

Introducing AI to Small and Medium-Sized Recruitment Companies

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Introduction

- ▶ Objective statement: To acquire basic knowledge of AI and to provide an opportunity to consider the possibility of using AI in their own business.
- ▶ Recognition of current situation: Growing interest in AI in the recruitment industry and expected benefits (increased business efficiency, improved matching accuracy, new value creation).



Agenda

- ▶ 1. basics of AI
- ▶ 2. latest AI technology trends and business applications
- ▶ 3. scenario of AI application in the recruitment industry
- ▶ 4. first steps for AI implementation and utilization

1. what is AI?

- ▶ **What is AI?**

- ▶ Definition: computer mimicry of human intellectual activity.
- ▶ Historical overview: after boom and winter periods, why is it gaining attention now (evolution of data, computational power, algorithms)?

- ▶ **Machine Learning**

Clarify that it is the core technology of AI.

- ▶ **Supervised learning:**

- ▶ E.g., recommending the best jobs based on resume data, **predicting the probability of successful hiring based on historical decision data.**
- ▶ Importance of teaching "correct data."

- ▶ **Unsupervised learning:**

- ▶ Example: Extracting groups of **candidates with** similar skill sets from a large number of resumes.
- ▶ Discovering structures and patterns in the data.

- ▶ **Reinforcement learning:**

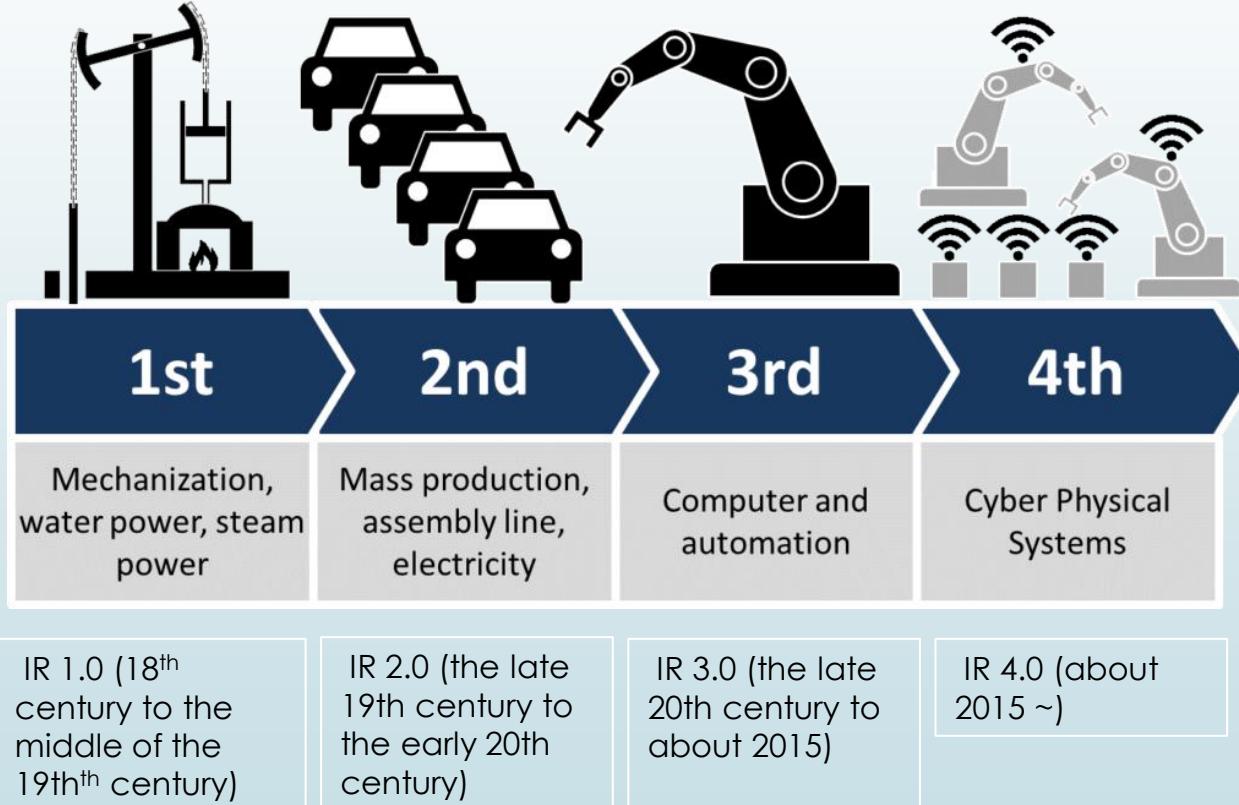
- ▶ (less direct application in recruiting, but touched on as a concept) **Learning optimal behavior through trial and error.**

