AI impact across industries
業界を横断したAIのコンバージェンス
APACの最新動向及び今後

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Artificial Narrow Intelligence (ANI)

01. Data dependent coded (rule based) intelligence

Artificial General Intelligence (AGI)

02. Human-like neural intelligence (e.g. perceive, understand)

Artificial Super Intelligence (ASI)

03. More intelligent than humans, including creativity and social skills

Algorithms or Programs which mimics human functions such as “learning” and “decision making”. Inherent objective is to exceed human performance.

Image Source: Flaticon.com; Source: Frost & Sullivan Analysis
“ビッグデータ”は単なるバズワードではなく、すでに現実であり、AI発展の生命線である。

Gigabytes < Terabytes < Petabytes < Exabytes < Zetabytes (20~25 ZB)

- Currently North America is biggest opportunity provider with more than 8000 exabytes of data being generated and stored
- Greater demand for big data analytics especially in retail, digital marketing, manufacturing and healthcare

- More than 5000 exabytes of data is being generated and stored in Europe as many organizations are finalizing big data adoption strategies
- Importance of big data in utilities, financial services, oil & gas and manufacturing

- About 100 exabytes of information is being generated in India
- Emerging as the talent hub and providers of big data services.

- South America has about 50 exabytes of information being generated

- About 3000 and 4000 exabytes of data is being generated and stored in China and Japan respectively.
- Data generation from industries such as telecom, manufacturing and retail
- 3 of the top 10 global data centers have recently been built in China

; Source: Frost & Sullivan
AIは、グローバルな「ゲームチェンジャー」となる主要テクノロジーとして認識されている。
Q: Which technology will have the biggest impact across all industries over the next 2 years?

- Artificial Intelligence: 58%
- 5G: 20%
- IoT: 14%
- Autonomous Tech (Drones, Vehicles, Robots): 7%
- Augmented Reality / Virtual Reality: 7%
- Blockchain: 58%
AI is, あらゆる業界に大きなインパクトを与える。

Next Wave Disruptors: Game Changing Potential of Technologies by Verticals, Global

* Other (industries) includes manufacturing, healthcare, travel/transportation, education and agriculture/mining.

** Other (technologies) includes autonomous vehicles, human intelligence augmentation, voice-controlled user interfaces (including digital assistants), 3D/4D printing, software-defined infrastructure, quantum computing, Augmented Reality (AR), Virtual Reality (VR), wearable devices and body area networks (including smart clothing), general-purpose autonomous robotics, digestible computing/nanobots, human brain-computer interface, flexible electronic devices, holographic technologies, facial recognition, drones, and others.

Image Source: Flaticon.com; Source: Frost & Sullivan, 2018
デジタルワールドではすでにAIが活用されている。

システムは、消費者の消費パターンと好みを分析し、サービスや製品を予測および推奨する。

推薦システム

Spam_detection

NLP

コンピュータビジョン

サイバーセキュリティ

システムは、消費者の消費パターンと好みを分析し、サービスや製品を予測および推奨する。MLアルゴリズムは、サンプルの文書を使用してメールをスパムと非スパムに分類します。

スピーカーリツクエンス認識システムは、音声のパターンを検出し、人間の音声をマッチします。

AIシステムは、高度な画像認識 MLアルゴリズムとコンピュータビジョンを使用して、書道を認識し、写真をタグ付けします。

MLアルゴリズムは、人間が見逃すか廃棄するデータのパターンを特定できます。スパム検出、誹謗中傷の検出、クレジットカード会社での詐欺または異常検出などのアプリケーション。

Netflix、Shopee、Amazon

Symantec、Mimecast

Google、Apple、Microsoft

NEC、Thales

Checkpoint、Cisco

Image Source: Flaticon.com; Source: Frost & Sullivan
AIの活用には、社会的、哲学的影響をともなった多くの課題がある。（倫理、ガバナンスなど）

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Impact Level</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenging training</td>
<td></td>
<td>Lengthy training process and large data sets (<em>relevant, non-discriminant</em>) required</td>
</tr>
<tr>
<td>Complexity of infrastructure</td>
<td></td>
<td>Enhanced, specialized hardware processors required (<em>focus on “inference” rather than “data crunching”</em>)</td>
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<tr>
<td>Verification and validation</td>
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<td>Verification and validation of AI algorithms is a challenge due to need for proven techniques &amp; models</td>
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<tr>
<td>Need for frequent updating</td>
<td></td>
<td>Evolving business environment requires constant update of data sets and AI engine</td>
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<tr>
<td>Shortage of skilled workforce</td>
<td></td>
<td>Insufficient availability of AI talent</td>
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AI進化のロードマップ

