AI in Marketing
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Week 2
Lecture-8 Transforming Marketing Strategy using AI-II

Welcome to this NPTEL online certification course on artificial intelligence marketing and now we are talking of module 8. So we are discussing how to transform marketing strategy using AI. So now this is part 2 of this and we are in module 8. In this module we will explore the ideas framework and understand 5 elements of technology landscape. Then we will study the expertise, architecture and strategy landscape of ideas framework in detail. Thereafter we will understand human and machine expertise and capabilities.

Then we will understand the phenomena of human teaching machines and build machine expertise. Thereafter we will understand IT architecture as living system. Study digital decoupling to transform legacy architecture into living systems and to study technology integrated strategy to explore the stages of human-machine interaction and then study the technology integrated strategy in the age of ideas. So let us again look at the 5 elements of the technology landscape that are these 5 things intelligence, data, expertise, architecture and strategies and combined they form this idea framework.

Now let us look at this we have talked about the intelligence and data now we will talk about expertise. Machine teaching can unleash the often untapped expertise that exists throughout an organization allowing a large number of people to use AI in new and sophisticated ways. It is customizable according to business situations thus it opens the way to real innovation and advantage. Now let us look at the human-machine hybrid activities. So machine augment human how? First amplifying our powers and in providing otherwise unattainable data-driven insights.

Interacting with us through intelligent agents and embodying us as with robots that extend our physical capabilities. In turn human complement machines how? By training them as in labeling data for machine learning systems. Explaining them to bridge the gap between technologists and business leaders and sustaining them by ensuring that AI systems are functioning properly, ethically and in the service of the human rather than the other way round. And in turn human complement machines by teaching machines the by endowing them with the experience of experts. In the new world of human teaching machines the real difference makers for business will be the domain expert.

So that will be the real difference makers who are the experts. So machine teaching is

about the transfer of knowledge from the human expert to the machine learning system. Machine teaching includes three distinct areas of human expertise that AI has long struggled to incorporate. One is the professional experience, second is collective social experience and the third is personal experience. The innate and acquired individual abilities of human being.

Making AI innovation business specific. Developers or subject matter experts with little AI expertise such as lawyers, accountants, engineers, nurses or forklift operators can impart important abstract concepts to an intelligent system which then performs the machine learning mechanics in the background. Someone who understand the task at hand decompose the problem into smaller parts and sets of rules and criteria for how the autonomous devices should operate. Then using simulation software the experts provide a limited number of examples. The equivalent of lesson plan that helps the machine learning algorithm solve the problem.

If the device consistently makes the same mistakes additional examples can be added to the digital curriculum. Once the curriculum is in place the system automates the process of teaching and learning across hundreds and thousands of simulations at the same time. It is not randomly exploring it is exploring in a way that is guided by the teacher. So we are exploring in a way that is guided by the expert the teacher. Collective expertise.

Teaching AI social context. Humans operate often effortlessly in collective and social context of immense complexity. These contexts overlap and inter penetrate and are constantly evolving on short and long time scales. When we maneuver a car through an urban environment we are negotiating a dense web of social systems. We are processing and anticipating the movements of other vehicles and the intentions of their drivers.

We are following and may be bending the formal rules of road and engaging in in the informal ones embedded in our culture. For instance in some cultures flashing your headlights on and off means you are yielding to another vehicle. In other cultures it means you are coming through and the other vehicle dam will better get give way. So these are the two opposite courses of action. While the course of action was the same.

So now let us look at the wisdom of crowds plus machine. Forecasting real life events of importance. Example geopolitical events behavior of drivers on a highway etcetera is notoriously difficult. Experts predictive accuracy tracked over time has been shown to be comparable to a random guess. One way to improve forecast is to crowd source them.

Aggregating a large number of human forecast into a single estimate of probability. This wisdom of crowds holds that large groups of people outperform a small allied groups of

experts at solving problems making wise decisions and predicting the future. In other word collective expertise in the broader sense can sometimes be superior to highly specific individual expertise. At the same time advances in machine learning have led to models that produce fairly reasonable forecasts for a number of tasks. The SAGE that is synergistic anticipation of geopolitical events projects combine the power of crowdsourcing with advances in AI.

Hence the term synergistic in its name to generate more accurate predictions that either method could on its own. In a competition held to test the accuracy of forecasting systems SAGE was tested against two competing systems given the same set of more than 400 forecasting questions SAGE won hence highlighting the importance of collective expertise. Now let us look at the personal expertise inherent human technology. For decades AI researchers have struggled with how to imbue machines with the basic building blocks of human intelligence. But the human turn in intelligence is not about recreating human consciousness.