- ▶ **Impact of Deep Learning (Deep Learning)**

- ▶ A type of machine learning, specifically a multi-layered neural network that mimics the structure of the human brain.
- ▶ Brief description of breakthroughs in image recognition, speech recognition, and natural language processing.

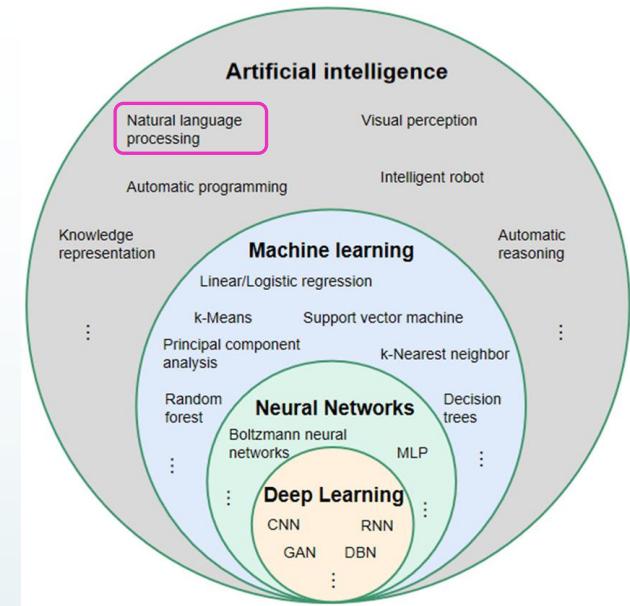
Industry Revolution (IR)

► Four phases in IR



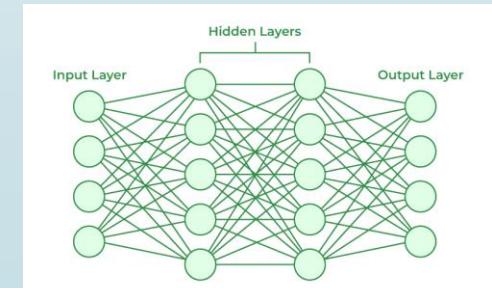
What is AI?

- ▶ A field that includes **machine learning** and **neural networks**.
 - ▶ Machine Learning (ML)
 - ▶ Has strong background on programming, algorithm development, statistical methodologies, and big data analytics.
 - ▶ Compared to deep learning, some people call it **shallow machine learning**.
 - ▶ Neural Network (NN)/Artificial Neural Network (ANN)
 - ▶ A technique to process data in a way that **mimics the human brain**. neural networks can **learn from experience** and **identify patterns** in data.
 - ▶ Multi-layer perceptron (MLP)
 - ▶ **Fully connected/dense layer feedforward networks**: Each node connects to all nodes in the next layer.
 - ▶ **At least three layers of nodes**: An input layer, one or more hidden layers, and an output layer.
 - ▶ **Non-linear Activation function**: to learn more complex patterns that are not possible with a purely linear model.
 - ▶ Deep learning
 - ▶ More than tens or even hundreds of layers
 - ▶ More complicated structures to enhance the problems of neural networks



Relationship between artificial intelligence, machine learning, neural networks, and deep learning.

