

Synergy in Technology How Generative AI Augments the Capabilities of Customer Data Platforms

Pan Singh Dhoni*

Five Below, Inc, United States.

*Corresponding Author

Pan Singh Dhoni, Five Below, Inc, United States.

Submitted: 2023, Aug 15; Accepted: 2023, Sep 14; Published: 2023, Sep 18

Citation: Dhoni, P. (2023). Synergy in Technology How Generative AI Augments the Capabilities of Customer Data Platforms. *J Math Techniques Comput Math*, 2(9), 390-396.

Abstract

In an era marked by data-driven decision-making, Customer Data Platforms (CDPs) have emerged as pivotal tools for aggregating and analyzing customer data. However, as these platforms grapple with increasingly complex data sets and realtime customer engagement demands, there is a pressing need for more advanced, scalable solutions. This study explores the synergy between Generative Artificial Intelligence (AI) and CDPs, aiming to understand how the integration of generative algorithms can augment the capabilities of these platforms. Employing a multi-method research approach, including case studies, empirical analyses, and expert interviews, this paper investigates various applications of Generative AI within CDPs, such as data augmentation, real-time decision-making, and customer personalization. Moreover, the ethical implications of using generative algorithms, especially concerning data privacy and security, are critically examined. The study reveals that Generative AI can significantly enhance the functionality, performance, and efficiency of CDPs while also posing new questions around ethical considerations. Our findings offer invaluable insights for businesses, marketers, and technologists seeking to leverage the synergistic potential of these two advanced technological paradigms.

Index Terms: Advantages, Activation, Ai, Cdp, Customer, Customer Data Platform, Chatgpt, Data, Generative Ai, Genai, Integration, Information Technology, Prediction, Segmentation

1. Introduction

In the rapidly evolving landscape of digital marketing and customer experience management, the necessity for comprehensive, robust, and intelligent platforms has never been more palpable. At the center of this revolution are Customer Data Platforms (CDPs), which serve as the backbone for collating, processing, and leveraging customer data in real-time. These platforms are integral to understanding customer behavior, driving personalization, and ultimately, fostering brand loyalty. However, with the explosion of data and increasingly nuanced customer behaviors, traditional CDPs often struggle to keep up. This study aims to explore the transformative potential of integrating Generative Artificial Intelligence (AI) into CDPs, hence delving into the synergy that exists between these two burgeoning technological domains.

As businesses increasingly move towards hyperpersonalization and real-time customer engagement, the limitations of rule-based algorithms and manual data analysis are glaringly evident. Generative AI, characterized by its ability to generate new data points, simulate customer behaviors, and offer real-time insights, presents a tantalizing solution to these challenges. This research paper focuses on how Generative AI can augment the capabilities of CDPs, from data augmentation to real-time decision-making and beyond, while maintaining ethical considerations and data

privacy concerns.

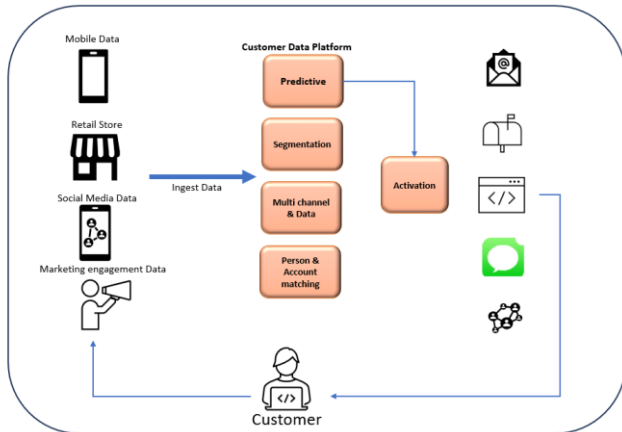
The paper argues that the synergistic relationship between Generative AI and CDPs can not only enhance the richness and utility of customer data but also redefine how businesses interact with and understand their customer base. Specifically, the paper will explore the technical feasibility, ethical implications, and business advantages of this synergy, supported by case studies, empirical analyses, and expert interviews.

