AI in Marketing
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Week 1
Lecture-5 Designs of AI, Transition process and AI matrix

Welcome to this NPTEL online certification course on Artificial Intelligence in Marketing and now we will talk about module 5. So, as you can see from this slide, in this module we are talking about the chapter 1, that is introduction to AI Marketing Management and in this module that is module 5 we will talk about the various designs of artificial intelligence, transition process and AI matrix. Now this is the overview of this module. So, we will talk about the different intelligent designs of AI and their benefits and limitations. Then we will talk about the process of transition of enterprises from basic to ultimate maturity levels. So, from this basic to the ultimate maturity level and the characteristics within each level. And then we will talk about understanding AI marketing matrix.

So, now let us look at the types of AI, the different intelligent designs of AI. AI has been conceptualized as the use of computational machinery to emulate capabilities inherent in humans. So, we are emulating, we are trying to recreate the capabilities that are inherent in humans such as doing physical or mechanical tasks, one. Thinking and feeling. So, these are the three capabilities which are inherent to a human. The multiple AI intelligence we use considers that rather than treating AI as a thinking machine AI can be designed to have multiple intelligences. So now we are talking of AI and multiple intelligences as human have for different tasks. These are mechanical thinking and feeling AI intelligences.

So, this is mechanical AI that can be used for automated automating repetitive task, and this is being actively used now. The next is thinking AI for processing data to arrive at new conclusions and decisions. And the third is feeling AI to analyze human emotions and feelings. So, these are the three types of different intelligent designs of AI mechanical thinking and feeling.

Now let us look into greater detail about what is mechanical AI. Mechanical AI is the lowest level of AI intelligence learning and adopting only minimally but being very good at routine and repetitive marketing tasks for standardized output. For example, remote sensing, machine translation, classification algorithms, clustering algorithms and dimensionality reductions are some current technologies that can be considered mechanical AI. Mechanical AI generally learns and adopts only to a minimal degree. It

is designed with the goals of maximizing efficiency and minimizing variability. So, we are maximizing the efficiency and minimizing the variability. Thus, it is ideal for service standardization when customers have homogeneous demands for the services and are low in potential customer lifetime value. For example, like fast food ordering and delivering, self-service, budget service and customer service for routine issues. The benefits of mechanical AI are that first mechanical AI is the best when process standardization is required. So that is one important aspect of this. These can be various tasks like collaborating robots helping in packaging, drones helping with the distribution of goods, self-service robot delivering services and service robots automating social presence in the front line of a service facility.

Also, this kind of routine application requires a high degree of consistency and outcome reliability. High degree of consistency and outcome reliability and mechanical AI rightly serves this purpose. Mechanical AI is also beneficial for firms emphasizing cost leadership as operational excellence can be achieved by automating production and service processes with reduced cost. So, when a firm is looking at cost leadership, cost reduction then this can be of great benefit to those kinds of companies.

Now what are the limitations of this AI? Mechanical AI is poor in contextual data. This is especially the case for emotional data because such data are about the individual in context. Meaning modeling the emotional state of a consumer requires contextual and individual specific data. And this mechanical AI is low in contextual data. Contextual data are often lost in the interaction process as emotional data are difficult to capture and thus are not analyzed. So, when this data is not captured so obviously it is not analyzed.

For example in customer service interactions the content and sentiments of the conversation are recorded but not the context of the conversation. So, you see that this is the cause of concern here in mechanical AI. Mechanical AI is very good at machine-to-machine interactions like ATM getting authorization from the bank for cash withdrawal. It plays an important role in these routine transactions however it may come at a cost of customer intimacy. So, the outcome is reliable, and the process is standardized. So these are the routine interactions but there is no customer intimacy.

This is because to be able to figure out the customer side of a strategy requires customer data collected and compiled with mechanical AI as it is the only methodology powerful and scalable enough to capture individual data. But when customers are removed from the interactions it becomes more challenging for marketers to remain intimate with the customers. So again, this customer intimacy is lost.