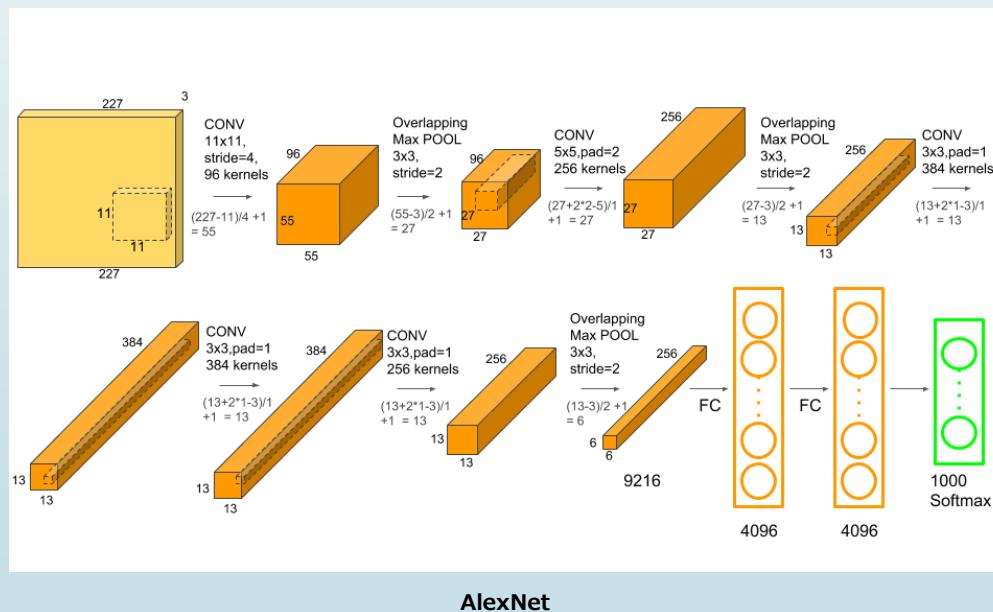
(MLP: multi-layer perception/preceptron; CNN: convolutional neural network; RNN: recurrent neural network; DBN: deep belief network; GAN: generative adversative network) generative adversative network)



