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Kasetsart University in an AI Disrupted Future

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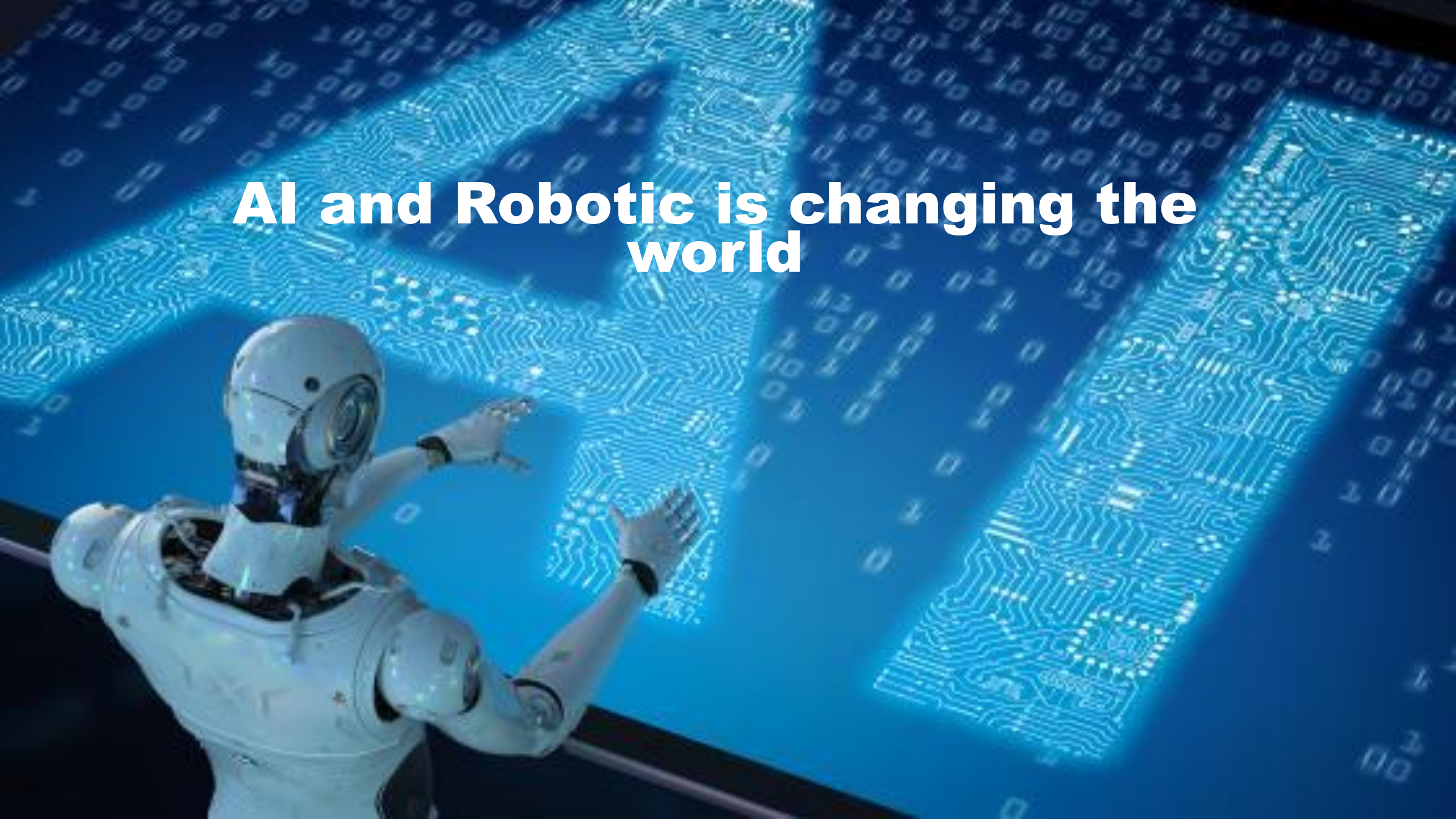
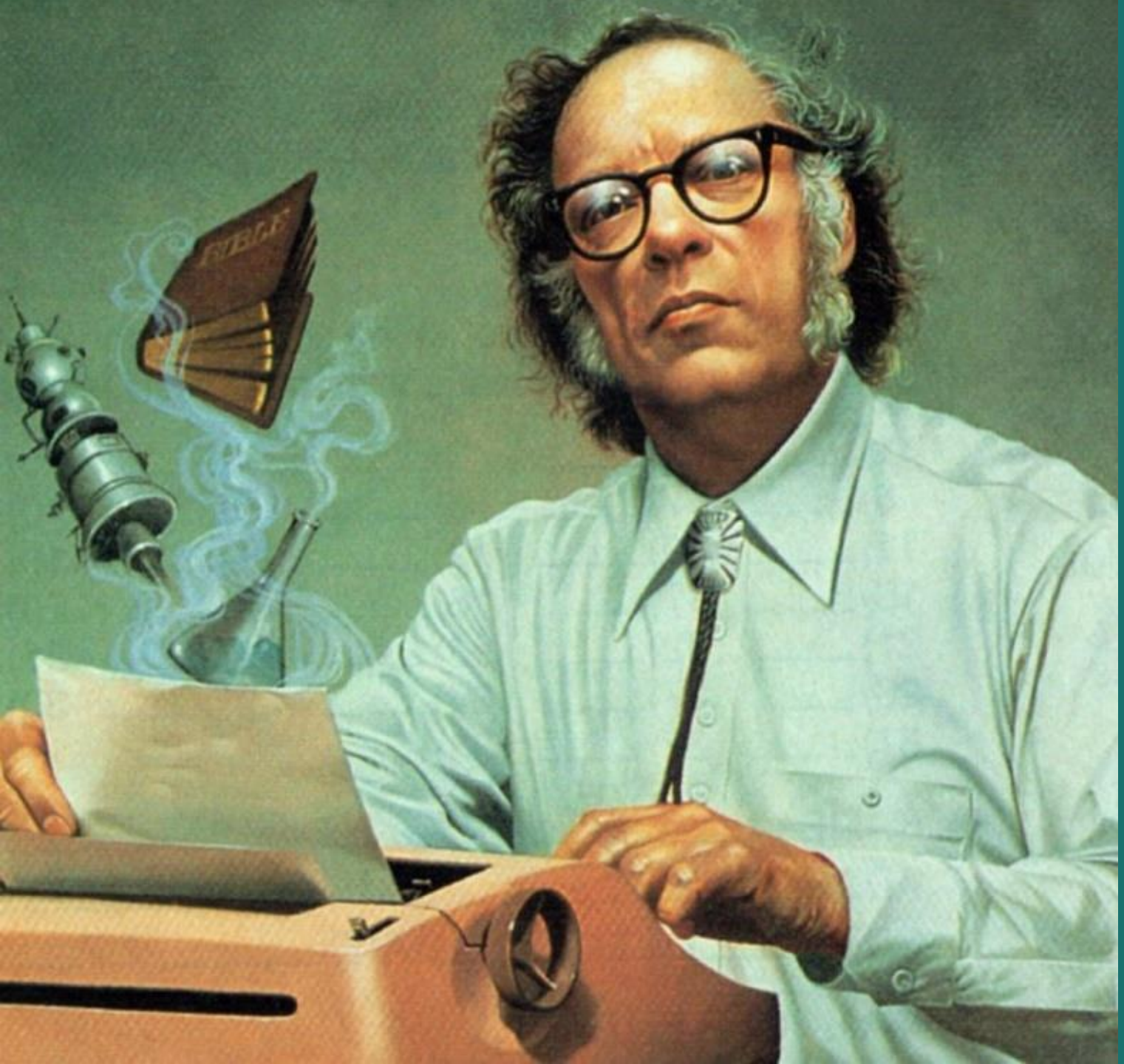
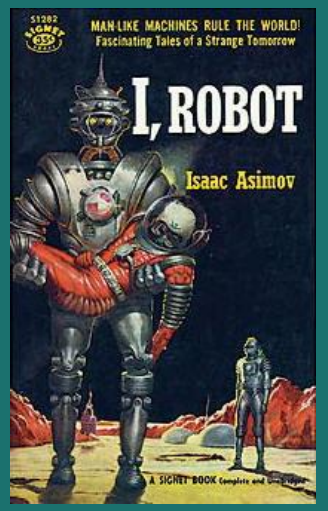
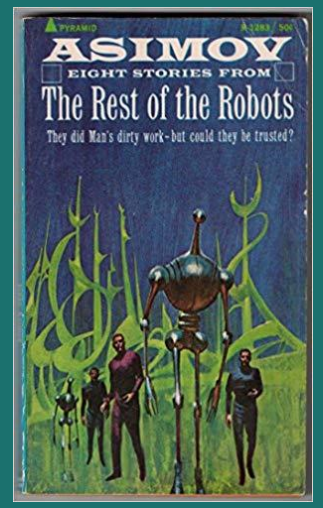

