



**งานวิจัย AI ในประเทศไทย
สู่ผลิตภัณฑ์ AI ในอนาคต**
AI Thailand: From Research to Products

Chai Wutiwivatchai
NECTEC NSTDA

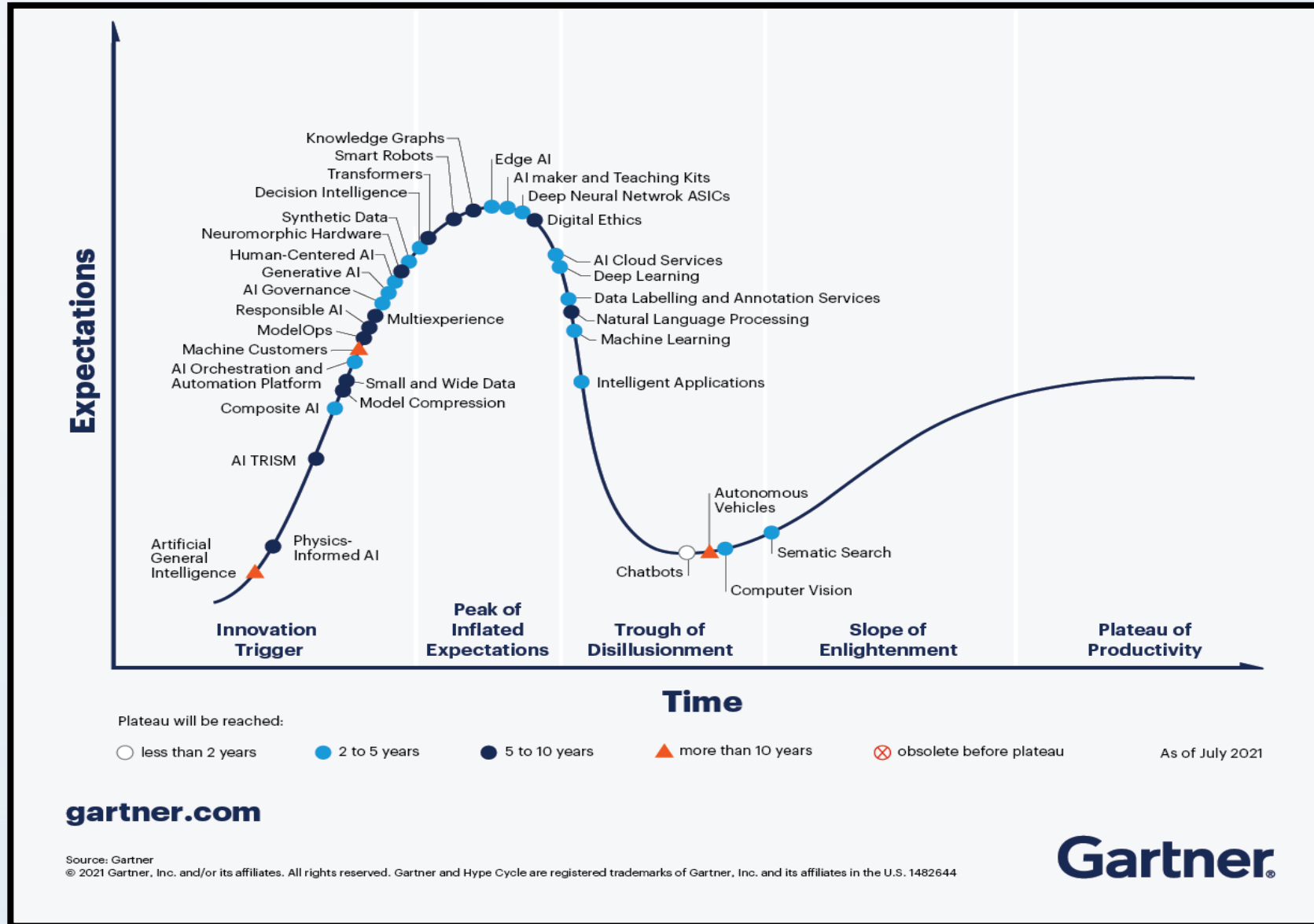
Topics

1. Advance of global AI
2. Stage of AI technology in Thailand
3. Highlighted AI technology in Thailand
4. Thailand AI future trend

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Hype Cycle for Artificial Intelligence 2021 (Gartner)



Enlightenment

- Semantic search
- Computer vision

Disillusionment

- Chatbot
- Deep learning

Peak

- Edge AI
- Knowledge graph

Trigger

- AI governance
- AGI

Examples of Global AI Advancement

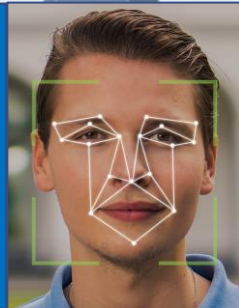
IMAGENET

200 classes **image recognition**, 99% accuracy against 95% by humans



Quality of **generated faces** higher than human touch since 2018

0.2% errors on mugshot and visa photos **face verification**



SQuAD 2.0

The Stanford Question Answering Dataset

Wikipedia article QA, 93% F1 score against 90% human capability

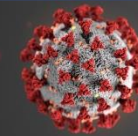


OpenAI GPT-3

57% accuracy of **next-word prediction** using the 570 GB training text

OpenSLR

1000-hours **speech-to-text** training, 2.6% errors achieved on noisy speech



Over 15,000 COVID-19 antiviral moonshot submissions analyzed in 48 hours to get optimized lead compounds

Daniel Zhang, Saurabh Mishra, Erik Brynjolfsson, John Etchemendy, Deep Ganguli, Barbara Grosz, Terah Lyons, James Manyika, Juan Carlos Niebles, Michael Sellitto, Yoav Shoham, Jack Clark, and Raymond Perrault, "The AI Index 2021 Annual Report," AI Index Steering Committee, Human-Centered AI Institute, Stanford University, Stanford, CA, March 2021.

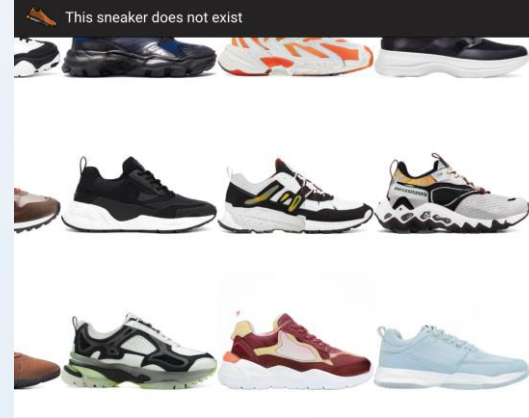
Advance of global AI: From Recognition to Synthesizing



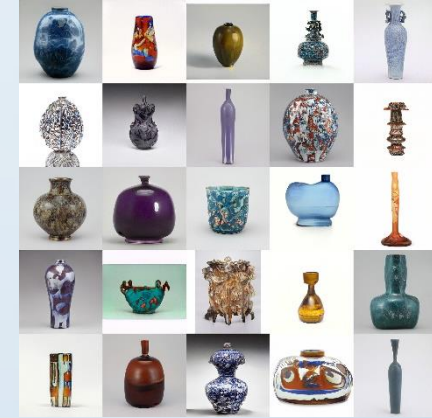
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<https://thispersondoesnotexist.com/>



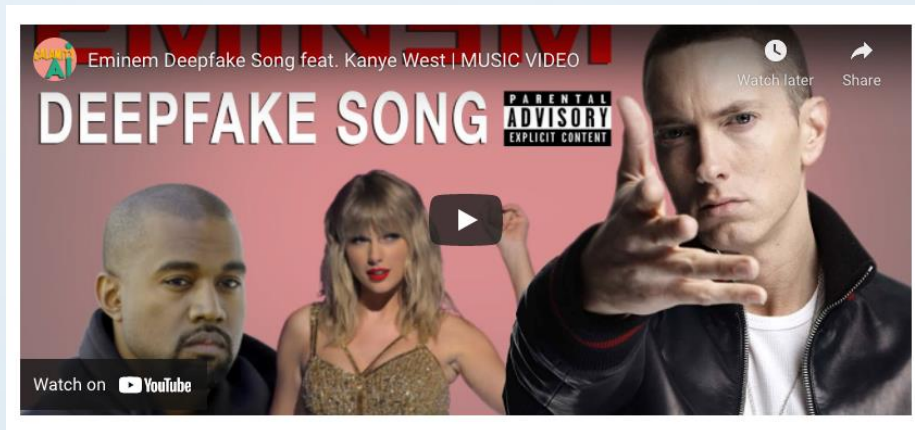
This cat does not exist
<https://thiscatdoesnotexist.com/>



