

AI In Product Management
Prof. Zillur Rahman
Department of Management Studies
Indian Institute of Technology, Roorkee

Lecture - 42
Price Optimization using AI (Part 2)

Welcome to this NPTEL online certification course on artificial intelligence and product. Now we are talking about module 42 and price optimization using AI, which is part 2. So, we are discussing price optimization using AI. To give an overview of this module, we will start by understanding the importance of competitor price analysis. Then we will discuss how to select AI tools for competitor price analysis.

Then, how to automate competitor price analysis with AI-based tools. The benefits of automated competitor price analysis and the tool features to look for. To understand the importance of real-time price intelligence and some of its applications. Then we will understand the difference between price crawling versus price intelligence and what are some of the AI tools used for competitor price monitoring. And how to make prompts for various pricing analyses. We will start with the introduction of competitive advantage in pricing. In today's crowded online marketplace, having a competitive edge is crucial. AI-driven pricing optimization allows businesses to react quickly to market changes, ensuring that they are always in line with or ahead of their competitors.

This ability to adapt swiftly to changes in demand and competitor pricing can significantly impact market share and customer loyalty. So now, let us look at the importance of competitor price analysis. Competitor price analysis means observing, analyzing, and gaining insight into your competitors' pricing strategies. This is important in any business, especially in the online retail market where prices fluctuate quickly. Based on past records,

Relying on intuition or support from outdated manual methods is a sure recipe for disaster. AI-based tools will make the process faster, more efficient, and more accurate. Access to real-time competitor pricing data is a must-have rather than a luxury for more than 80% of shoppers who compare prices online and offline before making a purchase. AI tools help gather this data, analyze it, and present it in such a way that businesses can make data-driven pricing decisions with ease.

Increased sales, better profit margins, and enhanced customer satisfaction are the fruits thereof. Gone are the days when human resources were required to track prices manually. Nowadays, AI algorithms can crawl thousands of websites, collect competitors' pricing data, and analyze it in real time. This enables businesses to dynamically adjust their pricing strategies based on current market conditions, demand, and competitor behavior. AI-powered tools use machine learning and natural language processing to understand the nuances of pricing data, such as differentiating between discounts, seasonal pricing, and permanent price changes.

They can also forecast future price trends based on historical data. This level of insight was unimaginable just a few years ago, and it is now literally at the fingertips of any business that knows where to look for it. Now let us look at AI tools for competitor price analysis. So there is no shortage of AI-powered tools that can help a company perform its competitor analysis.

As different tools have different pluses and minuses, picking the right tool depends on several factors, some of which are So, these are the factors that you should look for in a tool. One is business size and scope, the features, ease of use and the budget. So, we will talk about each one of them. So, let us start with business size and scope.

Smaller businesses may find simpler, less expansive tools more effective. Large enterprises would need enterprise level solutions to deliver sophisticated analytical capabilities ease of use it is a it must be easy to operate its interface should be intuitive and onboarding seamlessly after all the aim is to save time not invest weeks into trying to figure out how it works the next comes the features managers should look for tools that are packed with real-time data customizable alerts, deep analytics, and integrations available for their existing systems. We will discuss about real-time data later in this module.

The next comes budget. Pricing ranges from a few hundred dollars to a month to tens of thousands depending on the power of the tool. Be sure to pick the tool with the best value for you. It is all about getting the right mix between features and cost. For example, options like Pricing, Intelligence Node, and Mindy Rest would work well for small and medium-sized businesses.

If you want a larger and fuller featured platform, tools like Wiser or DataWeave can come handy. We will discuss some of the tools later in this module. Now let us look at how to automate competitor price analysis with AI-based tools. AI-based competitor price analysis may seem intimidating at first time, but it is done more easily once the

process is executed in manageable chunks. that will define your goals what do you really want to achieve with the competitor price analysis your goal may be a broad one like market share profit margins or merely competitive so we will discuss some of these points in the next slide choose the right tool based on your goals find a competitor pricing tool that suits your business needs make sure it will easily integrate with your existing systems the next is to configure the data feeds

set up the tools to monitor your competitor and key products basically most of the tools would enable you to upload a list of competitors target products and parameters such as how frequent the data should be collected the next is alerts and reports customized Turn on alerts for wide swinging but produce customized reports to deliver only the information relevant to your business. For example, daily summaries of price drops by the competitors or weekly reports on overall pricing trends. Monitor and adjust draw on a regular basis from the collected data to make relevant changes in your pricing strategy.