The next comes thinking AI. Thinking AI is designed for processing data to arrive at new conclusions or decisions. So now we are looking at new conclusions and decisions the data are typically unstructured. It learns and adapts from data. Thinking AI is good at

recognizing patterns and irregularities in data. For example, text mining, speech recognition and facial recognition. Machine learning, neural networks and deep learning, that is neural networks with additional layers are some of the current methods by which thinking AI process data. IBM Watson expert systems and recommender systems are some current applications for decision making. So here in this in these this thinking AI is used.

The benefits of thinking AI is that it is ideal for personalization. It is ideal for personalization. Especially when there is abundant customer data available. So, when more customer data is available personalization becomes easier. So, the more customer data easier is the personalization is. And when the problems are well defined, for example predicting which new services will be appealing to which customers. In this situation there are ample existing customer preference data that can be used to suggest different new services to different customers. So, it becomes easier to match the new services with the different customers which customers would like to have and what kind of service. The analytical subtype of thinking AI is good for uncovering or discovering meaningful patterns and data as the basis of personalization. So as more and more data come about a customer then it becomes a meaningful pattern emerges. And then this personalization becomes easier. For example, for complex shopping decisions AI assistants can learn customer criteria for and optimize whatever tradeoff the customers are willing to make.

Another benefit is that service provider should use thinking AI more. Why, because when the nature of the service task is mostly data based, analytical, predictive, and thinking. When the nature of service offering is utilitarian and not hedonic. That is customers obtain functional high-tech benefits from the service. When the service strategy emphasizes high quality as the major benefit to the customers and when the service creation stage requires figuring out valuable new service for specific customers. So, what new services can be offered for a specific customer?

Thinking AI can be used to predict new markets, one. Create new services, two. Prospects new customers, three and customize the services, four. The limitation of thinking AI is how thinking AI comes up with certain recommendation often is not transparent to human marketers. The current dominant machine learning approach to AI designs machines to learn via a mapping mechanism and not via cognitive reasoning. The result is the output being unexplainable because it does not answer the why questions and hence is risky if used for trustworthy and fair marketing exchanges. Because this why is not being answered.

It also results in liability issues. If AI output is not transparent, when AI goes wrong marketers who use the AI are likely to be held accountable. The accountability issue has emerged since the first fatal accident of an autonomous car. That was the triggering point.

This accident that was the. Thinking AI is not neutral. If data input is erroneous or biased output is also likely to be biased. However biased input is not the only way AI bias can occur. For example, it has been shown that for loan decisions, discriminatory results can occur even if there is no bigotry programmed into the system and the system only seeks to maximize profits. Researchers have also shown that gender biases can occur without any conscious or unconscious attempt to produce a biased outcome using only an unbiased algorithm. So that is another problem. In using Thinking AI for market analysis for targeting and for personalized marketing actions, marketers need to be aware of the potential AI biases and have better knowledge about how AI learns in order to avoid AI biases. Because if we continue our market analysis for targeting and for personalized marketing action then obviously, we will be losing out on the customers.

Then comes Feeling AI. Feeling AI learns and adapts from experience. It learns and adapts from experience. This level of AI may possess all the mechanical and thinking AI capabilities but applies these capabilities to experience based data. Feeling AI is ideal for service relationalization defined as personalized relationships and for customer satisfaction and retention. So that is where this Feeling AI is mostly used. It is critical for maintaining customer relationships in which interactions, communication, understanding, and experience are critical. So, in this situation, again Feeling AI will be of use to the marketer. All relationships are by nature personal and Feeling AI that can handle such data is ideal for this purpose. So, there are two polarized applications of Feeling AI. At the low end, Feeling AI applications such as virtual agents and chatbots are widely used to deliver mechanical AI like customer service. At the high end, Feeling AI has potential for customer care that requires empathy and understanding, not just serving as a customer contact interface. So now you see that Feeling AI is moving across the whole spectrum. Automatic speech emotion recognition is the next big thing of AI that can be applied widely to health, retrieval, robotics, security. Sophia and more sophisticated chatbots are examples of such applications. Feeling AI is still in its early stages of development and thus feeling mostly remains the territory of human service employees for the time being.