In the ensuing sections, we will elaborate on the existing literature concerning CDPs and Generative AI, elucidate the research methodology, and present our findings, eventually leading to a set of actionable insights and recommendations for businesses, marketers, and technology developers alike.

2. Customer Data Platform

As per Adobe blog post [1,2], A customer data platform is a type of software that integrates customer data from multiple sources and tools across the organization into a single database. This centralized database contains information on every customer touchpoint and every interaction that customer has with your product or service [3].

The data can include purchase, purchasing decisions, engagement with marketing messages (including email), website and app behavior, and more.



With the data collated into a central database, you can organize and segment the data in infinite ways. You can then leverage the gathered data to create more efficient marketing campaigns that bring a higher return on investment (ROI).

Profile Unification: Profile Unification is basically cleaning up and organizing your customer data so you have a clear and complete understanding of each customer. Here's how it works, simplified:

1) Associate ID to person: Linking different identifiers like email, phone number, or account number to one individual customer. This helps the system know that all these different IDs actually belong to the same person.

2) Append external data: Adding more information about the customer from other sources. For example, if you know their email, you might also add data like their shopping history from another system.

3) Deduplication: Removing duplicate entries to make sure each customer only has one complete profile.

Segmentation: As per Adobe blog Customer segmentation is the process of dividing your customer base into smaller groups or segments based on similar characteristics - such as purchasing behavior, demographics, or psychographics [4]. The purpose of customer segmentation is to help businesses create targeted marketing campaigns and strategies that resonate with specific segments of customers rather than trying to appeal to a broad, generic audience. It is worth noting that customer segmentation is different from market segmentation, which focuses on the broader market instead of a company's existing customers.

Prediction: In a Customer Data Platform, prediction means using data to guess future customer behavior so businesses can make better decisions. Below are more details:

1) Content/Offer Optimization: Predicting which promotions or content will interest specific customers, so you show them things they're more likely to buy or engage with.

2) Next-Best Recommendation: Guessing what product or service a customer might want next, based on what they've already looked at or bought.

3) Journey Analytics: Understanding the steps a customer takes from first hearing about a product to buying it, and predicting

what could make that journey faster or smoother.

4) Purchase, Click, or Convert: Trying to figure out what will make a customer actually buy something, click on a link, or take some other action you want them to take.

Basically, prediction in this context is all about using data to make educated guesses to improve business results.

Activation: connect external systems" means setting up the CDP so it can share information with other software your business uses. This could be your email system, your online store, or your customer service software.

By "activating" these connections, the CDP can use the data it has collected to help those other systems work better. For example, it could send customer behavior data to your email system to help you send more relevant emails. This makes your marketing more effective and can improve customer satisfaction.

3. What is artificial intelligence (ai)?

Artificial intelligence (AI) is intelligence—perceiving, synthesizing, and inferring information- demonstrated by machines, as opposed to intelligence displayed by humans or by other animals [5].

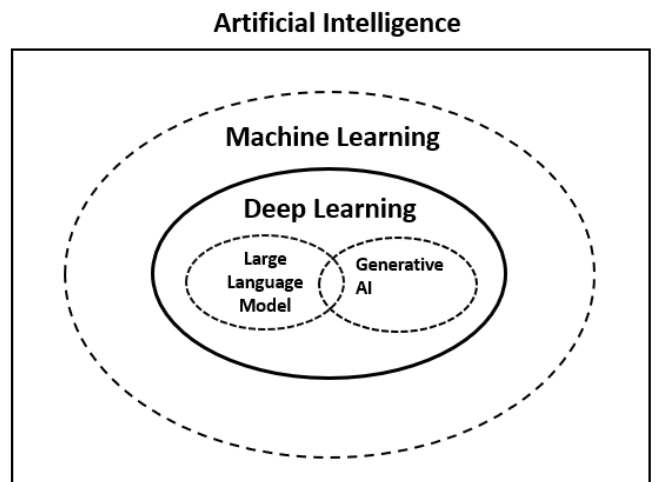


Figure 2: The relationship between AI, Machine Learning, and deep learning

Machine learning is a subset of AI, and deep learning (Natural Language processing (NLP), Convolutional Neural Network (CNN), and Recurrent Neural Network (RNN)) is a subset of machine learning (See Fig 1). Deep and machine learning have two important types: supervised learning (labelled data) and unsupervised learning.

