

Artificial Intelligence and Machine Learning Solutions for Attracting Investment and Financial Aid in the Digital Economy

Abdallah karimi*

Lecturer, Computer Faculty, Azad University of ILAM,
PhD Student, Artificial Intelligence

*Corresponding Author

Abdallah karimi, Lecturer, Computer Faculty, Azad University of ILAM, PhD Student, Artificial Intelligence.

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Abstract

In 2020, digitization and digital transformation required a new question for an entrepreneur in the startup ecosystem, and to answer it, the "Digital Transformation Guide" from Columbia Business School (Rogers, 2016) suggested that the company's activity in this area be revised. Digital age. Through the allegory of the matrix, this idea of the world of tomorrow was presented for startups that face new environmental, financial, social and social challenges. In this context, new technologies allow entrepreneurs to use artificial intelligence (AI) and machine learning (ML) in the financial sector and policy implications. A non-technical background on the evolution and capabilities of AI/ML systems, their deployment and use cases in the financial sector and the new challenges they present to the financial sector policy makers are used. AI/ML systems have made major advances in the past decade.

Although it is not yet possible to develop a machine with the capacity to understand or learn every intellectual task that a human does, today's artificial intelligence systems can perform well defined tasks that typically require human intelligence. The learning process, a critical component of most artificial intelligence systems, is in the form of ML, which relies on mathematics, statistics, and decision theory. Advances in ML, and especially in deep learning algorithms, are responsible for most recent achievements such as self-driving cars, digital assistants, and facial recognition. To determine his path and choose the best path of growth to fulfill his mission with the desired success. The example Covid-19 vaccine(s) provides an opportunity to leverage research in the drug discovery and business development phases of international pharmaceutical companies such as Pfizer, Moderna, Astrazeneca, Johnson & Johnson, Sanofi, etc.

by new technologies for the commercialization and deployment of global vaccine campaigns. Therefore, an excellent knowledge of the digital world thanks to overgrowth, the scalability of a business model, the implementation of a strategy by a management team, allows to reduce uncertainty and increase the chances of success. The financial sector, led by financial technology (fintech) companies, has rapidly increased the use of AI/ML systems (Box 1). The financial sector's recent adoption of technological advances, such as big data and cloud computing, along with the expansion of the digital economy, has enabled the effective deployment of AI/ML systems. A recent survey of financial institutions (WEF 2020) shows that 77 percent of all respondents predict that AI will be of general or very high importance to their business over the next two years. McKinsey (2020a) estimates the potential value of AI in the banking sector at \$1 trillion

Keywords: Digital Economy, Artificial Intelligence, Machine Learning, Investment, Income

1. Introduction

1.1. How Machine Learning Algorithms Help the Digital Economy

While machine learning (ML) is a common tool in today's artificial intelligence (AI) systems, it hasn't always been this way. Early artificial intelligence relied heavily on expert systems, which consisted of a set of detailed rules created by human experts. These were rules that a computer could follow step by step, often giving the impression that it was responding to changing conditions. However, given that these rules are often expressed in "if-then" form, they impose heavy restrictions and essentially render such systems useless when dealing with

situations outside the defined environment. Advances in ML give AI systems the ability to learn from experience, thus making them more adaptable to new world conditions. The key element that forms the basis of ML is that all learning can be reduced to learning a representation of a mapping between some input and output. For example, if a classification problem is considered in which objects Divided into predefined classes, the goal of ML is to learn mappings between object features and predefined classes. An important fact to understand is that a mapping does not necessarily have to be a functional form, i.e. a mathematical expression. There is an important distinction between fit and the learning process. If the functional forms for the mapping

are known, with only unknown parameters, then the problem becomes a proper task, meaning that all that needs to be done is to estimate the parameters. When the functional form is not known, or does not exist, the fit is not useful, and a learning process must be employed.

1.2. Learning Paradigms Depend on the Data Available for the Learning Process

- Supervised learning requires that the training data contains inputs (or features) and corresponding correct outputs (labels or goals). In this case, the goal of ML is to find a mapping between known inputs and outputs through the use of an algorithm. The idea is that the mapping (or model) learned in this way can be applied to unseen inputs and accurately predict outputs. Over fitting is one of the main challenges in ML and occurs when the model performs very well on the training data set, but not on new, unseen data (test data). It works poorly. The better a model performs on the training data, the less bias it has. However, its performance can vary dramatically on unseen data sets. In this case, to achieve robustness in performance, the researcher may choose a model that does not perform well in the training set but maintains its performance in the test set. This situation is known as bias-variance trading.

