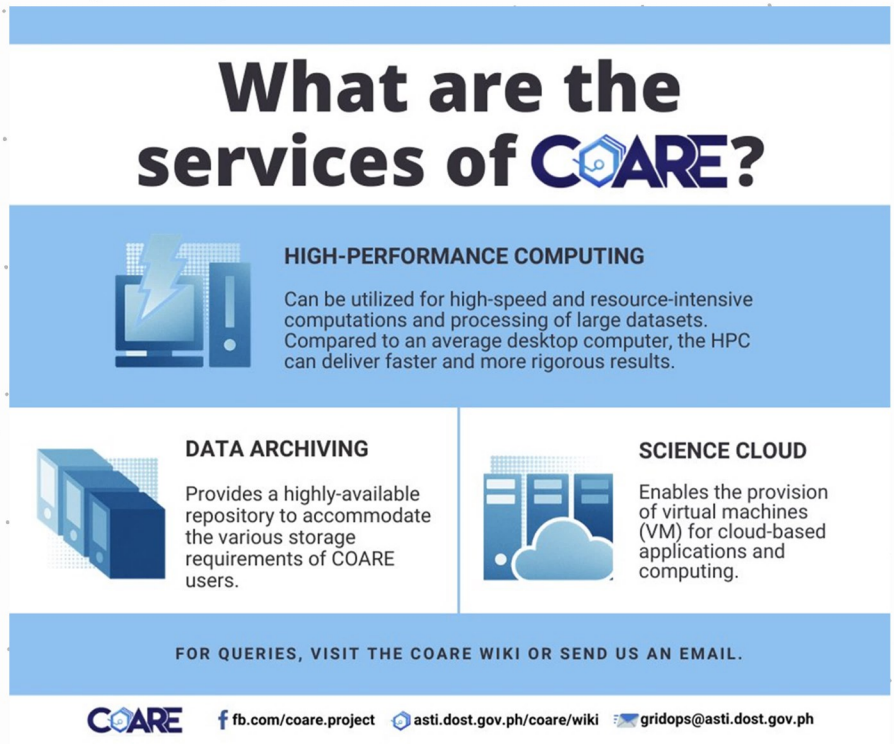
DOST aims to fund R&D projects on the use of quad computing and development of 5G products and services for 2022-2024. Quantum computing infrastructure would find a solution in minutes, hours, or days. Quantum computing will enable researchers to develop new catalysts and materials, improve medicines, accelerate advances in artificial intelligence, and answer fundamental questions about the origins of our universe. On the other hand, 5G has the potential to enable new applications, industries, and business models.

INFRASTRUCTURE

Computing and Archiving Research Environment (COARE)

COMPUTING AND ARCHIVING RESEARCH ENVIRONMENT

DOST supported the establishment of the Computing and Archiving Research Environment (COARE), a High-Performance Computing (HPC) and Cloud facility in the Advanced Science and Technology Institute that allows free access of its services to students, researchers, and data analysts.



INFRASTRUCTURE

Remote Sensing and Data Science (DATOS) Help Desk

DOST supported the institutionalization of DATOS: Remote Sensing and Data Science Helpdesk in the Philippine Space Agency

The Remote Sensing and Data Science (DATOS) Help Desk aims to produce and communicate relevant disaster information to agencies and key end-users to complement the current efforts of existing government agencies and initiatives. DATOS builds on and integrates past and ongoing DOST-supported projects; and different Geographic Information System (GIS), Remote Sensing (RS) and other Data Science techniques.

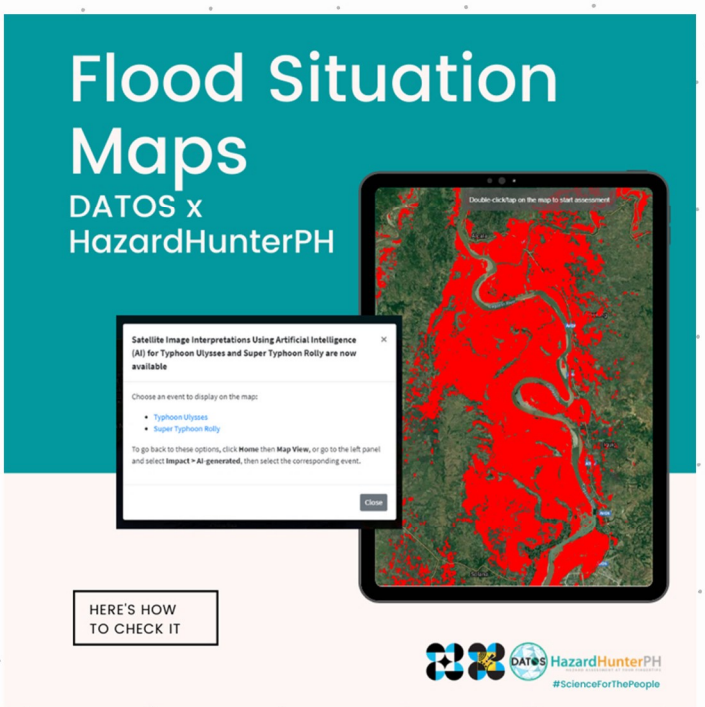
INFRASTRUCTURE

Hazard Hunter PH

HazardHunterPH™
HAZARD ASSESSMENT AT YOUR FINGERTIPS

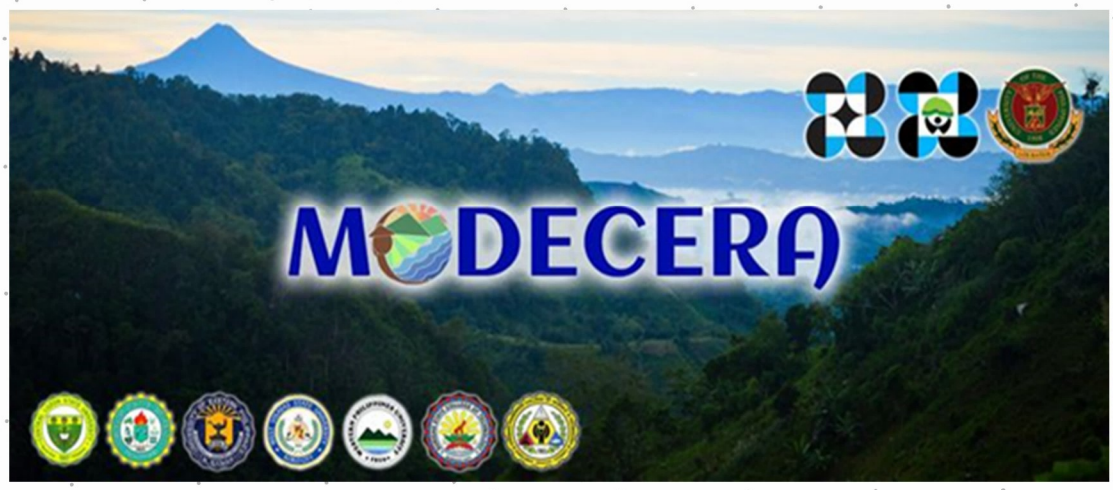
HazardHunterPH is a tool that can be used to generate indicative hazard assessment reports on the user's specified location. It is helpful as a reference of property owners, buyers, land developers, planners, and other stakeholders needing immediate hazard information and assessment. It aims to increase people's awareness to natural hazards and advocates the implementation of plans to prepare for and mitigate the effects of hazards.

All information used for the calculation of hazard assessment results are based on the most recent updates provided by the corresponding mandated government agencies through the GeoRiskPH Integrated System. To know more about other archived data or more detailed information about the hazards, please contact DOST-PHIVOLCS for seismic and volcanic hazards, DOST-PAGASA for storm surge and severe wind hazards, and DENR-MGB for flood and rain-induced landslide hazards.



INFRASTRUCTURE

Monitoring and Detection of Ecosystems Changes for Enhancing Resilience and Adaptation (MODECERA)



Implementing Agency: UPLB, CLSU, WPU, WVSU, UEP, SSCT, CCSPC, RSU

Aims to establish a long-term ecological based monitoring and detection system that will determine changes of different ecosystems of selected watersheds in the Philippines to increase resilience and adaptive capacity of agriculture, fisheries and natural resources sector.

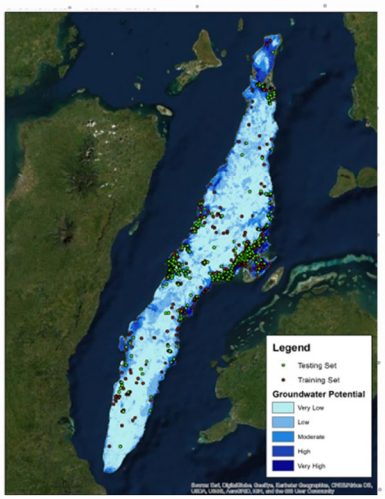
The project will assess and monitor various components of an ecosystem which include watershed functions, biodiversity, agroforestry, grassland, soil erosion, socio-economic, pest & diseases, and responses & productivity of agricultural crops.

INFRASTRUCTURE

GRNDH2O.ph

Groundwater Research Network Data on Habitat Hydrology Observations –Philippines

Implementing Agency: UP Cebu Center for Environmental Informatics (CENVI)



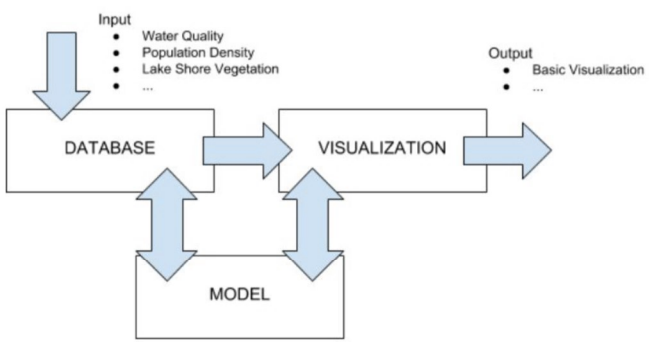
Groundwater Potential Zones

The project aims to map the groundwater data using a sensor network focused on hydrologic observations. The project aims to visualize the quality of groundwater resource of Metropolitan Cebu.

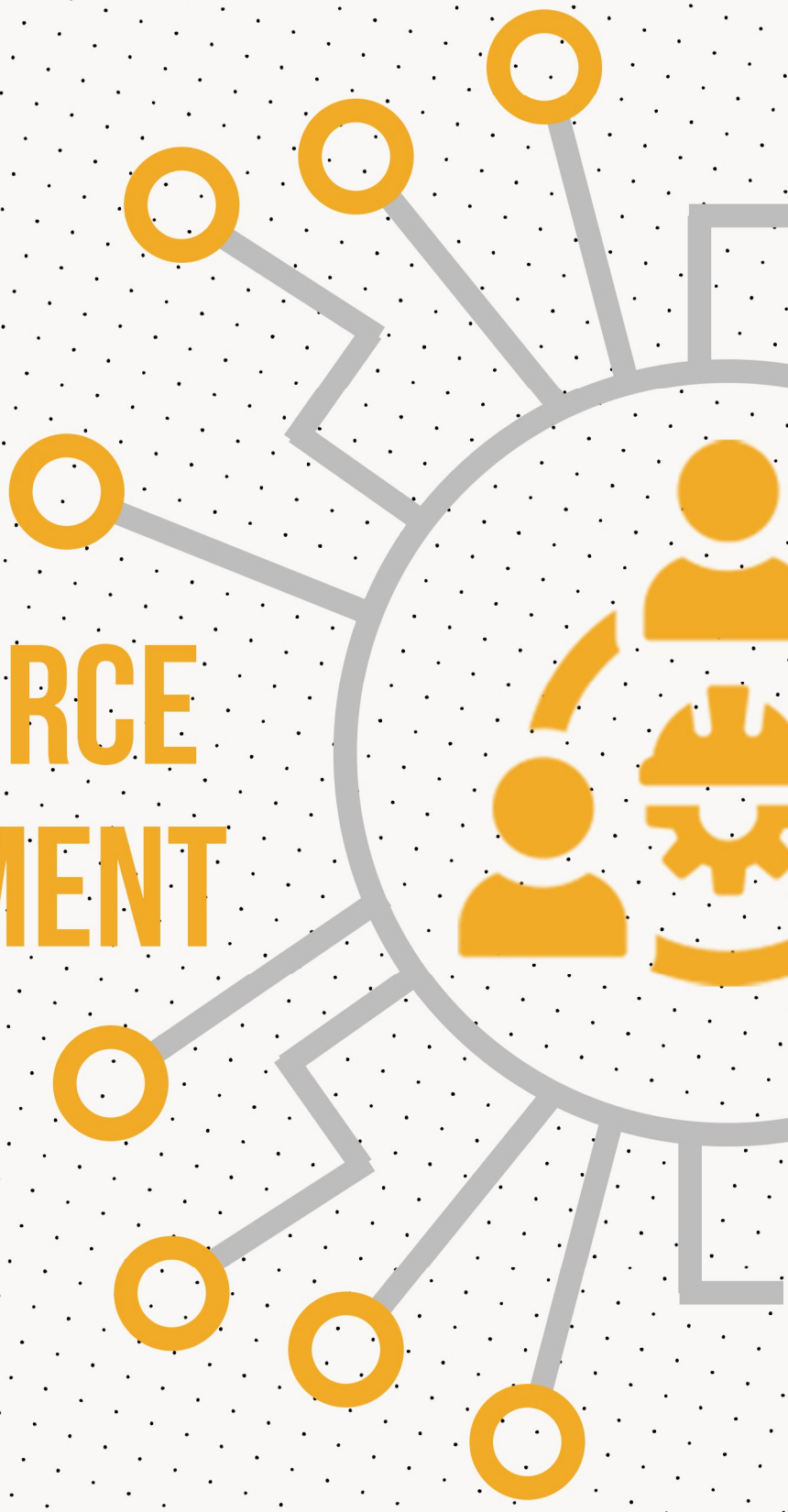
Project SLICE

Systems for Lake Information Convergence and Expertise

This research project aims to design develop, and implement a decision support system for lake ecosystems conservation and management so that lake data can be used for modeling and predictive analysis of lake ecosystem dynamics, or up-to-date assessment and monitoring of the state of lake ecosystems



WORKFORCE DEVELOPMENT



WORKFORCE DEVELOPMENT

AI Pinas Program

DOST supported trainings on data science and AI. From 2017-2019, about 143 participants from 37 HEIs were trained on AI.