AI and Robotic is changing the world







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Robot and AI is a Science Fiction!
Isaac Asimov's "Three Laws of Robotics“

1.A robot may not injure a human being or, through inaction, allow a human being to come to harm.

2.A robot must obey orders given it by human beings except where such orders would conflict with the First Law.

3.A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

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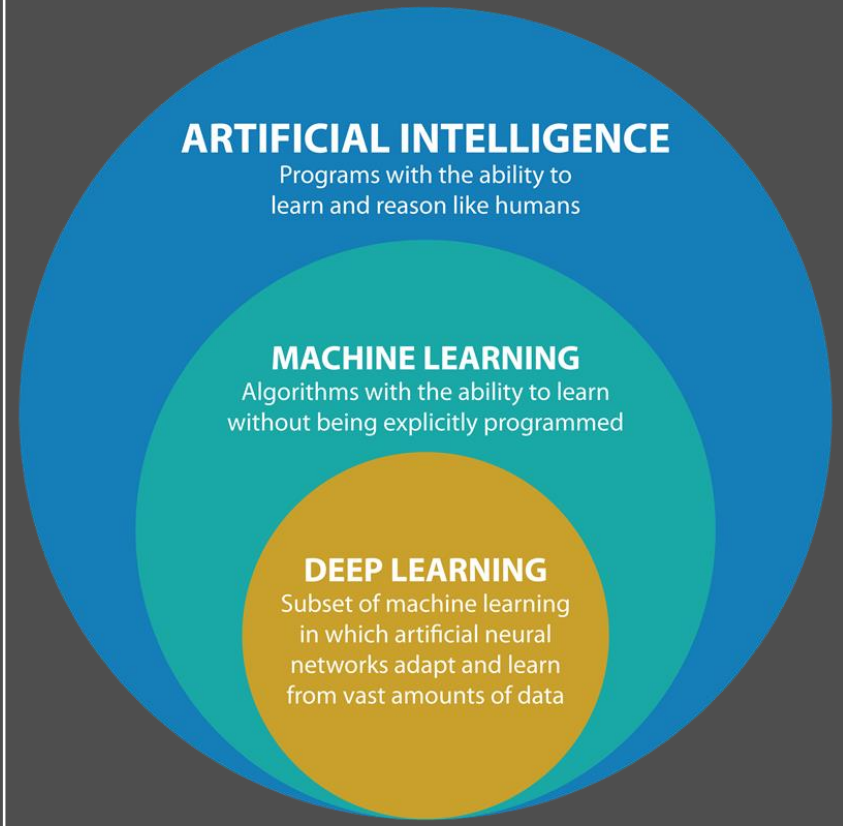
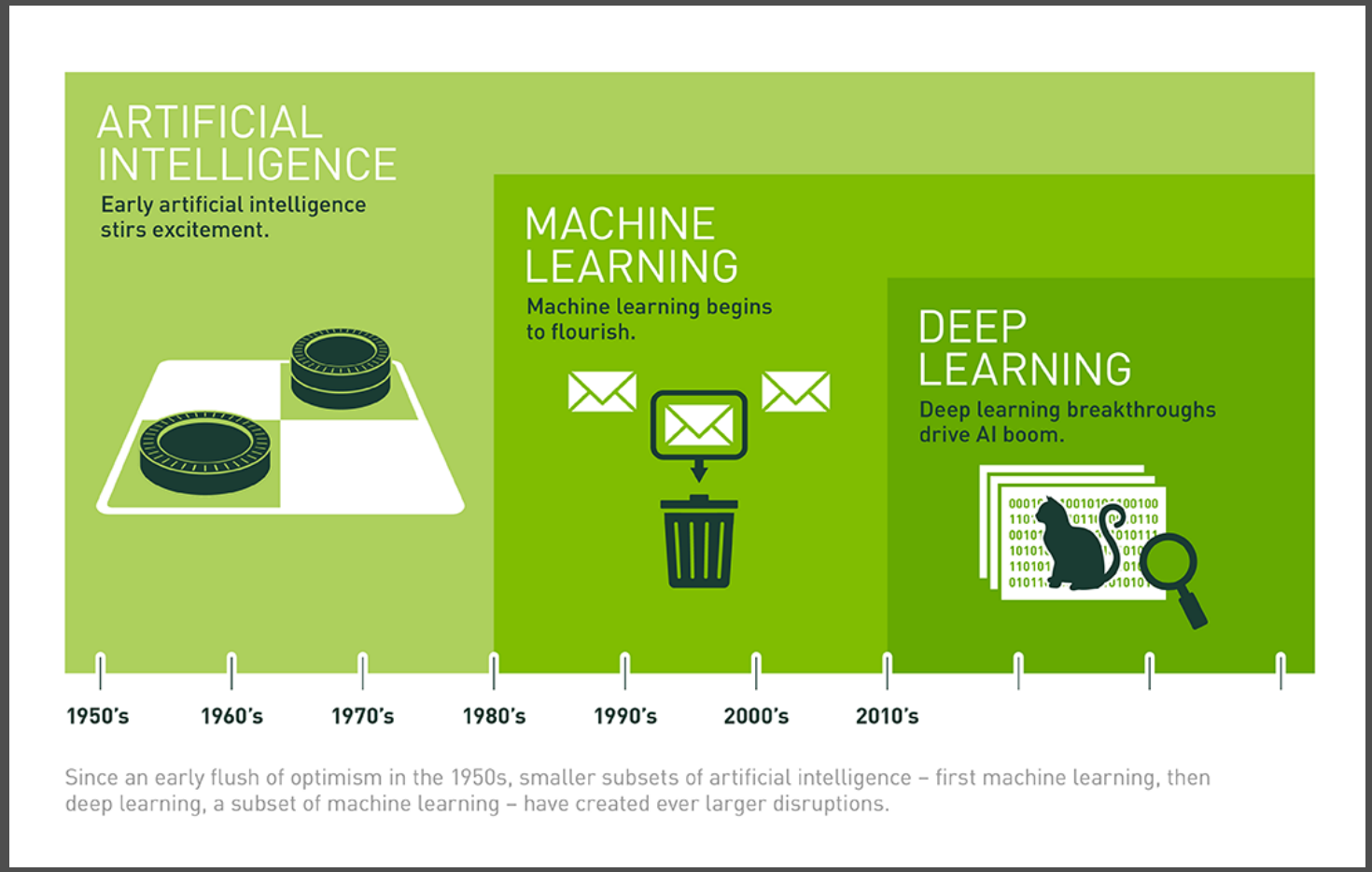
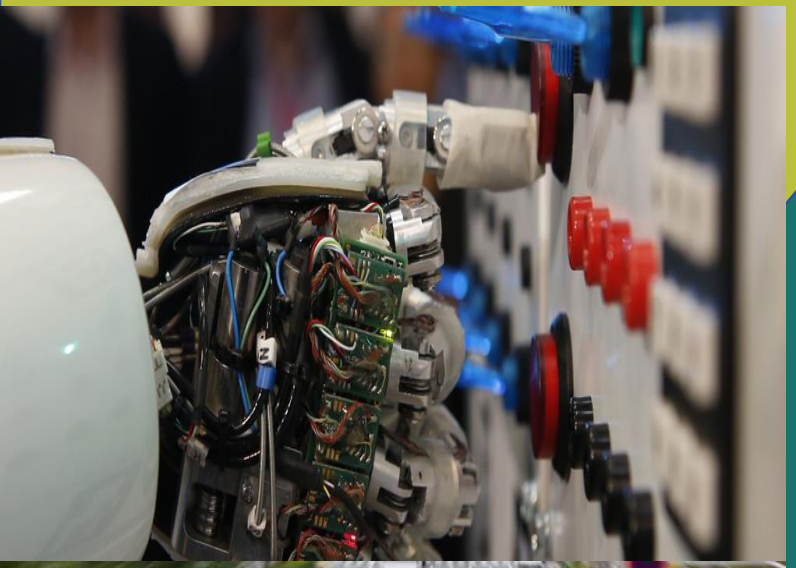
“machines performing tasks that once required human intelligence to complete”