The benefits of this Feeling AI is that Feeling AI provides relationalization benefits that is personalizes the relationships. So that is the biggest advantage of this Feeling AI. Because of its capability to recognize and respond to emotions. Any marketing functions or activities that require interaction and communication with the goal of relational benefit should consider Feeling AI. A broad range of marketing functions involves feeling for example customer satisfaction, customer complaints, customer moods and emotions in advertising etc. and can make use of Feeling AI. Because Feeling AI can make your advertising and better the customer moods can be changed and customer satisfaction can be increased.

So, service providers should use Feeling AI more. When the nature of service task is mostly experience-based, emotional and requires interaction and communication. When the nature of service offering is hedonic. So earlier we were talking about the utilitarian. Now for Feeling AI when the nature of service offering is hedonic that is customers of obtain sensory fun high touch benefit from the service or relational that is higher customer lifetime value. So, when the service strategy emphasizes customer relationships as the platform for continuing improving services for customers. Even at the service interaction stage provides an opportunity to communicate and interact with customers about the value of the service. So, it communicates, it interacts with the customers and also communicate about the value of the service. Feeling AI can be used to engage customers, personalize service adaptively over time and provide customer care and customer service.

Next is the limitations of the Feeling AI. The fact that marketers are using lower intelligence AI for feeling functions that is using mechanical AI to capture emotional data and using thinking AI to analyze emotional data. So now this is the catch we are using mechanical AI for capturing emotional data and thinking AI to analyze it. So that may inflate the perceived capability of AI to assist marketers in understanding customer emotions. For example, marketers may overly rely on such feeling AIs to interact with customers resulting in customer disengagement. Unlike an effective responses may imply that customer responses may be polarized more easily if technologies that is social media in their study are not able to interact with customers appropriately.

Another consideration is that the customers may not be ready for interacting with feeling AI. Researchers have found that many customers hang up on call-out marketing chatbot once they realize they are talking to a bot. The technology readiness index surveyed what people think about AI in the workplace and only 10% consider feeling AI to have a biggest impact in the past 5 years on their jobs indicating that customers are not aware that AI can have feeling and may constitute a threat to their jobs.

Now let us look at the use of AI in everyday life. So, we are not talking about the AI maturity that is the process of transition. Understanding AI algorithms use cases is one thing and implementing them is another and it is totally different ballgame when it comes to implementation or an organization level. An organization cannot transform into a super intelligent enterprise overnight. Those who have tried pumping huge capital have failed miserably and so the transition happens step by step and companies who are actively putting efforts in this transition today would be able to take the advantage of AI tomorrow. The companies that are at the highest level of maturity are still exploring the power of AI in their business applications even today as a lot is yet to be understood and learnt. The highest degree of maturity is difficult to forecast due to the uncertainty of the time of occurrence of the singularity and it is not of relevance in the short or medium

term.

According to various expert opinions the highest degree of maturity of AI is to be expected between 2040 and 2090. However, the individual degrees of maturity can be described as levels. With the help of an AI maturity model for enterprises the different levels are being discussed henceforth. So, this is on x axis we have the various maturity levels and on y axis we have AI levels or disruptions and then we have moved from digitization to digitalization. So, these are decisions supported by AI. These are decisions made by AI and supervised by humans and these are decisions made by AI autonomously on their own. So, these are non-algorithmic enterprises. These are semi automated enterprises. These are automated enterprises, and these are super intelligent enterprises where the maturity level is high, and decisions are made by AI autonomously. While digitization is low level of maturity and where decisions are supported by AI. So, this is how the organization can move from the first to the fourth.

So now let us look at the first one that is what is non algorithmic enterprise. Data algorithms and AI do not play a business-critical role when it comes to the non-algorithmic enterprise. The topics are described rather than operative and transactional significance. The strategy and organizations are rather classical and less analytical, and data driven. The strategy here is that there is no AI algorithmic strategy. Data is not regarded as critical to success. There is no alignment with goals that is marketing sales and service goals. There is no alignment with them and whatever analytics is used would be only part of the IT team. So, the AI team will use analytics and nobody else. About people there would be no CDO that is chief data officer. No or very minimum data scientist there would be very limited analytics talent. The team would be mostly comprised by classic marketers having very rigid and orthodox ideas. The decisions would solely be made by humans. No trace of automation would be there in any process. Only rule based systems would be applied that is controlled paths in service. There would largely be a hands-on mentality across the team and the decision makers. The data, whatever data is collected, would be used only in an operative system transaction-oriented way. The focus would only be on structured data. The different data sources would not be linked with each other for new insights. Data is not captured and used systematically. There would not be any automation used in the collection and analysis of the data. Analytics, that is simple analytics like XLS, SPSS are used. Analytics used would be isolated like web analytics, offline analytics.