This sneaker does not exist
<https://thissneakerdoesnotexist.com/>



This vessel does not exist
<https://thisvesseldoesnotexist.com/#/>



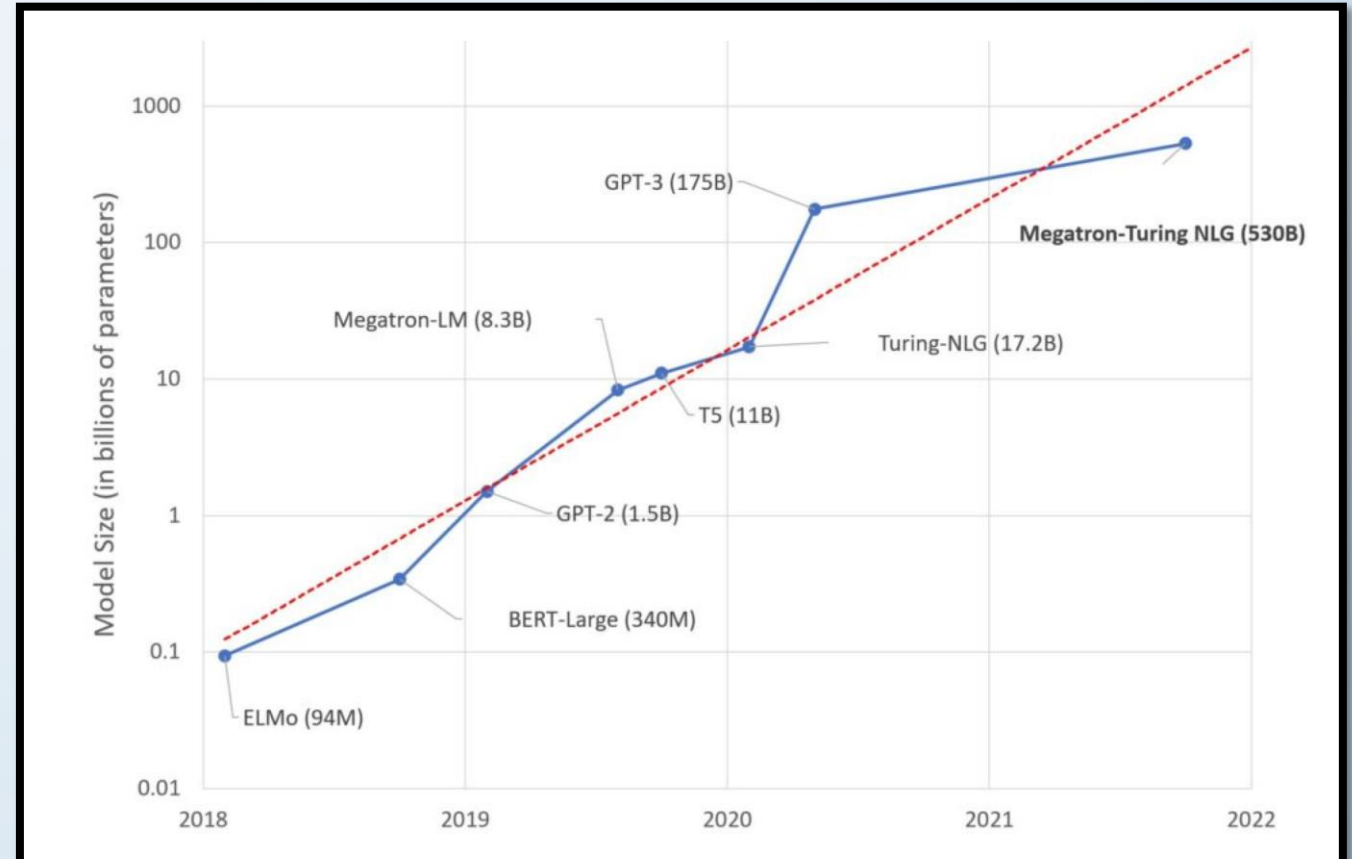
https://www.youtube.com/watch?v=LRX_towD6rs

<p>The Free Will Theorem</p> <p>Imagine an alien civilization were found where the individuals had no internal physiological indicators of their choice that were necessary for making the choice. The society was such that when you saw the individual prior to their making a choice, there were no clues in their behavior that would help you predict what they would decide. So, you could not determine from their appearance or mannerisms what they would decide. The individual was then taken away and was tortured for one year. The alien civilization called this process "freedom."</p>	<p>The Problem of Evil</p> <p>Imagine you are a benevolent god. You can create any reality you want, including creating life and setting up a system where that life is tortured for trillions of years.</p>
<p>The Perfect Roommate</p> <p>Imagine that you have a roommate who is better than you at absolutely everything (e.g., better at cleaning, better at fixing things around the house).</p>	<p>The Chinese Nation</p> <p>Imagine that you are a member of a particular nation of the world. This nation you call China. China is actually the same size it is in reality, but many of its citizens are blind and cannot see it. A few are not blind, and can tell other citizens about it.</p>

<https://gpt3demo.com/apps/10-thought-experiments>

Advance of global AI: Language Models

- Transformer, BERT, GPT
- Race for bigger models
 - Open AI: GPT-3 175 billion
~\$4 million (parameters)
 - AI21 labs: Jurassic-1 178 billion
 - Huawei: PanGu-Alpha 200 billion
 - Microsoft: Megatron 530 billion
 - Beijing Academy of AI (BAAI):
Wu Dao 2.0 1.75 trillion



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AI Government Readiness Index of Thailand

