

# **FOUNDATION OF DIGITAL BUSINESS**

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**Lecture 23**

## **Lecture 23 : Get AI ideas Flowing**

Good morning, now continuing on my the seventh module artificial intelligence for business now and beyond, the second lecture I will talk about get AI ideas flowing. So, what I will the concepts I will be covering here is how AI can improve business processes and what every manager should know about applying machine learning. So, how AI can improve business processes? The probable use cases I mean it is very sample list. So, I mean the list can be very long.

So, just to give you an idea for different business functions like marketing for example increasing the speed in responding to customers and improving productivity of your sales personnel and customer service agents. So, it is very customer oriented, customer centric that is what marketing is all about. And then identifying possible new markets and cohort. I hope you understand the meaning of cohorts which means a common group who have very common features any group

like say we now say Gen Z, Gen Y or maybe a group of students or school student or college student these can be classified as cohorts. So, cohorts is nowadays a very commonly used lingo in the marketing. and many other even social media practices. Improve hiring speed for new job openings, this is HR function recruitment because in many functions and many organizations they hire in bulk huge like Amazon or even maybe the call centers or say telecom companies or IT companies, they can hire in hundreds or even thousands.

So, you can use AI for improving the hiring speed because sorting so many CVs. Hundreds and hundreds of CVs can take manually will take a lot of time. Streamlining

the promotions and reward process. Another HR function predicting breakdowns this is typically plant operation, plant maintenance you can do predictive maintenance. So, you can have data coming being sensed using sensors and IoT devices and you can predict when this machine is likely to fail.

So, that you can take advance operations, advanced actions predicting quality failures And detecting also quality failures we can use visual systems computer vision and things like that and use AI extensively AI is being used extensively in such continuous or batch operating processes. Eliminating hate speech now this is something I am sure all of you must be familiar with social media platforms like Facebook which is the biggest one then your Instagrams and whatnots and X. So, we are seeing plethora of hate speeches or fake videos or morphed pictures or whatever it is creating a lot of negative value or negative perception or bad atmosphere within toxic culture. So, we can use all this term is creating within us the community and I can be impacted or any of us can be impacted by any of such dirty things.

So, how do you eliminate that? maintain their sanity that whatever is being posted is of certain quality minimum standards, ethical standards, etc. It is not insulting to somebody or it is doing some damage. So, they are using AI in a big way to identify such posts and removing them from their platform. The functional areas I will be touching upon giving an overview as AI in customer service, human resources, sales and marketing, supply chain operations, IT operations, manufacturing operations

and finance which will give you an idea that in all business literally in all business operations or processes AI can be deployed. Taking the first one about the customer service. It is a great place to introduce AI mainly because there is an abundance of data generated from daily interactions with customers. So, you are interacting with customers and you are collecting data, data about the customer, data about the transaction, data about the business, data about their satisfaction level, their reaction responses, the feelings, the sentiments whatever.

So, these are all data could be structured, could be unstructured. So, that is where I have already talked told many times that. Data is the essence of AI. So, if there is no data you cannot have AI. So, first thing you should have for any AI process or any AI product is data.

So, that is the starting point. So, look at places where you have data to start your AI journey. In addition the need for speed and efficiency in customer service also key for

business service and with the help of AI you can do lot of automation which will help you to improve your speed and efficiency and serve 24 by 7 maybe which all customers like. Work load reduction, virtual AI assistance can play a big role in this, they work around the clock and they can do many things which can replace a human being for example.

So, you need not be present. to answer some queries from your customer, you can employ an AI assistant to take care of all that. So, you might be working maybe 8-10 hours, but you need to be off for 16 hours or whatever. So, what happens during that time? Customer is impatient, customer has a problem with the equipment and needs immediate attention for example.

