AI and Customer Experience: The New Business Superpower

ADNAN GHAFFAR

Punjab University College of Information and Technology

Abstract- Customer experience (CX) has become one of the primary differentiators of businesses in the hypercompetitive marketplace of all industries nowadays. In the wake of the rapid development of artificial intelligence (AI), businesses can now afford to reinvent their relationships with customers by making them more personal, efficient, and proactive than they have never been. The paper examines the ways AI is transforming the customer experience landscape, including the use of AI in data-driven personalization, real-time service delivery, predictive analytics, and automated support. Using technologies like machine learning, natural language processing, and conversational AI, not only are businesses satisfying the growing customer expectations, but also achieving strategic benefits by operational efficiencies and insights into the customers. AI implementation into the CX is no longer a concept of the future but a reality of the present that is changing how businesses interact, maintain, and expand their customer base. This paper looks at the industry trends, effective deployments, and the pitfalls that organizations encounter in their efforts to use AI to develop meaningful and scalable customer experiences.

I. INTRODUCTION

A. Business Context Ai in Business Context. Definition of Artificial Intelligence?

Artificial Intelligence (AI) can be defined as an attempt of machine simulation of human intelligence processes, particularly, computer systems. Applied to the business sphere, AI allows systems to do the things that often demand human intelligence, i.e. interpretation of natural language, data pattern recognition, learning and decision making. Instead of being merely a tool to automate repetitive tasks, AI systems are adaptable, can learn, can give insights beneficial to business.

The main AI Technologies applicable in Customer Experience.

There are a number of fundamental AI technologies that are transforming the way businesses engage with their consumers:

1. Natural Language Processing (NLP): NLP allows machines to process human language,

- which drives chatbots, voice assistants, and sentiment analysis.1
- Machine Learning (ML): Enables systems to be made to learn based on historical data and draw predictions or decisions without explicit programming.
- 3. Chatbots and Virtual Assistants: Chatbots and Virtual Assistants offer 24/7 instant and customer service and support, shortening wait times, and lowering operational expenses.
- Predictive Analytics: Bases its use on data that foresees customer needs, behavior and eventual churn so that they can be engaged proactively.

A combination of these technologies assists businesses in offering smarter, quicker and more personalized interaction with customers.

- B. Customer Experience (CX) and the importance of CX in Contemporary Business.
- 1. Product- to Customer-Centric Models. Businesses used to be traditionally oriented on the development of better products or services to achieve competitive advantage. The market has however changed today. As the products and services grow more and more alike, businesses are moving toward customer-centric models, which focus on the overall customer experience, starting at the time of first contact and continuing after the purchase. The consumers now are modern and demand to be able to interact with each other at every touch point in a smooth, personalized, and responsive way.

2. CX as Competitive differentiator Market.

One of the most vital competitive market differentiators has turned into customer experience. Research has always revealed that consumers are ready to spend more on excellent experiences and they would be more likely to stay loyal to brands that live to their expectations or even surpass it. Exceptional CX, in that case, is not a nice-to-have in such an environment but the long-term success and profitability.

C. The Fusion of AI and CX

1. The reason why AI is being termed as a Customer Experience Superpower.

AI is becoming a business superpower since it allows firms to comprehend and cater to their customers with scale and velocity previously unachievable using traditional means. AI can also assist companies in processing large volumes of customer data and converting it into real-time actionable data.

2. Personalization on a large scale, using data.

The capability of AI to provide hyper-personalization on a large scale is one of the strongest contributions of AI to customer experience. AI enables businesses to market to each customer as an individual by default and with greater efficiency, whether it comes to product recommendations, marketing messages tailored to each customer, or the prediction of customer needs. This degree of personification builds stronger relationships, boosts satisfaction and eventually leads to loyalty and revenue.

II. THE EVOLUTION OF CUSTOMER EXPERIENCE

A. Customary Customer Service Models.

Prior to the advent of digital technology and artificial intelligence, customer service used to be manual, reactive, and frequently unreliable. Support was normally provided by either face-to-face, telephone calls or email and relied heavily on human agents.

