NEC Advanced Analytics Platform (AAPF) Promoting "AI Co-Creation"

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Abstract

To ensure the success of AI operation, it is essential to establish a collaboration between various specialists from data scientists to applications developers. NEC Advanced Analytics Platform (AAPF) is an AI operation platform that supports such collaborations. AAPF allows the use of analytics tools employed worldwide as open-source software (OSS) as well as NEC the WISE technologies, including Heterogeneous Mixture Learning. The container technology facilitates the creation of an analytics environment that meets the diverse needs of individual users. From data analytics environments to, AI development environments, AI execution platforms, and learning environments aimed at human resource cultivation, AAPF is currently being used in a wide range of applications and is supporting the implementation of AI in the field of business. This paper introduces AAPF and examples of its applications.

Keywords

AI, data analytics, machine learning, NEC the WISE, AI platform, AAPF

1. Introduction

AI is being adopted more and more in various domains, but there are still many cases in which AI deployment is stack in the PoC (Proof of Concept) phase. This is largely due to the fact that AI deployment requires processes that are different from ICT deployment, and also calls for an extensive range of personnel and job roles. AI deployment requires, for instance, data scientists in charge of data analytics, application developers who turn analytics results into apps, and analytics system administrators who manage a prediction system according to changes in environments after implementation.

In addition, the participation of legal and operations specialists are also required to ensure the proper implementation and operation of AI in society. A smooth collaboration between various specialists is needed for AI operations and for handling the changes that come about through operations. In other words, "AI Co-Creation" or AI based solutions through cooperation of specialists with different skills is the key to success.

To respond to these social needs, NEC provides NEC Advanced Analytics Platform (AAPF) as the platform to support the process of "AI Co-Creation".

The present paper introduces AAPF and examples of its applications. Section 2 describes the outline and features of AAPF, Section 3 deals with examples of its applications, and Section 4 focuses on the future developments. The conclusion provides a summary of the key points of the paper.

2. NEC Advanced Analytics Platform (AAPF)

AAPF is a platform that supports "AI Co-Creation".

A successful AI operation requires collaboration between various specialists in order to progress through the AI adoption lifecycle phases of research, planning, validation, deployment, and operation.

AAPF focuses particularly on the phases between validation, implementation, and operation, and supports smooth collaboration between data scientists, application developers, and analytics system administrators (**Fig. 1**).

Furthermore, with the addition of AAPF Solution Templates, which is described later in Section 4, the platform can support the consistent execution of the AI adoption lifecycle including the research and planning phases as
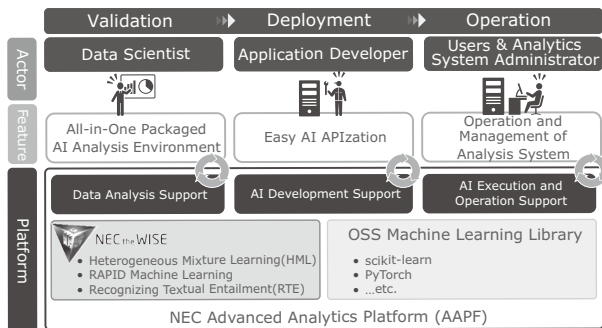
Fig. 1 AAPF to support "AI Co-Creation".

well as the operations by specialists involved in each of the phases.

The features of AAPF in each of the phases of validation, deployment, and operation are described.

2.1 Bundled AI analytics environment (Validation phase)

With AAPF, you can instantly build an analytics environment for various purposes without having to build a dedicated environment for each purpose, which usually requires the skill of a data scientist.

AI is being used in a diversifying range of domains. AI operations show significant potential for application in other domains including demand prediction, quality examination, and customers' feedback analysis. The technologies and tools that provide components of AI are also becoming increasingly diverse. For example, different technologies and tools are necessary depending on the fields, such as time-series data analysis, image analysis, and text analysis. In the validation phase, a dedicated analytics environment must be built rapidly, and designed to fully use the particular technologies and tools according to each purpose. The environment must also be provided and managed in a way that enables use by teams comprised of multiple data scientists.

AAPF provides environment configurations for various analytics purposes in advance. This makes it possible, for example, to use analytics tools to support Heterogeneous Mixture Learning, NEC's RAPID machine learning, Recognizing Textual Entailment, and Open-Source Software (OSS) analytics libraries, according to each purpose. The analytics environment is built automatically so that the data scientists can begin analytics by simply selecting the environment type. In this process, it is possible to customize the CPU and memory capacity as well as to decide whether or not to use the GPU. Analytics is carried out by several data scientists using the same environment configuration. This helps prevent issues caused by differences in tools or their versions, and enables smooth collaboration.