4. Generative Ai

As per Wikipedia, Generative artificial intelligence (AI) is artificial intelligence capable of generating text, images, or other media, using generative models [6].

Training generative AI involves a multi-step process that includes preparing data, fine-tuning, and optimization [7]. The goal is to enable the AI system to understand language patterns and generate coherent and contextually relevant text. Let's break down the process in detail:

Data Collection and Preprocessing: Collect a diverse and representative dataset that aligns with the type of content you want the AI to generate. For text generation, this could be a collection of books, articles, websites, etc. Clean and preprocess the data by removing irrelevant or noisy content.

Model Architecture Selection: Choose an appropriate architecture for your generative AI model. GPT-3 and similar models use transformer architectures. You might need to decide on the model size, number of layers, and other hyperparameters based on your computational resources and the complexity of the tasks you want the AI to perform.

Tokenization: Tokenization involves breaking down the input text into smaller units called tokens. Tokens can be as short as a single character or as long as a word. This step is crucial for feeding text into the model. Each token is usually associated with an embedding vector that the model uses for processing.

Model Training: Training a large generative AI model is computationally intensive and usually requires specialized hardware like GPUs or TPUs. The training process involves presenting the model with input sequences and having it predict the next token in the sequence. This process is known as "unsupervised learning" as the model learns patterns and relationships from the data without explicit labels.

Loss Function: During training, a loss function is used to measure the difference between the predicted tokens and the actual tokens. This guides the model to adjust its internal parameters to improve its predictions.

Backpropagation and Optimization: Backpropagation is a mathematical process that calculates how the model's parameters should be adjusted to minimize the loss. Optimization algorithms like Adam or SGD (Stochastic Gradient Descent) are used to update the model's parameters based on these calculations.

Fine-tuning: After the initial training, you might fine-tune the model on specific tasks or domains to improve its performance in those areas. This involves training the model on a narrower dataset related to the task you want it to perform.

Evaluation: Evaluating the model's performance is essential. Metrics like perplexity (how well the model predicts the next token) or specific task-related metrics can be used.

Deployment and Inference: Once the model is trained and evaluated, you can deploy it for generating text or performing specific tasks. Users interact with the model by providing prompts, and the model generates text based on its training.

Ethical Considerations: Large generative models can produce biased, offensive, or inappropriate content. It's important to implement safeguards, content filtering mechanisms, and ethical guidelines to ensure responsible and safe usage.

Remember that training large generative AI models requires significant computational resources, expertise in machine

learning, and careful consideration of ethical implications. Additionally, it's a dynamic field, so staying updated with the latest research and best practices is crucial.

5. Methodology

Few methods have been taken from research paper [5,7,8] Method 1- Undertaking research in the realm of social media has necessitated a thorough investigation across a variety of platforms, from industry stalwarts such as Google, YouTube, and LinkedIn to emerging technologies like ChatGPT. This diverse methodological approach has facilitated the accumulation of insights from a wide array of sources, each enriching a comprehensive grasp of the subject matter at hand.

The scope of perspectives analysed in this research covers an extensive range of organizational structures, from leading corporations to burgeoning startups. This breadth of expertise creates a complex fabric of opinions, methodologies, and experiences, delivering an inclusive overview that is not confined by organizational scale.

Interaction with this myriad of perspectives has not only deepened the intellectual substance of my research but also enhanced its applicability. The integration of wisdom from seasoned professionals in large corporations, as well as the detailed accounts presented by data pioneers in smaller enterprises, furnishes my study with a pluralistic array of viewpoints, thus promoting a balanced analysis.