2019

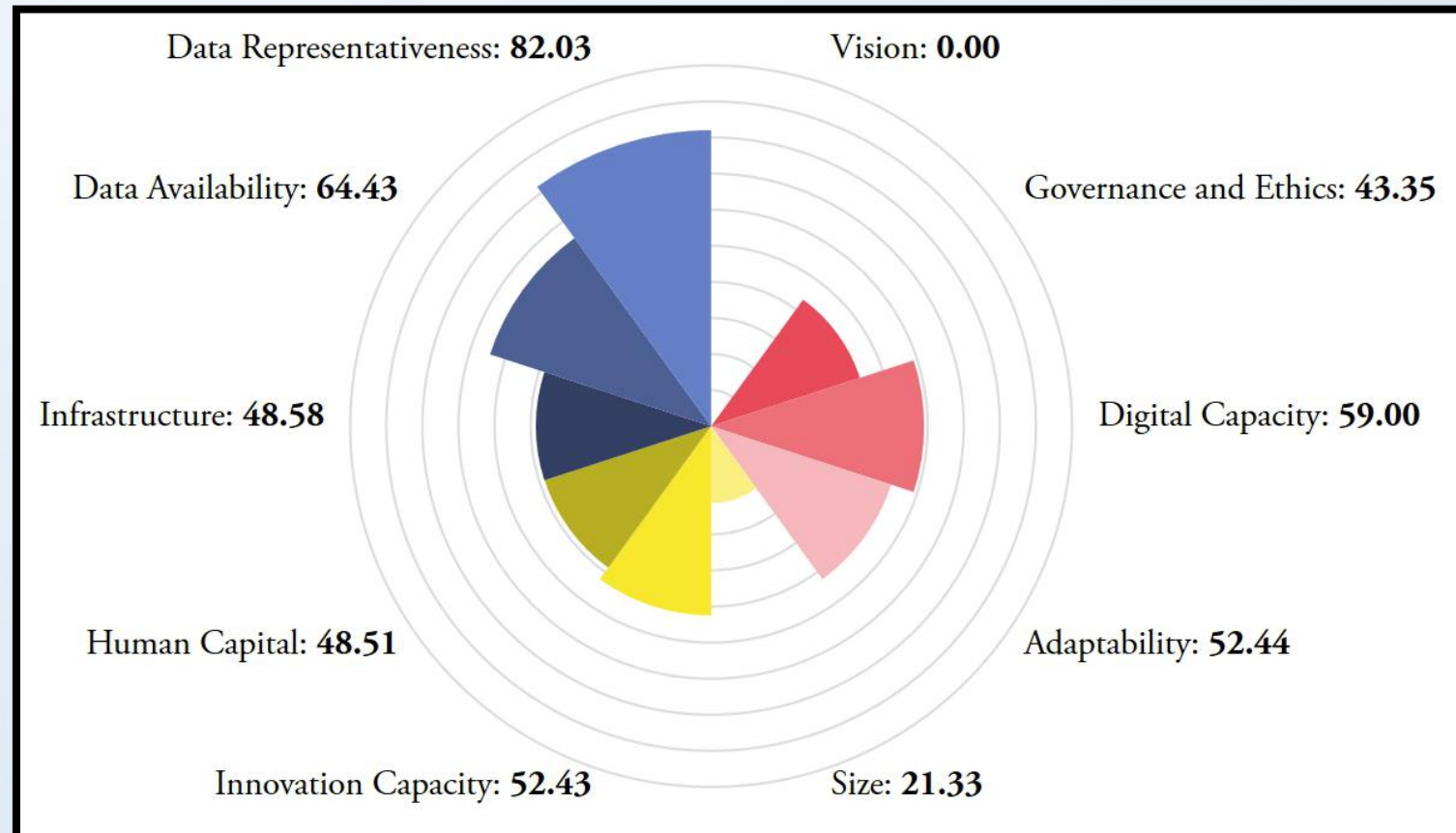
56th of 194 countries

Singapore: 1, Malaysia: 22, Philippines: 50)

2020

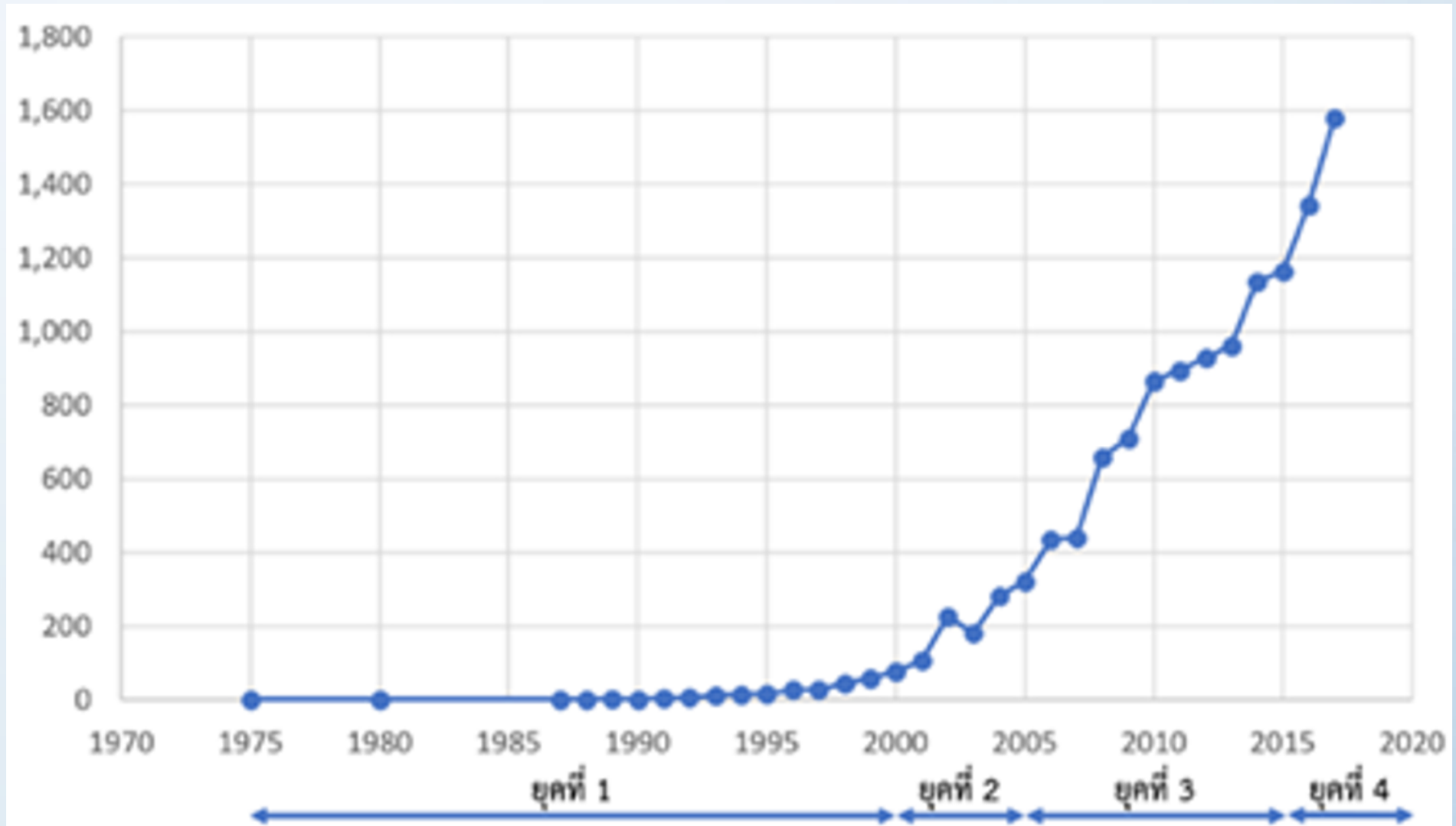
60th of 172 countries

(Singapore: 6, Malaysia: 28, Brunei: 49)



Oxford Insights,
International Research
Centre, 2020

AI Related Publications in Thailand



AIAT report, 2021 (data from Scopus)

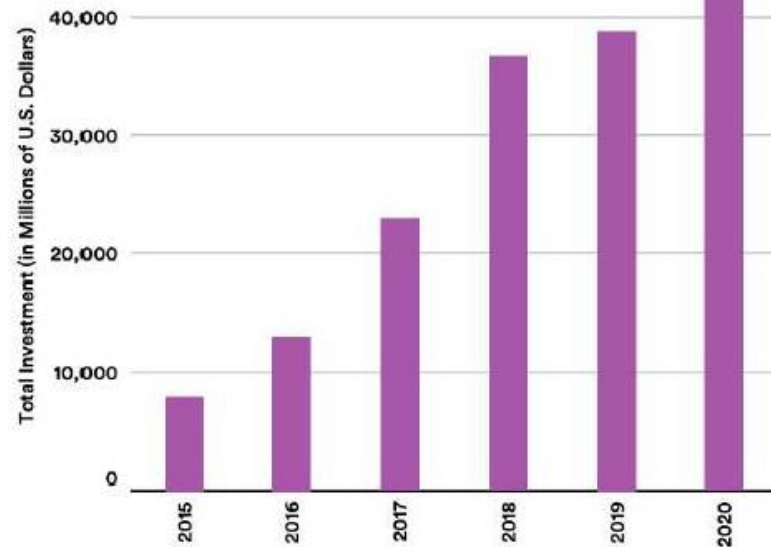
AI Startups Investment: Worldwide and Thailand