AI Pinas trainings equipped graduates / researchers from academic institutions on AI concepts such as Deep Learning and Machine Learning, and proposal development for DOST-funding.

3 AI Trainings with
143 participants
trained from **37** HEIs

WORKFORCE DEVELOPMENT

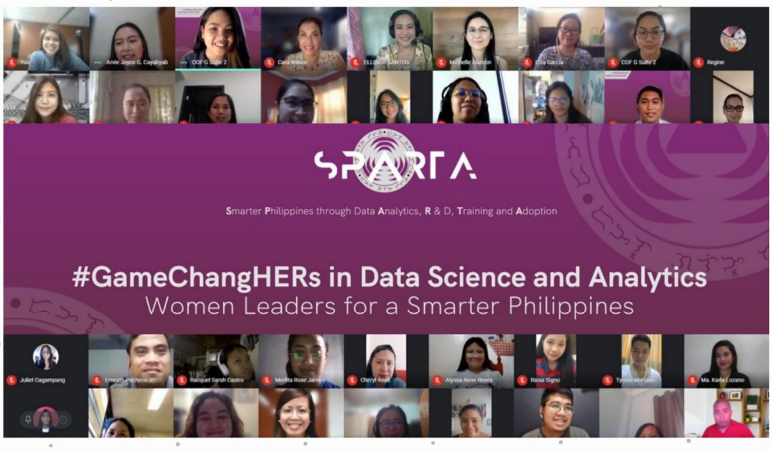
Smarter Philippines through Data Analytics R&D, Training and Adoption (SPARTA) Program

From 2020-present

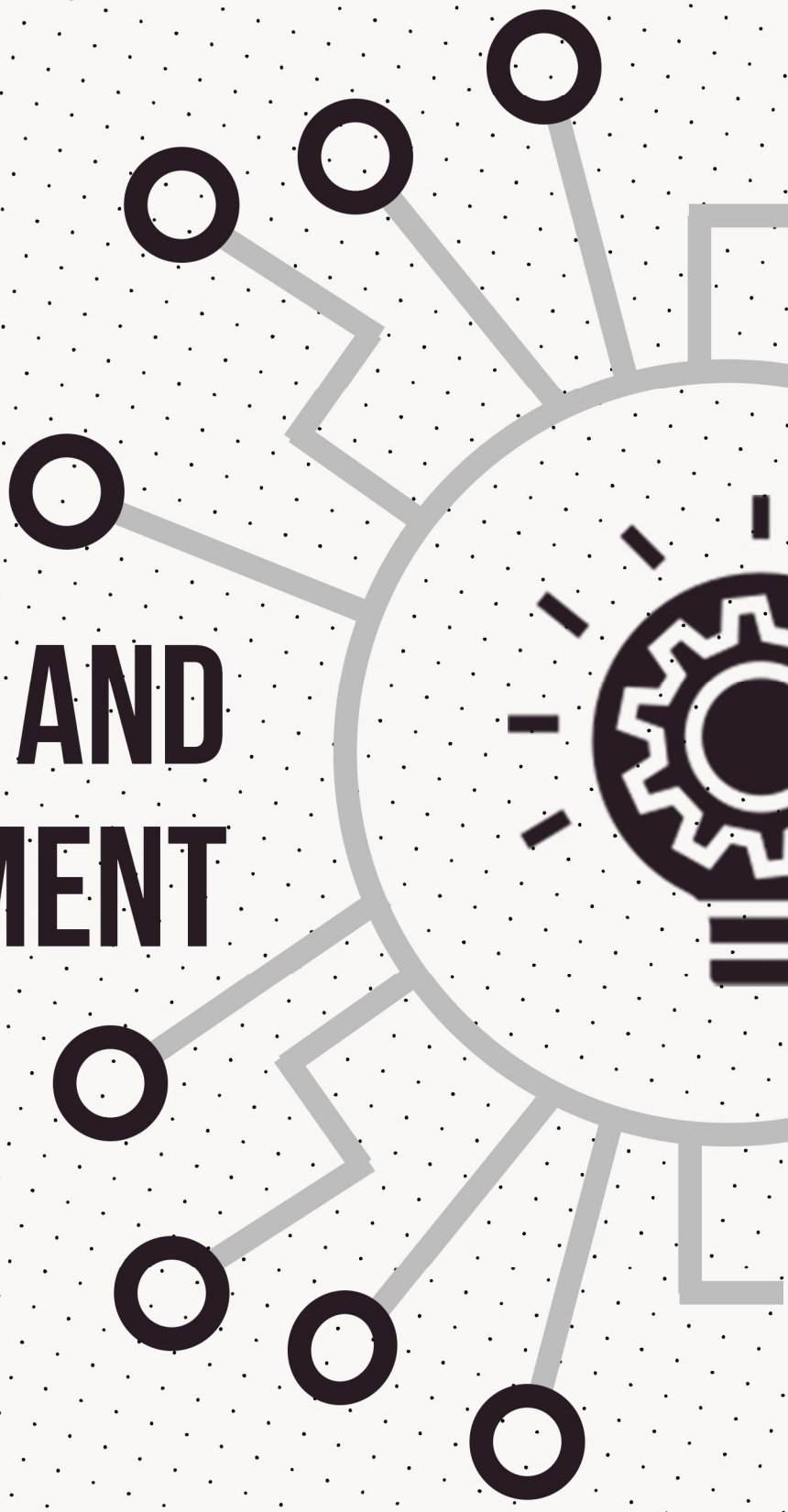
26, 104 scholars

Officially launched on February 24, 2020 Project SPARTA - Smarter Philippines through Data Analytics R&D, Training and Adoption aims to establish the necessary online education, research and development mechanisms and infrastructure to enable the industry of data science and analytics and foster smart governance practices.

By 2022, Project SPARTA has successfully trained and graduated 30,000 learners and fostered a community of data science and analytics practitioners



RESEARCH AND DEVELOPMENT

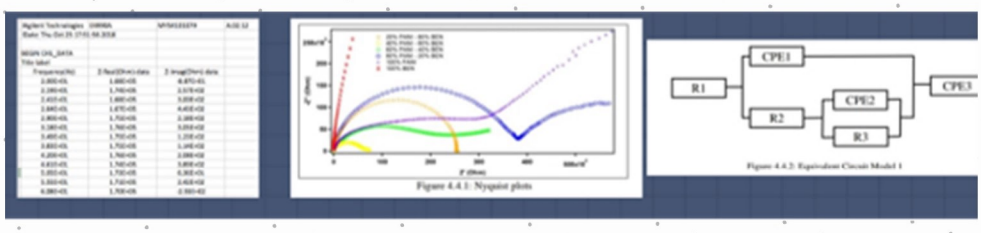


RESEARCH AND DEVELOPMENT

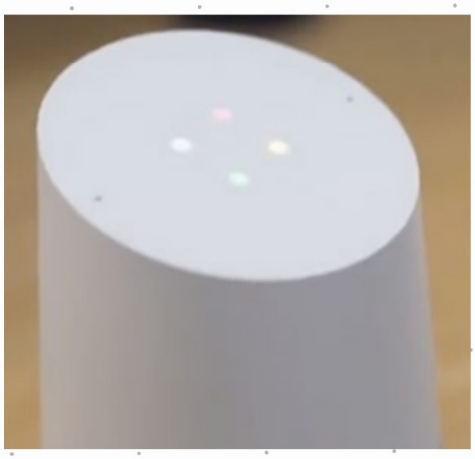
AI APPLICATIONS AND OPPORTUNITIES FOR INDUSTRIES

AI FOR ELECTRONICS

Machine Learning Algorithms for identification of electrical mass, temperature parameters, faster processing of data and databasing of spectra signatures



AI FOR COMMUNICATION

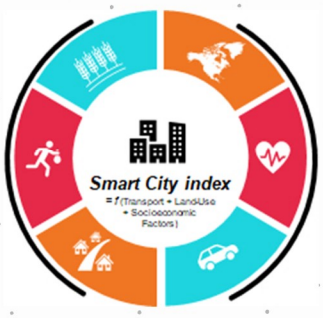


Enhancing Man-Machine Interaction through Intelligent Conversational Agents

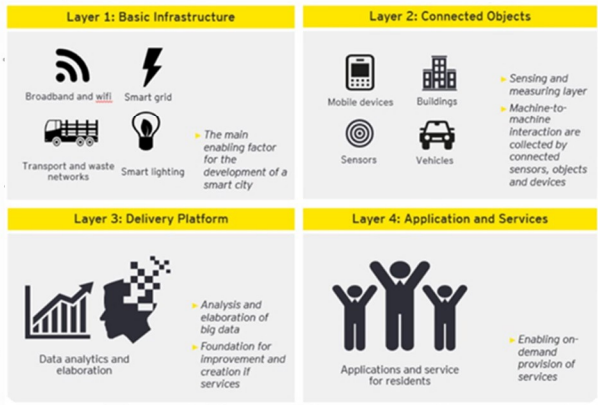
RESEARCH AND DEVELOPMENT

AI APPLICATIONS AND OPPORTUNITIES FOR INDUSTRIES

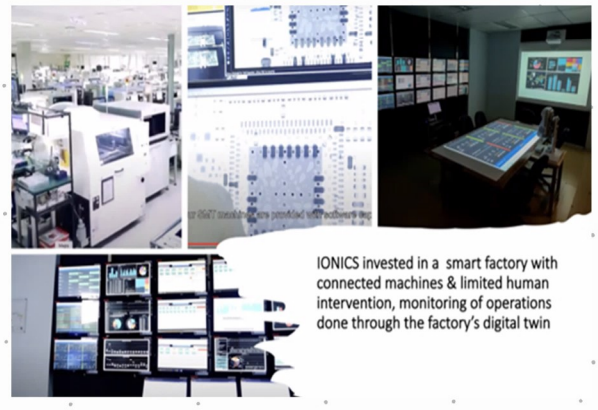
AI IN SMART CITIES



DOST also pursues initiatives to address challenges relating to sustainable urban development and smarter cities.



AI FOR INDUSTRY 4.0



IONICS invested in a smart factory with connected machines & limited human intervention, monitoring of operations done through the factory's digital twin

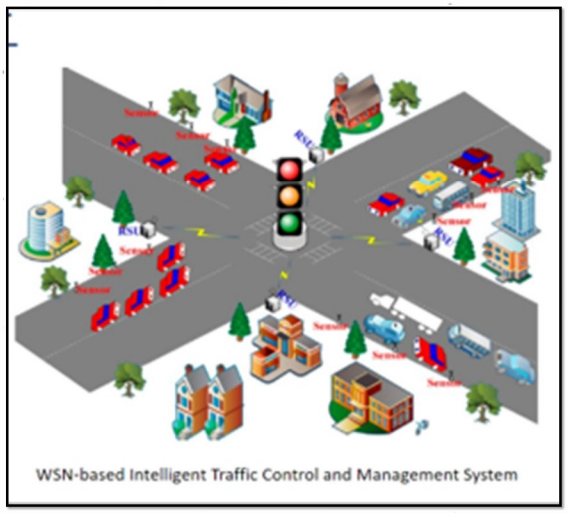
- Industrial IoT
- Machine to Machine Interaction
- Machine Vision
- Integrated sensors and actuators

RESEARCH AND DEVELOPMENT

AI APPLICATIONS AND OPPORTUNITIES FOR INDUSTRIES

AI FOR TRAFFIC CONTROL MANAGEMENT

- Intelligent Traffic Control and Management Using Sensors
- Intelligent Traffic Lights
- Web and Mobile Based Traffic Monitoring System and Applications



WSN-based Intelligent Traffic Control and Management System

Optimal Locations and Allocation of Personnel (OLAP) at Checkpoints during the Coronavirus Lockdown and Manual Development for Metro Manila and other Regions

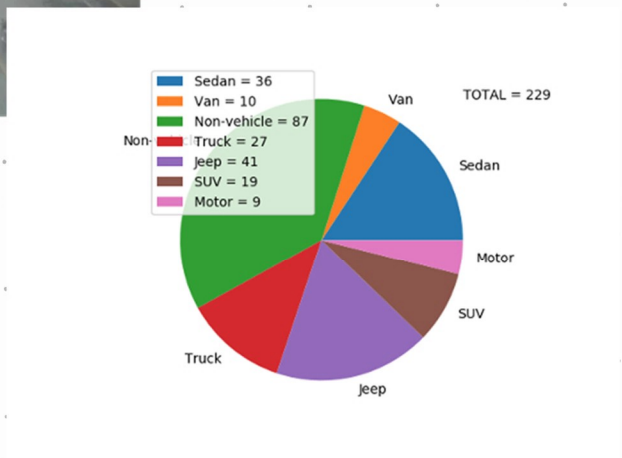
AI APPLICATIONS AND OPPORTUNITIES FOR INDUSTRIES

TITAN - vision based traffic information and analysis

Titan is a vision based traffic information and analysis system developed by DLSU which takes as an input a traffic video stream or a traffic video file.

The system can produce reports such as vehicle count per classification, speed estimate, and air quality estimate. The pre-defined vehicle classifications are sedan, SUV, truck,van, and jeepney.