This technique was limited in a number of ways:

- Minimal availability: Support was limited and most of it was available during business hours which created delays and frustration among customers.
- Poor uniformity of service delivery: There was a
 wide range of customer experiences based on the
 skills, training and attitude of product
 employees.
- Reactive problem-solving: Businesses were mostly reacting to problems once they happened instead of being proactive to customer needs or avoiding problems.

As much as these models worked in the past, they were inadequate as the customer expectations changed to fast, personalized and convenient interactions.

B. Emergence of Digital and Multichannel Experiences.

As digital technology started to spread, companies started to use an array of different avenues to communicate with their customers in the form of websites, mobile apps, social media, email and messaging services. This transition became the emergence of digital and omnichannel experiences, with customers being able to engage with brands in a variety of touchpoints.

The transition had new challenges though:

- 1. Diluted customer experiences: The experience of the customer was repetitive when switching channels and resulted in frustration and ineffectiveness.
- 2. Lack of consistency in the way messages are passed: The various channels may provide inconsistent information or levels of service without integration.
- 3. Increased expectations: Customers started to demand 24/7 association, speedy services, and customized services, which could not be attained with traditional systems.

The necessity to have smooth and consistent experiences on the platforms encouraged businesses to reconsider their CX strategies and invest in technologies that may help integrate and improve customer interactions.

C. AI-Enhanced Experience Transition.

AI will be the next significant step in the development of customer experience beyond the reactive models of service to the proactive and predictive interaction. This shift is transforming how business is conducted with their customers as follows:

- Proactive Support: AI can understand customer behavior and predict problems before they occur and so a business can proactively contact the customers with solutions before they arise (e.g. sending a message when the delivery was delayed).
- Predictive Personalization: With machine learning models, businesses can predict the needs of customers and make relevant and timely recommendations based on previous behavior.
- 3. Available 24/7: Chatbots and virtual assistants based on AI can offer round-the-clock service in various channels and offer the same response at scale.

 On-going Enrichment: AI systems also get smarter as they accumulate experience in their interactions with customers, becoming smarter and more useful.

This AI-based solution is not only able to increase customer satisfaction but also propel operational efficiency through the reduction of the workload on human agents and simplification of service processes.

III. KEY APPLICATIONS OF AI IN CUSTOMER EXPERIENCE

With the ever-increasing customer demands, AI technologies are currently being integrated throughout the customer experience to improve personalization and responsiveness and efficiency. The major customer experience landscape where AI is changing include:

A. Customized Recommendations and content.

Customer experience One of the most distinct values of AI in customer experience is delivering personalized content. The AI algorithms examine the customer behavior, preferences, and past data to provide personalized experiences in real-time.

- 1. Recommendation Engines: Netflix and Amazon are platforms that rely on complex machine learning models to recommend movies, products, or content based on each user, and their behaviour. This provides the effect of one-on-one appeal, which boosts the level of engagement and conversion.
- Dynamic Content Personalization: AI is applied by businesses to personalize web sites, emails, and promotions on a case-by-case basis. Indicatively, e-commerce websites can show various homepages or product assortment depending on browsing history or geographic (local) location of the customer.

AI builds stronger involvement and loyalty by understanding their customers and providing them with what they desire, without them having to make a request.

B. Artificial Intelligence Chatbots and Virtual Assistants.

Virtual assistants and AI-powered chatbots have transformed the level of customer services by providing 24-hour or real-time responses.

Dealing with Tier 1 Inquiries: Chatbots are highly effective in handling common questions like order status, password resets and product information, allowing human agents to perform more complex tasks.

- 1. Smooth Escalation: More sophisticated systems will be able to identify when an issue is overly complicated and will be able to hand over a conversation to a human representative, including all the context of the conversation.
- Multichannel Support: These AI agents can be used on websites, messaging apps, and social media platforms, as well as voice interfaces, so customers can be guaranteed of consistent customer support wherever they may be.

This speed, convenience and accuracy increases customer satisfaction and costs of support are also minimized to large extents.

C. Sentiment Analysis and Voice of Customer (VoC). Knowing the customer's perceptions about a brand is important in retaining the customers and enhancing the products or services. AI allows companies to process qualitative feedback in large quantities by sentiment analysis and Voice of Customer (VoC) programs.

