



Utilization of Artificial Intelligence to Support Technology Development at PT. Aplikasi Lintasarta – Makassar

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ABSTRAK

Kegiatan pengabdian masyarakat ini bertujuan untuk meningkatkan pemahaman teknologi *Machine Learning* (ML) dan *Deep Learning* (DL) di kalangan karyawan PT. Aplikasi Lintasarta, sebagai kontribusi akademisi dalam mendukung percepatan transformasi digital perusahaan. Kegiatan ini dilaksanakan secara hybrid (luring dan daring) pada tanggal 21 April 2025, dengan menghadirkan pemateri ahli serta menerapkan pendekatan penyuluhan interaktif yang dipadukan dengan studi kasus aplikatif. Untuk mengukur efektivitas kegiatan, digunakan instrumen pre-test dan post-test yang menunjukkan peningkatan rata-rata pemahaman peserta sebesar 45%. Respons peserta sangat positif, yang ditunjukkan melalui antusiasme dalam diskusi serta ketertarikan terhadap penerapan ML/DL di lingkungan kerja. Kegiatan ini tidak hanya memperkuat literasi teknologi internal, tetapi juga mendukung pengembangan ekosistem AI nasional, sejalan dengan peluncuran GPU Merdeka oleh Lintasarta.

Kata kunci: *Machine Learning; Deep Learning; Pengabdian Masyarakat; Lintasarta; Transformasi Digital*

ABSTRACT

This community service activity aimed to enhance the understanding of *Machine Learning* (ML) and *Deep Learning* (DL) technologies among employees of PT. Aplikasi Lintasarta, as an academic contribution to supporting the company's digital transformation acceleration. Conducted in a hybrid format (offline and online) on April 21, 2025, the program featured expert speakers and employed an interactive outreach approach combined with applicable case studies. To assess its effectiveness, pre-test and post-test instruments were utilized, revealing an average increase of 45% in participants' comprehension. Participants' responses were highly positive, as demonstrated by their enthusiasm during discussions and interest in implementing ML/DL within the workplace. This activity not only strengthened internal technological literacy but also supported the development of the national AI ecosystem, in alignment with the launch of GPU Merdeka by Lintasarta.

Keywords: *Machine Learning; Deep Learning; Community Service; Lintasarta; Digital Transformation*

INTRODUCTION

The development of Artificial Intelligence (AI) technology, particularly Machine Learning (ML) and Deep Learning (DL), has brought a significant impact on the



acceleration of digital transformation across various industrial sectors. One of the most prominent branches of AI is Deep Learning, which plays a key role in driving innovation in various fields. Deep Learning itself has been widely utilized in numerous applications such as cancer diagnosis, autonomous vehicles, voice recognition, and big data-based prediction, due to its capability to automatically extract hierarchical representations from multi-dimensional data (Shrestha & Mahmood, 2019).

This capability positions Deep Learning as a fundamental foundation in the development of intelligent systems capable of learning from data and making automated decisions. Thus, this technology becomes a strategic solution in addressing the complexity and challenges of the ever-evolving digital era. Alongside this, the relevance of Machine Learning as a part of artificial intelligence becomes increasingly evident in supporting digital transformation, especially when associated with Industry 5.0 trends, where technologies such as AI, IoT, and cloud computing open up new business opportunities that are adaptive, efficient, and sustainable (Herwanto, 2025). The convergence of these technologies not only drives structural changes within the industrial sector but also reinforces the importance of understanding the various approaches within Machine Learning itself.

In this situation, understanding the various levels of approaches within Machine Learning becomes crucial, ranging from shallow machine learning to deep learning. As explained by (Janiesch et al., 2021), Machine Learning describes the system's ability to learn from training data that is specific to a particular problem in order to automate the process of building analytical models. Meanwhile, deep learning, which is based on artificial neural networks, often demonstrates superior performance compared to traditional and shallower models across a range of applications.