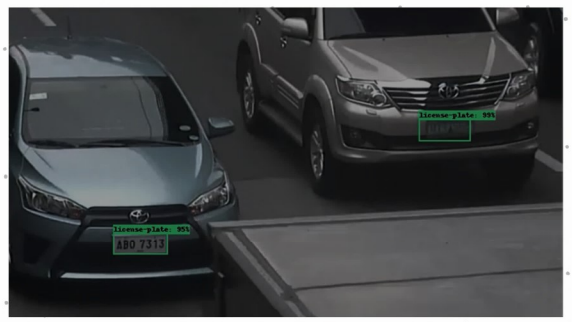
The system uses existing traffic video sources, including DLSU Archers eye and MMDA.



AI APPLICATIONS AND OPPORTUNITIES FOR INDUSTRIES

AI FOR TRANSPORT

Contactless apprehension of traffic violators on 24-hour basis and all -vehicle detection system (CATCH-ALL)



Currently, CCTV-Based non-contact apprehension of traffic violators rely on Human Operators who watch video recording of CCTVs to identify traffic violators.

Apart from being exhausting for the operators, the current system is inefficient and not capable of monitoring simultaneous events.

CATCH-ALL uses Artificial Intelligence (AI) in analyzing CCTV-Based videos in traffic management agencies. It is able to monitor, detect, and generate report of traffic violations on the road. Human operators will take care of validation and file reporting of the violations. The system can help in eliminating potential corruption committed in traffic violations.

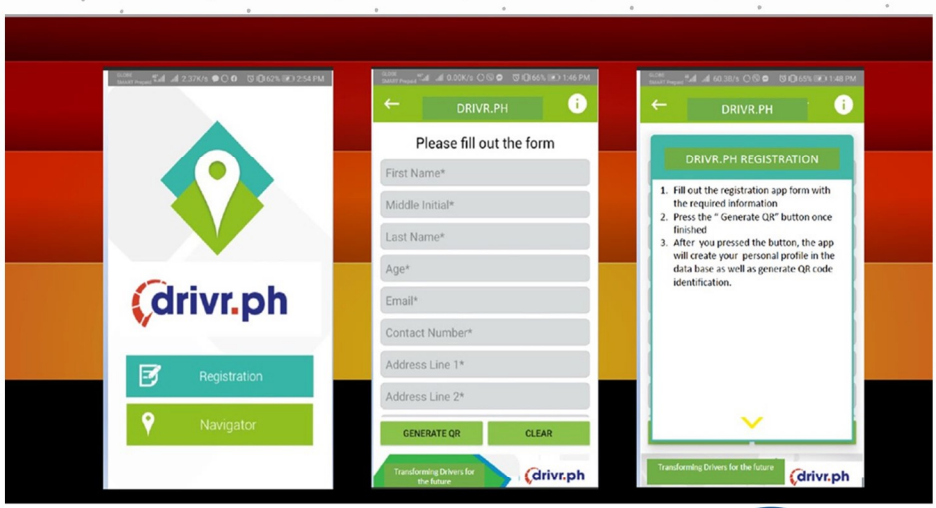
AI APPLICATIONS AND OPPORTUNITIES FOR INDUSTRIES

DRIVER.PH

Drivers' Roadworthiness Improvement, Verification, Education, and Readiness for the Philippine Logistics Industry

To help make our roads safer, the Department of Science and Technology (DOST) together with the Technological Institute of the Philippines (TIP) and Quicktrans Cargo Moving, Inc. officially inked the research collaboration agreement to develop software and hardware solutions to train Filipino truck drivers using Internet of Things (IoT)

The DRIVER PH project will combine information communication technology (ICT) solutions to monitor and record the driving attitude of drivers such as their sudden acceleration, stopping, swerving, and turning. It will also determine the degree of driving knowledge of drivers through a gamified assessment with emphasis on technical driving and vehicle roadworthiness know-how.



S4CP NICER RDLEAD CRADLE BIST

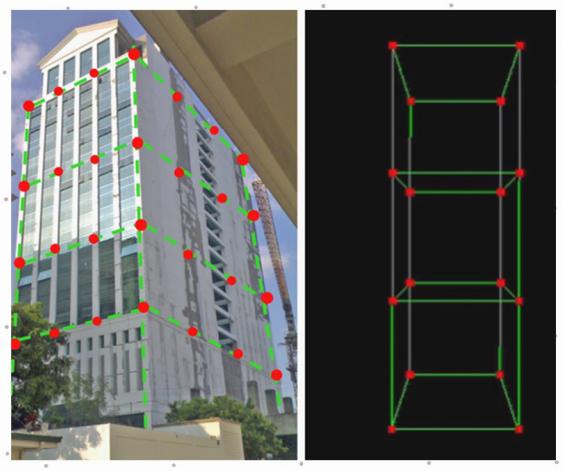
CRADLE

RESEARCH AND DEVELOPMENT

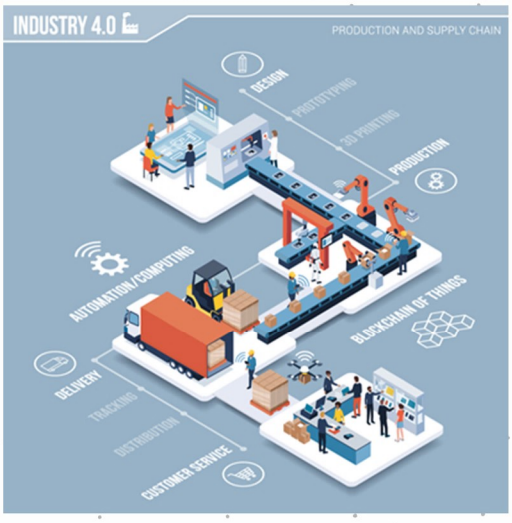
AI APPLICATIONS AND OPPORTUNITIES FOR INDUSTRIES

AI FOR THE INFRASTRUCTURE SECTOR

- Better Design of Buildings through Generative Design
- Risk mitigation
- Project planning
- Construction safety
- Post-construction



AI FOR PRESCRIPTIVE MAINTENANCE IN MANUFACTURING



Non-intrusive Sensor-based Prescriptive Maintenance Platform for Wire Manufacturing Factory

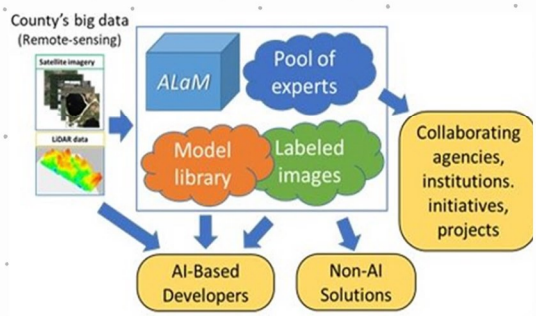
RESEARCH AND DEVELOPMENT

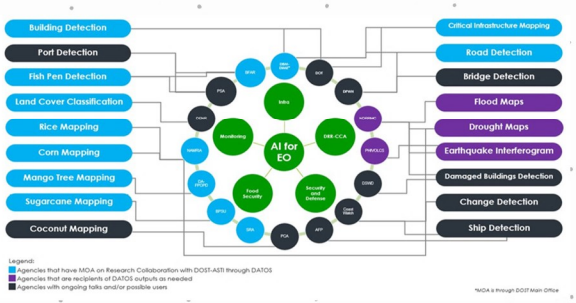
AI FOR DISASTER RISK REDUCTION

- Dams Water Release and River/Tributary Control Systems
- Optimization of Forecast for Ship-routing
- Bow Echo Detection for Tornado Warning
  Impact-based Forecasting: landslide, flooding, severe wind and storm surge
- Deep learning approach for automatic recognition of seismo-volcanic events
- Chatbot development services, among many other things

AI IN EARTH OBSERVATION

- Automated Labeling Machine
- Geomatics solutions





AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

AI IN CROP YIELD IMPROVEMENT

Improving Production Efficiency and Cane Yield in a Sugarcane Block Farm Using an Automated Furrow Irrigation System

Implementing Agency: Central Luzon State University

The project is aimed at introducing a robust, alternative option to facilitate precision irrigation in sugarcane production for 20% increase in water application efficiency and productivity.

Using:
- Furrow Irrigation
- Subsurface drip irrigation

Results to

Increase in sugarcane productivity

Furrow irrigation remains the most attractive option when water charges are low and water availability are high

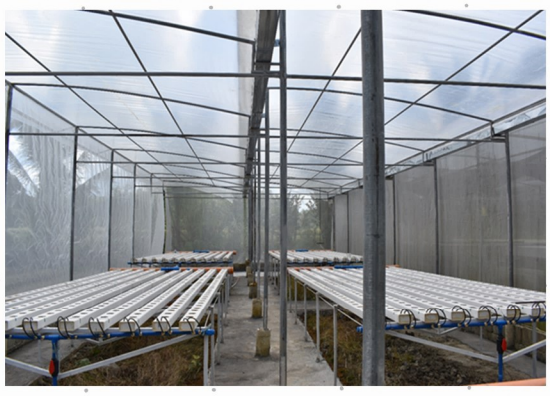
RESEARCH AND DEVELOPMENT

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

Management of Unified Control and Automated System for Smarter Hydroponics Greenhouse

Implementing Agency: Iloilo Science and Technology University in collaboration with Ephrathah Farms

The project aims to design, develop, and implement a smart management system for hydroponics greenhouse production of lettuce. The system involves software and hardware components for controlling, monitoring, and automating the provision of correct level of nutrients for optimized plant growth



Development and Installation of an Autonomous Navigation System Platform in a Hand Tractor for Agricultural Application

Implementing Agency: University of Santo Tomas

The general objective of this project is to develop an autonomous navigation hand tractor for tillage operation.

This will make land cultivation easy and efficient and will reduce labor cost in rice production without much involvement of the farmer.

RESEARCH AND DEVELOPMENT

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

AIoT Aided Farm Management for the Optimized Production of Selected High Value Crop (MECO-TECO)

Implementing Agency: University of the Philippines Los Baños

The general objective of the project is to develop and apply AIoT technology for tomato production by monitoring micro environmental variables (such as but not limited to temperature, relative humidity, solar irradiation, and soil water penetration) and controlling fertigation system in partnership with National Tsing Hua University (NTHU) of Taiwan

Near-real time Monitoring of Banana Nutritional Status and Yield Forecasting using Airborne Multispectral Imaging

Implementing Agency: University of Southeastern Philippines

The main objective is to explore the use of airborne multispectral imaging to monitor near real-time nutritional status of 'Cavendish' banana to improve yield and reduce fertilizer inputs.

RESEARCH AND DEVELOPMENT

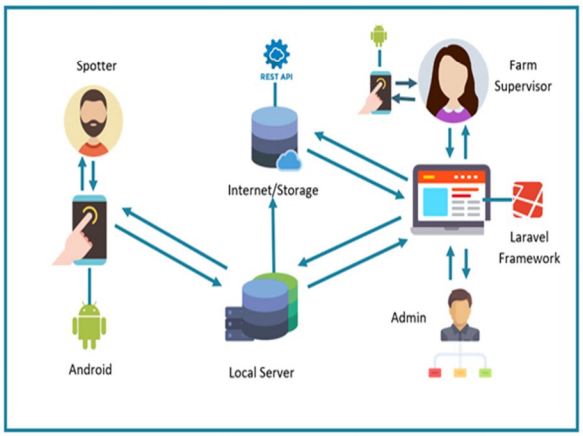
AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

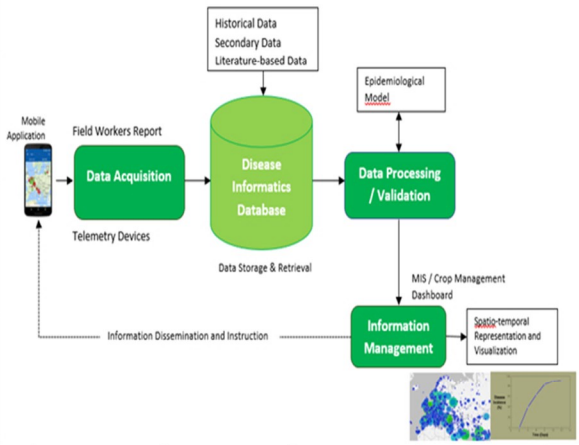
AI IN CROP DISEASES SURVEILLANCE AND MAPPING

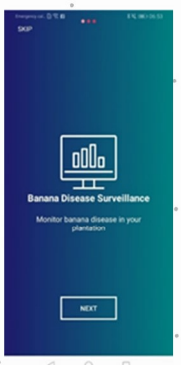
Synergize Academe-Industry Research Undertaking to Improve Productivity through Banana Diseases Surveillance System

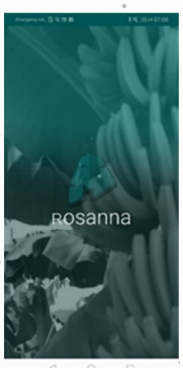
Implementing Agency: University of Southeastern Philippines in collaboration with Hijo Resources Corporation

The project designed and developed a mobile agricultural disease surveillance system that is used to gather and disseminate disease related information at farm level.









The developed ROSANNA application provides Near Real-time information system for a Quick response system and data-driven decision making in controlling banana diseases (e.g. Black Sigatoka, Banana Bunchy Top Disease (BBTD), etc.) for Hijo Resources Corporation (HRC).