An example of MLP neural networks architecture

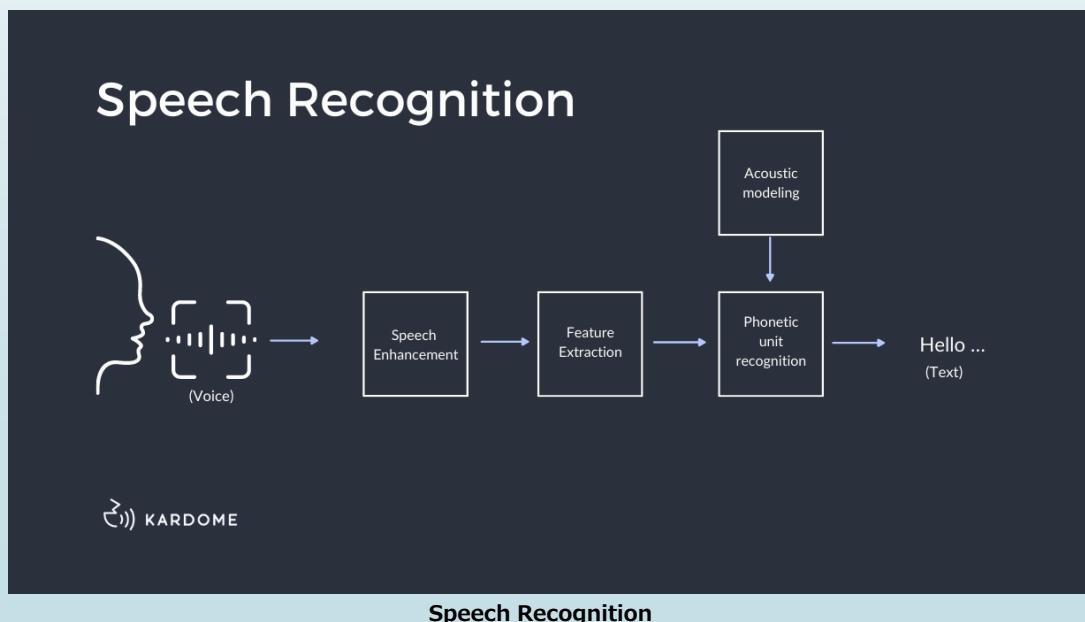
Image Recognition

- ▶ **Breakthrough:** In the 2012 ImageNet Large Scale Visual Recognition Challenge (ILSVRC), a model using deep learning (AlexNet) **achieved recognition accuracy that outperformed traditional methods**. This enables computers to identify objects in photographs (e.g., cats, cars, faces, etc.) with equal or better accuracy than humans.
- ▶ **Impact:** Accelerated practical applications in a wide range of fields, including automated driving, facial recognition, medical imaging, and anomaly detection.



Speech Recognition

- ▶ **Breakthrough:** The introduction of deep learning has **dramatically improved the accuracy of speaker-independent general-purpose speech recognition**. In particular, it is now able to handle background noise and diverse accents, and has significantly reduced the rate of misrecognition.
- ▶ **Impact:** Smart speakers, voice assistants on smartphones (Siri, Google Assistant, etc.), automated minutes taking, automated call center answering, etc. have become widespread and deeply embedded in our lives.



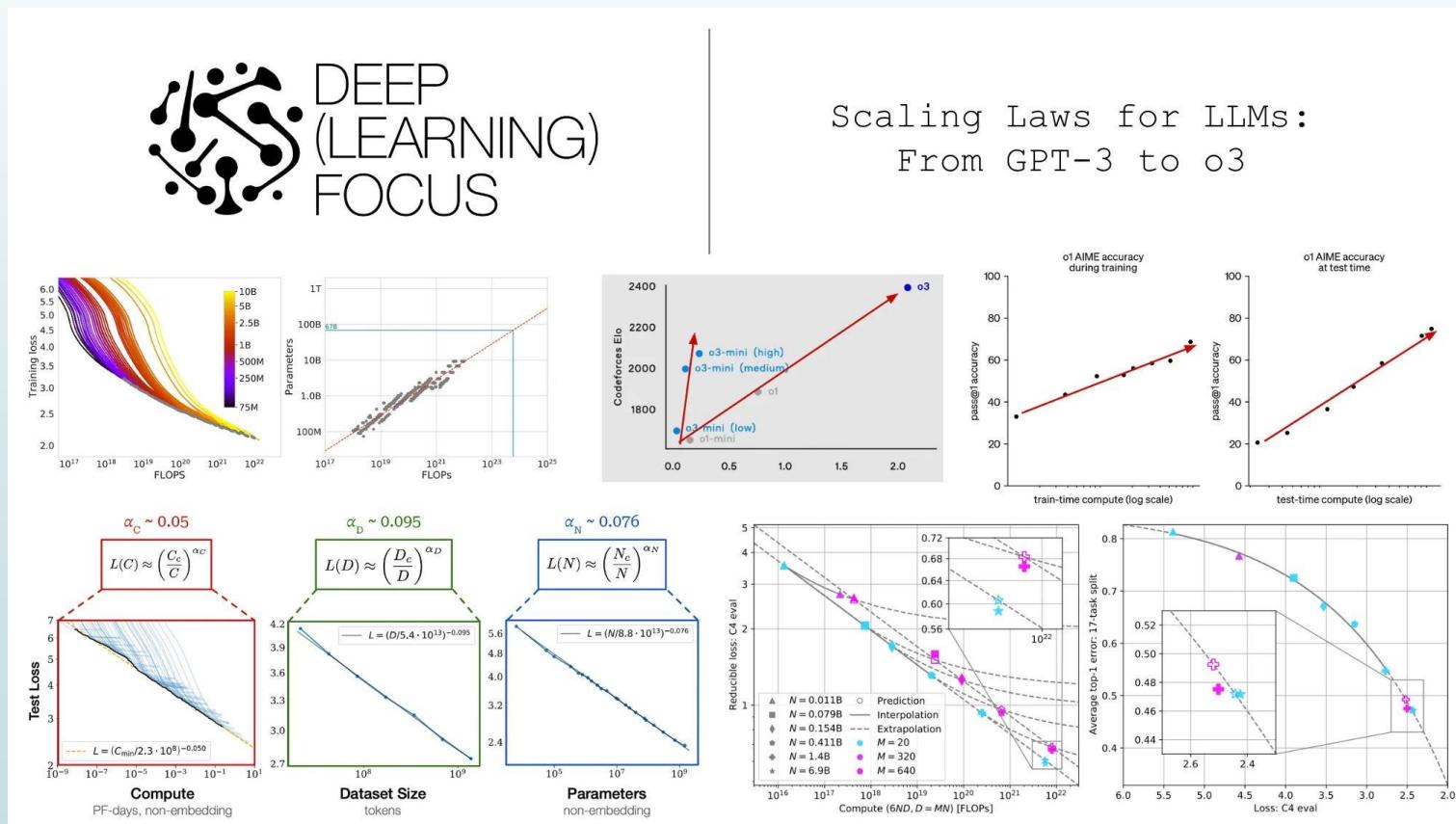
Natural Language Processing (NLP)