2.2 Easy AI APIzation (Deployment phase)

AAPF provides a mechanism for facilitating the development and deployment of AI applications.

AI operations that bring about a real innovation are realized after the deployment phase is complete. In this phase, the analytics procedures and systems developed in the validation phase must be designed to call APIs to enable incorporation into the application.

AAPF provides a feature to call the analytics procedures and systems. This feature facilitates the incorporation of AI functions into applications. With AAPF, application developers can easily develop value-added applications in collaboration with data scientists.

2.3 Operation and management of analytics systems (Operation phase)

AAPF can be adopted as an AI execution environment in the operation phase, which comes after the validation and deployment phases.

AI operations differ from traditional ICT operations in several aspects. One of the most important differences is the need for updating the analytics system according to the environmental changes. In the case of demand prediction, for example, unforeseeable changes may occur such as changes in consumer behavior, competitive relationships, and corporate strategies. Such changes make it necessary to adjust the prediction system and its operation appropriately. Thus, in the operation phase, the analytics system in operation must be monitored to ensure that it is performing up to its potential, and the analytics system must be tuned and updated as needed.

AAPF provides a mechanism for outside linkage of such analytics results. In addition, the "APIzation" implementation, described above, can be used to re-verify and update the analytics procedures and systems as well.

With these features, AAPF supports "AI Co-Creation" by seamlessly connecting the phases of validation, implementation, and operation. Some examples of its actual use are introduced in Section 3 below.

3. Examples of AAPF Use Cases

This section introduces three use cases of AAPF: data analytics environment, AI development/execution environment, and human resource cultivation environment.

3.1 Data analytics environment

AAPF has already been adopted as a data analytics environment in several hundreds of projects.

AAPF employs Python as the standard language for data analytics, and incorporates Jupyter to enable visual and interactive analyses. It can utilize the technologies of NEC the WISE brand, such as Heterogeneous Mixture Learning. AAPF can also perform data analytics by combining NEC the WISE analytics engines with OSS.

AAPF is already being used as a common AI analytics platform for multiple data analytics procedures that functions by connecting to various de facto standard technologies commonly used worldwide.

3.2 AI development/execution environment

AAPF has also been adopted as AI development and execution environments.

With the APIzation feature described in Section 2, the various AI analytics procedures and systems, implemented also as a web API, can be incorporated into different kinds of applications. The applications can also be coded in major programming languages other than Python. The web API can be called from Java, etc. In addition, it can also be called, for example, from VBScript to link with Microsoft Excel (**Fig. 2**).

An example of adoption of AAPF as an AI execution environment is the web service version of NEC's Supply and Demand Optimization Platform, which is an application service incorporating the AAPF demand prediction functions. This provides an example of how AAPF can be used by retailers to predict the number of customers, or by operations managers to easily and directly use the shipping predictions of food manufacturers.

3.3 AI human resource cultivation environment

AAPF is also adopted as an AI human resource cultivation environment.

Considering the importance of "AI Co-Creation", there is a need for a large number of people to learn data analytics of various contents according to their roles. Also, to learn data analytics, it is not sufficient to simply sit and learn about it, but experiencing actual data and algorithms is also a must. AAPF also provides the environment to experience this as well.

At NEC Group, AAPF is provided to all the employees, which means more than 4,500 users are learning data analytics procedures. AAPF users are composed not only of data scientists but also Group employees who are in charge of sales, system engineering, planning, and legal affairs. NEC Group also holds periodic contests where the participants compete in prediction accuracy and business ideas under an AAPF environment. AAPF is the foundation upon which "AI Co-Creation" is executed at the NEC Group.

As shown in this section, AAPF has already been widely adopted as a platform to support "AI Co-Creation" and to promote the social implementation of "truly feasible AI". Section 4 will discuss the future developments of AAPF.