As a result, the research stands as a confluence of ideas that resonate with both the authoritative utterances of established figures in the industry and the adaptable strategies of emerging entities. This confluence serves to illustrate not merely the expansive scope of the social media ecosystem but also the complex juxtaposition of challenges and opportunities that a diverse set of organizations face.

In summary, this research paper acts as a compendium of the multifaceted aspects of social media research, anchored by the collective wisdom obtained from experts shaping the discourse in this ever-evolving field.

first_name	last_name	gender	age	orders	spent	job	hobbies	s_married
Joseph	Rice	male	43	7	568.29	Artist	Playing sports	FALSE
Gary	Moore	male	71	11	568.92	Artist	Swimming	TRUE
John	Walker	male	44	11	497.12	Clerk	Painting	FALSE
Eric	Carter	male	38	17	834.6	Butcher	Playing musical instru	FALSE
William	Jackson	male	58	14	151.59	Engineer	Reading	FALSE
Nicole	Jones	female	33	19	33.17	Unemployed	Running	TRUE
David	Davis	male	59	9	970.96	Doctor	Playing sports	FALSE
Jason	Montgome	male	58	12	676.2	Waitress	Collecting	FALSE
Kent	Weaver	male	61	1	674.37	Clerk	Hiking	FALSE
Darrell	Dillon	male	50	12	750.72	Dentist	Watching movies	FALSE
Jacqueline	Wang	female	22	12	962.47	Housewife	Collecting	FALSE
Jodi	Gonzalez	female	69	12	68.67	Baker	Photography	FALSE

Method 2 prompt to chatGPT4, you can upload data for testing.

"based on above given data, please explain me which machine learning algorithm would be most suitable for customer segmentation project, additionally create python code to implement this machine learning algorithm and visualization for insights"

For customer segmentation, clustering algorithms are commonly used. The K-means algorithm is one of the simplest and most widely used clustering methods. Given the relatively small and simple dataset you've provided, K-means should work well. The algorithm assigns each data point to one of K clusters based on the feature similarity, which can be measured using Euclidean distance or other metrics.

Before applying machine learning algorithms, it's essential to prepare the data. We need to convert categorical features to numerical ones, scale the numerical features, and handle any missing values (though your dataset seems to lack those).

Below is an example of Python code that uses the K-means algorithm for customer segmentation based on your dataset. We'll also include data visualization to gain insights.

```
``python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
from sklearn.preprocessing import StandardScaler,
LabelEncoder

# Given data
data = {
    'first_name': ['Joseph', 'Gary', 'John', 'Eric', 'William',
'Nicole', 'David', 'Jason', 'Kent', 'Darrell', 'Jacqueline', 'Jodi'],
    'last_name': ['Rice', 'Moore', 'Walker', 'Carter', 'Jackson',
'Jones', 'Davis', 'Montgomery', 'Weaver', 'Dillon', 'Wang',
'Gonzalez'],
    'gender': ['male', 'male', 'male', 'male', 'male', 'female',
'male', 'male', 'male', 'male', 'female', 'female'],
    'age': [43, 71, 44, 38, 58, 33, 59, 58, 61, 50, 22, 69],
    'orders': [7, 11, 11, 17, 14, 19, 9, 12, 1, 12, 12, 12],
    'spent': [568.29, 568.92, 497.12, 834.6, 151.59, 33.17,
970.96, 676.2, 674.37, 750.72, 962.47, 68.67],
    'job': ['Artist', 'Artist', 'Clerk', 'Butcher', 'Engineer',
'Unemployed', 'Doctor', 'Waitress', 'Clerk', 'Dentist',
'Housewife', 'Baker'],
    'hobbies': ['Playing sports', 'Swimming', 'Painting',
'Playing musical instruments', 'Reading', 'Running', 'Playing
sports', 'Collecting', 'Hiking', 'Watching movies', 'Collecting',
'Photography'],
    'is_married': [False, True, False, False, False, True, False,
False, False, False, False, False]
}

df = pd.DataFrame(data)

# Encode categorical features
labelencoder = LabelEncoder()
df['gender'] = labelencoder.fit_transform(df['gender'])
df['job'] = labelencoder.fit_transform(df['job'])
df['hobbies'] = labelencoder.fit_transform(df['hobbies'])
df['is_married'] =
labelencoder.fit_transform(df['is_married'])

# Scale the features
scaler = StandardScaler()

scaled_df = scaler.fit_transform(df[['gender', 'age', 'orders',
'spent', 'job', 'hobbies', 'is_married']])

# K-means clustering
kmeans = KMeans(n_clusters=3)
df['cluster'] = kmeans.fit_predict(scaled_df)
```

```

# Visualization
plt.scatter(df['age'], df['spent'], c=df['cluster'])
plt.xlabel('Age')
plt.ylabel('Amount Spent')
plt.title('Customer Segmentation')
plt.show()
'''