Within the general framework of Machine Learning, the machine learning process can be divided into several approaches, one of which is supervised learning, which utilizes labeled data to build predictive models. On the other hand, unsupervised learning is employed to explore hidden patterns within data that lack explicit labels. Both approaches play important roles in establishing the foundations of classification and clustering in various practical applications, including anomaly detection and predictive analytics (Rajoub, 2020).

One practical implementation of these approaches is in anomaly detection systems, where Machine Learning algorithms such as Isolation Forest, One-Class SVM, and others are utilized to automatically identify unusual data patterns. This approach has been applied, for instance, in the detection of anomalous earthquake statuses in Indonesia using data from BMKG (Usman et al., 2023) demonstrating how Machine Learning can be leveraged in the context of spatial and temporal data. In addition to anomaly detection, another algorithmic approach that is also relevant in the application of Machine Learning is Naive Bayes. This algorithm, based on a probabilistic approach, has been effectively used in various studies. One such study is by (Alvina Felicia Watratan et al., 2020), which utilized Naive Bayes to predict the

spread of COVID-19 based on numerical data, highlighting the practical potential of this algorithm in addressing classification problems across various domains. As the demand for reliable and efficient AI solutions continues to grow, adequate infrastructure support becomes crucial in accelerating the development and implementation of such algorithms.

In addition to the Naive Bayes algorithm, the K-Nearest Neighbor (K-NN) based approach has also proven effective in supporting decision-making systems based on classification. For instance, a study by (Ida et al., 2023) demonstrated that the K-NN algorithm was successfully implemented in an information system to predict the feasibility of extending credit to MSME customers, yielding rapid and accurate classification results based on customer data attributes. These findings reinforce the importance of utilizing simple yet efficient machine learning algorithms to support decision-making across various sectors, including the financial and cooperative sectors.

In Indonesia, this demand is being addressed through the growing adoption of AI, particularly with the introduction of GPU Merdeka, an AI cloud supercomputer developed by PT. Aplikasi Lintasarta (hereinafter referred to as Lintasarta), launched as Indonesia's first Sovereign AI Cloud. The presence of GPU Merdeka underscores Lintasarta's commitment to supporting technological sovereignty and strengthening the national AI ecosystem. GPU Merdeka, functioning as GPU-as-a-Service (GPUaaS) for AI infrastructure, represents a Sovereign AI Cloud from NVIDIA, designed as a supercomputing cloud featuring advanced and state-of-the-art technology in Indonesia. The establishment of a Sovereign AI Cloud such as GPU Merdeka is part of a broader effort to realize national digital sovereignty, which, within the legal context of Indonesia, includes the strengthening of state control over cyberspace and the strategic data operating within it (Yuniarti & Herawati, 2020). The utilization of GPUaaS not only enables high flexibility and scalability in managing AI workloads but also significantly contributes to cost efficiency and optimal use of computing resources. However, behind these various advantages lies a challenge that cannot be overlooked: the difficulty in identifying the appropriate GPU instance for training specific deep learning (DL) workloads. This challenge arises from the wide array of GPU instance options offered by cloud platforms and the varying computational and performance requirements of each DL workload (Mittal et al., 2024).

Interestingly, various studies have also indicated the existence of technical approaches that can significantly optimize the utilization of GPUaaS. A study by (Filippini et al., 2020) demonstrated that hierarchical scheduling approaches and dynamic resource allocation within GPUaaS systems can improve operational efficiency by as much as 50–70% compared to conventional methods. This further reinforces the relevance and urgency of GPUaaS adoption in supporting the national AI ecosystem, particularly in the context of high-computation demands such as large-scale Deep Learning model training.