Here lies the real value of your tool. AI-based tools will let you come out with actionable insights that help you make informed decisions. Now let us look at the benefits of automating competitor price analysis. Automating competitor price analysis comes along with a set of key benefits, including real-time access managers will have up-to-the-minute competitor pricing data with AI-powered tools, which becomes serious in dynamic markets. cost efficiency it reduces the need for manual data collection in operational processes better decision making managers will have comprehensive data on your fingertips to make smart pricing decisions that complement market demands the improved customer satisfaction may be from knowing a competitive price giving them the best deal with the growth of your business the tool will easily scale up handling more data and competitor without needing any extra resource that support more scalability

These benefits outweigh the initial investment in the technology many times over. For example, one study by Intelligence Node found that companies using AI-based competitor pricing tools saw a 20% increase in profit margins within the first six months. Now, what are the competitor pricing tool features to watch for? While selecting an AI-based competitor pricing tool, you must focus on the features that best fit your needs. Based on personal experience,

Some of the key features managers should seek include dynamic pricing capabilities, customizable dashboards, and real-time notifications. Attention to these features ensures that the selected tools will provide maximum return on investment. So, what are these dynamic pricing capabilities? Tools with dynamic pricing enable you to adjust prices

dynamically in response to competitors' moves. and/or market conditions. Customizable dashboards provide greater flexibility in viewing and analyzing data for insights that meet your business needs. Real-time notifications offer immediate alerts

Get immediate notifications regarding significant variances in competitors' prices with the ability to take quick action. API integrations easily connect with your current e-commerce platform, CRM systems, or data warehouses to ensure seamless and smooth data flow. Advanced analytics: The tool should provide deep analytics, such as historical price trends, predictive pricing models, and custom demand forecasts. So, the importance of real-time price intelligence includes a lack of market reactivity.

Many traditional pricing models rely on outdated information, which makes it difficult to respond to rapid changes in the market. Manual processes relying solely on spreadsheets or manual calculations may lead to mistakes and inefficiencies. So, real-time pricing intelligence provides access to vital pricing data immediately, resulting in numerous benefits like enhanced adaptability. Suppliers are able to adjust their prices quickly as a result of market fluctuations. This ensures competitiveness.

Informed decision-making. Real-time insights lead to data-driven choices that improve the accuracy of pricing. Increased sales. Managers can increase their sales by responding in real-time to customers' demand and competitors' pricing. So, applications of real-time pricing intelligence.

Act on price improvement opportunities. Optimize profit margins with pricing strategies rooted in data-driven insights. Stay ahead of market shifts by configuring alerts that monitor price fluctuations for critical stock-keeping units, categories, or brands. With AI-powered pricing intelligence platforms, managers can have full confidence in the data's accuracy, exceeding 95% at any scale. Refer to the image of the dashboard in the next slide.

So, this is the dashboard of price competitiveness. So, you are compared against 30 plus percent lower, 10 to 30 percent lower, 0 to 10 percent lower, 0 percent. Again, 0 to 10 percent higher, 10 to 30 percent higher, and 30 percent higher, and then it gives the total. So, here when you are compared against the median, the data is given.

When you are compared against the lowest, again, some data is given for each category. Highest, again, some data is given, and then for Walmart and Amazon, the competitors are also given. So, the price perception is paramount. Make the right impression and drive sales by nailing your pricing strategy. A key aspect of staying competitive is how your customers perceive you,

largely based on how you are priced. Price perceptions can vary across product types, categories, and even zip codes or store labels. Identify and act on opportunities to strengthen your pricing via timely and accurate pricing intelligence. Next is to gain a competitive advantage with agile pricing strategies. By tracking, monitoring, and analyzing competing retailers' prices and pricing history, managers can get a clear picture of where their brand stands in the market and how to position themselves.

Accordingly, in the real-time, these price intelligence softwares are and data-driven pricing insights can give consumers the most lucrative deals while staying profitable. With AI-enabled real-time intelligence, managers can switch between multiple pricing strategies for maximum agility and make effective SKU level adjustment to their pricing. So, now you can look at this figure. So, the prices for Amazon, Walmart and Tesco and Costco is given here. And this is how on various dates in January.