So, with this such facilities and features can be offered to customers. This helps reduction in employee workload and burnout with freed up time employees can be more creative and innovative in the workplace. So, to say when you are automating some of these mundane routine repetitive functions you are freeing up your sales guy or marketing guy. So, that they can do different things they can innovate do some development etcetera etcetera or working expand their area of work.

Productivity improvement apart from reduction in work volume, AI models can analyze the the problem tickets for example, and suggest remedial solutions actions. So, you have this situation where you know the support service, the support team, the call centers they receive lot of tickets problem tickets something is going wrong they are supporting certain big industry say the whole AI, the IT systems, information technology of some large companies, multinationals etcetera all their databases, servers, softwares everything. So, a running business will incur day to day problems when the employees are using different IT products.

And they have this help centers located in these large IT service companies like PCS, Infosys, IBM, Accenture, Vipro and they raise tickets. Now, this ticket volumes can be very high and that causes lot of workload. So, where AI can step in is it can. Firstly, it can categorize the tickets in different priorities like priority, severe priority, high priority, medium priority etcetera. Also AI can be used to route it to the right service agent and on top of it AI can even

proactively suggesting the remedial solution give you the answer. So, they can AI systems like GPT's etcetera many such tools can be there at the back end where the ticket can be referred to again all by the agent. means the AI agent not the human agent and

probable answers can be given to the human agent, the human service engineer and he or she can then take a look and decide whether it is right or something else needs to be done or something more needs to be done etcetera. So, almost 70-80 percent of the job is being done by the AI agent.

So, that is directly relates to productivity improvement. Predictive support, AI can anticipate customer needs or potential issues example a subscription nearing renewal, unusual account activity and then offer timely assistance or solutions. So, use case can be we have subscribed to many things which has got an annual renewal of the subscription and we of course, we often forget to do those things. Because, we are of course, memory loss and then we are busy in so many things and it can always slip anybody's mind that something needs to be done renewed etcetera contract something has to be paid etc and at a certain by certain date.

So, here your personal digital assistants can be used like Alexa or Siri who can act almost like your secretary giving you reminders for these activities. Chatbots we are now quite familiar, they are available 24 by 7 giving customers to interact, find information and solutions anytime. So, anytime you login chatbots are available 24 by 7. So, if you have a problem you can start talking to an AI agent. Most of these chatbots in for most of the person responding to your chats is an AI agent and not a human being.

in sales and marketing, creating an account accurate prospect list. very useful for cold call, suppose you have gone in a new area and you do not know anybody. So, you can help of AI you can get a probably from the data collected from whatever the civil services or anywhere the local communities, AI can point out some potential customers and then you can shortlist the list to potential customers and give them cold calls or visits etcetera. So, it helps you in your work to reduce your search.

and make your search more reliable and more intelligent so to say. Predicting sales action at discounts or promos etcetera can be predicted using AI based on the buying journey of individual customers. So, they are all tracking what we are buying even online offline whatever we are being tracked. So, they know what is the type of buying behavior each of those most of the customers have and from based on that they can use

an AI tool that this person probably likes prefers discounts or prefers this. So, the preferences of individual customers are literally now being tracked and recorded by the AI systems and the companies the marketing people can utilize these two. adequately advertise or give push notifications to these customers for these actions. Personalized

recommendations, it has been seen that Amazon's product recommendation engine alone is responsible for one-third of its revenues. So, when you start logging in you are frequent visited to Amazon and buying things and surfing for things.

So, Amazon knows what you like and what you dislike and so it starts pushing. or clubbing things together you wanted to buy one thing, but you end up buying two or three because Amazon recommends people who are buying this also is buying this plus this and you get a discount. So, what is the attracting you is the offer of the discount and sometimes you might not have thought about a product to buy immediately it was not in your mind and when you see that being recommended you suddenly realize I actually I can use that or maybe this book yes I somebody was recommending. So, this is how we end up buying things more than probably what we initially planned

to when we logged in and this is the essence of marketing you know how to make you buy things which probably it is creating the demand because even when you logged in you are not thinking about buying a particular book, but when you saw that post your decision changed and yes you went and bought the book. So, good business for Amazon, good business for the bookseller. LinkedIn for example, is recommending jobs and new personal connections, this improves engagement with the platform and brand loyalty of the customer. The platform then gets more data from the customers increased interaction consequently generate ad revenue for the platform.