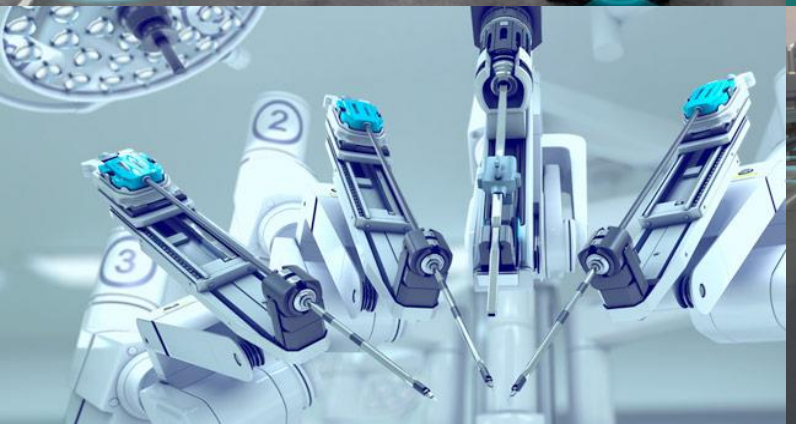
AI is everywhere nowadays. Various forms of AI solutions: automation, speech recognition, machine learning, decision making, natural language processing...

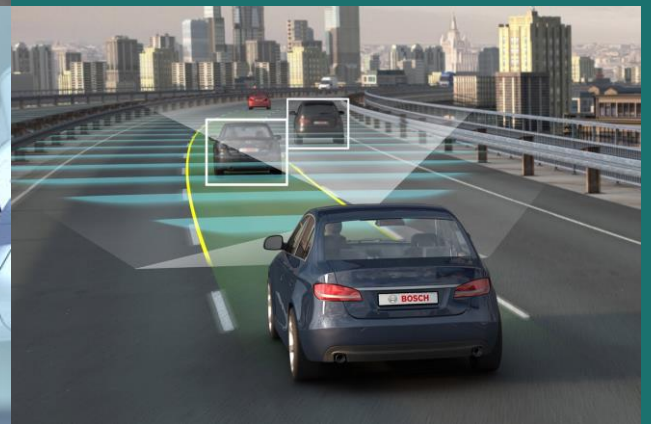
https://www.globalxfunds.com/ai-big-data-the-future-of-the-digital-world/


ARTIFICIAL INTELLIGENCE
Programs with the ability to learn and reason like humans
MACHINE LEARNING
Algorithms with the ability to learn without being explicitly programmed
DEEP LEARNING
Subset of machine learning in which artificial neural networks adapt and learn from vast amounts of data


ARTIFICIAL INTELLIGENCE
Early artificial intelligence stirs excitement.
MACHINE LEARNING
Machine learning begins to flourish.
DEEP LEARNING
Deep learning breakthroughs drive AI boom.
1950's
1960's
1970's
1980's
1990's
2000's
2010's
Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.