- Unsupervised learning occurs when the available data does not include the outputs. Given that only features are available (and no associated labels), the algorithm used must not only learn the mapping, but also generate the labels. For example, in anomaly detection problems, there is no prior information about the data points that represent an anomaly. In this situation, using a clustering algorithm is a common approach to learn a viable mapping. Assuming that all normal activity occurs in clusters, data points that are identified as belonging to clusters can be labeled as normal activity, while the rest of the data points are labeled as abnormalities. Be.

- Reinforcement learning is used in situations where the available data is not fixed and changes through a feedback loop from the environment to the artificial intelligence system. Furthermore, the labels or outputs associated with the inputs are not necessarily correct or desirable. The most common example of reinforcement learning is learning to play a game like chess

1.3. Probabilities of Access" and "Probabilities of Success" of startups/size-ups

Although the startup model presents itself as a more democratic and meritocratic model than it exists elsewhere, the — probabilities of access and — probabilities of success among founders, on the one hand, remain unequal (Flecher, 2019). and on the other hand, between social classes (Pinçon, Pinçon-Charlot, 1999; Bessiere, 2010; Bertaux-Wiame, 1982; Landour, 2017). Public institutions have defined an ecosystem, a group of companies, a way of creation and development that is different

from traditional companies. Therefore, a start-up is defined as an innovative company, with specific financing, especially with increased capital and rapid growth prospects. We find the myth of the self-made man as a unique model of social ascension and Silicon Valley as a symbol of California's ideals of progress, innovation and modernity. Although strongly supported by the government authorities in France "La Start-up Nation", the number of successful entrepreneurs is few and the number of startups raising funds is few. For every 10 startups funded, 6 fail... VCs rarely win because out of 10 companies they invest in, six fail to do what they say they will, four fail to do what they say they will do." They will and only one will really and truly succeed (sic). Therefore, VC depends a lot on this startup. It will succeed (...) but you should know that 40% of VC deals are unprofitable, even if it represents only 15% of the invested money. Jean-David Chambord on, co-president of Digital France and head of the ISAI investment fund, said at a round table on financing methods for startups in France, June 13, 2018, Paris Dauphine University. Experience versus luck: the most important ingredient in an entrepreneur's success. A Harvard Business School study (Gompers, Kovner, Lerner & Scharfste in 2006), shows that competence versus luck is the most important element in the success of an entrepreneur or venture capitalist. Thus, the serial entrepreneur reproduces success. In a future startup project it is easier and guarantees more profitability than a failed entrepreneur or first time for VC. Also, an experienced VC investor has the ability to identify a first-time entrepreneur with the potential to become a successful entrepreneur.

2. Help with Fundraising

In order to increase the low chance of success, it is important for start-ups to benefit from fundraising support (Reddis, 2000). The startup ecosystem has a category that includes all fundraising support functions and another category that is informal. Practices revolve around networking people and structures. These experts and forums provide human advice tailored to "startups/startups" by mentors or coaches who are often qualified by their profile. Entrepreneurs or C-level executives of large companies. They guarantee and bring expertise and time savings. Depending on the level of maturity, the startup/scale-up can be hosted in an incubator or accelerator or a space in a business unit of a large and increasingly remote company.

In the complex process of fundraising, as shown by the low rate of investors' financing requests, this support is positive for the investor by strengthening the trust in the relationship between the entrepreneur and the capital providers and by providing guarantees for the submitted requests. Initial analysis of cases includes various functions (assistance in the development and optimization of the business plan, knowledge of investor practices, pre-selection of potential investors, assistance in negotiations with investors) of support that helps to reduce asymmetry. Information and risk of conflict of representation 3.



Figure 1: Breakdown of fundraising support functions

The change of status of a start-up, which involves changing the scale of a company, thanks to an accelerated growth strategy, especially internationally, is called scaleup. A unicorn is a startup that is not listed on a stock exchange, but is valued at more than \$1 billion, with unconventional financial metrics that make it worth much more than when it goes public. These mechanisms attract investors who speculate a lot about this type of startup. To date, we have 300 unicorns worldwide, with the majority in the United States and China. You might wonder why there are so few French companies, given the abundance of creativity and the annual growth in startup registrations.