- 1. Real-Time Detection of Emotions: With the help of natural language processing (NLP) AI can analyze reviews, social media posts, emails, and support tickets to scan sentiment, which can be positive, negative, or neutral.
- 2. Customer Feedback Insights: AI uses customer feedback collected by various channels to determine trends, frequently occurring problems, or new areas of concern, allowing the business to focus more on improvement.
- Brand Health Monitoring: Sentiment monitoring tools enable companies to recognize PR crises or negative trends at an early stage and respond and address them promptly.

This level of understanding gives the companies the power to be keenly aware of customer perceptions and needs.

D. Anticipatory Customer Behaviour and Preemptive Customer Support.

AI can forecast the future as well as analyze what has already taken place, which allows transitioning to active instead of merely reactive customer support.

- Churn Prediction: AI will be able to recognize the customers who are in danger of churning by understanding their behavioral pattern and initiating a specific retention campaign (e.g. providing discounts or targeted outreach).
- Active Recommendations and Notifications: AI
 can recommend complementary products,
 services or support, based on predictive models;
 it may do so even before the customer
 understands that they need it.
- Smart Notifications: AI can also alert customers about the possible problem ahead of time (e.g., delays on a flight, service interruption) and provide an alternative solution beforehand in service sectors.

By taking this proactive role, the customer will develop trust and the business will show that the business cares about the success and satisfaction of the customer.

E. Mechanization of repetitive activities.

Whereas there are applications of AI that are directly involved with customers, there are those that operate indirectly by improving the overall experience by making operations more efficient.

- 1. Order Processing and Tracking: AI automation will be used to perform generic back-end logistics, including shipping, inventory, and delivery notifications, thus leading to more expedited and transparent service.
- Internal Workflow Automation: AI technology can help customer service teams to automatically classify tickets, propose answers, and direct problems to the right location, shortening the response time.
- 3. Fraud Detection and Risk Management: AI is used in financial services and e-commerce to constantly watch transactions to discard and stop fraud, safeguarding the customer and also minimizing false positives.

The automation of time-consuming processes will enable human workers to concentrate on more important interactions and innovation and eventually make the customer experience smoother and more dependable.

IV. BUSINESS BENEFITS OF AI-DRIVEN CUSTOMER EXPERIENCE

Integrating AI into customer experience strategies is more than a technological upgrade; it's a strategic investment that drives tangible business outcomes. Organizations that effectively leverage AI are seeing measurable improvements across satisfaction, efficiency, and competitive positioning. Below are the key business benefits of AI-enhanced CX:

A. Increased Customer Satisfaction and Loyalty At its core, AI enables businesses to deliver more personalized, consistent, and proactive interactions, which significantly improve the customer experience.

- 1. Personalization at Scale: Customers feel valued when experiences are tailored to their needs and preferences, which AI enables in real time.
- 2. Proactive Engagement: Predictive support and intelligent alerts help resolve issues before they affect the customer, building trust and satisfaction.
- 3. Consistency Across Channels: AI ensures the same quality of service across digital touchpoints, reducing frustration and increasing brand reliability.

These improvements lead to stronger emotional connections, which in turn drive long-term customer loyalty and higher lifetime value.

B. Cost Efficiency and Scalability

AI allows businesses to do more with less by automating repetitive tasks and handling large volumes of interactions simultaneously.

- 1. Reduced Operational Costs: Chatbots and automated systems lower the need for large customer support teams, especially for Tier 1 inquiries.
- Scalable Service: AI can manage thousands of customer interactions concurrently, ensuring consistent service even during peak periods or rapid growth.
- 3. Self-Service Optimization: AI-powered help centers and virtual assistants empower customers to solve issues independently, further reducing support load.

This combination of cost reduction and scalable support makes AI a valuable asset for both startups and large enterprises.

C. Faster Response Times and Resolution

Speed is a critical component of customer satisfaction, and AI drastically shortens response and resolution times.

- 1. Instant Responses: AI chatbots and virtual assistants provide immediate answers to common questions, available 24/7.
- 2. Automated Ticket Routing: AI can prioritize and route customer requests to the appropriate teams or agents, minimizing wait times.
- Real-Time Problem Solving: Predictive analytics and intelligent diagnostics can resolve issues proactively, often before the customer contacts support.