So, all of these platforms are bringing in the linchpin customers. We discussed with the platform business couple of classes back that these linchpin customers like us when we login and do more spend more time we are actually bringing in advertisers because they see plenty of large number of people are logging in and spending lot of time on that particular platform. So, why not advertise here. So, more advertisement means more revenue for LinkedIn the platform owner.

Churn reduction, AI can help predict. when the customers are about to charge. So, they can from there using the sentiment analysis technique and then you can find out which customer is probably not liking, having some issues which are not being resolved, the customer satisfaction level is quite low or is decreasing. And then you can take some action remedial action you can probably incentivize them to stay with specialized offers you can offer some

discount and some other thing or you can immediately send somebody to get them get their problem serviced attended to etcetera. So, when you do such proactive things all

customers like that. So, data points like duration of inactivity for example, subscription plan selected, you are at a higher level now you have reduced it at a lower level, customer service interaction etcetera are used for this purpose of identifying potential churns. And once you have identified potential churns then you take remedial action.

Continuing with sales and marketing targeted advertising helps in identifying and segmenting target audiences more effectively, optimizing ad spend, advertising ads where they are most likely to convert a classic example is again Amazon and such e-commerce sites they are using this heavily they are using targeting advertisement. Lead scoring and nurturing, AI algorithms can score leads based on their likelihood to convert allowing sales team to prioritize efforts and automate personalized nurturing campaign. So, if you get definite leads who are potential going to be your customer most likely to buy then you can put some extra effort for them and that will not be wasted because it will generate in a order.

So, it is all about the probability, but still that is where you are most likely to get an order. So, you can afford to spend devote more of your time for those customers. Sales forecasting by analyzing your historical sales data. market trends and other relevant factors, AI can provide more accurate sales forecast aiding in inventory and resource planning. This forecasting technique is nothing new, they are very old techniques, but with AI these are now much more refined, much more accurate.

So, it is all just a change in the level of accuracy what is has been done brought in by AI as compared to the traditional statistical techniques. Content creation and optimization, this is now a big ticket item these days and this is generating marketing copy, your ad copies, social media posts, campaigns as well as optimizing existing content for better engagement and search engine optimization. And we are heavily using generative AI, GenAI as all of you might be knowing for these tools like chat GPT's and perplexity and Gemini, Gork etc for doing this work. So, this is now almost reaching commercial use level.

Dynamic pricing, I can adjust the pricing in real time based on. demand, competitor pricing, inventory levels and other market factors to maximize revenue and competitiveness. One simple example is your Uber charges the rates the Uber taxi rates are not fixed depending on your say kilometer of travel. Like previously we used to know so much kilometers means that is the rate per kilometer. So, this is the cost.

or this is the chart, but Uber is doing dynamic pricing based on various things like say the availability of cars or taxis in that locality, maybe the weather if there is a bad weather then if there is a surge pricing the time of the day if it is after 10 pm in the night late night early morning etcetera. So, they use all of these variables or factors to decide the pricing for that moment. So, it is a real time based dynamic pricing.

In the human resources domain one is I was just touched upon in the faster recruitment through shifting through large number of CVs and you can use the AI to summarize the CVs and give you insights about the candidates. So, they are adding lot of value apart from just shifting through that etcetera. So, one example here is Vodafone which is for they have the call centers where they recruit people or in large numbers. And requiring this candidates what they do is to submit a video of themselves answering a very standard set of questions.