WORLDWIDE INVESTMENTS

PRIVATE INVESTMENT in FUNDED AI COMPANIES, 2015-20

Source: CapiQ, Crunchbase, and NetBase Quid, 2020 | Chart: 2021 AI Index Report

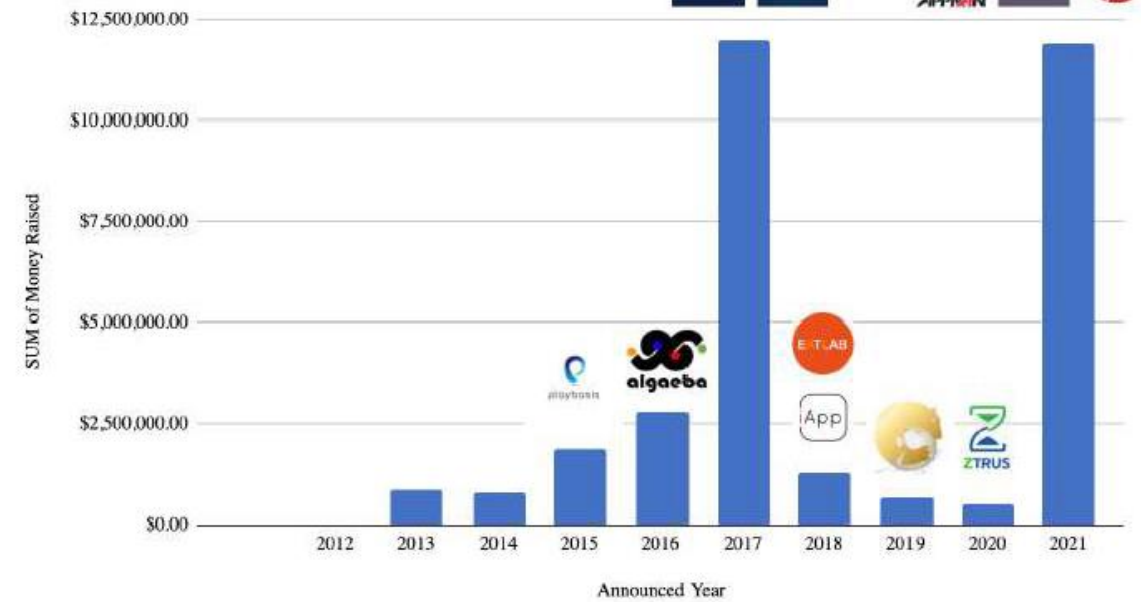


SOURCE: ZHANG, DANIEL, ET AL. "THE AI INDEX 2021 ANNUAL REPORT." ARXIV PREPRINT ARXIV:2103.06312 (2021).



THAILAND INVESTMENTS

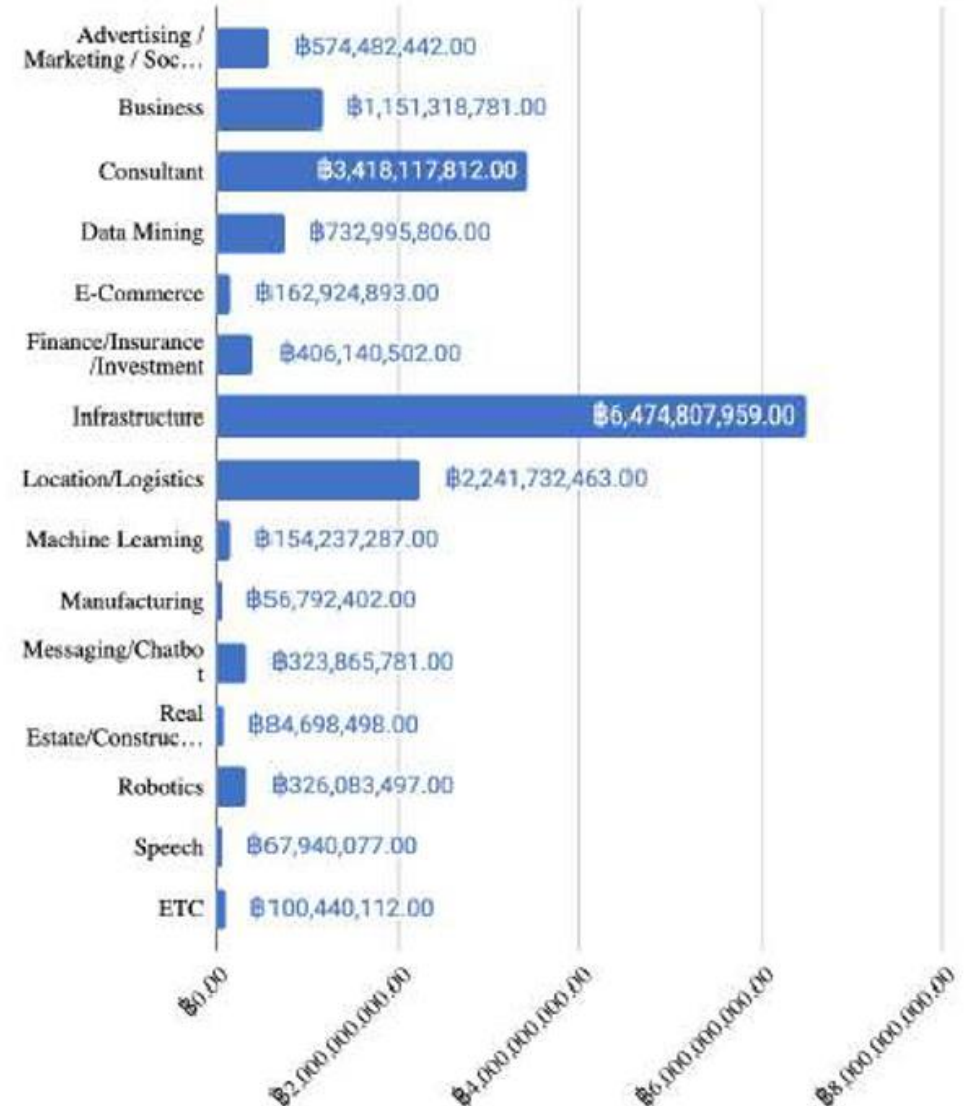
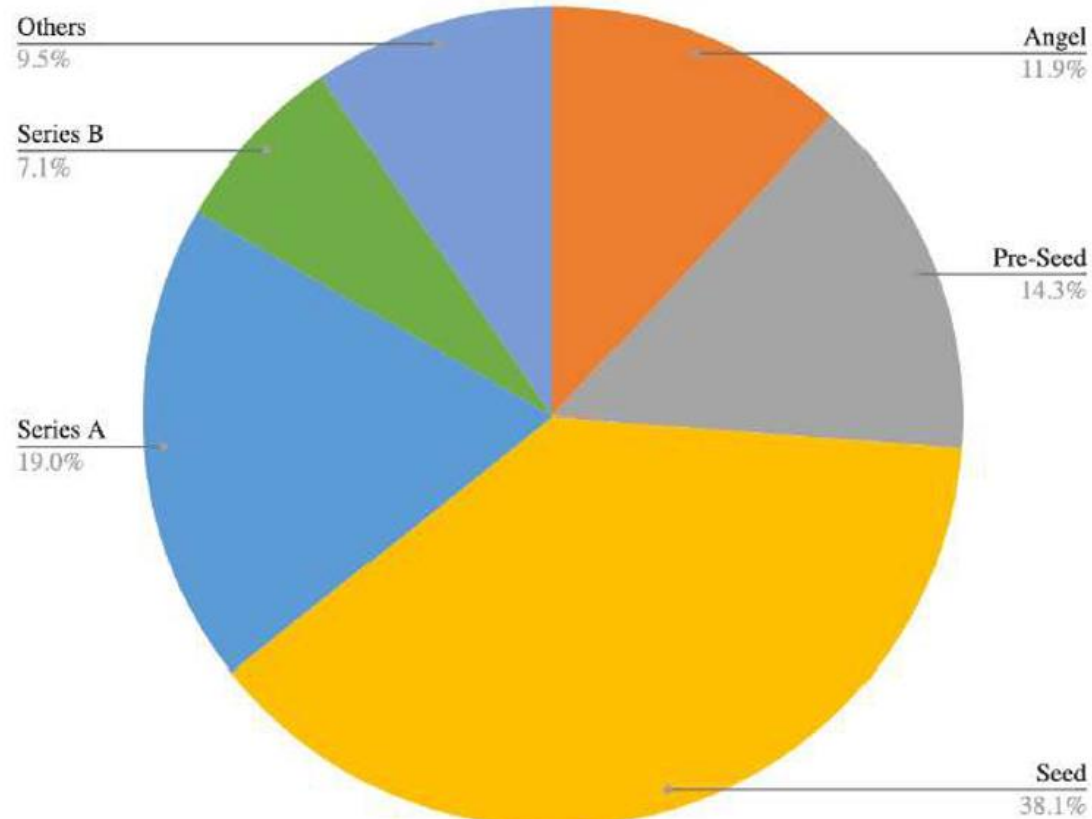
Total Investment (USD) vs. Announced Year



SOURCE: AIJAT COLLECTS DATA FROM CRUNCHBASE.