Faster resolution leads to higher satisfaction scores (CSAT) and reduced customer churn.

D. Data-Driven Decision Making

AI transforms raw customer data into actionable insights, empowering more informed strategic decisions.

- Customer Insights: AI tools analyze behavior, sentiment, and preferences to reveal patterns and trends.
- 2. Real-Time Dashboards: Businesses can monitor key performance indicators (KPIs) and customer sentiment live, adjusting tactics instantly.
- 3. Product and Service Optimization: Insights from AI-driven feedback analysis help improve offerings based on actual customer needs.

These insights fuel a continuous improvement loop, enhancing CX strategies and driving innovation.

E. Competitive Advantage

In an environment where customer experience can make or break a brand, AI provides a crucial edge.

- 1. Differentiation Through Experience: Superior CX becomes a key differentiator, particularly in crowded markets with similar products.
- Faster Adaptation to Trends: AI enables quicker pivots in response to customer feedback or market shifts.
- 3. Innovation Leadership: Companies that effectively implement AI in CX are often seen as forward-thinking and customer-centric, boosting brand perception.

Ultimately, AI-powered CX helps businesses outpace competitors, deepen customer relationships, and secure long-term market relevance.

V. CASE STUDIES / REAL-WORLD EXAMPLES

Actual examples of the application of AI in customer experience prove the transforming nature of such

technologies. The case studies below illustrate the application of AI at the best organizations to create individualized, efficient and proactive interactions that results in customer satisfaction and business achievements.

A. Amazon-Personalization at Scale.

Amazon is generally known as a pioneer in AI-based customer experience, especially when speaking of personalization.

- Recommendation Engine: Amazon is using AI algorithms to query customer browsing history, purchases, and even items left in carts to provide real-time and personalized recommendations of products. These recommendations cover more than 35 percent of the Amazon sales, and it shows how personalization influences the revenue.
- Personalized Web Experience: Every customer will have their own variant of the Amazon homepage, which will make their shopping experience a unique one and highly relevant to them.
- 3. Proactive Notifications: Shipping updates, price drops, and out of stock notifications are proactively sent using AI, which increases post-purchase experience.
- 4. Impact: AI-driven personalisation through Amazon not only improves the sales but also enhances the loyalty of customers because every interaction will be intuitive and valuable.
- B. Sephora Virtual Try-On and Beauty Chatbots Virtual Try-On Virtual Try-On is an artificial intelligence (AI) experience that allows customers to select products based on their preferences.https://doi.org/10.1001/j.nlm.nl/. Sephora Virtual Try-On and Beauty Chatbots Virtual Try-On Virtual Try-On is an artificial intelligence (AI) experience that enables customers to choose products according to their preferences.

Sephora has adopted AI to develop interactive and experience shopping online and in the physical store.

 Virtual Try-On: Sephora has implemented Virtual Artist, which is an augmented reality and AI-based tool that allows customers to virtually apply makeup products by pointing the smartphone or desktop camera at the face. This will decrease buying hesitation and gain trust in purchasing the product.

- 2. Beauty Chatbots: Sephora has a chatbot on social networks, such as Kik and Facebook Messenger, which provides beauty advice and product suggestions, as well as booking appointments. Its application involves NLP to know the queries and give corresponding answers.
- 3. Color Match and Skin Scanning: AI assists the customers in finding the right foundation or skincare products based on the skin tone and interests by analyzing the images or responding to the questions.
- 4. Impact: These artificial intelligent systems have greatly improved the online shopping process, particularly when it comes to beauty products, which normally involve physical experimentation.

C. Bank of America -Erica (AI-powered Financial Assistant)

Due to the need to make their money more convenient, Bank of America introduced a virtual financial assistant, Erica, to assist customers in their financial tasks.

Conversational Interface Erica uses voice and text recognition, utilizing natural language processing. Customers are able to inquire on recent transactions, credit scores and even financial advice.