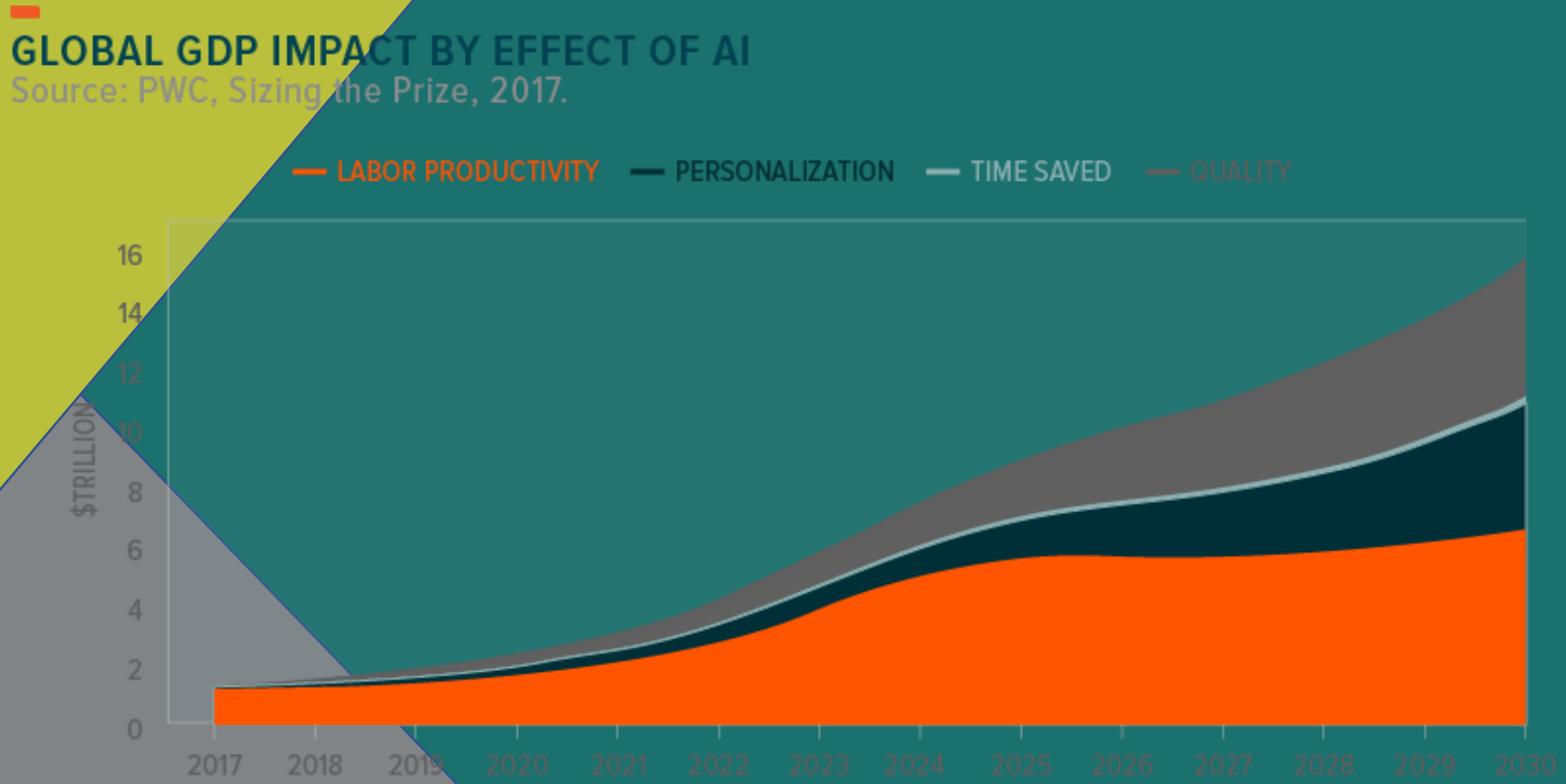




AI will disrupt and revolutionized many things

- Industrial automation
- Transportation (Autonomous vehicle)
- Consumer retail and E-commerce
- Healthcare
- Smart assistant

“AI could contribute up to $15.7 trillion to global GDP in 2030”,PWC.



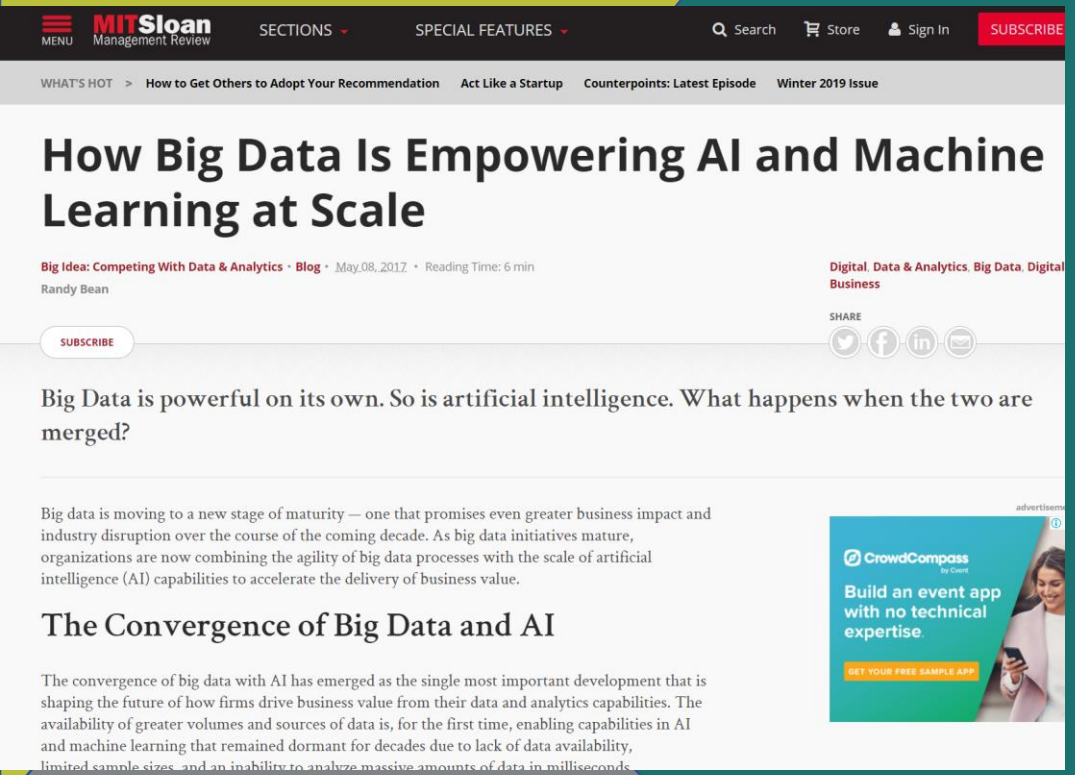
“AI could contribute up to $15.7 trillion to global GDP in 2030, with $9.1 trillion coming from consumption-side effects and $6.6 trillion coming from increased productivity. For context, that would add about 14% to global GDP, or more than China and India’s combined output.(3)”

(3) PwC, “AI to drive GDP gains of $15.7 trillion with productivity, personalisation improvements,” Jun 27, 2017

"AI is the new electricity" – Andrew Ng

Google Brain Project

Big Data is driving AI



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How Big Data Is Empowering AI and Machine Learning at Scale

Big Idea: Competing With Data & Analytics • Blog • May 08, 2017 • Reading Time: 6 min

Randy Bean

Digital, Data & Analytics, Big Data, Digital Business

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Big Data is powerful on its own. So is artificial intelligence. What happens when the two are merged?