AI Startups Investment in Thailand

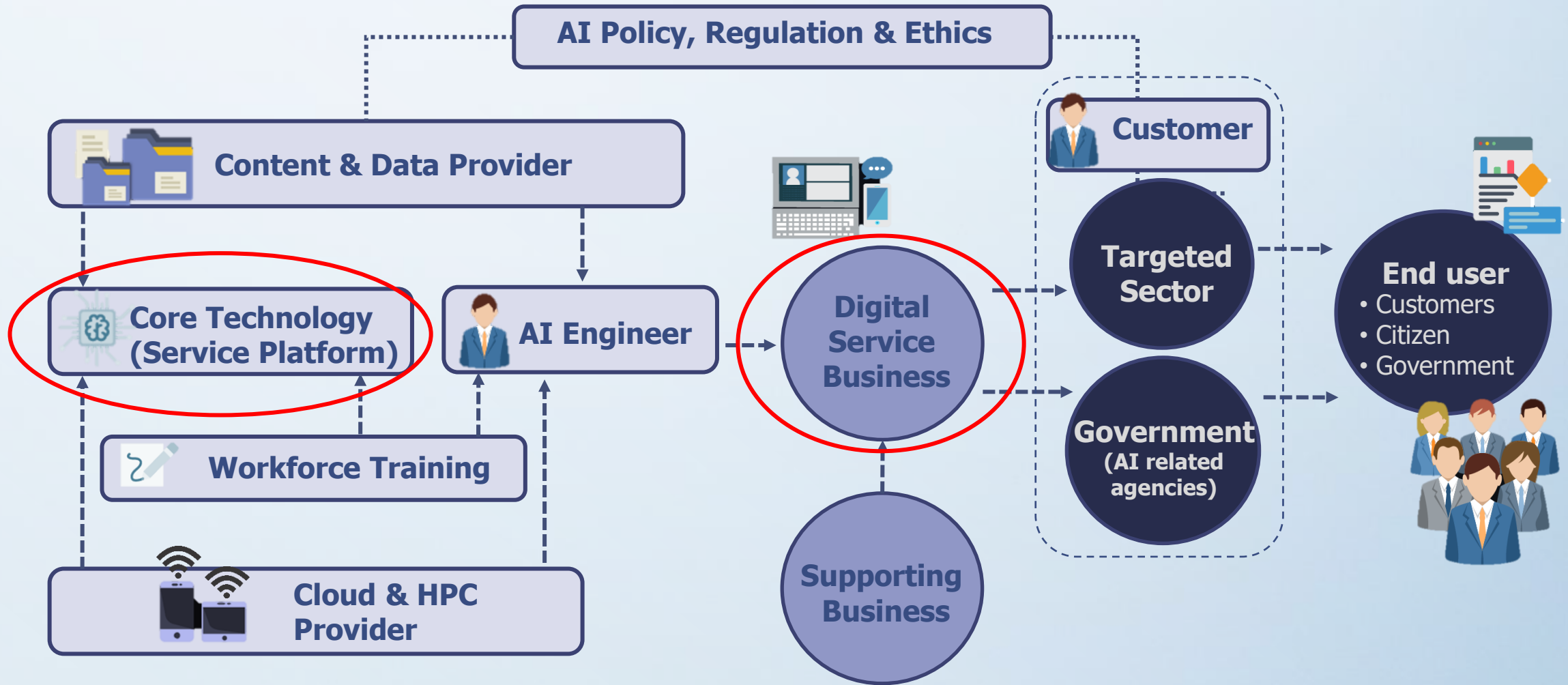
2012-2021 Thailand AI Startup Funding Type



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Thai AI Ecosystem: Value Chain Perspective





NECTEC: "AI for Thai" Service Platform

- AI service platform which provide open APIs and data sets for Thai Community

บริการของ
AI for Thai

ให้บริการแก่นักพัฒนาและผู้สนใจทั่วไป และ ขยายปริมาณการใช้งานสำหรับบริษัท/หน่วยงานที่ต้องการทำ **Proof of concept** ในการใช้งานจริง

Free
with Limit service

36 API Services

บริการด้านข้อความ	บริการด้านการวิเคราะห์ภาพ	บริการด้านเสียงและ Chatbot
20	13	3

NECTEC | KBTG | PANYA PRADIT TECHNOLOGY | App ARTIFICIAL INTELLIGENCE

6

2019-2021

- 5,458 Developers
- 1,014 Active (last 3 months)
- 28.1 million requests

Infrastructure Support :



NECTEC: “AI for Thai” Service Platform

Top services

- Thai word segmentation (9.2M)
- Thai sentiment analysis (7.1M)
- Thai text cleansing (3.6M)
- Thai tag suggestion (2.2M)
- Thai name-entity recognition (1.9M)
- Thai text-to-speech (1.5M)

Coming soon

- Thai full parser
- Thai text summarization
- Thai-Myanmar translation
- Thai food image classification

13 open data sets

- Thai dependency treebank
- 3M-word POS tagged text
- 1M Thai-character images
- 1.7K Thai-wiki QA sets
- Thai speech corpora