So, they send a set of questions and the candidate is supposed to record a video answering those questions. And then an AI tool is used to assess the candidates suitability. Because, suppose if may be 500 videos are coming I mean you can imagine if you have put somebody to go through the video and assess their quality of the interview it is a again very time consuming job, but they are applying AI tool to do that for them. There could be you know issues like biases for Amazon's we have heard stories about having recruitment bias where the AI tool was biased against.

black women this is a story from America this is a real story about a year and half back and that had created a huge ruckus in the media social media. So, these are of course, we will discuss we already discussed what are the risks with AI. So, this is part of that. product will have a certain amount of risk and you will always have to be aware of as a responsible manager, you have to be aware of these potential risks and be conscious about it. So, that whenever something goes wrong, you can take some protective action or defensive action.

Personalized learning and development, so this can be tailored to individual career goals like every individual will have the different career goals, different career path and then you can use AI to customize your training need. So, LinkedIn tries to find relevant educational content at each user based on their connections. and the skills needed for the current job and what peers within the same industry are learning. So, LinkedIn knows that you are working in such and such position such and such company and this is your job profile.

So, they can find out who are your peer group in other industries, what sort of learning they are undergoing and based on that they can recommend learning topics for you. Employee engagement and retention can analyze employee feedback and behavior patterns to identify factors affecting engagement and predict attrition risks enabling a proactive interventions. These are very it is a very big problem retaining talent even in especially in IT industry, in the service industry, in banking industry you see a huge amount of attrition. Now, AI for example, AI talent now is in a short supply. So, anything in a short supply will be in a large demand.

or say analytic skills in a short supply demand is more market is there. So, demand will be very high. So, attrition potential possibility attrition also is very high because the people are in demand the competitors offering them higher salaries which is the major motivator for any attrition. So, you can use your AI to be based on their feedback, employee behavior patterns, etc to identify that these candidates are potential attrition if the company thinks that these people are valuable for them should be retained then you must take again proactive action give them promotion increment or whatever the financial benefits so that they stay.

streamlined operations and supply chain management, it is another big area where AI is being introduced heavily, demand forecasting, inventory optimization, warehouse automation. AI powered robots you might have seen videos in YouTube's where Amazon warehouses are using robots to move all the racks material taking from one in their warehouses are huge and the robots are extensively used to shift material thus minimizing the human content in these warehouses. Logistics and route optimization can optimize delivery routes by considering factors like traffic, weather, fuel efficiency and delivery windows leading to faster deliveries. If you take a look at your Google map for example, what is telling you when you are driving using Google map, it indicates the traffic condition.

It marks probably the some route in red. So, you know that this route is to be avoided which will take very longer time and it also is continuously predicting you your time, journey time, how much it will more time will take and based on that you can take some decision to change your travel route. Predictive maintenance is AI is analyzing data from sensors received from all machinery as continuously receiving data from 24 by 7 basis and they can analyze the condition of the machine. A classic example is general electric manufacturers are the largest manufacturer of jet engines of the aircrafts will travel and for the jet engines you know how critical an engine is

And they are using again IoT to monitor in flight. So, long flights 4 hours, 8 hours etcetera the whole performance of the engine is monitored while it is flying through IoT based sensors and then when the flight aircrafts they land that whole data is logged into computers and analyzed for the condition of the engine. Each engine is being monitored continuously so that you can come to know whenever there is some signal of some problem that will be immediately identified and recorded and necessary action taken. For quality control AI driven computer vision systems I have already told you in the previous

can be used for analyzing the products coming out of your assembly lines etcetera and then can find out identify defects and which you can take immediate action remove them from the assembly line and do whatever repair rectification needs to be done. in finance and accounting functions one of the most again AI can be used very sensibly fraud detection and prevention. So, all of us know about this especially when you do your credit card transactions or when you are using credit card there can be a lot of frauds and AI algorithms can be used to detect frauds. You can just think say MasterCard or Visa, they are handling millions of transactions on a daily basis.