2.1. Five Areas of Digital Transformation

Customers, competition, data, innovation and value 2 today, our born-digital companies (such as Google or Amazon) have inspired digital enthusiasts to move into the next industrial age. The opportunities created by digital technologies are recognized and the limitations of the analog era have disappeared. New business models, new revenue streams and new competitive advantages are enabled by being cheaper, faster and more customer-centric than ever before.

3. Competition

This is the first area of digital transformation where the mass market model of traditional companies is evolving towards the customer network model. In this paradigm, customers are dynamically communicating and interacting, and their behavior is between the customers themselves (reciprocity, brand and reputation of the company) and customers in contact with the company (discovery, evaluation, purchase and use patterns of the product, subscription placement, interaction) and change with brands. As a result, companies are rethinking their traditional marketing methods and re-examining the customer purchase journey, social networks, search engines, in-store mobile or laptop screen, and online shopping. It is better to consider a dynamic and networked customer as the best focus group in your

sales strategy. Digital technologies are changing the way we think about competition by creating competitive assets outside the company's own organization, such as a network of partners.

4. Data

The digital transformation of data provides insight into how companies generate, manage and use information. Data originally generated as part of a company's own processes (production, operations, sales, marketing) are primarily used for evaluation. Forecasting and Decision Making Faced with the flood of data, every company now has access to a river of unstructured data that is generated without planning and can be used with new analytical tools. This "big data" enables companies to make new kinds of predictions, uncovering unexpected patterns in activities. Commercially discover and generate new sources of value. They allow companies to differentiate themselves in the market and create new value.

5. Innovation

Digital transformation in innovation, the process by which new ideas are developed, tested and brought to market by companies, enables a different approach for start-ups/scale-ups. Digital technologies can enable a continuous learning approach through rapid testing and market feedback from the very beginning of the innovation process to launch and beyond. Rigorous testing and minimum viable prototypes maximize learning while reducing costs and validating hypotheses based on real customers. Continuous learning and rapid product iteration, both before and after the release date, will become the norm.

6. Value

In the digital age, digital technologies force us to think differently about how to understand and create value for the customer. An unchanged value proposition is a source of challenge and potential disruption for new competitors. Constant pushing of boundaries is necessary to find the next source of customer

value. In a changing business landscape, it is necessary to follow the path of constant evolution and consider each technology as a means to expand and improve the customer value proposition. Adopting a paranoid attitude to survival (Grow, 2001), the firm must focus on seizing new opportunities, discarding resources with diminishing.

returns, and adapting quickly to stay on the curve of change. All these changes in strategic assumptions lead to a new reading or even a transformation of the key success factors of a startup/scale that digitizes its business model. This raises questions about the capacity of data processing to achieve performance goals through new decision support tools. This increases uncertainty and risk in venture capital. Business venture capital is a major component of the startup/scale-up ecosystem. It is useful to remember that the activity of venture capital has existed since ancient times and is presented in a way that has not been seen in the era of the so-called "new economy". The leverage effect created by corporate financing, the potential to become new technology giants, has sparked the interest of the media and government officials in this method of financing new technology companies. According to the National Venture Capital Association (NVCA), venture capital is a source of equity financing for very few new, unlisted companies. The goal of venture capital funds or VCs is to increase the value of the company by actively (hands-on) intervention in management. Theoretical literature allows us to reconstruct complex practices and judge their effectiveness in order to assess outcomes and reveal risks. This is why the existing literature is not completely satisfactory that venture capital is a research field for new theoretical works. By confronting practices with theories, we raise three problems that structure the theoretical literature:

- The legitimacy of venture capital, which is answered by the theory of financial intermediation based on asymmetric information.
- The relationship between the main factors involved, which is based on the agency theory approach and the optimal contract in VCentrepreneur and VC-Institutional Investor couples.
- Uncertainty decision-making based on the theory of real options is the main reference in this field.