```

In this example, we assumed 3 clusters for simplicity. You might want to use the Elbow Method or Silhouette Analysis to determine the optimal number of clusters. Then you can segment the customers based on these clusters and analyze each segment's characteristics.

Note: This is a simplified example for demonstration purposes. For a real-world project, you'd typically perform more extensive data exploration, feature engineering, and validation.

Method 3 -Marketing email for CDP, The way you market to each customer segment can differ based on the attributes common to that segment. For example, if one cluster predominantly contains younger people who have spent less, and another cluster contains older, more affluent customers, your marketing strategies would differ.

Sample Email Templates

Cluster 1: Younger, Less Spending

Subject: Unlock Your Youthful Spirit with Our Exclusive Deals!

Dear [Customer's First Name],

We see you're a fan of [Hobbies from data, e.g., "Playing Sports"]. That's why we thought you'd be excited to hear about our latest promotion tailored just for you!

From today until [End Date], enjoy a 20% discount on all sports-related products!

Use code YOUTH20 at checkout. Don't miss out; your perfect game day is just a click away!

Best wishes,

[Your Company]

Cluster 2: Older, More Affluent

Subject: Elevate Your Lifestyle with Our Premium Collection

Dear [Customer's First Name],

As one of our valued customers, we thought you might be interested in our new Premium Collection. Tailored for those who appreciate the finer things in life, this collection offers unparalleled quality and sophistication.

Use the code ELEGANT30 to receive an exclusive 30% discount valid until [End Date]. Sincerely,

[Your Company]

Cluster 3: Middle-aged, Moderate Spending

Subject: Perfect Balance: Quality and Affordability in One Package!

Dear [Customer's First Name],

We noticed that you have a diverse range of interests like [Hobbies from data, e.g., "Collecting and Hiking"]. Our new Versatile Range offers products that cater to all your hobbies, all

while offering the perfect balance of quality and affordability. Use code BALANCE15 for a 15% discount, valid until [End Date].

Best,

[Your Company]

Sample Chatbot Messages using ChatGPT-4

For Cluster 1

ChatGPT-4: Hey [Customer's First Name], we've got something special for you! How does a 20% discount on all our sports-related items sound?

For Cluster 2

ChatGPT-4: Hello [Customer's First Name], we value your refined taste. That's why we're offering you an exclusive 30% off our Premium Collection. Just use the code ELEGANT30 at checkout!

For Cluster 3

ChatGPT-4: Hi [Customer's First Name], we know you love a good balance in life. Guess what? Our new Versatile Range fits your lifestyle perfectly. Use code BALANCE15 for a 15% discount!

Method 4: In the present research, we explore the synergistic potential of generative Artificial Intelligence (AI) with traditional data science toolsets to address a pressing issue: the ease-of-use and accessibility of data analytics for a broader user base. Leveraging the English-language prompting feature inherently present in generative AI models such as ChatGPT, we have developed a novel framework that integrates this capability with Pandas-AI, a Python-based data manipulation library. The primary objective of this integration is to facilitate customer segmentation tasks that traditionally require specialized coding skills.