Along with this, the role of GPUs in supporting heavy computational processing has become increasingly crucial. Modern GPU architecture has evolved into broadly programmable parallel processors, with arithmetic capabilities and memory bandwidth that significantly surpass those of conventional CPUs. This development makes GPUs an attractive alternative for future high-performance computing systems (Owens et al., 2008)

With increasingly reliable GPU infrastructure support, the development of technologies such as Naive Bayes and other AI algorithms has become more facilitated and can be widely applied across various sectors. This trend aligns with the fact that Indonesia currently ranks third globally in the use of AI-based applications, with more than 1.4 billion visits recorded between September 2022 and August 2023 (Apriliana et al., 2024). This achievement reflects the high level of enthusiasm and readiness among the public to adopt artificial intelligence-based solutions. Such enthusiasm is evident not only in the industrial sector but has also extended to the field of education, where the utilization of AI technologies such as ChatGPT has been shown to offer significant benefits, including enhancing learning effectiveness and assisting students in completing academic tasks. An example of this can be observed in the training activities held at SMK Muhammadiyah 3 Makassar (Harmin et al., 2024). These findings reinforce the assertion made by (Aderibigbe et al., 2023) that AI adoption in developing countries is influenced not only by infrastructure and technical skills, but also requires a strategic approach involving public policy, cross-sector partnerships, and comprehensive improvements in digital literacy.

Given the vast potential of AI across various fields, including education, technology companies are increasingly driven to enhance their internal capabilities. As a total solution provider in the field of information and communication technology (ICT), Lintasarta has a strategic need to strengthen the competencies of its human resources in mastering AI technologies, particularly Machine Learning (ML) and Deep Learning (DL). This capacity-building effort is expected to support a sustainable and highly competitive digital transformation.

This effort is also reflected in the quality of digital services offered by Lintasarta. A study conducted by (Ilmiah & Grafis, 2023) showed that the quality of the website lintasarta.net was positively evaluated by users based on the three dimensions of WebQual 4.0, namely usability, information quality, and interaction quality. These dimensions significantly influence user satisfaction with Lintasarta's digital services.

However, behind these achievements, there are still internal challenges that need to be addressed. Preliminary communication with the partner organization indicated that most employees do not yet possess a thorough understanding, either in conceptual or practical terms, regarding the implementation of these technologies. This presents a distinct challenge to the optimal utilization of the available GPU Merdeka facilities.

In response to this challenge, a community service team from Universitas Muhammadiyah Makassar and STMIK Profesional Makassar organized an outreach activity entitled “Community Service in the Form of a Presentation on Machine Learning and Deep Learning to Support Technological Development at PT. Aplikasi Lintasarta.” This activity aimed to improve the technological literacy of Lintasarta employees, provide them with both foundational and applied knowledge of ML and DL, and encourage their active participation in the development of the national AI ecosystem through the effective use of GPU Merdeka technology.

METHOD OF IMPLEMENTATION

This community service activity employed a community education approach through an interactive outreach method. The implementation model combined scientific presentations and discussions, focusing on strengthening participants’ understanding of the concepts and implementation of Machine Learning (ML) and Deep Learning (DL). The material was delivered in an interactive lecture format, supplemented with applicable case studies to enhance participants’ absorption of the material.

Time and Place of Implementation

The activity was conducted on Monday, April 21, 2025, at 14:00 WITA. The main venue for the event was the Meeting Room of PT. Aplikasi Lintasarta, Makassar, located at Jl. Raya Pendidikan F1, Tidung, Rappocini, Makassar City, South Sulawesi 90222. In addition to the in-person session, the activity was also accessible online via the Microsoft Teams platform to reach participants from different locations.

Target Audience

The participants of the activity were employees of PT. Aplikasi Lintasarta, particularly those involved in digital transformation projects and the utilization of AI infrastructure such as GPU Merdeka. This target group was selected due to their strategic role in the direct application of ML and DL technologies within the work environment.