So, it is very difficult for to do a human control. So, it has to be some automation tool and nowadays they are using heavily AI to because that has got more intelligent sense to detect a power from better compared to the previous automated automation systems. So, we are now heavily using AI. AI to detect such frauds. And I have my personal experience where in a foreign airport after I came immediately there was some fraudulent transaction because I had bought something at the duty free shop and immediately on

landing at Calcutta after that I started getting messages that my card is being used to do transaction by things at that duty free shop. I immediately called up my credit card company. And they told me do not worry we have taken care it was detected the AI system did detect that these were frauds and they stopped those transactions. So, I did not have any I did not suffer any monetary loss, my card had to be replaced and all that was fine much simpler than actual the monetary loss. Automated data entry and reconciliation, so anything you do automation always helps in productivity.

Financial planning and analysis, AI tools can analyze. fast amounts of financial data to generate insights. The point here is insights. So, human beings we are also analyzing data, AI systems are also analyzing data. The difference is in AI system it can handle much more volumes large volumes of data and give so, hence give better insights.

So, we have our limitations a person can get tired, a person can overlook, a person can miss some data etcetera, but when it is tool based AI system based nothing will be overlooked or nothing gets missed. So, the insight which will be generated by such AI tools should be or expected to be better than what a human person will do. Algorithmic trading, the financial markets, AI is used to develop sophisticated trading algorithms that can execute trades at high speeds based on complex market analysis. So, we know how the stock market trades are happening, we have some experiences and we

And you know those brokers the way they do the trading if you have seen a trade market operating either online or real you will realize the complexity the whole thing how much amount of calculation goes behind when they take some decision. And obviously, you can automate that using algorithms it will be expected to be much better and more accurate predictions. Regulatory compliance, I can help organization stay compliant with financial regulations by automating monitoring reporting. So, that is where on the area auditing process where we know auditing the audit problems happen there are scams happen companies go bust so many things

will happen and this is where AI can be used to ensure that such things do not happen and any wrong doings can get detected at the right time. In IT operations we have talked about preventive maintenance, advanced analytics, predictive analytics and business intelligence all of these we have already discussed. So, I will not repeat here. So, taking actions and ideas, the question for all executive is do I really need to use AI in all these areas of business? So, I have given you host of this area, the answer is no.

Before one moves forward with any of these ideas you have to consider some of the factors why yes and why no, why when will you use AI and when will you not use AI consciously. So, the factors are which problem should I invest in first. So, obviously, we have a saying that we identify the low hanging fruits where we can do it and without spending much money and get some immediate results. So, once you start getting results that motivates for you to get into more and more projects.

Should you build the AI solution from scratch? or buy an off the shelf one, the make or buy decision. So, if you have so that is another important thing which you have to take from the organization level is do we have talent to develop the system. If yes fine we should do it in house internally, but if you do not have talent then looking for talent, searching talent, getting the talent etcetera takes time. So, if I want to start things quickly I might outsource, but outsourcing has its own problem which also you have to do.

you have to be judicious, you have to be knowledgeable to handle the outsource company because they might sell you something which is not for right for you and you have to find out what is right and that is what this particular course tries to address to give you an high level idea of the various aspects of AI. So, that you can ask them the right questions and how would you know if an AI initiative is helping your business. So, for that you have to design your We will talk about them more later, but these are the questions which should come first to your mind before you start doing something on AI.

And what another coming back to machine learning which is such an integral part of AI and I thought I will also repeat it here, as a manager what you should be knowing about applying machine learning because first thing you start on any AI thing is basically go to machine learning tool. What is data? Big data is just not big data, but what is a wide data? So, we have a long data and wide data.

It is just not long, but wide. So, what does it mean? An online retailer database of say customers in a spreadsheet each customer is a row on your excel file. So, you have a large number of rows that is a long list of data. However, the features of each of these customers name, address, the amount of business they do etcetera, etcetera various whatever

you want to capture as features of the customer are in each of these columns. So, if you have large number of features then you have large number of columns. So, you want to know their purchase history, you want to record their browser history, mouse clicks, text from reviews whatever. The more number of such features you want to capture the more number of columns and each of these columns and the data set becomes wide. So, the most of the tools in machine learning are designed to make better use of wide data.