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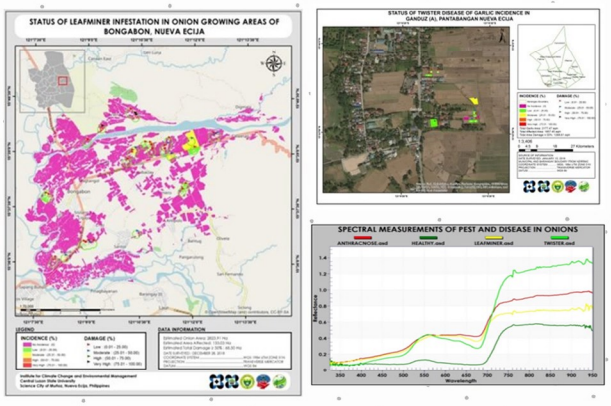
RESEARCH AND DEVELOPMENT

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

Surveillance, Detection and Mapping of Leaf Miner and Anthracnose-Twister Disease of Onion and Garlic in Nueva Ecija

Implementing Agency: Central Luzon State University

The general objective of the project is to detect and monitor major pests and diseases of onion and garlic (leaf miner and anthracnose-twister disease) in Nueva Ecija to prevent crop damages and losses



Demeter's Eyes: An Embedded System for Smart Detection, Recognition, and Mapping of Phytoplasma Disease (Witches' Broom) in Cassava Plants

Implementing Agency: Isabela State University in collaboration with EDCOR Development Cooperative

The main objective is to design, develop, establish, and implement an embedded system for smart detection, recognition, and mapping of Cassava Phytoplasma Disease (CPD) using Aerial Unmanned Vehicle (AUV) and deep learning technology.

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

AutoPPLex: Automated Pest Infestation and Parasitism Level Estimator

Implementing Agency: De La Salle University

The general objective of the project is to develop AutoPPLex, a tool in the form of a mobile app, that will accurately estimate the efficiency of a given biological control agent.

It will be used as basis for appropriate response for augmentation and conservation of the biological control agent.

Source: https://www.intechopen.com/books/natural-remedies-in-the-fight-against-parasites/biological-control-of-parasites-2017-07

RESEARCH AND DEVELOPMENT

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

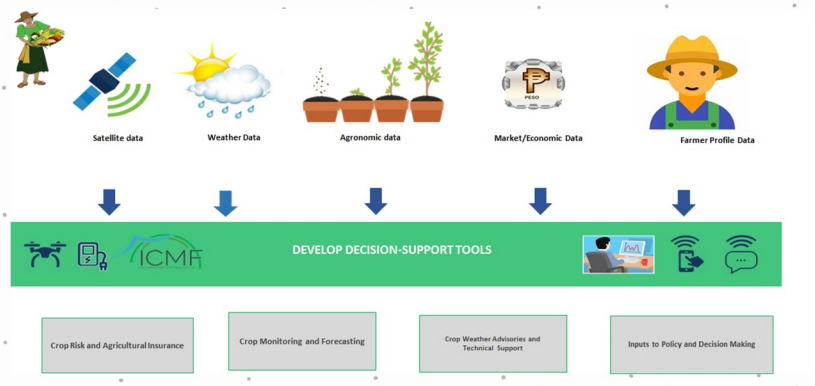
AI IN CREATION OF DECISION SUPPORT TOOLS

Smarter Approaches to Reinvigorate Agriculture as an Industry in the Philippines (SARAI)

Implementing Agency: University of the Philippines Los Baños

SARAI is an action-research program, funded by the Department of Science and Technology – Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD), working towards reducing climate risks by providing agricultural stakeholders with site-specific crop advisories.

It will provide crop advisories which are targeted for rice, corn, banana, coconut, coffee, cacao, sugarcane, soybean, and tomato. The crop advisories focus on integrating local weather data and drought forecast with farm management activities, specifically nutrient and water



RESEARCH AND DEVELOPMENT

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

SARAI's component projects

Enhanced Operation and Connectivity of Automatic Weather Stations and Unmanned Aerial Vehicle Units for Crop-Environment Monitoring and Forecasting

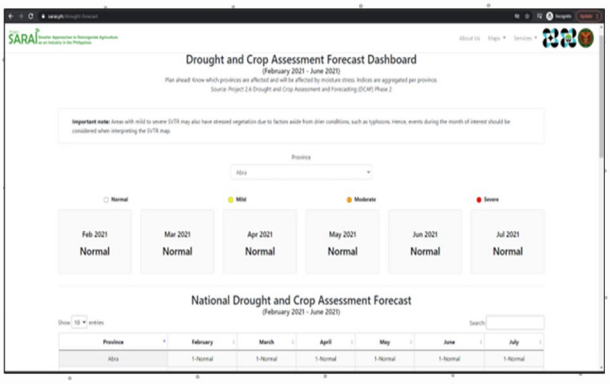
Implementing Agency: University of the Philippines Los Baños

The general objective of the project is to use the Near-infrared Reflectance (NIR) imagery together with the Unmanned Aerial Vehicle (UAV) for crop monitoring and data validation of remotely-sensed and plant-specific data.

Drought and Crop Assessment and Forecasting

Implementing Agency: University of the Philippines Diliman

The main objective is to develop technologies for agricultural drought assessment, monitoring and forecasting; and establish protocols for disseminating advanced drought warnings to optimize the flow of information and initiate appropriate actions to reduce drought impacts.



AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

SARAI's component projects

Bantay SARAi (Agricultural Market Information System

Implementing Agency: University of the Philippines Los Baños

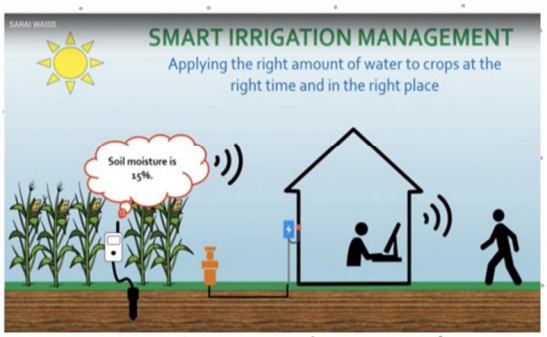
The general objective of the project is to collect, monitor, and generate analytics that can be used by various stakeholders, most especially by Municipal Agriculture Offices in support of their regular functions. The information that will be generated by the system can provide Local Government Units timely and reliable agricultural information to help ensure that agricultural surpluses or shortages are avoided, and agricultural production planning at the local and regional levels can become more efficient and effective.

Smarter Technology for Crop-Water Management

Implementing Agency: University of the Philippines Los Baños

The main objective is to establish site-specific crop water management using precision agriculture technologies, specifically to design, develop, and evaluate the performance of a smart irrigation decision support system for crops.

WAISS is a smart monitoring and decision platform that can provide farmers and crop growers a science- and data-based approach for crop irrigation.



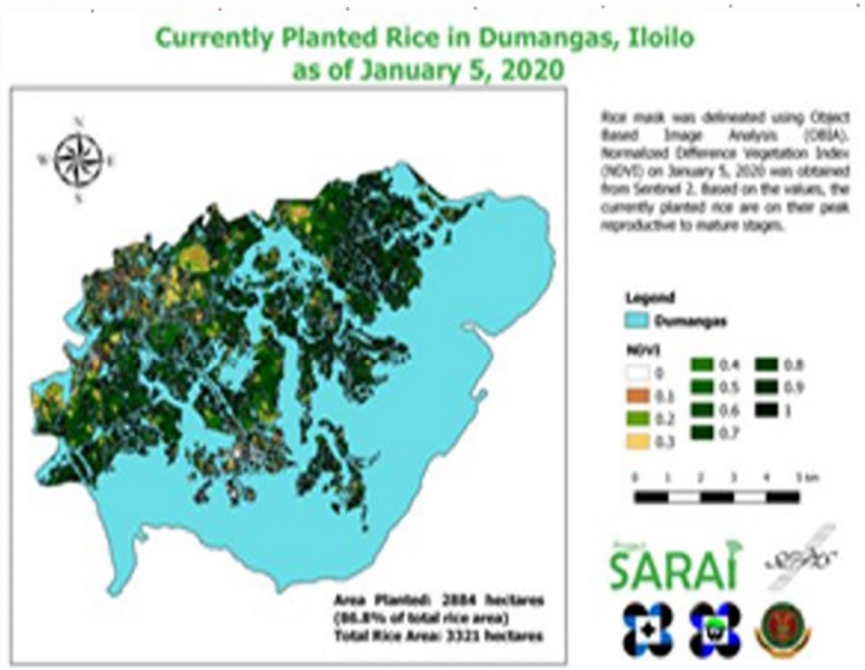
AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

SARAI's component projects

Community-Level SARAI-Enhanced Agricultural Monitoring System and Dissemination of Crop Advisories

Implementing Agency: University of the Philippines Los Baños

CL-SEAMS can be used to monitor, on a near real-time and site-specific basis, the actual area planted to a crop and its condition based on free and daily updated satellite images (from US and Europe Union).



Source: NASA

RESEARCH AND DEVELOPMENT

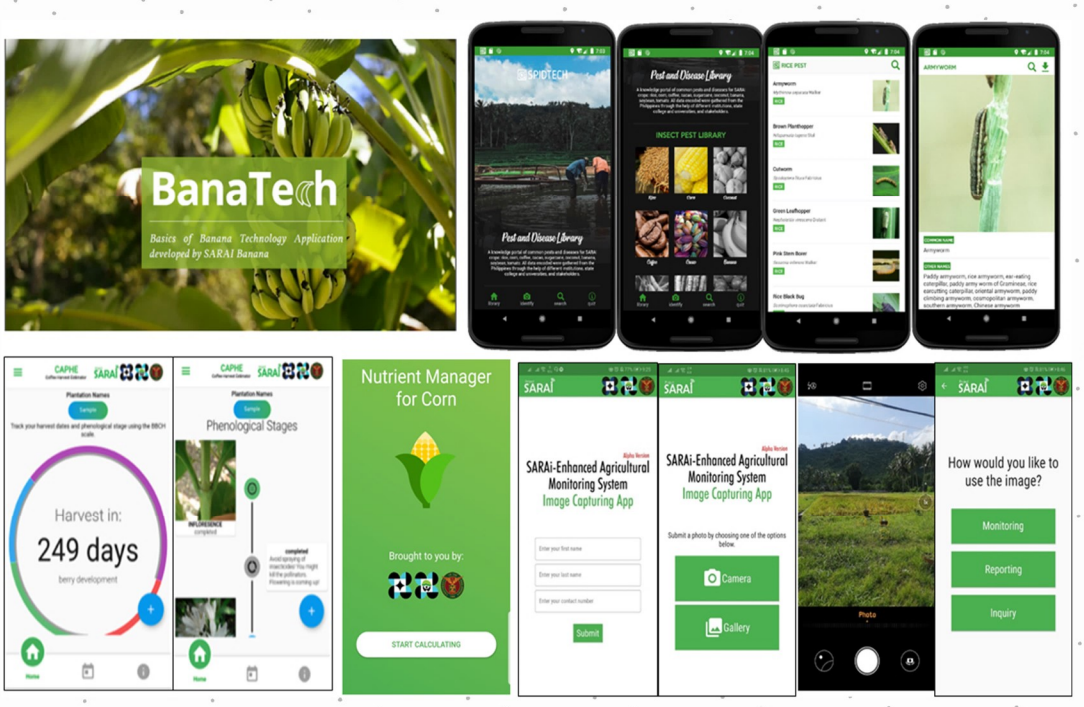
AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

SARAI's Technologies

SARAI Knowledge Portal

Houses various inputs of the program's components in a form that can be used by the farmers/users.

Mobile application for different crops



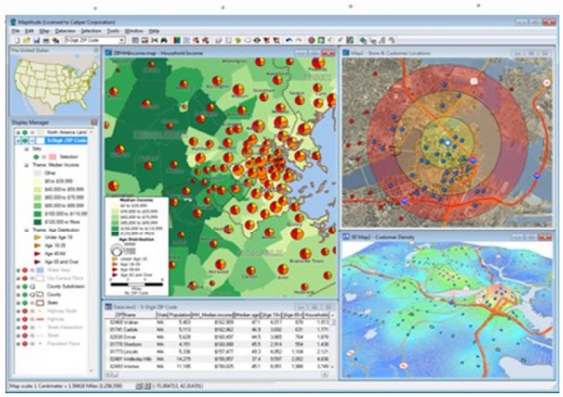
RESEARCH AND DEVELOPMENT

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

Optimization and Pilot Testing of the Mechanization Resource Mapping, Monitoring and Data Analysis System (M3DAS) for Mechanization Planning, Implementation and Policy Data Generation for Government Departments and LGUs

Implementing Agency: University of the Philippines Los Baños

The general objective of the project is to optimize, and pilot test the Mechanization Resource Mapping, Monitoring and Data Analysis System (M3DAS) for better functionality and ease of use.



Development and Use of a GIS-based System for Giant Swamp Taro Production, Processing and Utilization in Agusan del Sur

Implementing Agency: Agusan Del Sur State College of Agriculture and Technology

The main objective is to develop a GIS-based information to strategize the production, processing and utilization of Giant Swamp Taro in Agusan del Sur through data interpretation, mapping and assessment.

RESEARCH AND DEVELOPMENT

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

Appropriate Instrumentation and Data Acquisition System for Performance Testing of Agricultural Machinery

Implementing Agency: University of the Philippines Los Baños

The main objective of this project is to develop an integration system of appropriate instrumentation and data acquisition for the testing of selected agricultural machinery.

Supply Chain Management: Cacao Agro-Logistics in the Southern Philippines Context

Implementing Agency: University of Southeastern Philippines

The general objective of the project is to assess the supply chain of cacao industry vis-à-vis develop the traceability system for the Philippine cacao industry in Southern Philippines.

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

AI TO IMPROVE PRIMARY PROCESSES

Design, Development and Optimization of an Automated Combined Mechanical Demucilager-Fermenter-Dryer for Cacao

Implementing Agency: University of Southeastern Philippines

The project aims to design, develop, and to optimize the operating conditions of the automated combined mechanical cacao demucilager-fermenter dryer.