Speakers and Supporting Tools

The main speaker was Assoc. Prof. Ir. Muhammad Faisal Ph.D., IPM, an expert in the field of information technology and intelligent computing. He delivered the material using both academic and practical approaches. This activity also utilized various supporting media to facilitate the smooth delivery of the material, including the use of Microsoft Teams as an online platform that enabled remote participant engagement.

Evaluation Instruments

To measure the success of the activity, pre-test and post-test instruments were utilized, designed to identify the improvement in participants' understanding of the concepts and applications of ML and DL. In addition, direct observations were conducted on participants' engagement during the discussion sessions, along with documentation of active participation in the interactive forum.

Driving Factors of Implementation

The success of this activity cannot be separated from a number of supporting factors that synergistically enhanced the smooth execution in the field. One of the most critical factors was the full support from the management of PT. Aplikasi Lintasarta, which provided meeting facilities and encouraged the active participation of employees in the activity. This institutional commitment facilitated smooth technical and administrative coordination throughout the outreach process.

In addition, the readiness of technological infrastructure such as GPU Merdeka, which functions as a Sovereign AI Cloud based on NVIDIA technology, served as an engaging and contextual case study for participants. The use of the Microsoft Teams platform also enabled the hybrid implementation of the activity, allowing participation from various locations without significant obstacles.

Another equally important factor was the presence of expert speakers in the fields of information technology and artificial intelligence, who were able to deliver the material using both academic and applied approaches. The high level of enthusiasm from participants during the presentation and discussion sessions also served as a strong indicator that the activity proceeded successfully and effectively enhanced technological literacy within the workplace environment.

RESULTS OF THE ACTIVITY

Number of Participants and Engagement

The outreach activity was attended by more than 30 Lintasarta employees, both those who participated in person at the Makassar Office and those who joined online via the Microsoft Teams platform. Active participation was demonstrated through the enthusiasm of participants during the discussion sessions and their interest in further exploring the implementation of Machine Learning and Deep Learning within their work environment. The activity also received full support from Lintasarta management, reflecting institutional commitment to strengthening internal capabilities in intelligent technology.

Participants Response and Participation

Participants' responses to the material were highly positive. Several participants actively asked questions related to the application of ML and DL in the ICT service sector and how GPU Merdeka could be utilized to support their projects. The

open discussion forum provided after the presentation session served as a platform for participants to clarify concepts and share firsthand experiences related to the technologies being studied.

Activity Documentation

The activity was comprehensively documented, including photographs of the in-person outreach session held in the meeting room at Lintasarta Makassar Office, screenshots from the online session via Microsoft Teams, and recordings of the presentation sessions for internal company purposes. This documentation not only serves as an archive of the activity but also as material for evaluation and the continuation of future human resource development programs.

Figure 1. Atmosphere of the in-person outreach session held in the meeting room at Lintasarta's Makassar office. Participants engaged actively and interactively with the material presentation, including in-depth discussions regarding the implementation of AI in the workplace environment, including the utilization of GPU Merdeka as Sovereign AI Cloud infrastructure.



Figure 1. Atmosphere of the in-person outreach session

Figure 2. Interface display of the Microsoft Teams platform used for conducting the online outreach session. This setup enabled Lintasarta employees from various locations to attend the Machine Learning and Deep Learning presentation sessions in real-time.