Financial Markets and Venture Capital Activities Financial markets play a driving role in the venture capital business with Silicon Valley as a key reference and NASDAQ as a core component of the American model. Of course, the Silicon Valley model is fundamentally opposed to Schumpeter's model, in which a series of radical innovations followed by a phase of sector stability benefits incumbent firms, while frequent innovations that make products obsolete more quickly benefit incumbent firms. They challenge. New technologies are a good platform for startups.

It should be noted that France has created a venture capital financing model with French technology: Next 40/120 to reach 25 unicorns in 2025.

7. Challenges for Venture Capitalists

Although considered ideal financing for radical innovation, the challenges of venture capital are changing this landscape. VC

supports later rounds that finance the development of companies whose performance is more uncertain because the goal is to commercialize a new product on a large scale. This sustainable trend in the profession for less risk is supported by government authorities. The phenomenon of round-trip capital flows tends to analyze the investment decision under uncertainty as a sequential and dynamic process and goes beyond the usual framework.

7.1. The Limitations of This Analytical Framework for Decision Support Show Two Issues

- VC is not a neutral financial intermediary because it is part of the movement to expand intellectual property (particularly patents) that identifies intangible assets as a core component of corporate strategy. In this way, VCs format startups/scaleups,
- VC is dependent on the financial market as IPO is its preferred exit method. Raising funds from institutional investors varies according to stock market conditions, and evaluating real growth options is sensitive to market fluctuations.

This dependency raises questions about the ease of IPOs for startups/scalers. Finally, an exploratory path opens the field for theorists who want to understand a startup/scale-up entrepreneurial activity specializing in new technologies at the intersection of the knowledge economy and financial capitalism with the valuation and management of intangible assets as its cornerstone.

7.2. Artificial Intelligence in the Financial Sector

The ability to acquire large sets of data from the environment and process it with artificial intelligence (AI) and machine learning (ML) is changing the landscape of the financial sector. AI/ML facilitates increased capacity to predict economic, financial and risk events. Reshaping financial markets; improving risk management and compliance; strengthen prudential supervision; and equipping central banks with new tools to pursue their monetary and macro-prudential tasks. AI/ML systems are used in the financial sector to predict macroeconomic and financial variables, meet customer demands, provide payment capacity, and monitor business conditions. Compared to traditional statistical and econometric models, AI/ML models offer flexibility, can help discover undetectable relationships between variables, and enhance the tools used by institutions. Evidence shows that ML methods often outperform linear regression-based methods in predictive accuracy and robustness (Bolhuis and Rayner 2020).

While the use of AI/ML in forecasting offers benefits, it also poses challenges. Using non-traditional data (eg, social media data, browsing history, and location data) in AI/ML can be useful in finding new relationships between variables. Similarly, using artificial intelligence natural language processing (NLP), unstructured data (for example, information contained in email texts) can be fed into the predictive process. However, the use of non-traditional data in financial forecasts raises several concerns, including the prevailing legal and regulatory framework. ethical and privacy implications; and data quality in terms of cleanliness, accuracy, relevance and possible biases.

7.3. Adoption of Artificial Intelligence and Machine Learning in the Old School and Traditional Activities of VCs

A Scandinavian VC has developed a proprietary AI solution for transaction sourcing, including high-potential companies to add to the investment portfolio, with a data-driven approach to managing investment funds. This is the first attempt to apply automation, machine learning and artificial intelligence to venture capital work. In fact, technology is revolutionizing his business, based on which the investor "... is, in many ways, very old and traditional, a typical venture capital activity..." and based on relationships, meeting thousands of Entrepreneur and over the years on the development of recognition of models, networks and ideas. All this knowledge enables this VC to achieve good financial returns for their investors. From a technical point of view, the AI-based platform enables data-driven investment in three verticals: smart mobility, smart enterprise and mobile technologies.

This tool is fast growing companies without Pay attention to their location, it scans and ranks more than 700,000 companies in real time, while taking into account about 300 growth parameters for each company, and more are constantly being added. The fact that a VC is turning to artificial intelligence for part of its transaction management work raises important questions about how the future will shape companies eager to raise capital. VC data-driven investment means an additional constraint for startups/scale-ups with a digital footprint in mind. From hundreds of online sources, this algorithm compares investment and growth patterns between different geographic regions (Scandinavia, Europe) based on investment periods. In terms of financing, on average, startups in this country tend to attract more seed capital but less Series A and B than other European companies or even other Nordic companies.