- Proactive Alerts: Erica also actively reminds its users about suspicious spending, bill payments, and recommends financial health-enhancing measures.
- Massive Adherence: According to the latest reports, Erica already had more than 25 million users with hundreds of millions of interactions, which demonstrates its ability to scale and customer confidence.
- 3. Impact: Erica has enabled Bank of America to ease the load in its call centers, enhance mobile interaction and offer more proactive financial assistance to its clients.

D. Netflix -Predictive Content Delivery.

Netflix uses AI to create personalized entertainment experiences for every user to boost their engagement and retention.

Content Recommendation Engine: Netflix uses
 AI to predict what a user will most likely
 appreciate based on his viewing history, rating
 and search patterns. These recommendations are
 real-time updated.

- Thumbnail Personalization: Netflix also personalizes the cover images its users get on the same title depending on their previous preferences to watch, which enhances the chances of clicking.
- 3. Content Development: Netflix implements AI to study the tastes of its viewers to inform its decisions around original content investment based on viewer preferences.
- Impact: The recommendation system of Netflix contributes more than 80% to viewing activity, which highlights the influence of AI in improving customer experience and churn reduction.

VI. CHALLENGES AND CONSIDERATIONS

Although AI is a potent source of optimizing customer experience, its adoption is not an unchallenged one. To make sure that AI creates value without negatively affecting trust or compliance or customer satisfaction, businesses have to walk a fine line between various technical, ethical, and strategic challenges.

The privacy and data security concerns are

A. AI systems are happy with data; only great data come with great responsibility.

- Risks of Data Collection: Predictive features and personalization usually involve bulk collection of personal and behavioral data. Poor management may subject companies to fines and loss of reputation.
- Regulatory Compliance: It should comply with the international privacy laws including GDPR, CCPA, and other regional laws. These legislations demand transparency, consent and safe storage of data.
- Cybersecurity risks: AI systems may fall victim to data breaches or malicious operations, which is why having strong cybersecurity infrastructure is a non-negotiable requirement.
- Consideration: To gain and keep customer trust, companies need to invest in effective data governance systems and transparent privacy policies.

B. Biased AI (Bias, Transparency)

The decisions made by AI may unethically or unwillingly impact biases in the data or the algorithm, resulting in inequitable or inconsistent results.

- Algorithmic Bias: Artificial intelligence models that have been trained on biased data can make discriminatory recommendations or responses, with some types of customers being targeted more than others.
- Absence of Transparency: AI systems are often black-box systems that are hard to understand how they make decisions, even by customers and even developers.
- 3. Ethical Responsibility: Customers require brands to be ethical. In case AI results are seen as unjust or unethical, it may harm the faith and brand equity.
- Consideration: Development of AI ethically involves training on various datasets, providing fairness tests, and creating explainable AI systems.

C. Striking a Balance between Automation and the Human Touch.

Although AI is efficient, excessive automation may cause uninterested or irritating experiences.

- 1. Customer Frustration with Bots: Stiff or undertrained chatbots may end up as dead-ends where the customer has no choice but to repeat himself or dissatisfiedly fight to get a human operator.
- Loss of Empathy: AI has no emotional intelligence and can be unable to address delicate or complicated situations with the appropriate delicacy.
- Risks of Brand Identity: Over-automation will be towards the detriment of the human factor that adds warmth and customer loyalties to the brand.
- Consideration: AI efficiency combined with human empathy usually leads to the best customer experiences. Artificial intelligence must not eliminate, but supplement human actors.

D. Interoperability with Legacy Systems.

Many AI technologies can only work with modern and flexible infrastructures.

- 1. Obsolete Tech Stacks: There are also numerous businesses who run on legacy systems that are not easily compatible with the latest AI tools.
- 2. Data Silos: Separated data sources constrain AI to provide correct insights or provide consistent customer experiences.
- Expensive Implementation: It may be expensive and time-consuming to upgrade or integrate systems to accommodate AI, particularly when dealing with large organizations.

4. Consideration: Digital transformation requires organizations to have roadmaps such as progressive strategies of integration and investing in scalable platforms.

E. Customer Trust and Expectations Management. The greater the integration of AI in CX, the greater the expectations of the customers- and the risk of betraying trust.