Our framework enables users to input natural language queries or 'prompts' to trigger complex data analytics tasks. For instance, users can enter English prompts like 'Show the highest selling product' or 'Identify the lowest selling product,' and the system will autonomously execute the corresponding data manipulation and analysis procedures to produce the requested outcomes.

This research contributes to simplifying the data analytics workflow in multiple ways. First, it reduces the barrier to entry for professionals who may be proficient in business analytics but are not well-versed in programming. Second, it accelerates the analytics process by eliminating the need for manual coding for routine tasks. Lastly, it fosters interdisciplinary collaboration by making data analytics more accessible to a diverse range of business stakeholders, including but not limited to data analysts, marketers, and decision-makers. Through the integration of

Pandas AI with generative AI models, we have thus created a more streamlined, efficient, and inclusive data analytics ecosystem.

These templates and chatbot messages are just a starting point. Customizing them according to the specific metrics or characteristics of each cluster will make your marketing efforts even more effective.

5. Results

As per articles [9,10] and research below are findings:

A. Personalization at Scale 1) Dynamic Content Creation

a. Email Campaigns: Generative AI can create personalized email copy and even subject lines that resonate with individual customer profiles.

b. Product Recommendations: Rather than simply suggesting popular items, the AI can tailor recommendations based on customer behavior, preferences, and needs.

2) Tailored User Experiences

a. Dynamic UI: The user interface of a website or app can adapt in real-time, changing layouts or features to match the customer's profile.

b. Personalized Offers: Generative AI can create special deals or discount codes aimed specifically at individual users.

B. Improved Analytics and Insights

1) Anomaly Detection

a. Fraud Detection: By modeling normal customer behavior, generative AI can flag transactions or activities that seem suspicious.

b. Churn Prediction: Unusual changes in customer activity can be early indicators of churn.

2) Predictive Modeling

a. Lifetime Value Prediction: Generative models can assess a multitude of factors to predict a customer's lifetime value, allowing for more focused marketing.

b. Sentiment Analysis: Text generated from customer reviews or social media can be analyzed to predict customer sentiment trends.

C. Customer Journey Mapping

1) Automated Scenario Planning

a. Journey Simulations: Generative AI can simulate different customer journeys, helping businesses optimize the various touchpoints.

b. Resource Allocation: By understanding how different journeys fare, businesses can allocate resources more efficiently.

2) Next-Best-Action Recommendations

a. Dynamic Scripts: Customer service representatives can be aided by dynamic scripts generated in real-time based on the customer's history and current situation.

b. Upselling and Cross-Selling: Real-time analysis of customer behavior can provide timely opportunities for upselling or cross-selling.

D. Enhanced Customer Support 1) Chatbots and Virtual Assistants

a. Context-Aware Support: Chatbots powered by generative AI can pull in contextual data from CDPs to provide more relevant assistance.

b. Multi-Lingual Support: Generative models can facilitate real-time translation to serve customers in their native languages.

2) Automated Issue Resolution

a. Self-Service Options: Generative AI can suggest and execute automated solutions for common customer issues, freeing up human agents for more complex problems.

b. Root Cause Analysis: Generative models can assist in identifying the underlying causes of frequent customer complaints, aiding in longterm resolutions.

E. Automation and Efficiency 1) Data Cleanup

a. Error Correction: Generative algorithms can identify inconsistencies in customer data and propose corrections.

b. Data Enrichment: These models can also suggest appending additional relevant data to customer profiles to make them more comprehensive.

3) Task Automation

a. Automated Reporting: Generative AI can create comprehensive reports summarizing key performance indicators, customer behavior metrics, and more.

b. Customer Segmentation: Algorithms can automatically identify and create new customer segments based on emerging patterns in the data.