Instead it is about solving problems by mimicking the most powerful cognitive characteristics of human and supplementing them with the most powerful abilities of computers. The radically human turn in personal expertise is about directly leveraging not mimicking the innate and acquired intelligence of human to augment AI. This can be more subtle kind of teaching. A kind where tested skills some that the teacher may not even know they possess are subtly transferred to a learning system. The next comes expertise.

In supervised learning scenarios machine teaching is particularly useful when little or no labeled training data exist for the machine learning algorithms as is often does not because an industry or a company needs are so specific. Now let us look at the example of Etsy. For Etsy an online marketplace for vintage and handmade goods classifying them by style was particularly challenging. So most of the product on its sites are one of a kind creation and there are some 50 million items on offer at any given time. So now you see there are 50 million items and every item is a different item.

In the past style based recommendation system produced unexplainable product suggestions for the group of shoppers because the AI assumed that two items would be similar in style if they are frequently purchased together. So that was the problem. In order to teach AI the subjective notions of style Etsy merchandising experts developed 42 style labels that captured buyers traced across 15 categories from jewelry to toys to crafts. The merchandiser produced a list of 130000 items distributed across these 42 styles. Etsy technologies then turned to buyers who tend to use style related terms in their searches typing in things like art, deco, sideboard.

From just one month of such queries the company was able to collect a labeled data set of 3 million instances against which to test their style classifications. So that happened within one month. Etsy engineers then trained a neural network to use textual and visual cues to best distinguish between those classification for each item. The result was style predictions for all 50 million active items on Etsy.com.

Now let us look at the implications of machine teaching by experts. One is the increased relevance. The search engines allowed buyers to find products that express their sense of taste and style. The second is increased sales. During COVID-19 sales of masks tailored to the aesthetic sensibility of customers went from virtually nothing in April 2020 to some $740 million for the next of the year for the rest of the year.

The third is the company's revenues more than doubled during that time and its market value rose to $22 billion. The next comes the A on the ideas framework that is architecture. So legacy architecture are tightly bounded maintaining barriers between lines of businesses, geographies, sales channels and functions. The wide range of emerging information technologies supports the development of IT architecture as living system as shown in the next slide. So let us look at the IT architecture as living system.

One is that it is boundary less. It breaks down barriers within the IT stack and also between companies using cloud based platforms to harness network effects. Another characteristic of this living system is that they are adaptable. Rapidly adjusted to business and technology changes. Adaptable systems move legacy systems to the cloud to reduce dependence between systems.

Increase speed and efficiency, capitalize on human intelligence of your talent and meet the evolving needs of the customers. The third is radically human modeled on human brain and behavior. IT architecture as living systems are radically human in the ways they use agile methods, complex human intelligence, nimble data strategies to deliver insight and trusted experience. Such systems connect people across organization silos, bringing together business talent, IT talent and ecosystem partners to innovate and co-create. Digital decoupling, the first component of that is legacy architecture to living system.

For many companies the journey towards living systems begin with digital decoupling. So that is the first step. Using new technologies, data access methods and development methodologies to build new system that execute alongside the legacy systems. This includes open application programming interfaces that is APIs, agile DevOps, cloud migration factories and robotic process automation that enables greater flexibility. Using

this and other approaches, organizations can gradually decouple their core systems, migrating critical customer facing functionality and data to new service based platforms.

Instead of periodic large scale IT transformations that rigid architectures require, this decoupled approach provides a stable and constantly evolving architecture capable of accommodating innovation and scaling to respond quickly to changing market conditions and the competitive landscape. LL Bean is a 110 year old retailer with a heritage that include classic clothing, rugged outdoor gears and a deep commitment to customer satisfaction. So these are the three things that they have. In recent years, as the company reached out to customers across multiple channels, print, brick and mortar stores, computers and mobile websites, email and social media, it found itself hampered by a cumbersome IT system. Different platforms only loosely connected supported different customer channels running on separate applications.

So providing a seamless customer experience across all channels was next to impossible because there were so many channels. Integrating all those channels and a seamless movement across the channes was next to impossible. And instead of focusing on delivering customer value, IT personnel had to spend time managing the infrastructure. So they were spending the time on infrastructure that was bad instead of delivering on the customer value. To compete successfully in the age of amazing, LL Bean decoupled machine critical applications from its legacy IT systems and located them in the Google Cloud.

Now let us look at the implications of using a cloud based architecture. First is increased productivity. IT teams could integrate data from multiple systems, handle peak website loads more efficiently and deliver new customer features faster. Second is the increased efficiency, continuous optimization of backend cloud based architecture, less time spent by front end developers on managing it. And the third is the flexible front end architecture.