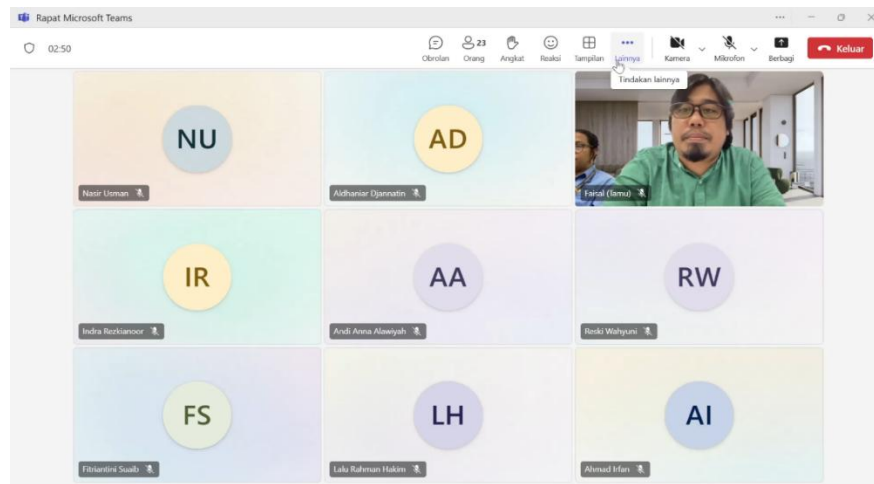


Figure 2. Interface display of the Microsoft Teams platform.

Figure 3. Documentation of participants in the online session attending the outreach activity via Microsoft Teams. The hybrid implementation (offline and online) provided greater flexibility and wider reach, as well as supported active participation from all operational units at Lintasarta.

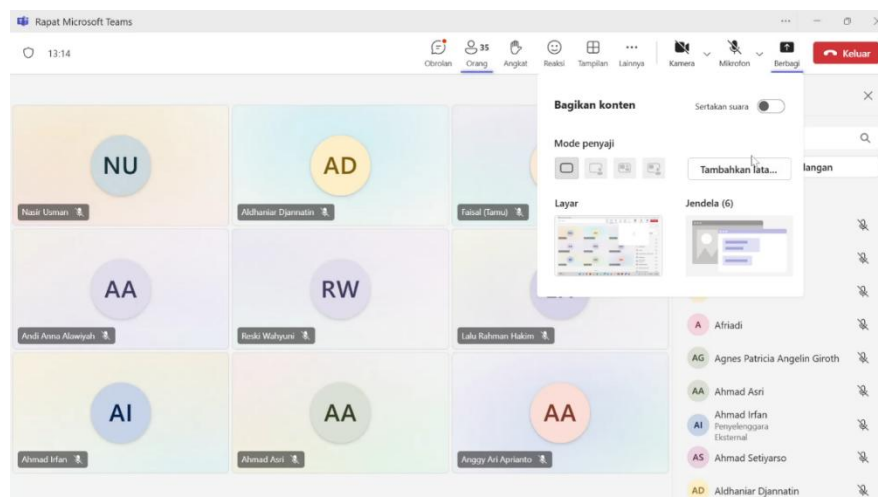


Figure 3. Documentation of participants in the online session.

DISCUSSION

Relevance of the Activity to Partner Needs

In this effort, it is important to understand that the use of technology does not always have to rely on complex infrastructures; simple yet effective technology-based approaches remain relevant in expanding access and the application of innovation. One concrete example of such an approach is the application of an interoperability model, which enables systems from different platforms to exchange and utilize data efficiently, thereby supporting flexibility in technology development within heterogeneous environments (Faisal, 2014). This approach has also been proven successful in other contexts, such as in the implementation of an SMS autoreply-based agricultural commodity price information dissemination system developed by (Faisal

et al., 2018) which demonstrated that simple solutions can have a significant impact on expanding information reach and improving communication efficiency.

Achievement of Activity Objectives

The primary objective of the activity, namely to enhance technological literacy among Lintasarta employees, was successfully achieved. This is evidenced by the improvement in post-test scores and the participants' active engagement during discussion sessions. Participants not only grasped theoretical concepts but also began to show interest in the practical application of ML/DL in their work environment. This success indicates that the interactive outreach and case study approach was highly effective in the context of non-formal capacity building.

Challenges and Solutions During Implementation

One of the main challenges during the implementation of this activity was the diverse technical backgrounds of the participants, which led to variations in initial understanding of the material. To address this, the speaker delivered the material using a gradual approach, starting from basic concepts to advanced applications, supplemented with practical analogies and open Q&A sessions. Other technical challenges, such as online connectivity issues, were anticipated with backup documentation systems and session recordings that were shared with participants.