- 1. Overpromising Capabilities: Selling AI products as intelligent may have a backfire effect when the customers get negative experiences (e.g. chatbots that are not helpful).
- 2. Transparency Expectations: The customers are becoming more and more insistent on information about when they are dealing with AI, as opposed to a human being, and what they are using their information.
- 3. Trust Erosion: Even one instance of misuse of data or AI failure can cause trust to be severely damaged in a brand, particularly in sensitive devices, such as healthcare or finance.
- Consideration: Commercial entities should be realistic, explain the purpose of AI clearly, and create the ability to opt-out or fall back to humans when necessary.

VII. THE FUTURE OF AI AND CUSTOMER EXPERIENCE

As AI technology continues to grow, its implementation in customer experience is becoming more about automation and efficiency than empathy and personalization. The future of the AI in the CX is deemed in its application with the human-oriented design, or the creation of not only intelligent but also caring, proactive and creatively designed experiences. Some of the key trends defining the next are as follows.

A. Hyper-Personalization

The future customer experience will be tailored, basically in real-time on a case-by-case basis, not just with product suggestions.

- Context-Aware Personalization: AI will extend
 past what has been done and will take into
 account current signals (location, mood, device,
 time of day) to modify content and presentations
 and make offers in real-time.
- Mapping the Customer Experience on an Individual Level: AI will map customer

- experiences to each individual on a case-by-case basis across the channels.
- B2B Impact: In large-scale businesses, hyperpersonalization will result in individual onboarding, support, and engagements.
- Future Impact: This will ultimately result in customers insisting on Amazon-like personalization in any industry, which will raise the quality of all industries.

B. Voice and Conversation AIs.

As natural voice interfaces and their more widespread application become a reality, conversational AI will play a major role in CX.

- Voice Assistants: Customers are beginning to interact with their brands verbally (Alexa, Siri, Google Assistant), and AI will be forced to meet them at this stage.
- Natural language conversations: Advanced NLP will bring the voice and chat conversation a little closer to people and less algorithms.
- 3. Multilinguality/Multimodality Multilinguality: AI will support more languages and dialects and voice + interactions with images and text.
- 4. Future Impact: Firms will be forced to develop brand-cohesive voice experiences, and conversational tone is one CX approach.

C. Emotion AI (Affective computing)

The AI emotion will detect and respond to human emotions, making communications more empathetic and thoughtful.

- 1. Feeling in Real Time: AI will interpret the tone, facial expression, and words used by a customer to discern how they feel.
- Adaptive Responses: Support systems may change the tone, escalation logic or content delivery based on the mood or degree of frustration facing the customer.
- The uses: Emotion-aware systems can be used to reduce tension and enhance empathy within call centers, telehealth, education, and retail.

Future Impact The digital and human experience will be blurred through the use of emotion AI to create the illusion of the computer actually knowing its user.

D. AI Co-Pilots of the Humans.

Rather than replacing humans, AI is more likely to act as intelligent co-pilots to improve human performance in the future.

- Live Suggestions and Prompts: AI will suggest next-best actions, changes in tone, or upsell opportunities when engaging in a live conversation.
- Agents: Bots can manage the documentation, follow-ups and updates in the system, and agents also can work on the conversations with customers.
- Continual Training: AI will have the capability to provide feedback representations and training recommendations so that agents can evolve over time.

Future Effect Agent roles will be more advisory with an AI investigator, rather than a programmed reactor.

E. Generative AI (e.g., GPT, DALL·E) Usage in CX. Generative AI is revitalizing what is possible in content distribution, interaction design, and customer interaction.

Natural Conversations at Scale Large language models (like GPT) can support more natural human conversations than FAQ bots, capable of responding to subtle queries and recalling context.

- Dynamic Content Generation: AI can generate email messages, generate graphics or even an entire web page to meet the requirements of a particular user.
- Virtual Experiences: Generative AI can be deployed to power immersive, AI-based virtual shopping assistants, product demos or learning experiences.
- Brand Voice Consistency: Sophisticated AI will support the tone, vocabulary, character, and any content and interactions.
- 4. Future Impact: Generative AI will allow businesses to create personalized experiences, on the fly, changing marketing, customer support and service delivery.