Development of Giant Swamp Taro Chipping Machine

Implementing Agency: Agusan Del Sur State College of Agriculture and Technology

The main objective is to design and develop a chipping machine suitable for the production of fresh taro chips from giant swamp taro (GST) (Cyrtosperma chamissonis). The design will use sensors to determine the exact dimension of GST.

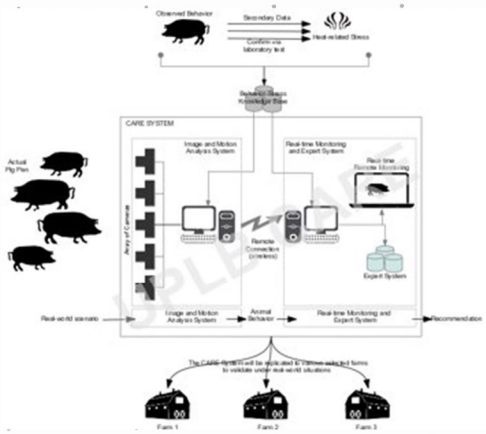
AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

AI IN LIVESTOCK

Development of computer-aided remote expert (CARE) system model for enhancing productivity and efficiency in swine farms

Implementing Agency: University of the Philippines Los Baños

The general objective of the project is to develop CARE System Model for commercial piggery farm that will automate the detection of heat stress and oestrus related responses through web-based real time video recording system. The use of Radio Frequency Identification (RFID) system will also be incorporated to enable the tracking and identification of the animals as they are transported within the farm.



Source: UPLB - https://sites.google.com/site/uplbcare/

ChicIoT: An IoT-Based Smart Poultry Building Environment and Growth and Health Status Monitoring and Modelling

Implementing Agency: University of Southeastern Philippines in collaboration with Tetra Consulting Company

The main objective is to set-up a monitoring and disease surveillance system based on WSN core framework and computer vision techniques in VICO Farms in San Rosario, Agro Industrial Development Corporation (AIDC), Brgy. Mahayahay Rosario, Agusan del Sur.

RESEARCH AND DEVELOPMENT

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

AI IN FISHERIES

Fisheries catch assessment using GPS trackers and effort survey of municipal and commercial fishers in Mindanao

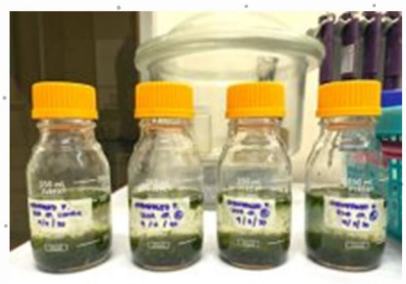
Implementing Agency: Davao Oriental State College of Science & Technology

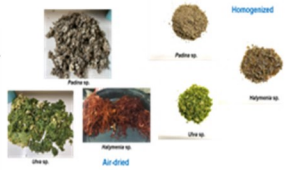
The general objective of the project is to map and determine the fishing effort distribution of municipal (hook and line) and commercial (purse seine and ringnet) fishers in selected sites of Mindanao using GPS trackers.

Development of Macroalgae-Fermented Feed Additive for Chicken using Microbial System

Implementing Agency: University of San Carlos

The main objective is to develop an intelligent microbial systems for the formulation and production of macroalgae-fermented super-feed additive using functional microorganisms.





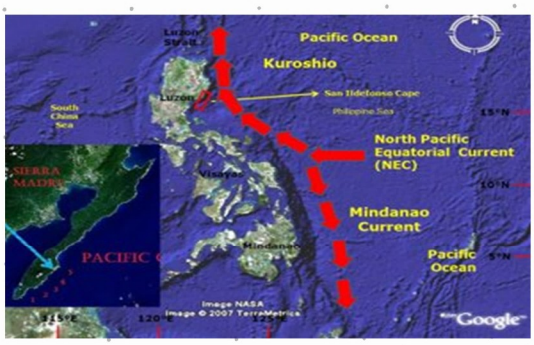
RESEARCH AND DEVELOPMENT

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

Kuroshio Current Observing System in the Philippines: Remote observations of the interactions of the Kuroshio with Internal Tides and Mesoscale Currents in Luzon Strait by High Frequency Doppler Radio Scatterometer in the Philippines

Implementing Agency: University of the Philippines Diliman

The general objective of the project is to deploy two systems of land-based High Frequency Doppler Radio Scatterometers (HFDRS) on the North coast of Luzon, with the eventual aim of mapping the surface currents, surface waves and wind direction.



Source: https://www.researchgate.net/figure/Map-of-the-Philippines-showing-the--regions-where-Kuroshio-originates-with-San-Ildefonsofig1_286044460

Information System for Marine Fishery Morphology and DNA Sequence in Mindanao (under ABRAHAM program)

Implementing Agency: University of the Philippines Mindanao

The main objective is to develop a database which will store morphology and DNA sequence, 2D and 3D visualizations, location mapping, and a detection/classification tool (analysis module) for identifying similarity/dissimilarity of marine species samples

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

AI IN FORESTRY, ENVIRONMENT AND NATURAL RESOURCES

Development of Decision Support System for Enhancing Climate Change Resiliency of Smallholder Upland Farmers in Selected Communities of CALABARZON, Philippines

Implementing Agency: University of the Philippines Los Baños

The general objective of the project is to develop a decision support system that will lead towards building climate resilient farming communities in CALABARZON.

Rubber, Coffee, and Cacao: Building Site Matching Functions for Improved Upland Development

Implementing Agency: Ecosystems Research and Development Bureau-DENR

The main objective is to develop site matching functions for four economically important tree crops to aid farmers in selecting the best sites for planting these crops.

RESEARCH AND DEVELOPMENT

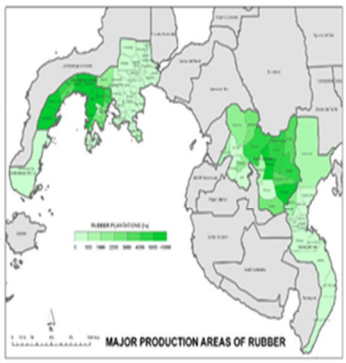
AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

GIS-Based Inventory and Sustainability Assessment for Rubber and Cacao in Major Production Areas of the Philippines

Implementing Agency: University of the Philippines Los Baños

The general objective of the project is to develop a GIS-based data management framework for Philippine plantations of rubber and cacao.

Dr. Nathaniel Bantayan of UPLB discusses the project.



National Research and Development Project for Watershed Management in the Philippines

Implementing Agency: UPLB, MMSU, ISU, BU, CMU, ERDB

Founded on the vision of enhancing science and technology-based watershed and ecosystem management, the project aims to develop a network of learning watersheds and watershed management decision support system.

Dr. Rex Victor O. Cruz presenting the project overview,
(Image credit: Eirene Grace C. Zaragoza, FERD, PCAARRD)

RESEARCH AND DEVELOPMENT

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

Resource Assessment and Utilization of Indigenous Fruit Trees in CALABARZON

Implementing Agency: University of the Philippines Los Baños

The general objective of the project is to assess the diversity and conserve indigenous fruit trees in CALABARZON that can be utilized in the development of natural food colorant and flavoring agent.

Inventory and Assessment of Flora, Fauna, and Macrofungi in Mt. Banahaw de Lucban

Implementing Agency: South Luzon State University

The main objective is to determine the current status of biodiversity, flora, fauna and macrofungi in Mt. Banahaw de Lucban (MBdL).

AI APPLICATIONS AND OPPORTUNITIES FOR AGRICULTURE

Program: Ex-situ Conservation of Threatened Philippine Plants: Restoring Philippine Plant Resources and Environment

Project 2: Plant Conservation Education and Database Management for Advocacy and Promotion of Threatened Philippine Plants

Implementing Agency: University of the Philippines Los Baños

The general objective of the project is to educate about conservation of threatened Philippine plants through an interdisciplinary approach using art, science, and communication. The project will develop and maintain a geodatabase of the collection and develop communication, advocacy strategies, and approaches for threatened Philippine plants.

Integration of traditional and modern bioproduction systems for a sustainable and resilient future under climate and ecosystem changes (ITMoB)

Implementing Agency: University of the Philippines Los Baños

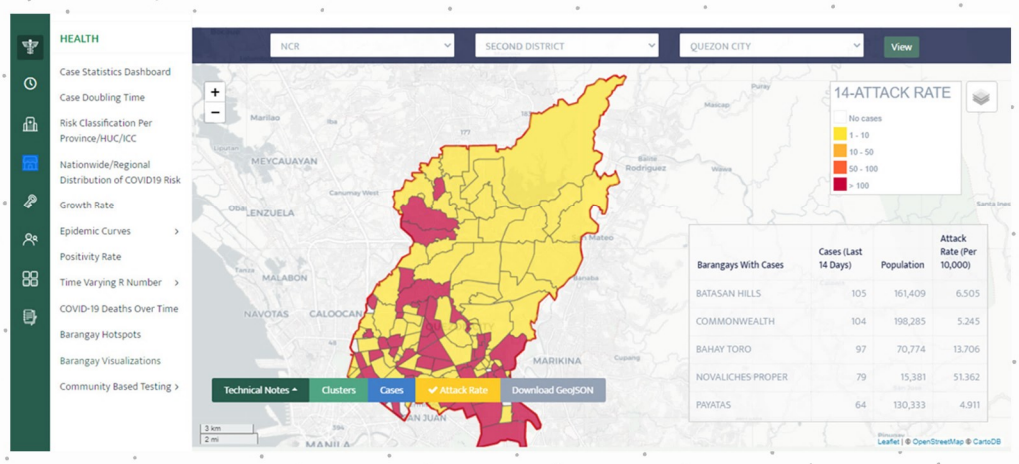
The main objective is to determine which combinations of traditional bioproduction systems and modern bioproduction systems are most likely to lead to a sustainable and resilient future in Japan, the Philippines, and Indonesia.

RESEARCH AND DEVELOPMENT

AI IN HEALTH

Feasibility Analysis of Syndromic Surveillance using Spatio-Temporal Epidemiological Modeler (FASSSTER) for LGU Epidemiology Surveillance Units: Enhancements for Monitoring and Predicting the Spread of Coronavirus Disease 2019

Implementing Agency: : Ateneo De Manila University, DOH – Epidemiology Bureau (DOHEB) and the UP Manila – National Telehealth Center (UPNTHC)



FASSSTER
Feasibility Analysis of Syndromic Surveillance Using a Spatio-Temporal Epidemiological Modeler For Early Detection of Diseases

Source: PCHRD 2020 Annual Report

Used to forecast the effect of health systems capacity and specific interventions, such as community quarantine measures, optimal testing, and compliance to minimum health standards, on the future number of COVID-19 cases in specific areas over time.

Part of the FASSSTER enhancements is the addition of a complementary passive contact tracing application called Tanod COVID. It is a companion application of FASSSTER that enables constituents to report their COVID-19-related symptoms to their local health authorities using free SMS.

RESEARCH AND DEVELOPMENT

AI IN HEALTH

eHATID Interoperability Layer

Implementing Agency: : Ateneo De Manila University Institute of Philippine Culture (ADMU-IPC)

Source: PCHRD 2020 Annual Report

"eHATID Interoperability Layer" or Smarter and Integrated Local Health Information Systems (SMILHIS)" aims to shorten the processing time of releasing health certificates and work permits in the municipality of Pulilan, Bulacan

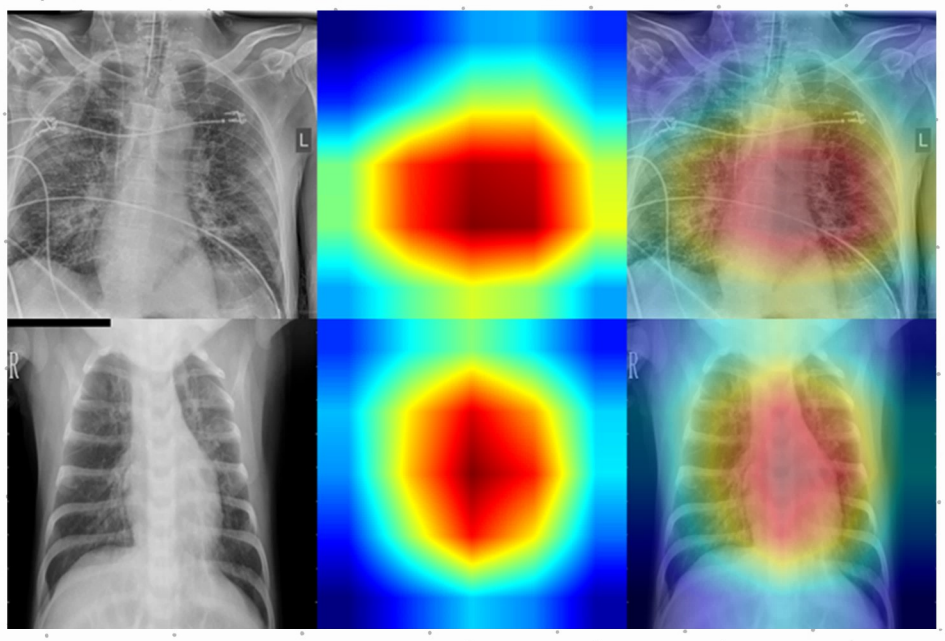
The SMILHIS is currently being utilized by the RHU-Sanitary Office, Treasury Office, and the laboratory and diagnostic center in Pulilan City. As of August 2019, there is a total of 590 applications and 198 health IDs, health certificates, and work permits generated through the system.