The company can easily, quickly and cost effectively scale up capacity in peak buying periods and scale down during the LULs, the low period. The next component of this ideas framework is the S that is the strategy. So technology integrated strategy. So far we have seen examples of several companies that have adopted new approaches to intelligence, data, expertise and architecture and created distinctive strategies as varied as the industry in which the firm competes. Let us now take a look at the fifth and the final element of the ideas framework which talks about human centered technological strategy.

These are the three stages of human machine interaction. The response of companies to

intelligent technologies has unfolded in three stages. Stage one the machine centric, stage is collaborative and the three is human centric. The first stage of the evolution was machine centric. The dominant response to the new technology was to re-engineer AI and other emerging technologies were used to automate the repetitive tasks.

Humans had to adopt machines and were often replaced by them. Strategy and execution was sequential, spread over steps like assess, identify, design and implement. The second stage of machine human machine interaction was collaborative. Human and machine adopted to each other. As a new generation of intelligent technologies and techniques emerged, companies sought to reimagine their traditional business processes in order to take advantage of collaborative teams of humans working alongside machines.

Nevertheless, strategy and execution remained separate. First a process was reimagined in light of AI, machine learning and the like and then tested in small experiments. If it passed the test, then it was implemented at scale across the enterprise. Again that was a sequential approach that separates strategy and execution.

The third stage underway now is the human centric. Machines adopt to humans. The agility and adaptability of radically human technologies guided by human enables savvy companies to interrelate technology, strategy formulation and execution in an organic whole. The three elements grow and change synchronously often very rapidly. The technology integrated strategies for the age of ideas. So, three prominent strategies illustrate the wide range of possibilities that radically human technologies have opened up.

These three stages forever beta, minimum variable ideas and the third is collab create distinctive advantages for companies and customers alike. Now let us look at each one of them. So, forever beta strategies offer software enabled products and services that continually evolve and improve after they have been purchased. So that customers sees them grow in value and utility over time rather than fade.

MVI strategies use one or more elements of the ideas framework to preciously target weak links in a traditional industry and provide a superior customer experience that can be quickly scaled to make rapid inroads in the market. Collab strategies produce superior results in the sciences or other knowledge intensive environments through human guided machine driven discovery. Now let us look at the evolution of technology. A subset of examples of how technology is advancing.

First is this intelligence. The first is this intelligence. So machine centric that is

industrial robots. Uses sensors to guide pre-programmed actions behind safety gates. So this machine centric machine can do what its program to do.

Second is collaborative. Human trained machines machine augment humans that is deep learning. Employ neural networks to learn from large data sets. The third is human centric. Machines adapt to humans and human teach machines.

So that is emotional AI. Response to human emotions and increases relevance. Then comes the data. Again the three stages are machine centric, collaborative and human centric. So in data machine centric the machines can do what it is program to do.

So the data in machine centric means business intelligence one. Produce reports from database queries and batch processes. Collaborative where human teach machines and machines augment human data is big data. Uncovers actionable patterns from extremely large data sets. In human centric where machines adapt to humans and human teach machines.

The data is synthetic data. Mimics original data with strong privacy safeguards. Again in at the third stage that is this expertise. Again there are three stages human centric, collaborative and human centric. So expertise in machine centric is traditional programming uses computer codes to instruct machines. Collaborative is data science, extract insights from data to solve problems.

And in human centric the expertise is machine teaching enables non-technical experts to train AI systems. The next comes architecture that is. Again the three stages human centric, collaborative and human centric. So architecture in human centric situation is monolithic, works as a homogeneous static integrated system. Collaborative is layered, handles functions autonomously at separate levels.

And human centric are living systems, assembles heterogeneous adoptive capabilities dynamically like the Lego blocks. Then comes the last one that is the strategy. Again the three stages machine centric, collaborative and human centric. So strategy in machine centric is re-engineer, foster sequential change from analysis to execution. In collaborative re-imagine, rethink processes then sequentially experiments, adopts and scales.

And then comes human centric that is interrelate, synchronize human guided technologies, strategy and execution. So in order to conclude we have studied the ways in which human and machine complement each other. We discussed the three types of expertise which are the professional, social and personal expertise. We discussed the

collaborative wisdom of crowds and AI. Then we have discussed the IT architecture, how IT architecture is now evolving as living systems.

Then we have discussed the three dimensions of IT architecture as living systems are being boundaryless, adaptable and radically human. Then we have talked about human-machine interaction and how it has evolved from being machine centric to human centric. And then we talked about the three strategies. The first is beta, forever beta.

The second is minimum viable idea MVI and the third is CoLab. And how are they being adopted in the age of idea. And these are the five books from which the material for this module was taken. Thank you.