Big data is moving to a new stage of maturity — one that promises even greater business impact and industry disruption over the course of the coming decade. As big data initiatives mature, organizations are now combining the agility of big data processes with the scale of artificial intelligence (AI) capabilities to accelerate the delivery of business value.

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The Convergence of Big Data and AI

The convergence of big data with AI has emerged as the single most important development that is shaping the future of how firms drive business value from their data and analytics capabilities. The availability of greater volumes and sources of data is, for the first time, enabling capabilities in AI and machine learning that remained dormant for decades due to lack of data availability, limited sample sizes, and an inability to analyze massive amounts of data in milliseconds

"In fact, 90% of the world's data has been generated since 2015 .That year, the digital universe, i.e., the reservoir of data created and copied, totaled less than 10 zettabytes—that would be 10, followed by 21 zeros. By 2020, it is expected to grow more than four times to 44 zettabytes. Just five years after that, it could reach 180 zettabytes."

- Machine learning needs lots of data to learn for better prediction or clustering.
- Deep learning needs millions of images for training/ text data for feature representation.
- IoT produces lots of sensor data (minuitely, hourly, daily) useful for machine learning.
- Everydays (mobile/Internet) business transactions create lots of data used customer marketing/promotion.

Watermark, "Artificial intelligence is the fourth industrial revolution," Jan 18, 2018
Forbes, "IoT Mid-Year Update From IDC And Other Research Firms," May 16, 2016

The Process

And AI is driving Big Data!!!

Data Generated → Data Stored → Data Processing → Actionable Insights

Big Data — Artificial Intelligence

Structured and unstructured (ex. video) data

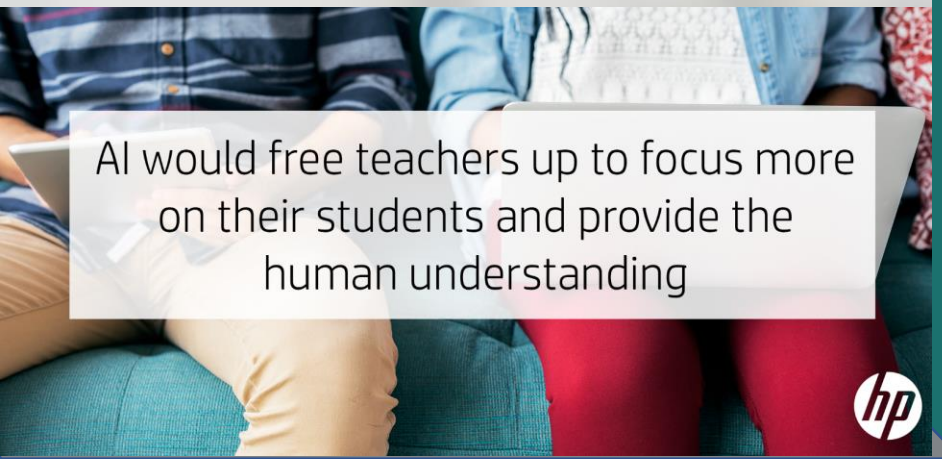
Data is stored in databases and servers

Process the data using CPU/GPUs and AI algorithms to detect patterns

Predictive signals are generated

What our university should do as a thought leader?

- Building an awareness of the social and economic disruption caused by the future AI technology
- Preparing our student to work , live, and thrive in this new AI disrupted society
- Creating a future workforce that help driving AI economy
- Using AI in improving the learning process for our students
- Driving research development and application of AI technology for the social and economic well being



Potential use of AI in learning and education

- Take over more routine task
  - Grading the home work
  - Virtual teaching assistant using chatbot
- Making learning more personalized
  - Adapt to student different learning speed
  - Making customized and personalized contents
- Making measured learning more meaningful and efficient
  - Better assessment of student behavior and preference
  - Better feedback to teacher to help improve the teaching method

Further reading: http://www.eiinsight.com/20180801-how-ai-can-help-boost-student-performance/

https://hpmegatrends.com/ai-in-education-the-effect-on-the-classroom-46c1b569babb

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How should the university prepare the students, staff and learning environments?

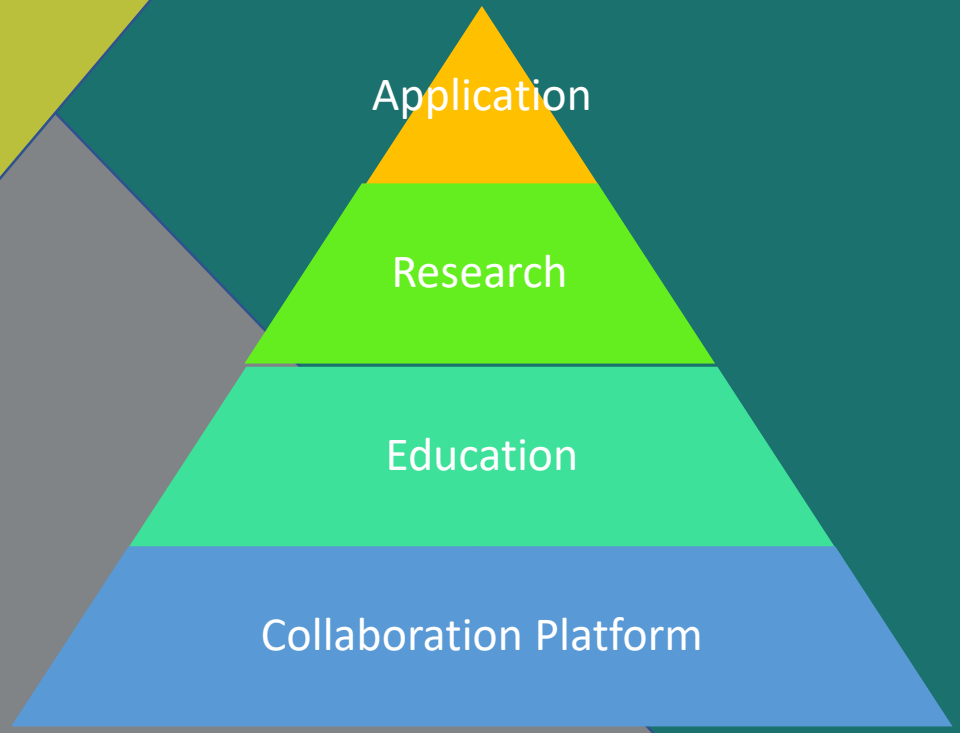
AI Personnel preparation:

1. Prepare skill to work with AI systems
2. Provide them opportunity to pursue learning and training program.
3. Provide life-long learning resources. Provide access to computer science course online by every student level.
4. Modernize the course teaching: do not reward on memorizing, but learning by doing, favor of curiosity, experimentation.

https://www.entrepreneur.com/article/295520

KU Data Science Forum (KU DSF)

- Collaboration project initiated by President of KU University Council in 2018
- Goal : Driving the awareness and development of AI and Data science in KU



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Progress

- KU Data Science Forum #1 and #2 more than 200 researchers involved
- KU Data Science Boot Camp
  - Boot camp #1 with HAII more than 100 students working of Analytics, Deep learning, on Rain fall data
  - Boot camp #2 with Google, Wongnai, SCB on Wongnai Social Data 45 teams of 270 people from KU and many universities
    - Deep learning and machine learning analysis on bad promotion detection
- Forming of Virtual Research Group from many faculties
  - Environment, engineering, science, business, argriculture
  - Pursue many research projects together

Ku13 (2545-2549)	KU14 (2550-2558)	Kucc28 , ku14/1 , ku14/2 , ku14/3 (2558-2559-2560)	Ku1328 ที่ 6 , Kucc29 , Ku14/3 (2560-2562)

Digital Twin
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2548 — 2558 — 2560 — 2561 — 2562

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Smart KU

Super service

Super infra

DU

Super data

6U

- Green University (เขียว)
- Digital University (ดิจิทัล)
- Happiness University (ความสุข)
- Research University (วิจัย)
- Social Responsibility University (สังคม)
- World Class University (สากล)

e-Academic
e-MIS
e-Research
e-University
e-Service
e-Government

Smart people

Hello, my name is PIRUN PANYA

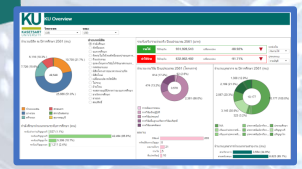
HI!

Artificial Intelligent (AI)

AI

KU Big Data platform

Business Intelligent (BI)



Data Integration (DI)

KU Data Science Team

DAT AI Center
@ Kasetsart sriracha

Building up AI infrastructure capability in 2019

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ARES 1
Xeon Gold 16 core (2)
256 GB RAM DDR4
3.2 TB SSD ,1.8 TB SAS
TESLA V100 32 GB NVLINK (2)

ARES 2
Xeon Gold 16 core (2)
256 GB RAM DDR4
3.2 TB SSD ,1.8 TB SAS
TESLA V100 32 GB NVLINK (2)

ARES 3
Xeon Gold 16 core x 2
256 GB RAM DDR4
3.2 TB SSD ,1.8 TB SAS
TESLA V100 32 GB NVLINK (2)

200 Gbps

200 Gbps

200 Gbps

100 GB Network Switch

Expect delivery in Q1 2019
(Budget 2562)

- **ARES (AI Research and Education System) @KU 2019**
- Advanced AI and computational platform for research and education
- 3 AI machines equipped with state of the art GPU 8x NVIDIA V100 and NV-Link
  - Peak 62.4 Teraflops double precision
  - Peak 1 Petaflops Deep Learning
  - Peak 125 Teraflops single precision
- Application
  - deep learning application for Big Data in agriculture
  - Omics Research
  - CFD, Drug Design, Nano material

KU Sriracha Digital Academy Thailand (DAT) Project

KU KASETSART UNIVERSITY KNOWLEDGE OF THE LAND

KU KASETSART UNIVERSITY
มหาวิทยาลัยเกษตรศาสตร์ วิทยาเขตศรีราชา
Kasetsart University Sriracha Campus

- Academy for Digital Competency in EEC
  - Project funding by Ministry of Digital Economy through DEPA infrastructure fund (50M THB)
- Focus on innovative technology
  - AI, Data Science, IoT
- Consists of
  - Co-work space
  - Training room
  - State-of-the ART AI facility based on NIVIDA DGX-1 Deep learning server (1 Petaflops)