So, more number of features that you have better insight or better prediction you will get about the target which you want to find out using this model. the dependent variable what you are trying to find out using all these variants. Say sales behavior potential sales whether they will buy or not buy etcetera. So, the predictions and not causality. So, we want predictions from when we use machine learning we want the tool to predict.

Making personalized recommendations for customers, what sort of personalization these customers prefer, I want to know that because otherwise I am depending on the tool to tell me that based on all these data. Forecasting long term customer loyalty, stickiness where this customer will stay with me or not, anticipating the future performance of employees, what about these employees will they perform well not so well they

indicating that no probably they will not be able to cope up. So, I should take some again actions and rating the credit risk of loan applicants.

So, these are some typical use cases in various functions to give you an idea where how we want to use the machine learning and what sort of predictions we need from the machine learning tool. The other things we need is separating the signal from the noise. Feature extraction is again a common nomenclature in machine learning, it is finds out which are the variables the model will be using. You want to find there are lot of variables for example, but you do not want to apply all of them because all of them are not significant enough. So, you need to find out which are the features are actually having more effect on the outcome.

So, that is called feature engineering. So, it can help aggregate important signals. Say example let us take facial recognition, where the features could be nose, nose length, eye color, skin tone etcetera that are calculated from the dataset, but all of the features may not be playing a role or a significant role. So, you might remove some of them.

maybe the width of the forehead or things like that you know the design, but certain things are more important like the color of the eyes, length of the nose, the shape of the lips etcetera to find out to identify that this picture is for this person individual. Regularization in machine learning is a technique which is used to prevent over fitting. It discourages models from assigning too much importance to an individual feature or coefficient. If you then that becomes a very biased model.

So, it is kind of over fitting. So, it will always when you given new data to test data and that probably that feature is not represented etcetera. So, it will give all sorts of wrong output. So, do not depend heavily on just one or two feature do not give them too much of weightage. Those coefficients values which we are which indicates the weightage that  $c_1, x_1, c_2, x_2$  that those  $c_1$ 's and  $c_2$ 's should not be very high for any  $x_1$ 's,  $x_2$ 's etcetera.

So, it should be a balanced model. Cross validation ensure that the models performance is reliable and not very optimistic. So, that is also not good it is always says everything very positively which will not give you the right essence or the right meaning or the right outcome. So, cross validation is a crucial technique in machine learning and statistical modeling. It helps assess the performance of a predictive model by estimating how well it will generalize to unseen data.

So, your training data you have and you train them on development model that is your training data, but will it work the same way when you bring in new set of data. So, that is how you should consider those things when you are actually developing the data. So, that is where you have to focus on the training data very minutely. Is this data right? So, that rightness of the data correctness of the data will be depending on the expertise there is no written formula for that.

So, you have to be the subject matter expert only can say that whether this set of data is good not so good or very good. In conclusion machine learning can do we think about this supervised learning. So, if you give an input A and there is a response B. So, if the input A is picture, the response you want is are there human faces. So, it will be say maybe 0 or 1 classification, the application could be photo tagging. Loan application, will they repay the loan?

So, if the outcome will be 0 or 1, 0 means will not 1 means will yes. So, application loan approval, ad plus user info. So, will user click that if I give this ad will the it will catch the attention and it will click that yes or no. So, this is about targeted online ads the application. What about the transcript of audio clip?

So, this is speech recognition application. So, like when I am speaking audio gets recorded into text. Sensors from aircraft engines are talked about it, is it about to fail? So, this is preventive maintenance and car camera and other sensors position of other cars. So, this is related to a driverless car application.

So, these are some just examples I give you what could be an input, what is the response