Now let us look at the real-time crawling capability. Real-time price intelligence software sophisticated data crawling algorithms provide competitive price intelligence software so that managers can get exactly the information they need without needing to manually scan through thousands of different data sets. This real-time price intelligence software identifies the appropriate competing products by categorizing our ones into different attributes and matching them to products similar to it on the web. These applications notify when products are out of stock, when prices change, and where traffic is coming from.

With their large datasets, managers can harness the end-to-end competitive price intelligence. So, this is 30% full-streets plus 13%, 100% recycled down, 6% test-trived plus 2%. and red and white plus three percent next we will look at the price intelligence dashboard managers can stay on top of the competitors price and product movements with customer price intelligence dashboards with less than 10 seconds data refresh rate Managers can get all pricing information, price changes, in-stock, out-of-stock, competitor product discounts, down to the SQL level in single, unified, easy-to-read dashboard that can be optimized to any prices to take advantage of market movements instantly. With such intelligence tools, managers can configure rules for automatic price optimization or choose to manually update price with a few clicks.

Right from within their dashboard, based on data-driven recommendations. So, this is an example of a stock overview, the various products, and recently added average discount. Now, we will try to understand price crawling versus price intelligence. Price crawling is

where the application crawls a website's data to extract relevant information like price, product description, etc. And then presents it in a structured, readable format.

But it is not as simple as it sounds. A lot of times, scaling up data extraction can prove to be very challenging. Price intelligence adds more layers to the crawled data by providing actionable insights that can be used to develop a holistic pricing strategy. The process involves multiple steps like URL discovery, data extraction, data matching, data quality assurance, and reporting and analytics. In simple terms, price crawling is extracting large amounts of raw pricing data from the web, while price intelligence goes deeper by combining the high-quality crawled data with quality assurance, analysis, and reporting.

Now, let us look at some AI tools to consider for competitor price monitoring. One is Pricefx offers a complete pricing platform that uses AI and machine learning to provide real-time monitoring, optimization, and pricing management. The key feature is real-time price monitoring, tracking competitors' prices in real-time across channels. The dynamic pricing engine adjusts prices automatically based on the market, competitors' prices, and customer behavior.

Predictive analytics offers forecasting capabilities to help businesses anticipate market trends and adjust their pricing strategies. It is best for large businesses that are looking for a scalable pricing solution. Another is Competera. Competera is an AI-based pricing software that offers real-time insights into competitors' pricing strategies and helps e-commerce companies optimize their prices accordingly.

The key features include monitoring competitor prices. This feature monitors competitors' prices in real time, ensuring you are always up to date on pricing changes. The next is elasticity-based pricing. It adjusts prices by analyzing demand elasticity and competitor behavior. It also provides automated price recommendations.

AI algorithms suggest optimal prices based on competitor data, market demand, and your business goals. Price Wars Prevention helps businesses avoid damaging price wars by identifying opportunities to improve margins without sacrificing competitiveness. It is best for businesses that need advanced pricing insights and automation to maintain profitability and competitiveness. Next is Price Intel Guru. Price Intel Guru is a service that focuses on price intelligence and competitor monitoring. It was designed explicitly for e-commerce businesses and uses AI to deliver accurate and actionable data. The key features include

Competitive price intelligence provides detailed insight into competitor pricing strategies. It helps companies identify trends and make price-driven decisions. Nexus dynamic

pricing automates price adjustments based on competitor data, market demand, and other factors. Customizable reports create customized reports to meet your specific business needs, from daily price changes to competitor tracking in different regions. Industry-specific solutions provide tailored Solutions for particular industries such as retail, automotive, and hospitality. It is best for companies that require deep competitor pricing insights and a flexible, industry-focused solution. The next is Aimondo. Aimondo is an AI-powered platform that brings together the most accurate market intelligence, pricing analytics, predictive analytics, and pricing management.

They fine-tune all the elements to achieve business goals faster. The key features include better accuracy, So, while other price optimization solutions rely on a single parameter for matching products when doing competitor analysis, AI Mondo's deep semantic analysis matches at least four data points. Ensuring precise price tracking. Another advantage is unlimited scale—it can track any number of competitors and reprice any number of products, maximizing revenues in real time and discovering hidden opportunities across channels. Another benefit is internal data—it seamlessly processes and analyzes vast amounts of internal corporate data, including historical prices, sales data, and records of correlated marketing efforts. For instance, it distinguishes sales generated during active Google Ads campaigns from periods without any specific promotional activity.