Future Roadmap of AI, Global, 201x – 203x

- ICT
- Healthcare
- Gaming and Entertainment
- Automotive and Transportation
- All

- Quantum AI
- Brain Computer Interface
- Autonomous Vehicles
- Cloud Robotics
- Robotic Personal Assistant
- Cognitive Cyber Security
- Thought Controlled Computing
- Autonomous Surgical Robots
- Universal Autonomous Translator
- Thought Controlled Gaming
- Real Time Emotion Analytics
- Virtual Companions

201x 202x 203x

Image Source: Flaticon.com; Source: Frost & Sullivan
#1 OCBC: 奥針マネーロンダリングの監視にAIを導入。

**Background**

- Existing system was rule-based and lacked flexibility & instantaneous response.
- More than 100,000 alerts a year with more than 90% false positives

**Results**

- Transaction pattern detection reduced alerts to around 4,000 a year
- Reduced volume of false transaction alerts by 35%
- Classified OCBC’s alerts into 48 unique risk clusters, which helped compliance analysts to prioritize and accelerate case examination

Image Source: Source: AI use cases in APAC pdf(slide 60); Source: Frost & Sullivan
#2 Honda：自律走行車にSenseTime社のAIを搭載。

**Background**

- Possessed their own advanced vehicle safety control system technology
- Wanted to develop autonomous driving to fulfil Level 4 automation

- AI unicorn developed its own computer vision perception technology
- Owns a deep learning supercomputing center
- Opened self driving test facility near Tokyo

**Results**

- Provided computer vision algorithms, trained models, and development platforms to support the development of autonomous cars.
- Navigation is feasible even without detailed and high-resolution map. Covers a wide range of driving scenarios and conditions (e.g. snow, thunderstorms).

Image Source: AI use cases in APAC pdf(slide 60); Source: Frost & Sullivan
#3 Maxwell Plus: Googleの機械学習エンジンを利用し、癌検知機能を強化。

**AI Application**

- Maxwell Plus adopts Google Cloud Platform’s ML engine to build its own model for conducting image recognition to detect and analyze prostate cancer at a faster pace and larger volume.

**Issue**

- Before adoption, prostate cancer results are needed up to a week to process. Cases where patients are misdiagnosed, and resulting in wrong treatments.

**Results**

- Enable results to be delivered to clinicians in <5 minutes (instead of 1 week).
- Reduce false positives by 30%
- Expanding to diagnosis on Alzheimer
Challenges with thermodynamics of OLED resulting in degradation. Shorter lifespan of blue OLEDs as compared to red and green OLEDs.

AI-based methods developed to reverse engineer and achieve desired properties and structures for OLED emitters.

Uses ML program to calculate optimum brewing formula based on 20 years worth of test data. Perfect beer developed is determined by flavor, aroma, color and alcohol content desired by consumers.

Use of AI in beer production has significantly shortened development time and helped to address ever changing consumer taste.

ML deployments for materials discovery suffer from the lack of availability of large and consistent datasets due to the high cost of library synthesis.
Manufacturers often provide customization, which can result in tens of thousands of possible product permutations. Hence, need to procure and have excess inventory on hand to ensure that they can fulfill their orders on time.

C3 created an inventory optimisation solution that aggregates data from disparate sources including production orders, product configurations, inventory movements, historical settings of order parameters etc. Provides real-time recommendations to the manufacturer and carry out “what-if” scenario planning.

Solution was applied to 3M’s industrial product manufacturing environment

Reduced excess inventory levels by up to 35% which helped 3M to save >USD 100 million in inventory holding costs
AI research is capital intensive. Acquisition by the likes of Google, Apple, Facebook, and/or Amazon. AI start-up acquisitions were at an all-time high in 2018.

Existing advanced technologies, such as cloud, IoT, and Big Data, provide the critical foundation for AI to develop and deliver value.

ML systems, especially deep learning systems, require huge volumes of training data. The company with the most data will provide the best outputs. (Sensetime, China)

Tech giants, such as Amazon, Baidu, Facebook, Google, IBM, and Microsoft are sharing their ML frameworks for free, as frameworks and algorithms are not what create the most value.
“It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way.”

~ Charles Dickens

_A Tale of Two Cities_ (1859)
THANK YOU

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