The next comes semi-automated enterprise. So, upon the transition to a semi automated enterprise the crucial value of algorithmic and AI is increasingly recognized. Accordingly, there are corresponding data and analytics structures. Characteristics is the increased degree of automation of data collection and analysis as well as decision making and implementation. This is made possible by the holistic integration of data sources,

analysis, and process chains. The strategy here is that rudimentary AI and algorithmic strategies are implemented. Data is regarded as only business relevant. There would be some levels of alignment present with partial goals. And analytics would be a part of IT and some other specialist departments also. People typically there will be no chief data officer other than some very few exceptions. Staff would be more analytically oriented as compared to the previous level. There would be a substantial level of cooperation between the marketing sales service and the IT department.

The decisions in this. So, algorithms are used to take recommendations for the possible courses of action. However, humans make the final decisions. Algorithms make partial decisions humans may have to confirm them before they are executed. Automation of individual processes like services, chatbots are done. Both rules based and knowledge-based systems are applied like knowledge databases for call center agents. Operations like product recommendations, marketing automations and drip campaign are done.

Data is used more strategically than at the previous level, like in the customer value related segmentation and sales prediction. The focus is now both on structured as well as unstructured data. The data sources are partially linked with each other for new insights and the various touch points in the customer journey are now being captured.

Data is partially captured and used systematically. Partial optimization in data collection and analysis is obtained in this level. Advanced analytics, data mining, and machine learning are being used in this level of organization. A-B testing is a common phenomenon. Analytic system is partially integrated to promote analysis via various touch points of the customer journey. Analysis models are not integrated automatically into the process though.

The next comes automated enterprise. So, this can be made possible by a holistic integration of data sources, analysis, and process chains. Data analytics and AI facilitates the creation and implementation of new business processes and models in this maturity level. The data and analytics driven real time company obtain systematic competitive advantage this way.

Strategy, AI decided algorithmic strategies are implemented. Data and analytics are extensively used for business processes and business models. Data are considered as a value driver and competitive advantage for the organization. Predictive analytics are used to optimize and automate the company's decision. There is full alignment with targets like marketing, sales, and service. Analytics is primarily part of a specialist department, and it would act as a support for them.

There would mandatorily be a chief data officer position. Overall mindsets would be completely data driven across the organization. Marketing, sales, and service would be in

the data analytics driving seat. There would be a chief conversational officer responsible for automation speech control of customer interaction.

Decisions here are routine decisions. They are made by and executed by algorithm. The majority of decisions are made by algorithm then partially directly executed, partially confirmed by human prior to execution. However, humans would have the last say. The entire customer journey would be automated from start to end. Besides rule based and knowledge-based systems, AI systems are also used. There would be integrated recommendation systems for product, content and communication. Strategic decision chains like CRM, customer journey, marketing automation, automatic identification, profiling and addressing target groups would be present here. The decisions the entire sales funnel would be automated. There would be automated content generation and curation. Internal planning and coordination processes would be automatically controlled by bots, that is conversational office. The data in automated enterprise is used strategically for areas like customer value related segmentation, sales prediction and many more. The focus is on structured and unstructured data. The relevant sources of data are fully linked up with each other to get new insights. Extensive collection of data is done from all touch points of the customer journey and data is automatically collected and used.

The analytics in automated enterprise, advanced analytics, data mining, machine learning, deep learning, narrow AI are used. Analytics results are automatically used for creating and optimizing business processes. Automated attribution modeling is used to optimize the customer journey in real time. All the analytic systems are integrated for analysis via various touch points of the customer journey. However, the analysis models are not integrated automatically in processes and executed. Automated analysis and creation of content is done at this level of maturity.