VIII. CONCLUSION

A. AI as a CX Strategic Imperative.

Artificial Intelligence has become a game-changer when it comes to customer experience, becoming a supporting technology that transformed into a business superpower. Nowadays, it is not a choice but a necessity to use AI in the competitive environment. Companies that utilize AI to provide customers with personal, proactive, and frictionless experiences will be more likely to acquire, please, and keep customers.

B. AI is Investing in the Customer.

The main reason to invest in AI-driven customer experience solutions is to understand customers and serve them in a better way. AI offers intelligence automation and hyper-personalized recommendations, helping businesses to scale their operations to meet and surpass increasing customer demands. Not only will it result in better satisfaction and loyalty, but also business growth and efficiency.

C. The Road Ahead - Better Experiences with Human-Centric AI.

In the future, AI applications that combine the latest technological innovations with human emotions and moral values will be the most effective. The future of customer experience will be human-centric AI, where machines do not replace but augment human agents and do not violate customer privacy and trust. This moderate stance will enable companies to harness the full capabilities of AI to build meaningful, delightful, and long-lasting customer interactions.

REFERENCE

- [1] Jamil, G. L. (2024). When Things Changed: AI in Our Lives. Forever. In *Perspectives on Artificial Intelligence in Times of Turbulence: Theoretical Background to Applications* (pp. 13-33). IGI Global.
- [2] Basu, Kanadpriya, Ritwik Sinha, Aihui Ong, and Treena Basu. "Artificial intelligence: How is it changing medical sciences and its future?." Indian journal of dermatology 65, no. 5 (2020): 365-370.
- [3] Roski, Joachim, B. A. Hamilton, W. Chapman, J. Heffner, R. Trivedi, G. Del Fiol, R. Kukafka et al. "How artificial intelligence is changing health and healthcare." *Artificial intelligence in health care: The hope, the hype, the promise, the peril. Washington DC: National Academy of Medicine* (2019): 58.
- [4] Noorbakhsh-Sabet, Nariman, Ramin Zand, Yanfei Zhang, and Vida Abedi. "Artificial intelligence transforms the future of health care." *The American journal of medicine* 132, no. 7 (2019): 795-801.
- [5] Bohr, Adam, and Kaveh Memarzadeh. "The rise of artificial intelligence in healthcare applications." In *Artificial Intelligence in healthcare*, pp. 25-60. Academic Press, 2020.
- [6] Gillner, Sandra. "We're implementing AI now, so why not ask us what to do?-How AI

- providers perceive and navigate the spread of diagnostic AI in complex healthcare systems." *Social Science & Medicine* 340 (2024): 116442.
- [7] Mohammad, S., Rahman, M. M. M., & Farahmandi, F. (2021, December). Required policies and properties of the security engine of an SoC. In 2021 IEEE International Symposium on Smart Electronic Systems (iSES) (pp. 414-420). IEEE.
- [8] Hossain, M. M., Mohammad, S., Vosatka, J., Allen, J., Allen, M., Farahmandi, F., ... & Tehranipoor, M. (2021, July). Hexon: Protecting firmware using hardware-assisted execution-level obfuscation. In 2021 IEEE Computer Society Annual Symposium on VLSI (ISVLSI) (pp. 343-349). IEEE.
- [9] Mohammad, S., & Farahmandi, F. (2024, June). Dyfora: Dynamic firmware obfuscation and remote attestation using hardware signatures. In Proceedings of the Great Lakes Symposium on VLSI 2024 (pp. 471-476).
- [10] Bepary, M. K., Basu, A., Mohammad, S., Hassan, R., Farahmandi, F., & Tehranipoor, M. (2025). SPY-PMU: Side-Channel Profiling of Your Performance Monitoring Unit to Leak Remote User Activity. Cryptology ePrint Archive.
- [11] Mohammad, S., & Farahmandi, F. (2024, October). FortBoot: Fortifying Rooted-in-Device-Specific Security Through Secure Booting. In 2024 IFIP/IEEE 32nd International Conference on Very Large Scale Integration (VLSI-SoC) (pp. 1-4). IEEE.
- [12] Busari, M. (2025). Secure Boot and Firmware Authentication Policies in SoCs.