AI Smart University

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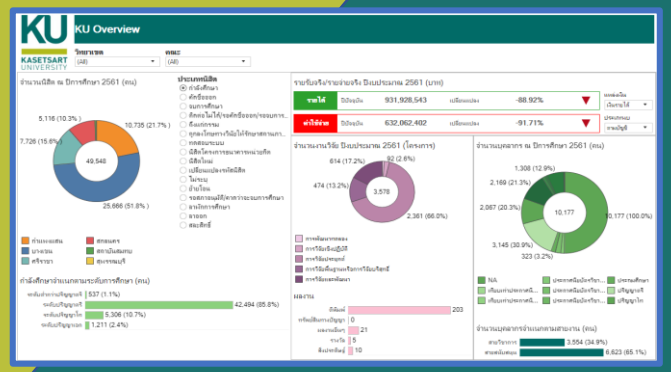
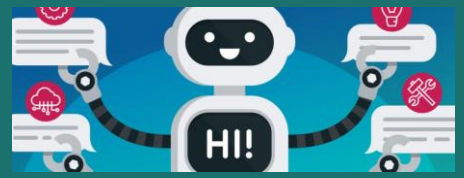
Business Intelligent (BI)



Artificial Intelligent (AI)



พิรุณปัญญา
(PirunPanya)

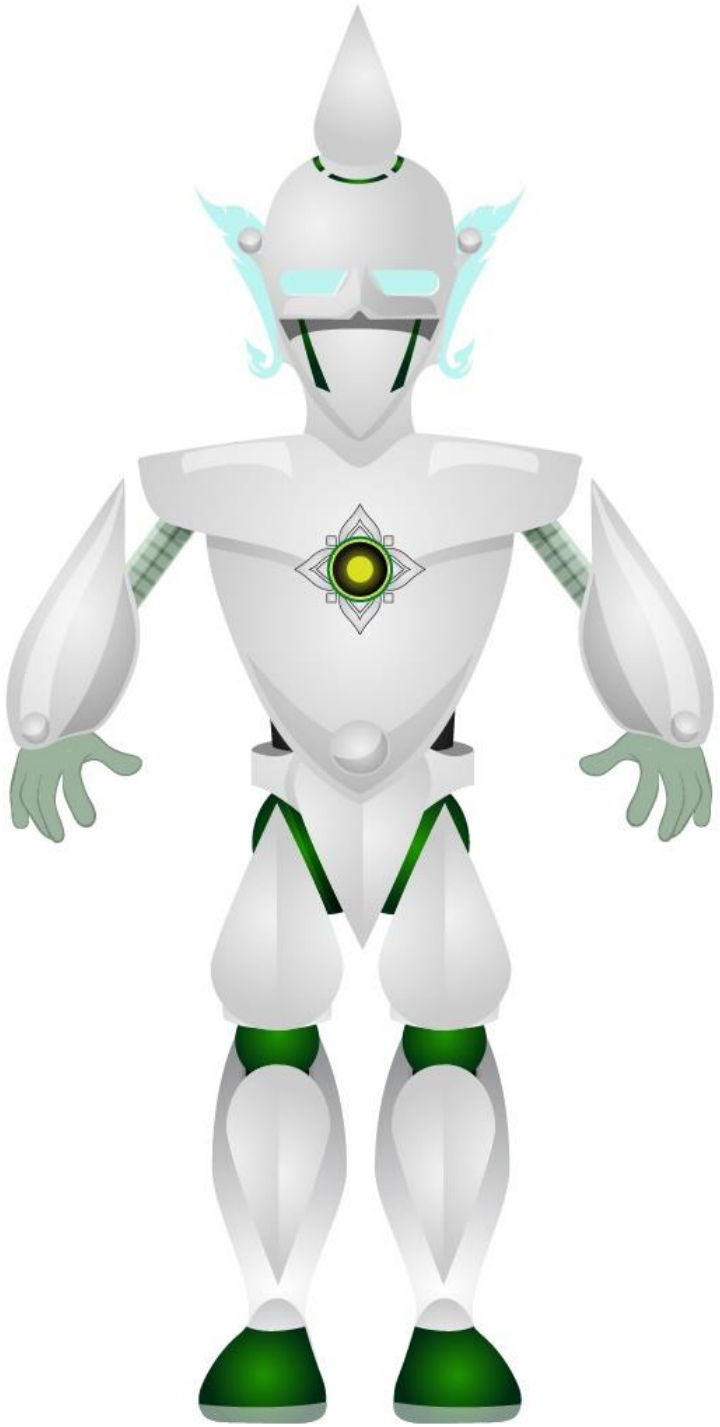
UX
Speech and Natural Language Interface
ใช้ Chat Bot, Siri,
Google assistant service, Mobile App

Data Integration (DI)

KU DWH
(data warehouse)

KU Data Lake

KU Big Data platform



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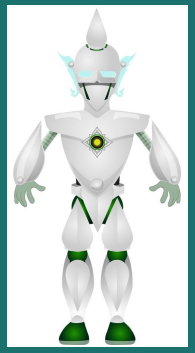
PIRUN PANYA

Smart Assistant System for KU management

พิรุณปัญญา

ระบบอัจฉริยะเพื่อการบริหารมหาวิทยาลัยเกษตรศาสตร์



Project PirunPanya

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- KU presidential Initiative in 2019
- Project that aims to create a smart assistant management system from university data
- Support smart services based on AI and Big Data Analytic
  - Data analytic and prediction using machine learning
  - Notification and early warning
  - Management status
- Innovative natural language interface, mobile app, AR/VR (future)
- A trusted and true companion for KU top management

PirunPanya Potential

- Helps administrators to forecast and manage issues, such as predicting the impact of declining student enrollments, assessing the quality of teaching and learning, and managing related financial considerations.
- Using automated decision-making processes aligned with basic standardized practices, it makes management systems more intelligent and faster, resulting in fewer human errors.
- Improves operational staff capabilities by automatically issuing warnings or precautions if irregularities occur in various management actions.

Last word:

- AI and human are the new partner for the future
- KU will drive this change for the good of our society.

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Thank You and Warm Welcome to KU