- ▶ **Breakthroughs:** The advent of deep learning, especially new architectures such as Transformer, has enabled computers to **better understand the meaning and context of words**. This has led to improved machine translation accuracy, sentence summarization, sentiment analysis, and the emergence of high-performance chatbots and **large-scale language models (LLMs)** such as ChatGPT.
- ▶ **Impact:** High-quality automated translation, text generation, question and answer systems, improved search engine accuracy, and AI capable of natural human interaction are just a few of the many applications that are emerging and transforming the way we gather information and communicate.



Necessary Elements for Breakthroughs

- These breakthroughs have emerged as a result of the fusion of **large amounts of data, high-performance computational resources (e.g., GPUs)**, and sophisticated **algorithms**.



Scaling Laws for LLMs

Source: <https://cameronwolfe.substack.com/p/llm-scaling-laws>

2. trends in the latest AI technologies and business applications

► Impact of Generative AI (especially large scale language models such as ChatGPT - LLM)

► What can it do?

- Brief description of principles: natural text generation (emails, resume correction, job posting assistance)
- Summarization (long-form candidate information, interview minutes)
- Translation
- Information retrieval, question and answer session
- Idea generation (career path proposal, list of interview questions)

► Predicting the next word from the last data.

► Explanation of actual examples:

- When you input "Create a job offer", the system generates a skeleton and sentences.
- When you type "Summarize this resume in 3 lines," a summary is generated.

► Other Noteworthy Technologies

► Image recognition and video analysis:

- (e.g.) Possibility of analyzing nonverbal information from recruitment videos (future application), etc.

► Advancements in speech recognition and natural language processing:

- (e.g., automatic transcription of interview content, sentiment analysis, and work efficiency improvement through extraction of key points).

► Recommendation systems:

- Improvement of accuracy of job recommendation to candidates and candidate recommendation to companies.

► Examples of business applications (broaden the image to include fields other than recruiting)

- Automatic customer service (chatbot)
- Personalization in marketing
- Quality inspection at manufacturing sites

Example-1: Generating a skeleton and sentences by LLM (Generation AI) after inputting "Create a ●●job offer".

▶ Prompt:

- "I need you to create a job posting for **an engineer at an IT company as a member of a new web service launch**. Required skills are React and TypeScript; English is business level. Salary is 7-10 million yen per year. The company's appeal is its free culture and discretionary power."