4. Future of AAPF

The AAPF platform supports "AI Co-Creation" and promotes the dissemination of "truly feasible AI" to every corner of society. This section shows three ways in which
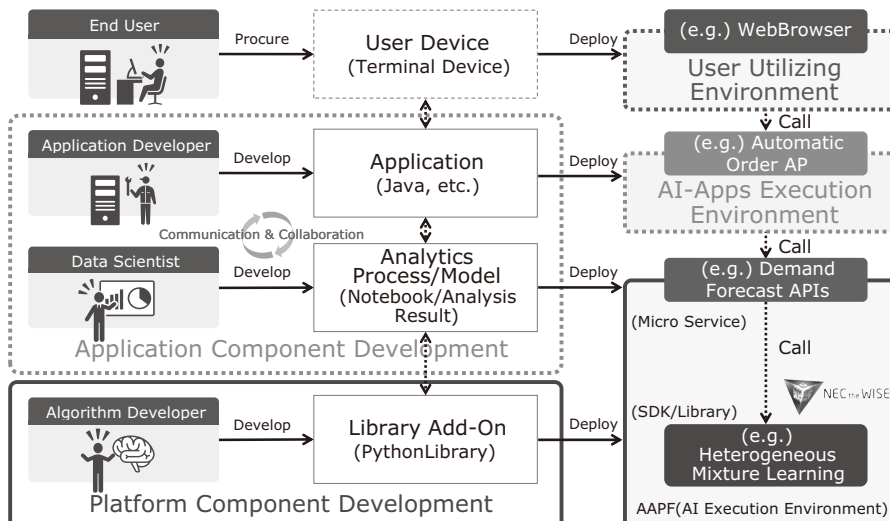

Fig. 2 Incorporation of AI in applications.

this is achieved. One is the AAPF Solution Templates that assists in extending AI adoptions to various business types and operations. The second is NEC Academy for AI that uses AAPF to assist the spread of AI personnel throughout society. The third is the extension of new technologies incorporation.

4.1 AAPF Solution Templates

AAPF Solution Templates are composed of additional libraries and services that provide AAPF for applications in businesses. AI operations knowhow is provided in the form of templates, ranging from analytics procedures for various business types and operations to visualization techniques.

Discussions with specialists are indispensable for promoting AI applications in various operations. AAPF Solution Templates provide specific steps and screens used in AI adoption to various business types and operations, which can facilitate a proactive survey of AI adoption as well as the planning of its desirable format.

At present, AAPF Solution Templates are being provided gradually, starting with the manufacturing and financial industries. Templates will be further extended to applicable domains with the aim of disseminating AI operations throughout society.

4.2 NEC Academy for AI

NEC Academy for AI is another means to support AI operations in society by widely spreading NEC's human resource cultivation expertise.

As described in Section 3, AAPF is employed actively as the learning environment of the NEC Group. In the future, the NEC Group intends to expand the scope of AAPF provision, which is being adopted more widely and easily outside NEC as the AI learning environment in NEC Academy for AI. Plans are also underway to promote mutual distributions of analytics expertise and ideas through AAPF.

4.3 Expansion of new technologies incorporation

AAPF is based on the global standard technologies stack that includes OSS. Under the open technical specifications, analytics algorithms and libraries can be added easily.

AAPF currently incorporates "NEC the WISE" brand technologies including Heterogeneous Mixture Learning, RAPID machine learning, and Recognizing Textual Entailment, as well as OSS libraries such as scikit-learn. In the future, "NEC the WISE" brand technologies will be

generated continuously and technologies of NEC Group's partner companies will also be incorporated to collaboratively provide technologies.

5. Conclusion

This paper introduced the importance of "AI Co-Creation" and explained how AAPF is used to support the concept. While continuously pursuing "AI Co-Creation" in order to cover more diverse domains and offer various technologies, the NEC Group will also plan and develop AI technologies to support industrial and technological innovations and contribute to society as a whole.

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Papers for Special Issue

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NEC's Commitment to Its New "NEC Group AI and Human Rights Principles" Policy
Human Resource Development in the Age of AI

AI-Enhanced Services/Solutions to Accelerate Digital Transformation
NEC Advanced Analytics Platform (AAPF) Promoting "AI Co-Creation"
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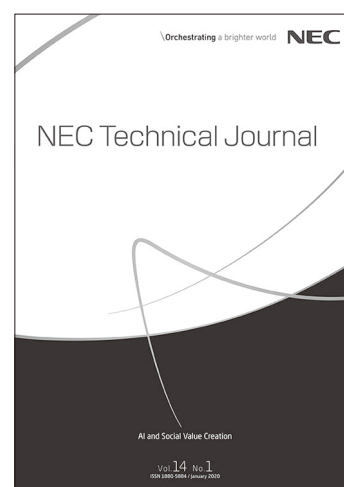
Vol.14 No.1
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