This ensures that the price optimization strategy accounts for all the integrated details. Another advantage is third-party data. It integrates third-party data, such as inflation rates or weather patterns, through seamless API connections. Pre-built integrations. By syncing with real-world conditions, it elevates the relevance of the pricing strategy.

This comprehensive and valuable data integration ensures that sales predictions are exceptionally accurate, particularly aligning with ever-changing market dynamics. This is best for businesses that are large-scale and global, with a large product portfolio, where they have to tackle multiple competitors at the same time. Another tool is Black Curve. BlackCurve is a comprehensive pricing optimization platform that helps businesses develop data-driven pricing strategies. By combining competitor pricing data, market trends, and internal costs,

BlackCurve provides businesses with actionable insights and recommendations, enabling them to optimize their pricing and boost profitability. Another tool is Omnia Retail. Omnia Retail is a comprehensive pricing and marketing automation platform that combines competitor price data with advanced analytics and machine learning

algorithms. This powerful combination enables businesses to develop and implement intelligent pricing strategies that adapt to changing market conditions and maximize profitability. The next tool is PROS.

PROS is an AI-powered pricing and sales optimization platform that helps businesses maximize their revenues and profit margins. By combining competitor pricing data with advanced machine learning algorithms, PROS provides businesses with actionable recommendations for optimizing their pricing strategies and staying competitive. The next tool is Vendavo. Vendavo is a leading enterprise solution that offers a range of tools and features designed to help businesses maximize their profit margins. With its advanced analytics,

Segmentation and price optimization capabilities. Vendavo enables businesses to develop dynamic and responsive pricing strategies based on competitor and market data. Price to Spy. Price to Spy is a versatile competitor price monitoring tool that provides businesses with real-time pricing data from a wide range of sources. With its customizable alerts, reports, and integrations, Price to Spy helps businesses to stay informed about competitor pricing activities and make

data-driven pricing decisions. Then comes Price Edge. Price Edge is a cloud-based pricing solution that helps businesses to develop, manage, and optimize their pricing strategies. With its robust competitor price tracking, analytics, and price optimization capabilities, Price edge enables businesses to make data-driven pricing decisions and maximize their profit margins.

Then comes SYMSOM. SYMSON is an AI-driven pricing optimization platform that combines competitors' pricing data and advanced machine learning algorithms to provide businesses with actionable pricing insights. By automating the pricing process and providing real-time recommendations, Samsung helps businesses to optimize their pricing strategies and stay competitive in the market. Now, let us look at AI prompts for pricing analysis.

In this part, we will discuss a prompt for some of the price strategies in AI-based platforms should be and the factors to include. One is competitor price comparison. Perform a competitive pricing analysis. for our product service against key competitors. Gather pricing data for similar offerings, including base prices, discounts, and pricing strategies.

Identify pricing trends and differentiators among competitors. Provide insights into how our pricing compares and recommendations for adjusting pricing strategies accordingly.

Price elasticity assessment assesses the price elasticity of our products and services analyze historical sales data and price changes to determine the price elasticity coefficient for each product or service identify price points that maximize revenues and profit margins provide insights into pricing strategies based on price elasticity findings customer segmentation based pricing reviews review our pricing structure based on customer segmentation Analyze pricing strategies for different customer segments such as B2B and B2C.

Evaluate the effectiveness of segmented pricing in attracting and retaining the customers and providing insights into optimizing pricing for each customer segment and potential adjustments. Discount effectiveness analysis. Analyze the effectiveness of discounting strategies on sales and revenues. Evaluate the impact of various discount types. for example percentage based rupee based volume discounts on customer behavior and purchase patterns identify scenarios where discounts drive revenue growth and those where they may erode profit margins provide insights into discounting best practices the next is dynamic pricing implementation develop a strategy for implementing dynamic pricing for our products or services identify key factors such as demand fluctuations competitor pricing

And real-time data sources to inform dynamic pricing decisions. Outline pricing rules and algorithms to adjust prices dynamically, providing insights into monitoring and adapting dynamic pricing strategies. The next is price optimization for Product bundles. Optimize pricing strategies for product bundles and packages.

Analyze customer preferences and purchase patterns related to bundled offerings. Identify ideal product combinations and bundle pricing that maximize overall revenues. Provide insights into cross-selling and upselling opportunities through optimized bundling. Cost-plus pricing analysis. Conduct a cost-plus pricing analysis for our products or services.