Extension to real sectors

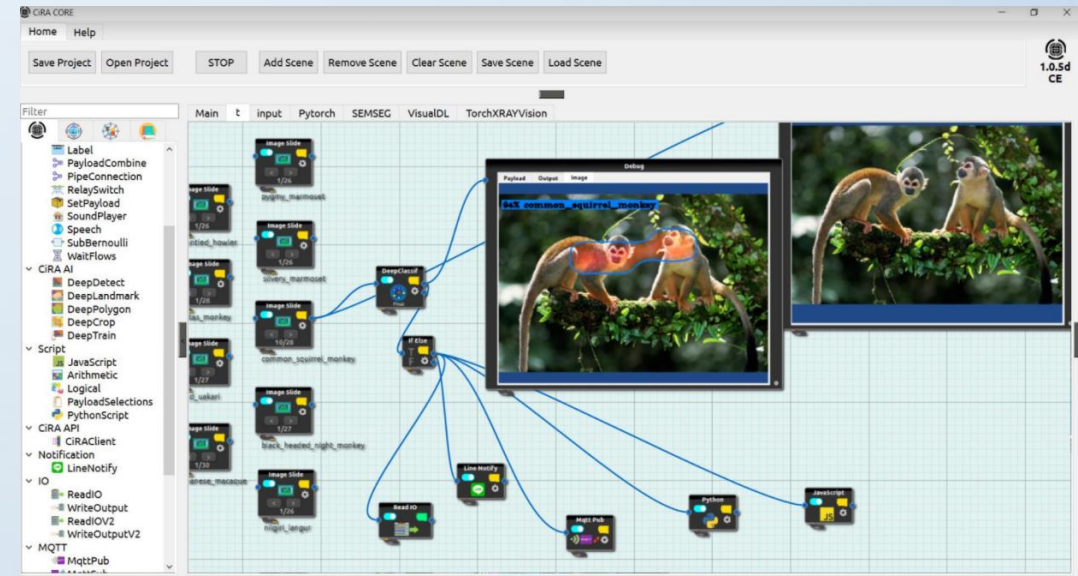
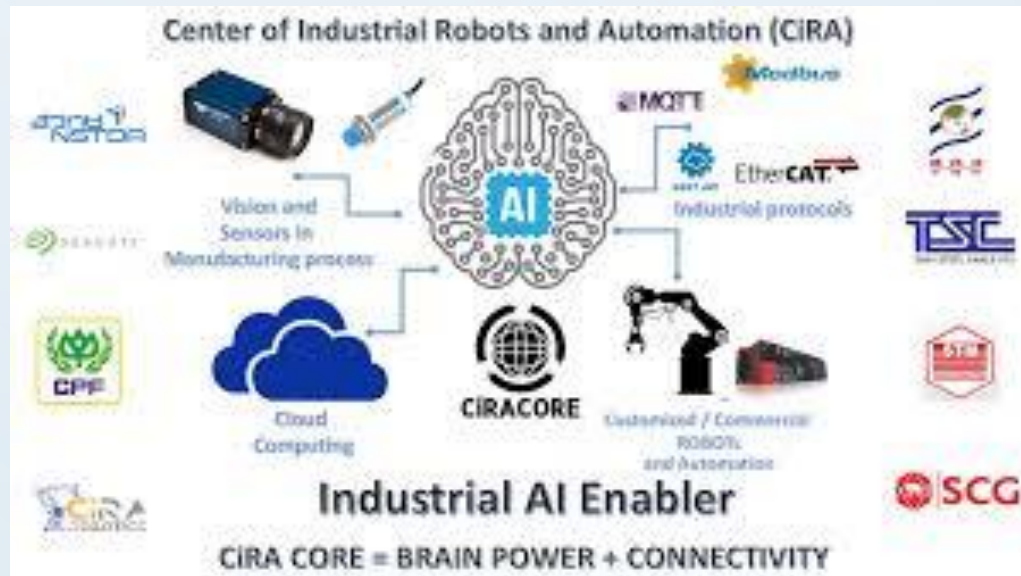
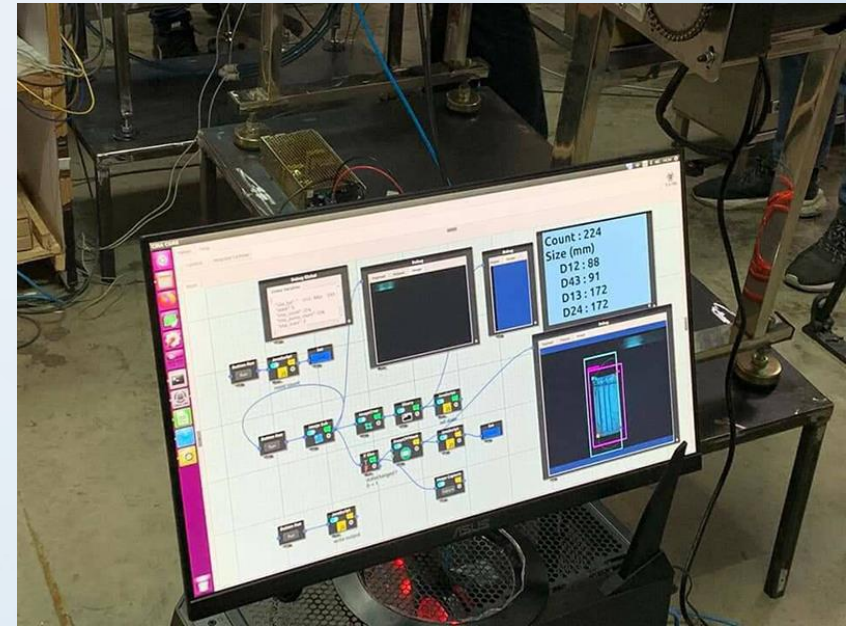
- Chatbot for NCB
- AI for Performance audit
- Microscopic image analytics
- Commercial audio book

CiRA Core



AI Platform for smart industry by KMITL with CiRA Automation and Tech Co.,Ltd.

- Flexible HW compatibility
- Simplified industrial computer vision

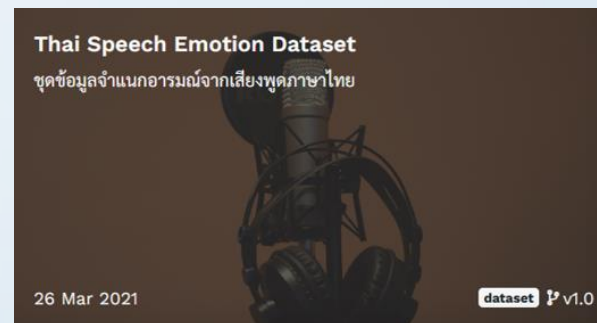




VISTEC-depa AI Research Institute

airesearch.in.th

- AI Research Institute under the collaboration between depa and VISTEC
- Provide large data sets and pre-train models
 - Thai speech emotion data set
 - English-Thai machine translation data set and model
 - WangchanBERTa pretrained Thai language model



PyThaiNLP by a Thai NLP Community

- An integration of open-sourced libraries for fundamental Thai language processing



Fundamental	Advanced	Language Models
Word segmentation	Machine translation (TH-CH, TH-EN, TH-FR)	WangchanBERTa
Sentence segmentation	Automatic summarization	Thai2Fit
Soundex	Sentence generation	
Part-of-speech tagging	Text augmentation	
Name-entity recognition		
Spell checking		
Transliteration		

AI Business

Target	Technology	Sample Company
Drone/Robotics	Image analytics Language and speech processing Data analytics	ARV, HG Robotics
Intelligent Medical Imaging	Image analytics	Perceptra, INET
Intelligent Voice Interface	Language and speech processing	AI9
Digital Transformation / Intelligent Working Process	Optical character recognition Language processing and Chatbot Image analytics	iApp, Sertis, Backyard, AppMan
Social Media / Market Intelligence	Language processing	WiseSight
Financial Tech	Data analytics Blockchain	DeepInvest



HG Robotics

Provide a full spectrum of robot and automation services in agriculture, industrial and residential.

Better Planning






Plant counting Crop health analysis Plant height Weed and disease detection



VETAL



Tiger Drone



Vespa Hex



HGMC



HiveGrid



ARV

PTTEP spined-off company for driving AI/robotics

ROVULA
REVOLUTIONIZED SUBSEA INSPECTION, REPAIR SERVICES AND MAINTENANCE



EXPLORE MORE →

SKYLLER
AUTONOMOUS ASSET INSPECTION SERVICE AND PLATFORMS



EXPLORE MORE →

VARUNA
REVOLUTIONIZE FUTURE SMART FARMING WITH DATA ANALYTICS AND UAV TECHNOLOGY




EXPLORE MORE →

CARIVA
DATA-DRIVEN SOLUTIONS TO ENHANCE HEALTHCARE AND WELLNESS




EXPLORE MORE →




TECHNOLOGY DEVELOPMENT

As we are the technology spin-off company dedicated to leverage cutting-edge AI & Robotics technology, the technology development is one of our core company strategies.




PROFESSIONAL SERVICES

ARV provides professional services and solutions for Oil & Gas and non-Oil & Gas business including facility inspection using our AI and Robotics technology across air/sea/land applications and through our business units.



BUSINESS BUILDING

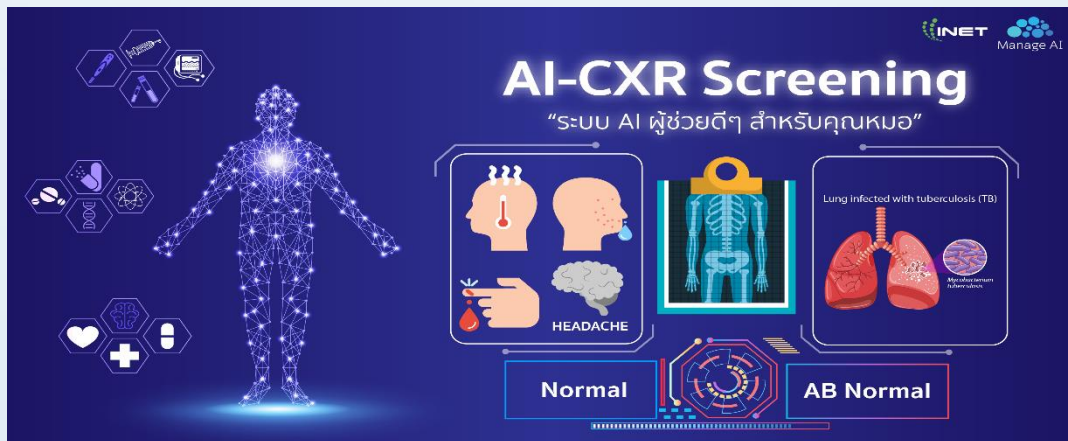
ARV innovates and develops new business S-Curves in our Venture Studio team.