RESEARCH AND DEVELOPMENT

AI IN HEALTH

A Retrospective Study on the Accuracy of AI-Powered Reading of Chest X-Rays in the Diagnosis of COVID-19 Pneumonia in a Tertiary Hospital (CHERISH Study)

Implementing Agency: The Medical City



The CHERISH Study aims to develop and determine the diagnostic accuracy of AI-powered Chest X-ray reading software for COVID-19 pneumonia as a tool for diagnosing the disease. Several studies suggest that CT-scan combined with clinical conditions, lung lesion density, morphological characteristics and other associated signs, has a high accuracy for the early diagnosis of COVID-19 and acts as the differential diagnosis from Community-acquired Pneumonia.

Through these parameters and the utilization of machine learning, the developed software may be used as a tool to enhance the diagnostic capability of facilities and improve management of pneumonia that was of COVID-19 origin.

RESEARCH AND DEVELOPMENT

AI IN HEALTH

AI-driven Integration of Genomic, Ultrasound, Serum Biomarkers, and Clinical data for Early Diagnosis of Liver Cancer

Implementing Agency: : UP Manila, UP Los Banos, The Medical City, CARE Hospital Network, and Domingo AI Research Center (DARC).

Aims to study the clinical and genomic profile of Filipinos to identify and establish genetic variations that contribute to liver cancer diagnosis and prognosis.

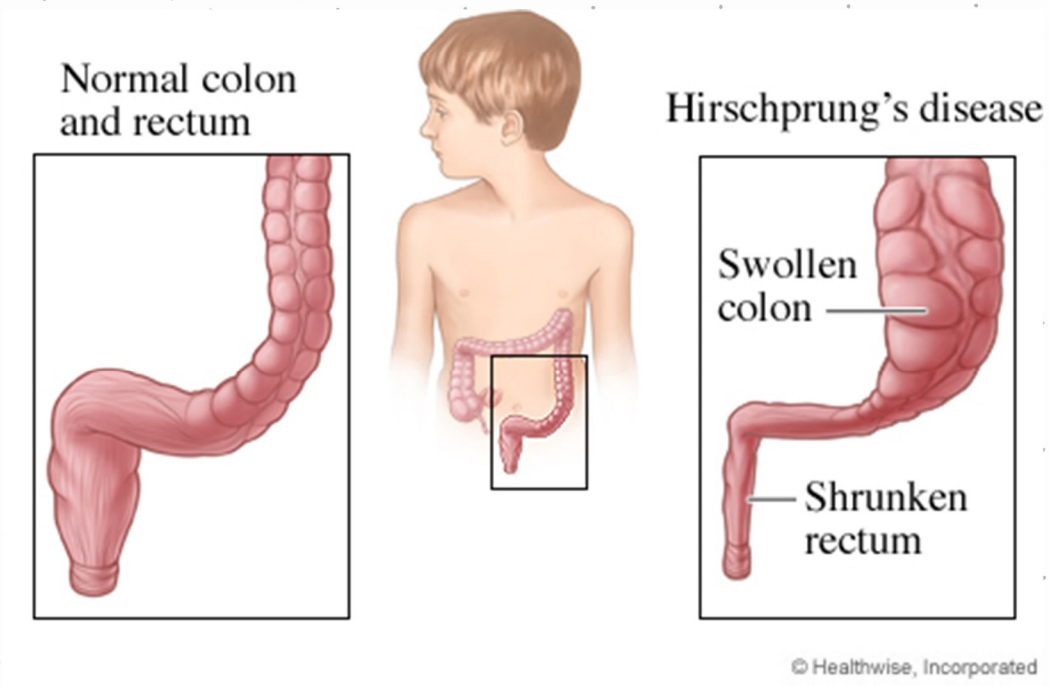
The software is envisioned to provide healthcare professionals with actionable insights to manage disease risks, improve diagnosis, and plan appropriate interventions for a healthier population.

RESEARCH AND DEVELOPMENT

AI IN HEALTH

Digital Histologic Image Analysis Software for Hirschsprung's Disease

Implementing Agency: : UP Manila



The program aims to develop an image analysis software using machine learning techniques to assist in the diagnosis of Hirschsprung's Disease.

Hirschsprung's Disease is a congenital condition that affects the colon causing problems with passing stool. The development of the AI-assisted analysis software will provide a great impact in the overall management of the disease and may increase the survivability of fragile newborn in their first days in life.

RESEARCH AND DEVELOPMENT

AI IN HEALTH

Telehealth Services for the Treatment of Psychiatric Conditions

Implementing Agency: : Southern Philippines Medical Center

Source: PCHRD 2019 Annual Report

Utilizing video conferencing, the program enables online consultation between psychiatrists and their patients through software like Skype and Chrome box video recording technology.

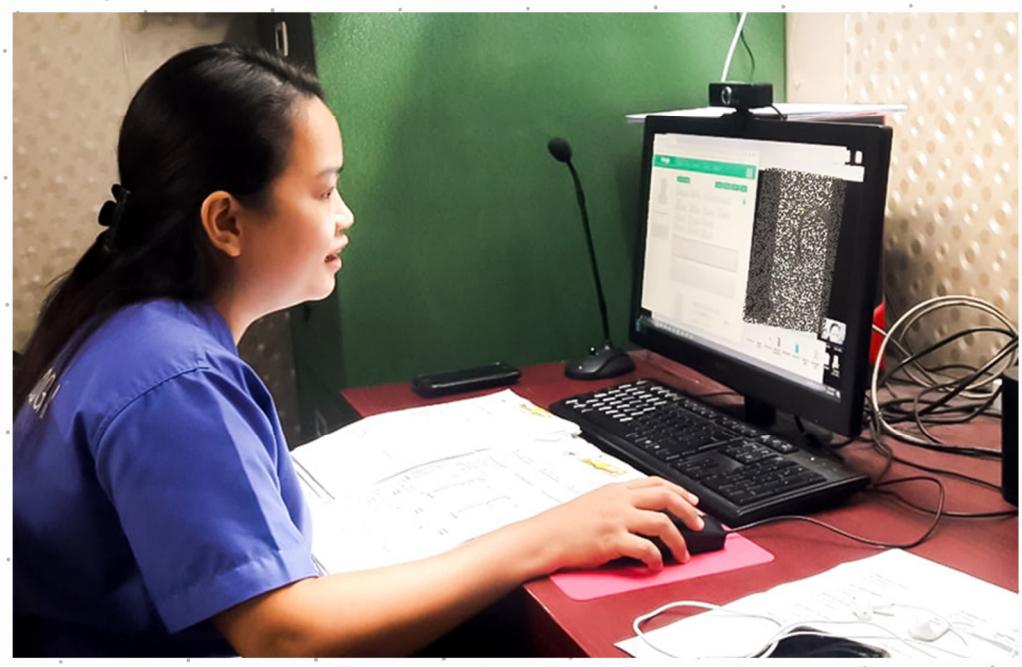
Facilitated by psychiatrists from the SPMC, the program is currently utilized by the J.R Borja General Hospital (JRBGH) in Cagayan De Oro City. From July 2018 to February 2019, a total of 76 psychiatric patients were diagnosed through the program.

RESEARCH AND DEVELOPMENT

AI IN HEALTH

Aruga: Empowering health professionals and caregivers of kids with cancer

Implementing Agency: University of the Philippines Open University



Source: PCHRD 2020 Annual Report

This initiative is a web-based pediatric palliative care service provider offering three services in one platform, namely:

1. provision of learning materials for healthcare professionals and primary caregivers of pediatric patients with cancer,

2. development of a telemedicine platform which connects primary care physicians and patients with oncologists in regional tertiary hospitals, and

3. establishment of a pediatric cancer registry

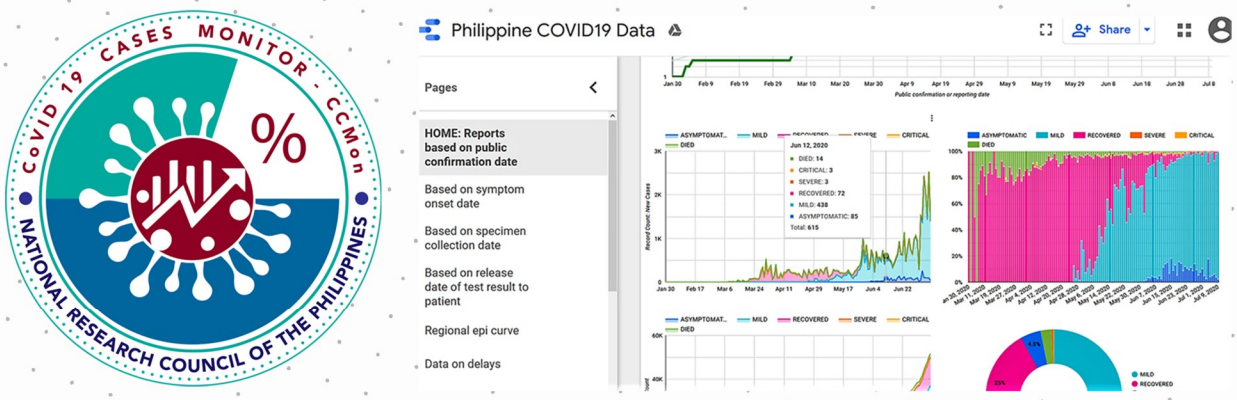
Through ABC's telemedicine platform, pediatric patients who are originally consulting with oncologists from tertiary hospitals may avoid long hours of travel and save on transportation expenses by availing telemedicine-enabled follow-up consultations in the nearest Rural Health Unit or Health Center.

RESEARCH AND DEVELOPMENT

AI IN BASIC RESEARCH

Gender-specific Insights Based on COVID-19 Epidemiological and Socio-economic Data: COVID-19 Cases Monitor "CCMon"

Implementing Agency: UPLB Institute of Mathematical Sciences and Physics



Source: https://nrcp.dost.gov.ph/latest-news/606-council-unveils-first-gender-sensitive-covid-19-online-dashboard-for-local-policy-decision-makers-academics

The dashboard is unique among other existing local COVID-19 dashboards in breaking down datasets into sex-disaggregated graphs for more nuanced insights to aid decision-makers, government administrators, academics, and the general public.

This monitoring tool is a graphical user interface that provides at-a-glance views of the number of COVID-19 cases or progress reports across the National and Local Government Units, Regional, Provincial, Municipality, Barangay. This was created through the mined epidemiological datasets on COVID-19 (especially sex disaggregated variables and features) and connecting this information to social and economic datasets.

RESEARCH AND DEVELOPMENT

AI IN BASIC RESEARCH

NRCP Membership Data Analytics

Membership data from the Scientific Knowledge Management System (SKMS) of NRCP was subjected to data analytics to develop administrative systems to complement SKMS

Scientific Knowledge Management System

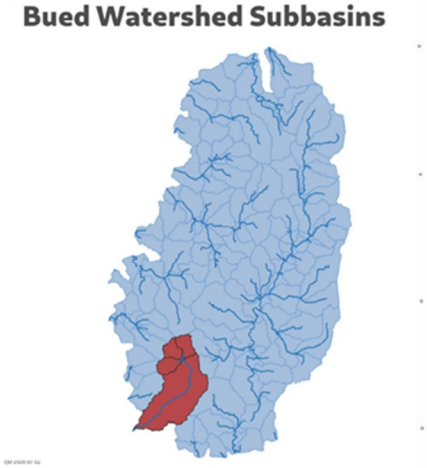
Source: https://nrcp.dost.gov.ph/

Soft Computing for Impact Assessment Methodology of Sustainable Ecotourism In Coastal Communities with an Integrated Fuzzy Multi-attribute Decision-making Approach

This study aims to generate an integrated mathematical framework for the assessment of ecotourism on the sustainability of coastal communities.

Project DANUM: Decision Support and Nurturing Management of Watersheds

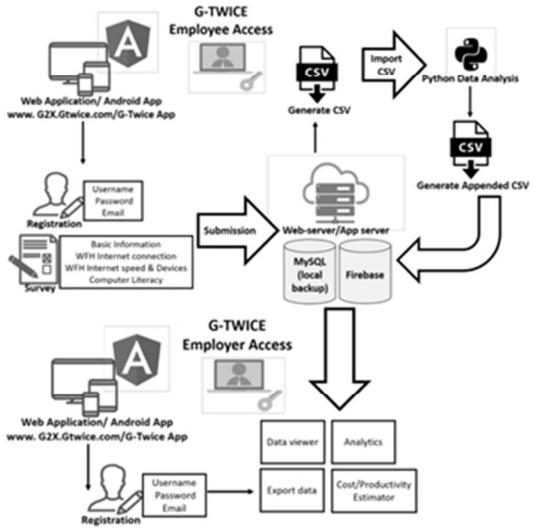
To provide Local Government Units (LGUs), line agencies, and communities a technology enhanced information and decision support system to conserve and protect the rivers and watersheds of the Cordilleras. The technology enhanced decision support system will include front-end and back-end systems. The frontend systems will include human sensors, physical sensors, drones, UAVs, and post processing in GIS.



RESEARCH AND DEVELOPMENT

AI IN BASIC RESEARCH

G-TWICE (Government Telecommuting Work Infrastructure Cost Estimator)



The project aims to develop the G-TWICE (Government Telecommuting Work Infrastructure Cost Estimator) mobile application to provide an estimate of the telecommuting cost of a given government employee or a given government employer implementing a work-from-home setup in their respective household.

Optimal Design of a Polygeneration System Using Various Clean And Low Carbon Technologies Using Fuzzy Mathematical Programming Approach

The general objective of the project is to develop a model to optimally design a polygeneration plant while incorporating low carbon technologies to mitigate carbon emissions while producing energy.