7.4. Good Practices in Evaluating Startups/Scales by VCs

The valuation of these companies is important to VCs because the value of a company determines the proportion of equity they receive in return for investment, as well as the bottom line. The difficulty of finding an investor suitable for the business project, obtaining the right amount of investment and the structure of fair treatment are essential for the entrepreneur. This question depends on whether one is pro-entrepreneur to know how to value their startup/scale-up when looking to raise capital from a VC or a VC's side to value the startup/scale-up they decide on. For investment also, business valuation is a topic of discussion in financial theory. There is great variation in results between different methods (Waldron and Hubbard, 1991) and sometimes VCs' valuation methods of start-ups/scale-ups can provide

incorrect and unjustified valuations (Gompers, 1999), which are sources of conflict between entrepreneurs and investors. It is in this framework that conceptual approaches derived from strategic management (Miloud & Cabrol, 2016) from the analysis of industrial economics, resources and networks provide a complement to define a theoretical framework for the valuation of start-ups/scales by VC.

- Industrial economics approach is based on the fact that the economic and financial performance of young companies is positively correlated with the performance of an industry (Caves, 1972), degree of product differentiation (Sandberg & Hofer, 1987), growth rate of the industry (McDougall, Robinson and Dennisi, 1992), industry profitability and market size. Rapid growth of an industry sector ensures economic and financial performance for established firms, even as new entrants gain market share (Porter, 1980) and reduced competitive pressure (Eisenhardt & Schoonhoven, 1990) allows start-ups/scales it allows them to take advantage of many resource opportunities.

- The resource approach imagines the organization as a structured set of resources. Internal resources are important for predicting firm performance. In the case of start-ups, the entrepreneur and his team are considered as the main resources of the company, who can mobilize external resources of the organization through their networks in order to develop the entrepreneurial project by discovering, evaluating and exploiting.

Opportunities in their environment (Shin and Venkataraman, 2000; Eckhart and Shin, 2003). Several studies on the venture capital process show that experience (a combination of various entrepreneurial, managerial, technical and industrial experiences) is a key criterion for financing decisions and has a positive contribution to sales growth (Siegel, Siegel & Mac Millan, 1993).

8. Artificial Intelligence Solutions to Predict the Path of Accelerated Growth

If artificial intelligence is not a new phenomenon—Alan Turing was already thinking about it in 1950—it is the rise of big data that makes it so relevant. In fact, artificial intelligence is the ability to intelligently process data. Today, more and more data is generated every day, and we are increasing our ability to process it thanks to the introduction of more and more powerful algorithms.

Artificial intelligence is a scientific discipline that seeks tools that imitate or replace some of the human cognitive functions".

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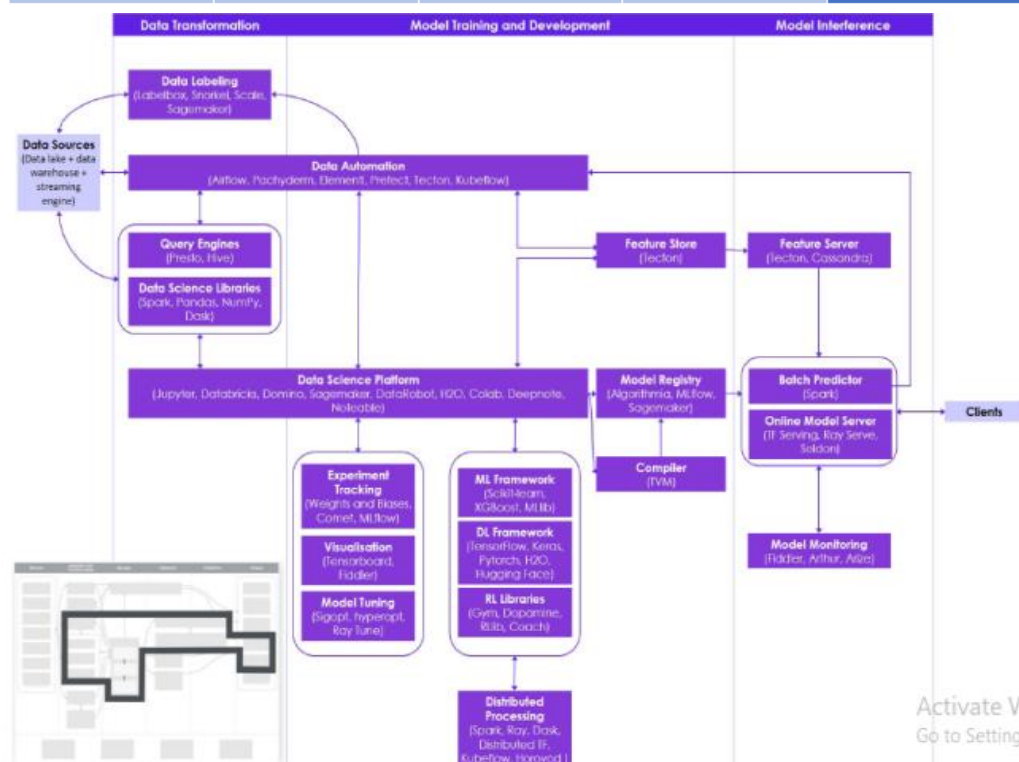