F. Innovation and New Services 1) Product Development

c. Virtual Focus Groups: Generative AI can simulate customer reactions to prototype products, speeding up the iteration process.

2) Customer-Centric Services

a. Personalized Subscription Models: By understanding individual customer needs, generative AI can help in devising personalized subscription or payment plans.

6. Conclusion

In the ever-evolving landscape of artificial intelligence, a growing number of corporations are dedicating resources to the exploration and investment in generative AI technologies. The primary objective of this research paper was to scrutinize the potential impacts of generative AI on Customer Data Platforms (CDPs). Our findings indicate that the integration of generative AI within CDPs substantially augments customer understanding through the comprehensive analysis of various parameters, including customer demographics, interests, and transactional behaviors. Such nuanced understanding enables the creation of more precise segmentation strategies, thereby allowing for targeted marketing efforts tailored to individual customer needs.

Moreover, generative AI stands to revolutionize marketing communications, particularly in the domain of email marketing. The application of generative AI techniques can facilitate the crafting of more compelling and personalized email content, potentially leading to increased email open rates and, consequently, contributing to revenue growth.

It will also help to generate personalized product recommendations to boost sales.

Additionally, our research suggests that CDP-based applications and tools stand to benefit substantially from leveraging generative AI capabilities. The symbiosis between generative AI and CDPs not only enhances product and service offerings but also provides organizations with a viable pathway for revenue optimization.

Acknowledgment

We express our heartfelt gratitude to the individuals who have been pivotal in shaping our journey throughout the process of crafting this research paper. Their unwavering support and guidance have been instrumental in bringing this endeavor to fruition. We extend our sincerest thanks to research community who have placed more related content at the internet. Without those content it was impossible to complete research on this topic.

We would like to extend our heartfelt gratitude to our exceptional Customer Data Platform Team, including our Product Manager, Tech Lead, Director, and Engineering VP, for their unwavering support throughout this research.

We would also like to express our gratitude to our new Chief Information Officer (CIO) for encouraging this type of research activity.

This revised sentence should fit well in the acknowledgments section of a research paper.

Special mention is reserved for my wife, Beena Dhoni, whose unwavering support, time, and encouragement have empowered me to pursue my passions and excel in this academic pursuit. Lastly, we extend our sincere appreciation to the creators of ChatGPT, whose assistance in refining grammar and sentence structure has been invaluable in enhancing the quality of our paper.

References

1. <https://business.adobe.com/blog/basics/guide-to-customerdata-platforms>
2. <https://segment.com/resources/cdp/>
3. Dhoni, Pan. A Cost-Effective It Approach to Rapidly Build a Data Platform and Integrate Retail Applications for Small and Mid-Size Companies., 2023, <https://doi.org/10.36227/techrxiv.23538447>.
4. <https://business.adobe.com/blog/basics/define-customersegmentation>
5. Dhoni, Pan. Unleashing the Potential: Overcoming Hurdles and Embracing Generative AI in It Workplaces: Advantages, Guidelines, and Policies, 2023, <https://doi.org/10.36227/techrxiv.23696709.v1>.
6. https://en.wikipedia.org/wiki/Generative_artificial_intelligence
7. Dhoni, Pan, and Ravinder Kumar. Synergizing Generative AI and Cybersecurity: Roles of Generative AI Entities, Companies, Agencies, and Government in Enhancing Cybersecurity, 2023, <https://doi.org/10.36227/techrxiv.23968809.v1>.
8. Dhoni, Pan. Exploring the Synergy between Generative AI, Data and Analytics in the Modern Age, 2023, <https://doi.org/10.36227/techrxiv.24045792.v1>.
9. <HTTPS://WWW.LINKEDIN.COM/PULSE/HOW-CUSTOMER-DATA-PLATFORMS-GENERATIVE-AI-CAN-IMPROVE-FRED-GREENE/>
10. <https://www.adexchanger.com/ai/adobe-is-traininggenerative-ai-for-its-customer-data-platform/>

Copyright: ©2023 Pan Singh Dhoni. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.