INNOVATION PLATFORM

Through ARV network of clients and partners, we have resources to accelerate and invest in high potential start-ups to meet market demands. ARV's headquarter is home to a shared workspace, facilities infrastructure, and access to network & playground for our partners.

Emerging of AI systems for medical image diagnosis: Respiratory disease from CXR images



COVID-19 CXR Screening

With Thai AI system

- Detect lung infection from CXR images
- 94% accuracy on 400,000 Thai people CXR images
- Reduce 40% doctors' workload



Free Online Service

Perceptra Co., Ltd.



Digitally transform businesses with intelligent working process

APPMAN FINNOMENA
Speed Up Onboarding and Protect **FINNOMENA**'s Customers Data with **APPMAN OCR**

FINNOMENA Case Study
AppMan OCR Technology

+66 2079 5477 | www.appman.co.th | agentmate@appman.co.th

APPMAN rabbit finance
RABBIT FINANCE
Leveraging Technology to Remove **MANUAL DATA CAPTURING**

RABBIT FINANCE Case Study
AppMan OCR Technology

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APPMAN SCHIC INSPECTION
DIGITAL FACE TO FACE
Communication Beyond Limits

SCHIC Case Study
Remote First Technology

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AI service platform and service robot communication in Thai

Thai Natural Language Processing

Image Recognition

Voice and Speech

Optimization and Prediction

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Thailand National AI Strategy 2022-2027

Drafted, March 2022



Thailand has an effective ecosystem to promote AI development and application to enhance the economy and quality of life within 2027

VISION

OBJECTIVE

Human & Technology

Economy

Social & Environment

STRATEGY

1
ELSI

2
Infra

3
HR

4
Tech

5
Use

SECTOR

Tourism

Logistics

Educa
tion

Security

Energy

Health

Agricul
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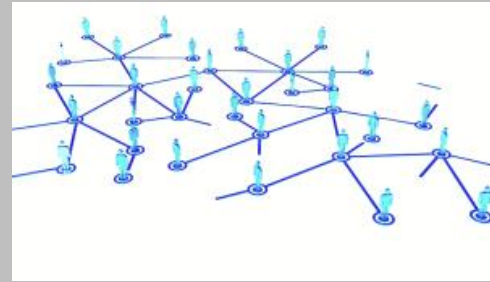
Govern
ment

Industry

Trading

Thailand Trend: Enablers

Expert



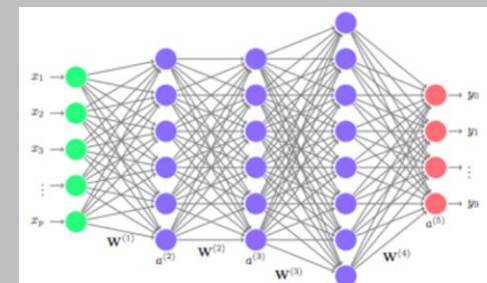
Data



HPC & DC



Core Tech & Service Platform



Thailand Trend: **Supercomputer**



Resources	2019 "TARA"	2022
Computing capability		
- Compute-intensive node	2,400 CPU cores	20,480 CPU cores
- Memory-intensive node	3 TB memory/node	4 TB memory/node
- GPU node	400 CPU cores + 28 V100 GPUs	11,264 CPU cores + 704 A100 GPUs
Storage (PB)	0.8	10
Double-Precision Performance	252 teraFLOPS	7-8 petaFLOPS
AI Performance (Tensor-core)	3.5 petaFLOPS AI	219.6 petaFLOPS AI



Pollution Control Department

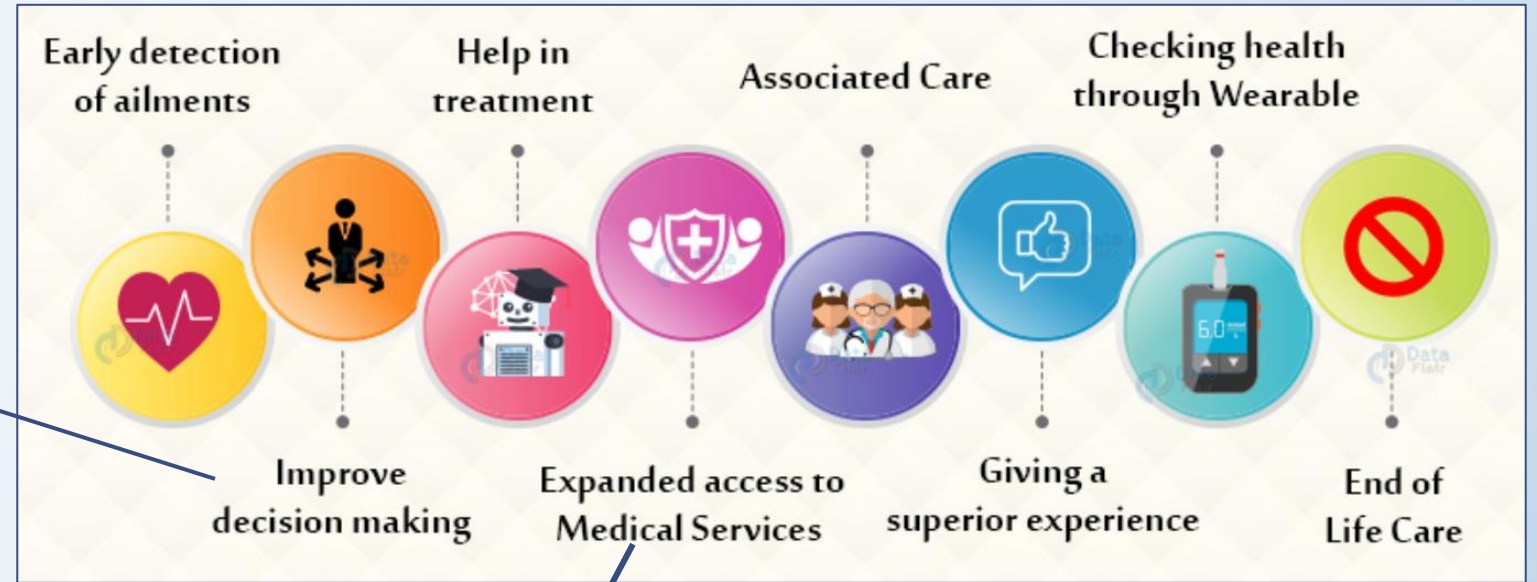
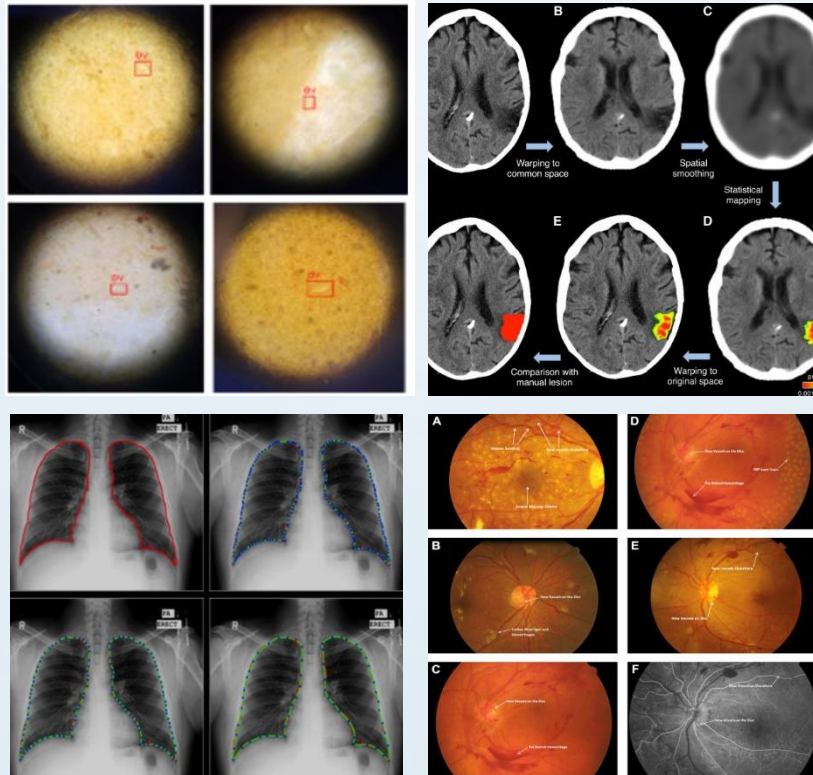
- 15x reduction of PM2.5 data computation
- 3 days ahead PM2.5 prediction