Figure 2: Presentation of the general plan of artificial intelligence (AI) and machine learning (ML) technology

The aim is to process a database of a significant number of start-ups/scale-ups and data about their various activities and their market, to create the ability to predict the growth path and make automated recommendations for each of them. This real decision support tool helps to speed up some of the tasks of the fund-raising process (such as developing a business plan, pre-selection of potential investors, submission of documents, road shows, financial and legal negotiations) and shortening the time of assistance analysis. Slow Before investing at the beginning of the research.

9. Valuing the Creation of Sustainable EDHEC Chair Value

Participating in the Sustainable Value Creation Chair research program at EDHEC Business School, Uppers develops and tests the hypotheses of its dynamic valuation model on a database of 57,000 startups/scale-ups. Validation of its results By the

head, it makes it possible for the research to be valued through scientific, technical and/or financial publications. The research area of this chair is related to the paradigm shift in business performance measurement through digital transformation, social, societal and environmental issues. Managers must enrich traditional management tools, which must be well mastered (Fulkwer, 2020) before integrating extra-financial analysis in a world where intangible assets now weigh four times as much as tangible assets.

9.1. These Goals Provide the Possibility to Respond to the Following

- Mastering the basics of financial analysis and measuring the impact of digital transformation, new business models, millennial values, social and environmental issues on these indicators.
- Assessing the impact of strategic, commercial, operational and

financial decisions on value creation and company management.

- Identify the criteria that should be considered in order to make the most appropriate investment choices.
- Predicting the reactions of the market and investors,
- Enrichment of value creation by integrating extra-financial analysis, values from intangible assets (human capital, environment, employer's brand, social and social responsibility, etc.) And using the company's own resources.

10. Result

The digital era gives us the task of reinventing ourselves and an opportunity to measure strategic changes in companies on the one hand and on the other hand, changes in the behavior of venture capitalists towards startups/scaleups that are looking for crowd funding. Are raising capital. Or to generate growth through self-financing. Academic research on generating financial and extra-financial metrics helps improve knowledge and measure the impact of new technologies in the Startup/Scale up ecosystem. The deployment of artificial intelligence (AI) and machine learning (ML) systems in the financial sector will continue rapidly. This trend is due to the rapid increase in computing power, data storage capacity and big data, as well as significant progress in modeling and case adaptations. The COVID-19 pandemic is accelerating the shift to a more contactless environment and digital financial services, which will make AI/ML systems even more attractive to financial service providers. The use of AI/ML will bring important benefits, but will also create significant challenges in fiscal policy. AI/ML systems offer financial institutions the potential for cost savings and increased productivity, new markets and better risk management. Offer customers new experiences, products and lower costs. And provide powerful tools for regulatory compliance and prudential oversight. However, these systems also raise new unique ethical questions and risks to the integrity and safety of the financial system, the full extent of which has yet to be assessed. The task of politics financial sector investors are further complicated by the fact that these innovations continue to evolve and are shaped by the arrival of new technologies. These developments require improved regulatory frameworks and active engagement with stakeholders to identify potential risks and corrective regulatory actions. Digital economy based on big data: artificial intelligence and computing book [1-14].

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