The next comes the super intelligent enterprise. While with the automated enterprise, the approach of narrow AI is applied, the super intelligence enterprise concludes the potential of autonomy and self-learning of companies by way of general and super intelligence. This scenario currently appearing to be hardly realistic has two types of manifestations. In the positive version, we as humans control the framework conditions and rules of the autonomous AI systems. We can intervene and rectify via regulative and corrective measures at any time. Productivity and well-being are increased further by the performance, scalability and innovation of these super intelligences.

In the negative version, we as humans have lost control over the framework conditions and rules of the autonomous systems. There is no longer the last call for man. AI systems further develop uncontrolled without the possibility of human intervention permanently and with an open-ended result. Even if the super intelligence enterprise seems to be a long way away, there are some businesses today with an extremely high level of

automation. In super intelligence enterprises, AI systems not only execute algorithms but rather AI develops its own algorithm automatically and flexibly. Strategy, resources, data, and analytics are the subject of planning and execution processes of autonomous systems. In this case, the AI systems would develop uncontrollably without the possibility of human intervention. It is questionable whether the development resulting from this would be for the well-being of mankind. The super intelligence enterprise, AI systems not only execute algorithms but rather AI develops its own algorithm automatically and flexibly.

Now, let us look at the story of DAO. That is Decentralized Autonomous Organization is a highly automated and virtual organizational construct. This is a virtual company without a business domicile, CEO or staff which organizes itself with the help of quotes. DAO broke all crowdfunding records in early 2016 and collected 160 million US dollars. DAO works like an investment fund whereby the collected capital is invested into startups and products to yield a profit for the members of the organization. The so-called crowd fund vote on the directions in which the organization is to develop. So-called smart contracts regulate the investments of the DAO members. They are algorithms added to the software which automatically and permanently review the terms of a contract and take corresponding measures. These rules are stored in a centrally managed database, the so-called blockchain. When the defined goals have been achieved, the smart contract automatically executes the transfer. The DAO members receive tokens from for the voting which are used for voting in line with the money paid in. In addition, the members can also submit their own ideas for projects and ideas to be financed by the DAO.

DAO automates company processes on the basis of blockchain technologies. The governance rules are executed by the algorithmic CEO and not as is customary by the board of directors. A company, organization is formed that is fully digitized. Algorithmic technology has the potential to fundamentally change the way we do business and has been flagged as the most prominent sweeping change since the industrial revolution. The next comes AI marketing metrics. Nowadays, there already is a multitude of potential applications for marketing based on artificial intelligence. These potentials can, in principle, be subdivided into dimensions automation and augmentation. So, these are the two dimensions. As well as on the basis of respectively associated business impact. In the case of augmented applications, it is especially a matter of intelligent support and enrichment of complex and creative marketing tasks that are currently still performed by human actors. Artificial intelligence can, for example, support the marketing team in media planning or in the generation of marketing insights. First and foremost, the augment potential is already more strongly developed in those companies that reveal a high degree of maturity in the AI maturity model. Planning and decision making processes are also supported or already performed here by artificial intelligence.

With regard to the automation applications, it is hardly surprisingly noticeable that with them, both the degree of maturity and the distribution are significantly more developed in comparison. There are many automation applications, for example, that already have a high degree of maturity and use in practice today. This includes marketing automation on real-time bidding. How are there applications that are used comparatively little in practice today despite their high degree of maturity and high business impact? One area of application this phenomenon applies to is the principle of lookalikes that can be used for lead predictions and audience profiling. In the B2C field, this can easily be put into practice with Facebook audiences.

Let us look into the metrics depicting the maturity level and the degree of use in practice the various marketing activities through the scope of augmentation or automation used and its business impact on the company. So, this is the degree of auto augmentation. This is the degree of automation. And here it is the business impact. And now we can see that this is strategy, planning, influencer marketing, targeting, lookalike audience.

So, to conclude in this module, we have discussed the different intelligent designs of AI. We have talked about the various levels of maturity of enterprise based on their AI adoption and also the characteristics of each level. Finally, we discussed the AI matrix which is based on the degree of maturity, practice, and its impact on business. And these are the five books from the from which the material for this module was taken. Thank you.