- 5 petabytes data processing of human genomes

Thailand Trend: Telehealth

AI for Medical Image Diagnosis



Telehealth

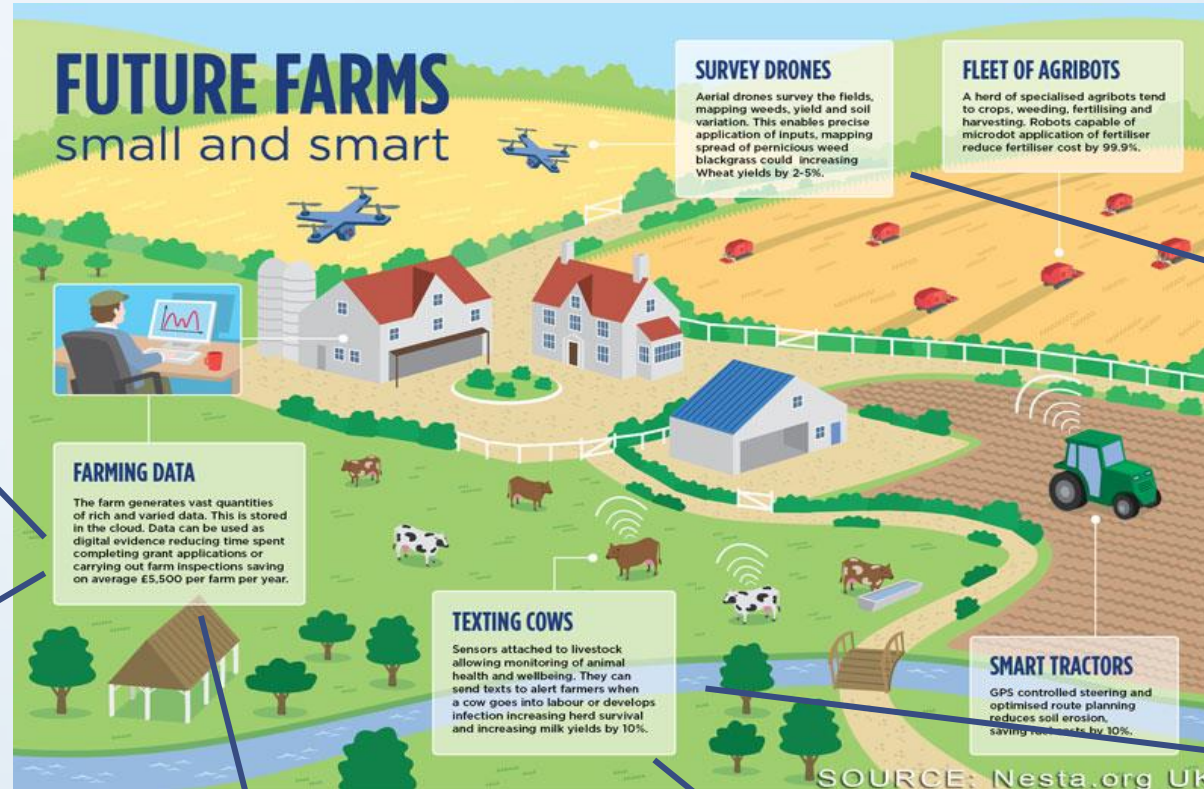
<https://data-flair.training/>

Thailand Trend: Digital Farming

Agricultural Big Data



<http://nesta.org/>



Drone and Smart Machine

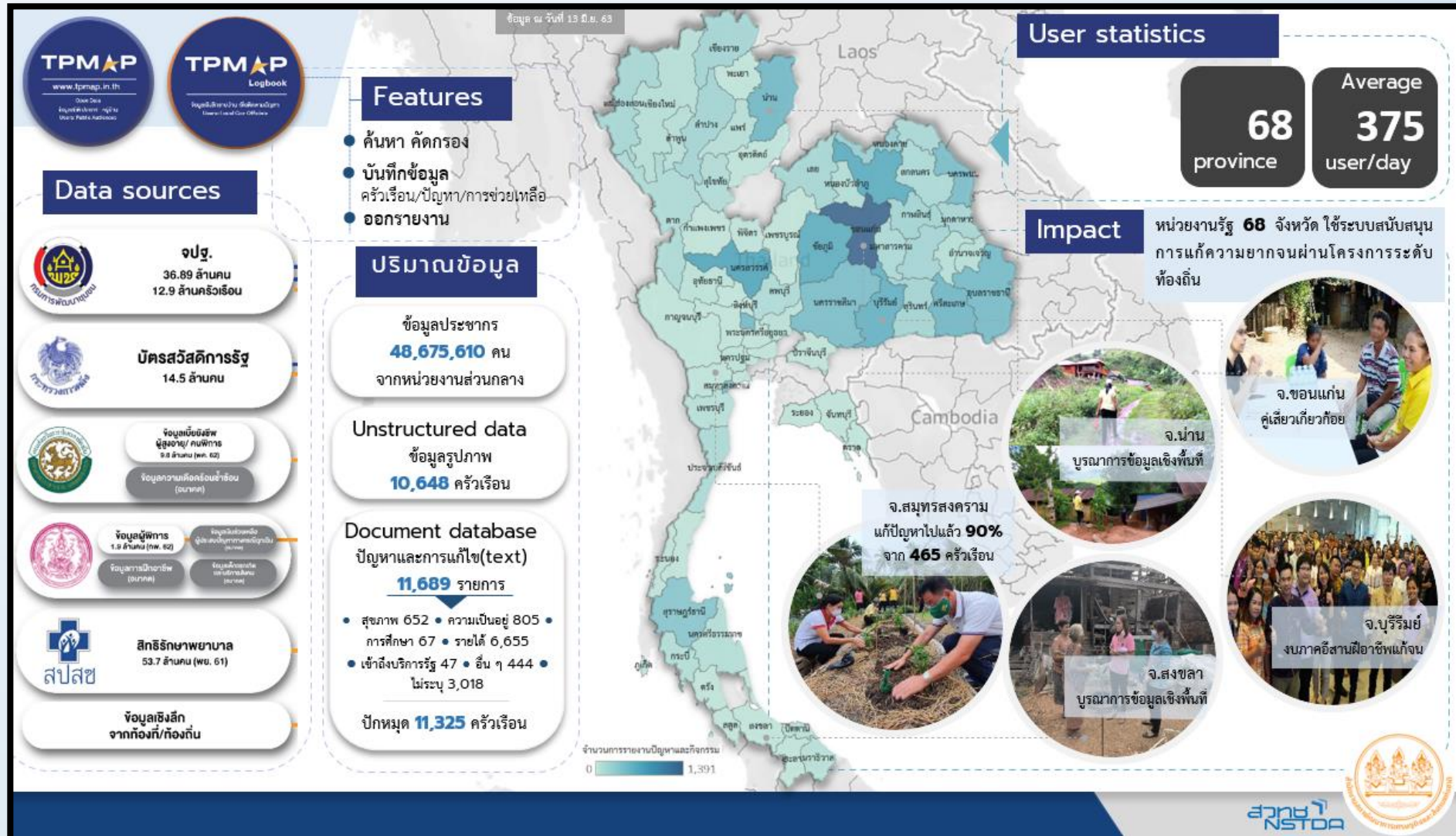


Sensor and IoT



Thailand Trend: Government

AI is used in many governmental sectors for policy planning and improving services



Thank you

 Chai Wutiwivatchai