RESEARCH AND DEVELOPMENT

AI IN BASIC RESEARCH

ATIN-Heritage and Arts for Tourism and Creative Industries (HATCI)

Source: DOST-NRCP Website

The research program which will look into and investigate the artistic and cultural dynamics of selected creative industry sectors for a much deeper perspective, understanding and support to maximize its potentials in contributing to the productivity of the creative industry sectors, as well as its potentials for agro or cultural tourism.

HATCI will also document Philippine indigenous knowledge, culture, and heritage.

MATINO – Modeling Analysis of Telework Impact in the 'New Normal'

The project aims to create an online cost and savings calculator that would allow government agencies to estimate the cost and savings of a work-from-home arrangement specific to their constraints. This calculator embeds Philippine-specific assumptions, and survey-based parameter calibration.

This is part of the research program, "Conduct of a National Work From Home Experience in the Philippine Public Sector".

POLICY AND GOVERNANCE

POLICY AND GOVERNANCE

POLICIES AND STAKEHOLDER ENGAGEMENT

Legislative agenda on development of Policies and Standards for AI

CURRENT SITUATION	INTERVENTIONS	WAYS FORWARD
Lack of policies and standards to address issues and ethical risks of AI	Launch programs to formulate AI policies, laws and standards Provision of support for the implementation of the National AI Roadmap	Fund high quality R&D to obtain high level of confidence in AI technologies Robustness, security and safety of AI products and services Transparency and explainability Accountability Fairness

In spite of the many benefits offered by AI, there are also questions on how AI will impact the BPO industry, cybersecurity and data privacy protection landscape in the country. There is a need to study the other ethical risks that can be mitigated with proper policy interventions and standards.

To address the lack of policies and standards for the various issues and ethical risks posed by AI, DOST shall launch programs that will help formulate AI policies, laws and standards to boost AI in the country while protecting our researchers, workers, and industries. Through these efforts, we hope to reach high level of confidence in AI technologies, robustness, security, and safety as well as transparency, accountability, and fairness in the coming years.

POLICY AND GOVERNANCE

AI APPLICATIONS AND OPPORTUNITIES FOR GOVERNMENT STAKEHOLDERS

Government Stakeholders

Bureau of Internal Revenue

AI for More efficient tax system and better possibilities to combat fraud in VAT, tax and social benefits

Department of Defense

Application in combat simulation and training of military personnel and enhancement of cybersecurity; national and human security; and DRR

Department of Agriculture

AI application for yield estimation and precision farming to increasing agricultural production

Department of Transportation

AI application for yield estimation Use of AI for optimizing routes through real-time detection of traffic conditions and course predictions

Department of Health

AI for managing medical records and other data, health monitoring, and distance healthcare

Department of Environment and Natural Resources

AI in monitoring pollution and air, land, and water quality

Department of Interior and Local Government

Smart city planning and smart infrastructure, PNP Cybersecurity

Department of Finance

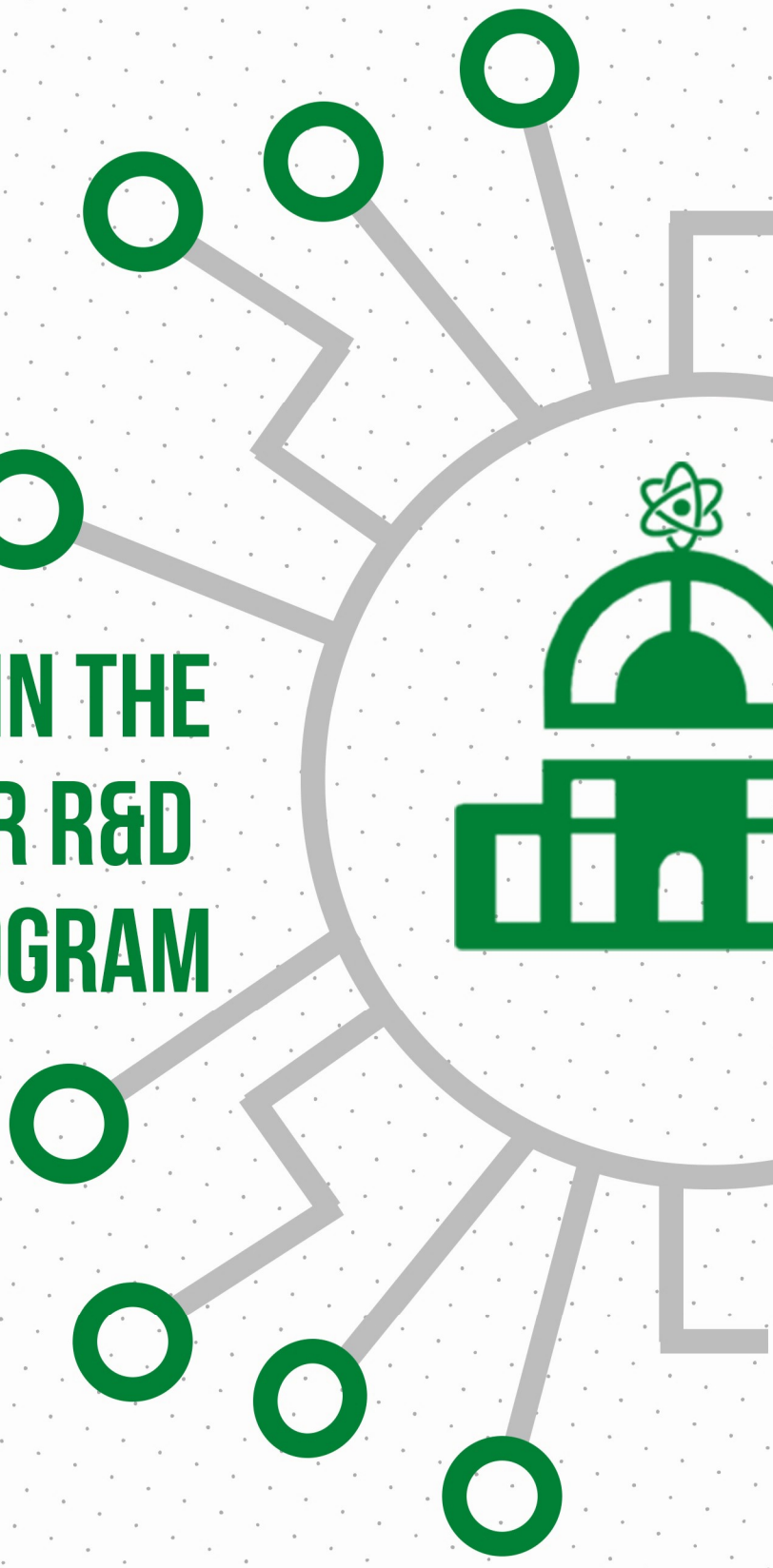
Use of AI in detection of fraudulent transactions and strengthening anti-money laundering regulations

Department of Science and Technology

AI for science, technology, and innovation

Through R&D, DOST aspires to aid various government stakeholders in developing applications or AI-enabled decision support tools that are science-based and data-driven. These AI-enabled solutions developed will help enhance government functions and delivery of its services to the FIlipino people. Government stakeholders should be the first to champion the various AI programs and projects towards the attainment of its goals or aspirations.

NICHE CENTERS IN THE REGIONS FOR R&D (NICER) PROGRAM



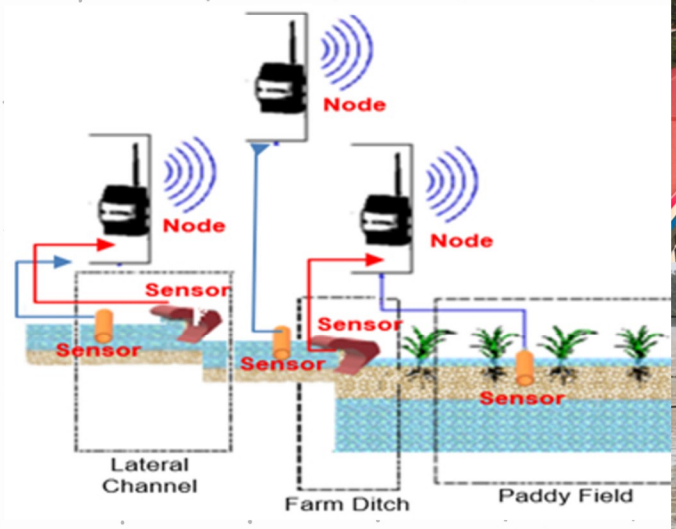
The Niche Centers in the Regions for R&D (NICER) Program was created to accelerate inclusive growth and innovation in the regions. Under NICER, AI related centers have been established such as the Smart Water Infrastructure Management Center in Luzon, Environmental Informatics in Visayas and Health Data Analytics in Mindanao. We aim to establish more NICERs on AI focusing on different priorities such as Smart Farming, Medical Intelligence, Intelligent Transport and more.

NICHE CENTERS IN THE REGIONS FOR R&D (NICER) PROGRAM

Smart Water Infrastructure and Management (SWIM) Research and Development Center

A comprehensive assessment of water resources in Region 2 considering socio-economic factors, increasing demands from other sectors, expansion of irrigation services and the effect of climate and land use changes. In particular, the project aims to help mitigate the impacts of climate change, land use change and population growth through comprehensive water resources framework and water resources projects and interventions in Region 2.

The project will conduct analysis of water resources, water uses and existing water infrastructure, policies and governance in the provinces of Region 2. Localized tools or framework for water resources planning needed for future water development and management strategies per province in the Region will also be developed. The appropriate water management and interventions for adoption and actual demonstration will also be designed and demonstrated.

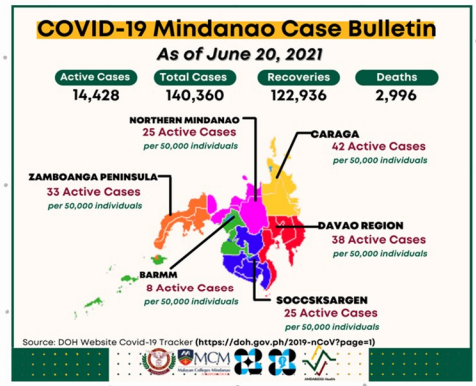


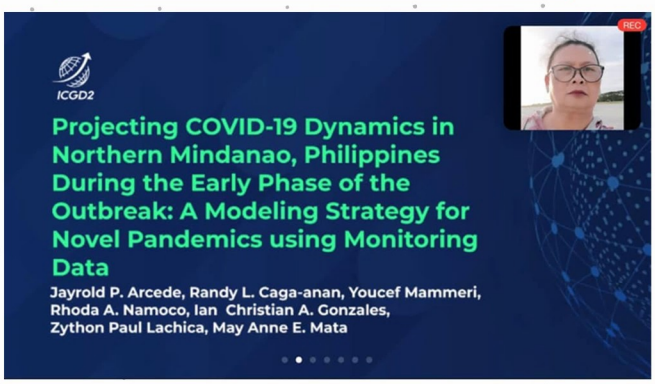
NICHE CENTERS IN THE REGIONS FOR R&D (NICER) PROGRAM

Center for Applied Modeling, Data Analytics, and Bioinformatics in Health

AMDABiDSS-Health

University of the Philippines Mindanao
Mintal, Tugbok District, Davao City
nicer.upmin@up.edu.ph

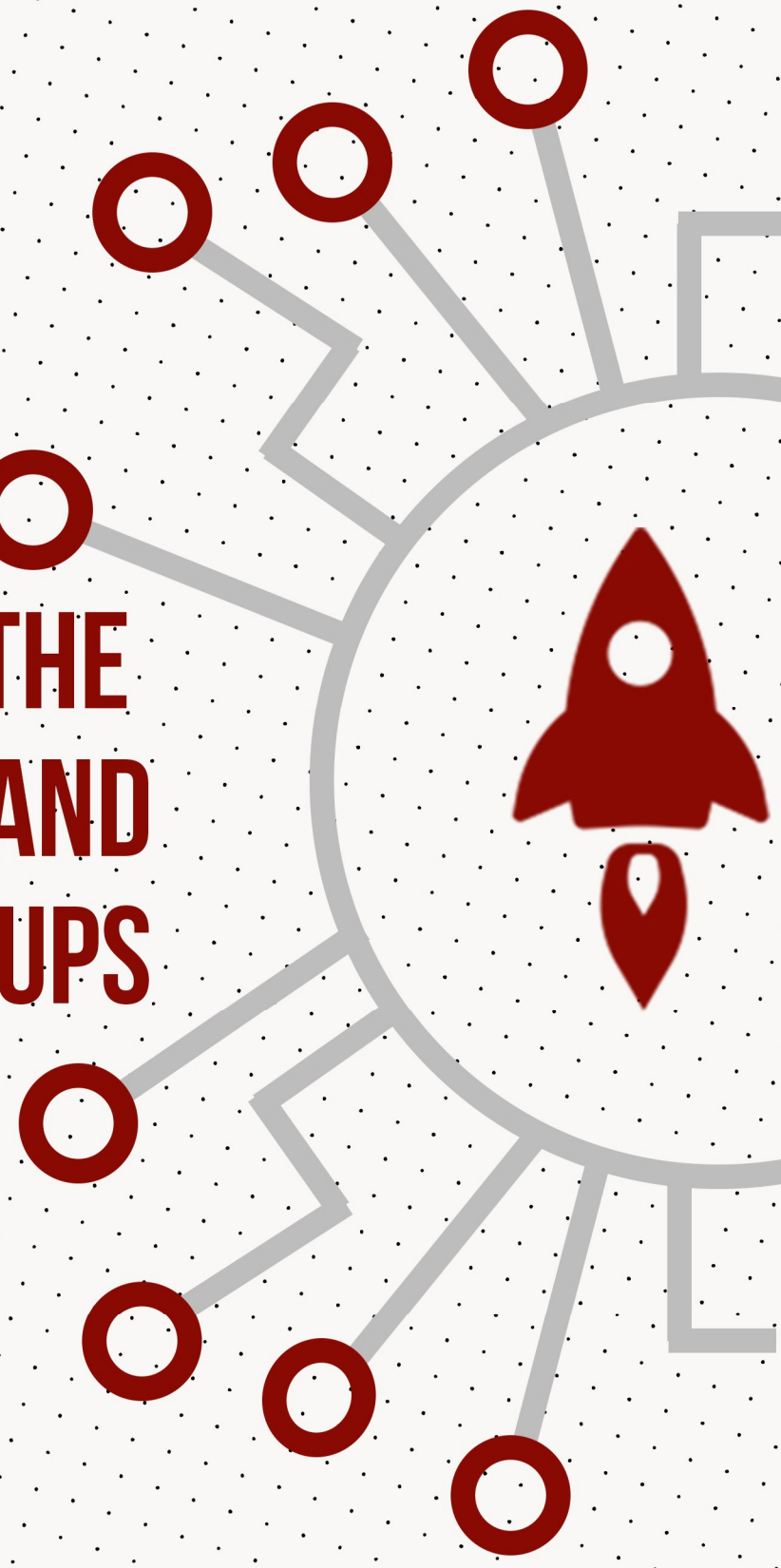




The AMDABiDSS-Health is a research center that focuses on generating a Decision Support System to strengthen the Mindanao Wide Response to COVID-19, Dengue, and other infectious diseases.