Calculate the total cost of production, including fixed and variable costs; determine the desired profit margins and apply cost-plus pricing methodology, providing insights into the accuracy and competitiveness of cost-plus pricing. Another prompt is price discrimination strategy evaluation. Evaluate the effectiveness of price discrimination strategies, such as tiered pricing based on customer type, Location or purchase history. Analyze the impact of price discrimination on revenues and customer retention.

Identify potential areas for defining price discrimination tactics and personalization. Another prompt is pricing strategy alignment with value proposition. Ensure our pricing

strategy aligns with our value proposition. Analyze how pricing reflects the perceived value of our products and services in the market. Identify opportunities to enhance the value proposition through pricing adjustments and provide insights into communicating value effectively to customers through pricing.

Yet another prompt is international pricing strategy development. Develop a pricing strategy for international markets. Consider factors such as currency fluctuations, local market conditions, and competitor pricing. Analyze the price dynamics for entering new international markets and provide insights into adopting a pricing strategy for global expansion. Then comes price sensitivity analysis by product category.

Conduct a price sensitivity analysis for each product category in your portfolio. Analyze historical sales data, customer surveys, and market research to determine price sensitivity for different product categories. Identify which categories are more price-sensitive and recommend pricing strategies that optimize revenue and profit margins accordingly. Competitor price positioning: Analyze your pricing positioning relative to key competitors. Gather comprehensive pricing data for competitors' products and services.

Evaluate our price premium or discount compared to competitors, provide insights into potential adjustments to our pricing to gain a competitive edge, considering factors like value-added features and customer perception. The next prompt is seasonal pricing strategy review. Review our seasonal pricing strategy for products and services, analyze historical data, sales patterns, and customer behavior during different seasons or holidays. Identify opportunities for seasonal pricing adjustments, promotions, and discounts that align with customer preferences and maximize revenue. Another prompt is price tiering strategy for subscription models.

Develop a price tiering strategy for subscription-based services. Create multiple subscription tiers with varying features and pricing points. Determine the optimal number of tiers and the value proposition for each. Provide insights into segmenting customers effectively and driving subscription growth through tiered pricing. Review pricing for software-as-a-service offerings.

Analyze pricing models such as per-user, per-feature, or tiered pricing. Evaluate pricing competitiveness within the SaaS market. Identify opportunities for aligning pricing with customer value and optimizing pricing models for sustained growth. The next prompt is price optimization for cross-selling and upselling. Optimize pricing strategy to encourage cross-selling and upselling of complementary products or services.

Analyze customer purchase histories and behavior to identify cross-selling opportunities. Determine appropriate pricing discounts for bundled strategies to increase cross-sell and upsell conversion rates. Provide insights into maximizing revenue through these strategies. Then comes psychological pricing analysis. Conduct a psychological pricing analysis for select products or services.

Explore the impact of pricing strategies that use techniques like charm pricing (ending with 0.99) or prestige pricing (setting higher prices to convey quality). Evaluate customer perceptions and purchasing behavior influenced by psychological pricing tactics. The next prompt is dynamic discounting implementation: develop a strategy for implementing dynamic discounting for specific products or customer segments. Define criteria for when and how discounts are applied dynamically. Consider factors like inventory levels, customer behavior, or order size. Provide insights into setting rules and monitoring the effectiveness of dynamic discounting. Yet another prompt is customer lifetime value-based pricing.

Implement a customer lifetime value-based pricing strategy. Analyze the customer lifetime value (CLV) data for different customer segments. Develop pricing structures that reflect the long-term value of customers, encouraging retention and loyalty. Provide insights into tailoring pricing for high-CLV customers and optimizing customer acquisition costs. Then comes geographic pricing strategy for global markets.

Create a geographic pricing strategy for expanding into global markets. Consider currency exchanges, local economic conditions, and critical factors that affect prices. Analyze competitor pricing in target regions. and provide insights into adopting pricing for each market to maximize competitiveness and profitability. So, to conclude in this module, we have first discussed the importance of competitor price analysis.

Thereafter, we understood how to select AI tools for competitor price analysis. Then we have discussed how to automate competitor price analysis with AI based tools. And then we have also understood the benefits of automated competitor pricing analysis and the tools, features to look for. Thereafter, we have understood the importance of real-time price intelligence and some of its applications. Then we have discussed the difference between price crawling and price intelligence.

We have also over overviewed some of the AI tools that are used for competitor price monitoring. And then finally, we have learned how to make prompts for various pricing analysis. These are some of the sources from which the material for this module was taken. Thank you.