Relation of Results to Literature and AI/ML/DL Technology Trends

This activity aligns with the global trend in adopting efficient and scalable cloud-based AI, while also underscoring the importance of technological literacy in the era of industrial digital transformation. This is reinforced by the findings of a study by (Wamba-Taguimdje et al., 2020), which demonstrated that AI-driven transformation projects can significantly enhance organizational performance and business processes, particularly when AI is leveraged to automate, transform, and inform organizational processes comprehensively. However, as highlighted by (Peres et al., 2020), despite the vast potential of AI in the industrial sector to support decision-making within complex manufacturing environments, its adoption beyond the pilot scale remains relatively low. This is attributed to the immaturity of existing frameworks, limitations in system interoperability, as well as challenges in data integration and model reliability, which serve as barriers to the widespread and sustainable utilization of AI.

One concrete example of efforts to overcome these challenges is the emergence of GPU Merdeka, which utilizes the NVIDIA H100 SXM to support various AI workloads such as generative AI, CAD modeling, and data analytics, as emphasized in several studies related to AI readiness in the ICT industry sector. On the other hand, the application of AI in the education sector has also experienced significant development, as demonstrated by Microsoft Copilot, which is capable of supporting various academic tasks through natural interaction, thereby reinforcing the role of AI as an efficient digital assistant (Moeis et al., 2024).

Human resource development through educational approaches has become a key strategy in building national AI ecosystems across various countries, underscoring the importance of understanding and adopting this technology in a range of fields, from industry to education. Moreover, the aspect of explainability in AI systems has emerged as a critical issue that must be addressed, particularly to ensure that users can understand, trust, and manage AI-based systems effectively. This aligns with the perspective of (Gunning et al., 2019), who emphasize that Explainable Artificial Intelligence (XAI) systems are essential in the context of critical applications such as defense, healthcare, finance, and law, where the clarity and transparency of AI decisions are fundamental to building trust and enabling effective human-machine interaction.

CONCLUSION AND RECOMMENDATIONS

The community service activity in the form of a seminar on Machine Learning (ML) and Deep Learning (DL) conducted at PT. Aplikanusa Lintasarta – Makassar successfully produced a positive impact on improving employees' technological literacy, particularly in understanding contemporary AI concepts and applications. Evaluation results indicated a significant increase in participants' comprehension. During the pre-test phase, the majority of participants demonstrated only a limited basic understanding of ML and DL concepts. However, following the seminar sessions and case study presentations, post-test scores increased by an average of 45%. This improvement indicates the effectiveness of the interactive outreach methods employed. Participants' enthusiasm during the discussion sessions also reflected growing interest and awareness regarding the urgency of mastering AI technologies in the workplace.

This activity also reaffirmed the strategic role of academics in supporting digital transformation in industry through the dissemination of applicable and contextual knowledge. With a targeted educational approach, the potential for implementing AI technologies such as ML and DL in the work environment becomes more feasible, supported by improved human resource readiness.

As a recommendation, similar activities should be conducted regularly with more in-depth content coverage, such as the use of ML for customer behavior analysis or the development of DL-based recommendation systems. It is also recommended that PT. Aplikanusa Lintasarta form a dedicated internal team, supported by academic experts, to apply the insights gained from the seminar to real-world projects. This will foster continuity between employee capacity building and the company's technological transformation.

Furthermore, it is important to establish sustainable collaboration between academic institutions and industry to develop a roadmap for AI technology advancement at Lintasarta. This strategic partnership will ensure that the company consistently receives up-to-date knowledge, keeps pace with the latest research developments, and accelerates the systematic adoption of innovative technologies.

Such close collaboration will also serve as a foundation for developing human resources that are adaptive, innovative, and competitive in facing the challenges of a dynamic and disruptive digital era.

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