It is the first research center in Mindanao dedicated to health research initiatives that uses interdisciplinary quantitative approaches (e.g. modeling, data analytics, bioinformatics) coupled with improved disease surveillance techniques.

SUPPORT TO THE SPIN-OFFS AND STARTUPS



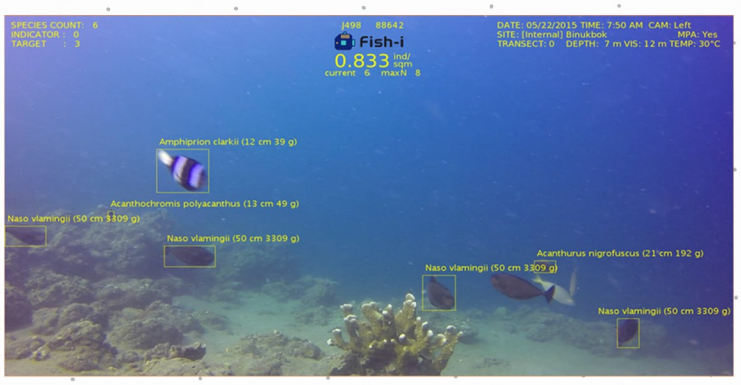
SUPPORT TO THE SPIN-OFFS AND STARTUPS

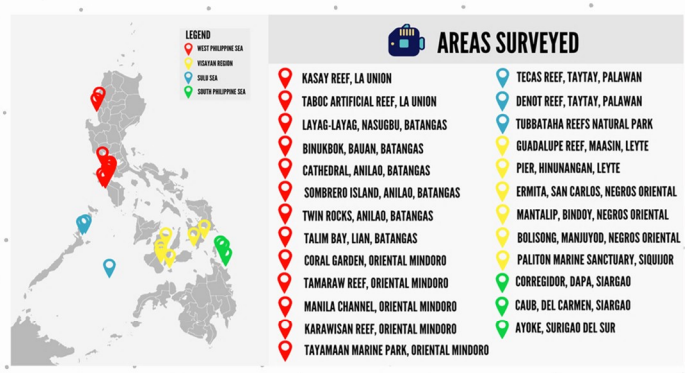
SPIN-OFF FROM UNIVERSITY

Fish-i®

Fish-i is a semi-automated video camera-based fish census system that provides fish population density and distribution measurements for monitoring Marine Protected Areas and for quantifying environmental impact of projects on marine and inland water ecosystems.

- Crowd-sourced census for greater community and stakeholder participation
- High accuracy and scalability
- Faster, safer, cheaper
- No data collection bottleneck





UPDATES / MILESTONES

- Patents filed in USA, Brazil, Mexico and Indonesia, and the Philippines
- Presented at NOAA USA Grand Prize Winner, 2017 AMY
- Intellectual Property Award
- SEC Registered
- Trial and test surveys done in more than 50 sites in the Philippines
- Trial surveys on-going for Hawaii, USA

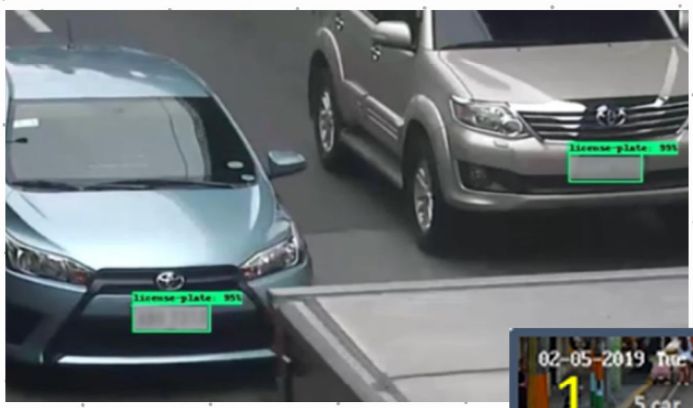
SUPPORT TO THE SPIN-OFFS AND STARTUPS

CATCH ALL
VISUAL ARTIFICIAL INTELLIGENCE
INNOVATE AND EXPERIENCE

Transforming cities and communities into smart, organized, sustainable, and safe urban centers.

Accomplishments:

- One (1) filed patent
- USD 6,500 business support grant from Amazon Web Services
- On-premise and Cloud-ready technology



SUPPORT TO THE SPIN-OFFS AND STARTUPS

AI-BASED STARTUPS

senti

SENTI is comprised of Filipino software engineers that are experts in linguistics, natural language processing and data statistical analysis. They provide social media monitoring services that is focused on understanding Filipino. To process social media posts better, they have developed a machine learning - based language classifier that automatically detects the language of any document. The product will allow the clients to view the market behavior on social media as well as the real time conversations about their brands.

Milestones
- Established office in Singapore
- Generated over PHP 24 million in revenues
- Clients include Cebu Pacific, Standard Chartered, ABS-CBN, and more
- Partnered with Google and PLDT Enterprise
- Grew team from 2 to 35 employees after getting

Partnerships:
- PLDT Enterprise, CDM, IMMAP, Google, Microsoft, Center for
•Kapampangan Studies, Amazon Web Service, De La Salle University

Awards:
- 2017 – Top 20 Startups To The Rescue, Top 10 Ignite Pitch Competition, 2nd place Seedstars World Manila
- 2018 – JT Award for Leave A Nest's Tech Plan Demo Day
- 2019 - 2nd Place ASEAN-KOREA Startup Week

Core Technology:
- Natural Language Processing Engine that understands 10 Major Philippine Languages
- Launched 6 solutions using the core technology

Community Impact:
- Partnered with Department of Health to deliver accurate, timely, and updated information on CoVid-19 policies nationwide.
- Conducted a hackathon to help NGOs in the Philippines Using Artificial Intelligence

SUPPORT TO THE SPIN-OFFS AND STARTUPS

AI-BASED STARTUPS

edusuite

Edusuite is an AI-driven School Management solution for Colleges, Universities and K-12 Schools.

CIIT College of Arts and Technology

CORE TECHNOLOGY

Using artificial intelligence and data analytics, Edusuite's cloud computing solutions enable automatic student advising, online enlistment and enrollment, forecasting of class demand, and automated scheduling and computation of assessments.

Milestones

- Started as a prototype running in 1 school.
- Funded by DOST to launch it as a commercial product
- Raised additional funding from external investors more than 3x the grant given by DOST
- Currently have 14 employees and growing

Clients

- Now catering to 10 schools across Luzon, Visayas and Mindanao
- 24,000 students helped
- Clients conducted online enrollment remotely during the quarantine. Students and Parents were able to enroll from home.

SUPPORT TO THE SPIN-OFFS AND STARTUPS

AI-BASED STARTUPS

RETAILGATE

RETAILGATE is a Smart Retailing Company geared towards harnessing the power of Artificial Intelligence thru Machine Vision Technology to help Brick & Mortar Retailers capture Shopper Behavior Data and thus gain Actionable Insights to develop Data-Driven Strategies to serve customers better and create a better customer experience

Milestones

- Deployed in five retail stores nationwide
- Accuracy level at 90%
- Social Distancing Measurement implemented
- Realtime processing through common CCTV cameras operationalized
- Featured in two (2) news articles
- Partnered with Philippine Retailers Association
- Partnered with United Neon Media Group

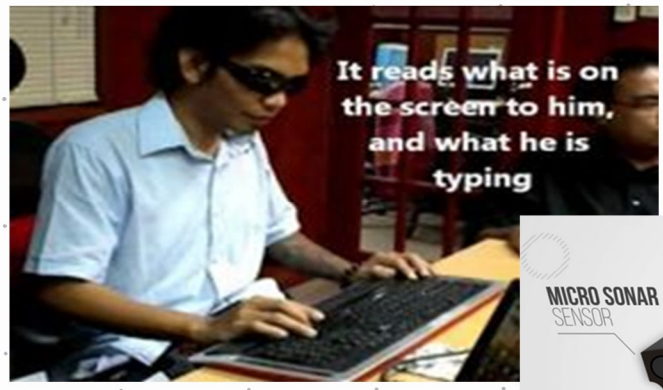
SUPPORT TO THE SPIN-OFFS AND STARTUPS

AI-BASED STARTUPS

GRAYSCALE

GRAYSCALE BUSINESS CONSULTANCY & MARKETING SERVICES

RESULTS THAT COUNT



Grayscale developed Smart VISION, a software-based platform that helps visually-impaired individuals and assist them by supplying information about his environment, thereby improving mobility, interaction with the community and promotes independence. The Smart VISION software has a compatible eyeglass-type prototype capable of:

- visual pattern recognition, distance calculation
- guided focus for text in object of interest (like amount in paper bills)
- optical character recognition
- TTS (Text-to-Speech) capability (the visually-impaired can now send emails)
- voice and gesture commands, among others

Milestones

- Hand-picked by blind judges for the semi-finals round at the global 2019 Holman Prize Competition, out of over 100 entries across 6 continents;

- Winner of a grant from Awesome Foundation Disability Chapter in Boston, MA, USA in 2019.

SUPPORT TO THE STARTUPS

QBO ONEWATT

OneWatt helps industrial users prevent unplanned downtimes, minimize revenue losses, and increase the productivity of maintenance work by literally listening to motors. They do this using their DSP, AI, and Embedded Acoustic Recognition Sensors (EARS) to detect and predict faults before they happen

We love to listen

Milestones

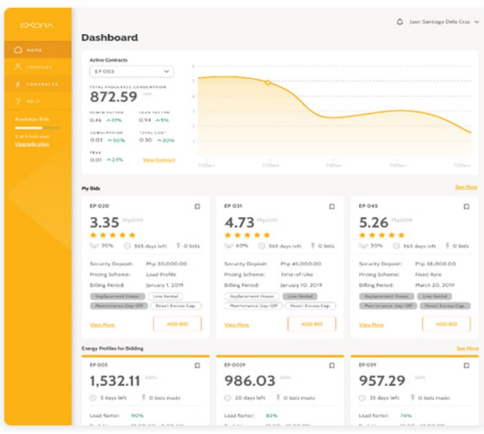
- €115,000 worth in sales pipeline
- 94.5% accuracy verified using ABB test data
- 4th iteration of hardware
- €15,000 revenue in 2019
- Operating in the Netherlands, France, Taiwan, and the Philippines

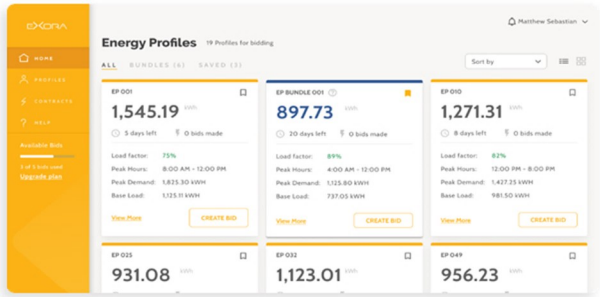
Founders

Emmanuel Bueta
Founder, CEO

Paolo Samontanez
Founder, CTO

SUPPORT TO THE STARTUPS





Exora Technologies Inc. is an end-to-end energy solutions platform which cuts electricity costs through its proprietary specialized energy procurement platform and data-driven analysis.

Save more on your electricity bill

Milestones

- 2.5 weeks for the entire energy procurement process (compared to industry average of 4-6 months)
- Energy analytics deployed in Metro Manila, Bataan, and Davao
- PHP 1.8 million average electricity savings annually
- 7 retail electricity suppliers in the platform
- 8 key energy companies and stakeholders partnered

Founders

Sergius Santos
Co-founder and CEO

Matt Tan
Co-founder and COO

SUPPORT TO THE STARTUPS

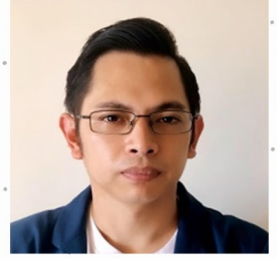
AdMov is a smart advertising platform that uses location data with facial recognition to generate and deliver personalized advertising content, raising effectiveness and cost-efficiency of advertising campaigns. They provide ridesharing drivers with additional monthly income by installing their tablets to their vehicles.

Ads you can't miss

Milestones

- Over 1,000 Grab cars with tablets and 800 vehicles with car stickers for advertising
- Raised PHP 10 million through QBO
- Explored expansion in Taiwan and Singapore
- Company profitable since 2018

Founder



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