▶ LLM Generated Results:

●● Specific requirements
of the job offer

- 生成される求人票の骨子イメージ:

- 【ポジション名】Webサービス立ち上げ・開発エンジニア
- 【募集背景】新規Webサービス立ち上げに伴うコアメンバー募集
- 【業務内容】(詳細な箇条書き)
- 【必須スキル】React, TypeScriptを用いた開発経験、ビジネスレベルの英語力
- 【歓迎スキル】(関連技術)
- 【求める人物像】(主体性、成長意欲など)
- 【この仕事の魅力】(裁量権、自由な風土、キャリアパス)
- 【給与】年俸700万円～1000万円

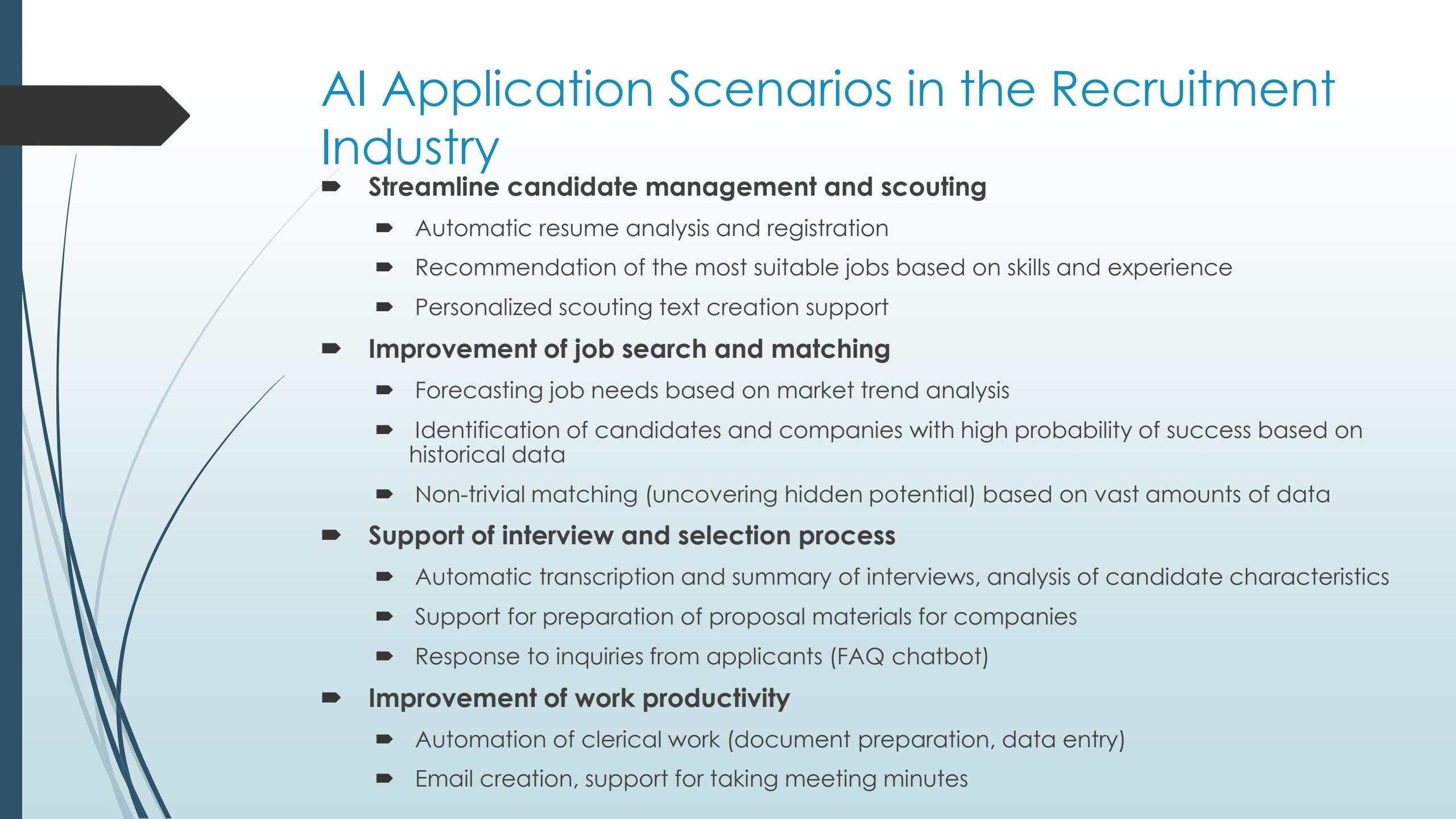
- 生成される求人票の文章イメージ:

「この求人は、革新的なWebサービスの立ち上げに情熱を燃やすエンジニアの方を募集しています。(中略) ReactとTypeScriptを用いた開発経験、およびビジネスレベルの英語力は必須です。年俸700万円～1000万円。自由な社風の中で大きな裁量権を持ち、サービスをゼロから創り上げる貴重な経験を積むことができます。」

「このように、指示するだけで求人票のたたき台がものの数秒で完成するんです。あとは、エージェントである皆さんのが最終的な調整や付加価値を加えるだけで、大幅な時間短縮と求人票作成の質の向上が見込めます。」

Example-2: Resume Summarization Support by LLM (Generated AI)

- ▶ **Prompt.**
 - ▶ "Please summarize the content of this resume (or CV) in three lines, focusing specifically on your work experience and skills."
- ▶ **Example 2.1: For a resume for a sales position**
 - ▶ **Summary:** "Worked as a corporate solutions sales representative for a major financial institution for seven years. Consistently maintained a target achievement rate of 120% or higher and contributed to the development of new clients. Demonstrated leadership with project management experience."
- ▶ **Example 2.2: Resume for an engineering position**
 - ▶ **Summary:** "More than 5 years of experience in web application development, working on several projects with Python and AWS as key technologies. Particular strength in designing and implementing customer management systems. Extensive team development experience and strong technical problem solving skills."
- ▶ In this way, **you will be able to quickly and efficiently understand the candidate's core information without** having to read through the entire detailed dossier. This speeds up the screening process and allows agents to spend more time on in-depth interviews and communication with candidates.
- ▶ This can be a powerful tool to **reduce the burden of information processing in daily work and dramatically improve productivity.**



AI Application Scenarios in the Recruitment Industry

► Streamline candidate management and scouting

- ▶ Automatic resume analysis and registration
- ▶ Recommendation of the most suitable jobs based on skills and experience
- ▶ Personalized scouting text creation support

► Improvement of job search and matching

- ▶ Forecasting job needs based on market trend analysis
- ▶ Identification of candidates and companies with high probability of success based on historical data
- ▶ Non-trivial matching (uncovering hidden potential) based on vast amounts of data

► Support of interview and selection process

- ▶ Automatic transcription and summary of interviews, analysis of candidate characteristics
- ▶ Support for preparation of proposal materials for companies
- ▶ Response to inquiries from applicants (FAQ chatbot)

► Improvement of work productivity

- ▶ Automation of clerical work (document preparation, data entry)
- ▶ Email creation, support for taking meeting minutes

4. first steps in introducing and utilizing AI

- ▶ **Importance of starting small:** Don't seek perfection, but start with some operations.
- ▶ **Clarify objectives:** What is the purpose of using AI?
- ▶ **Establish data infrastructure:** AI is only possible with data. First of all, take stock of your data, organize it, and accumulate it.
- ▶ **Collaboration with vendors:** Utilize the knowledge of experts.
- ▶ **Human resource development:** Develop human resources who can master AI and co-create with AI.
- ▶ **Conclusion:** AI is not a threat but a powerful partner.



If you have any questions, please feel free to contact me.