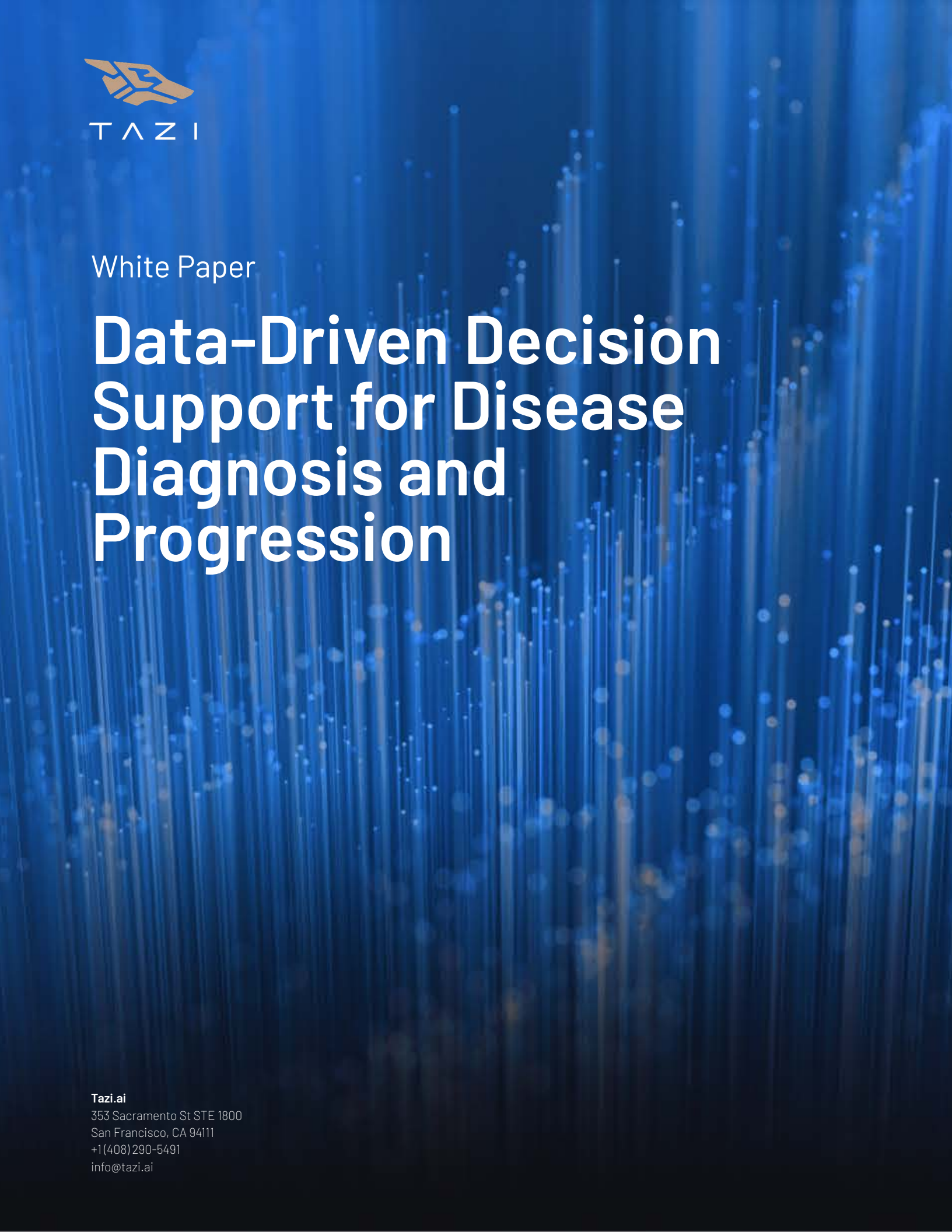

TAZI

White Paper

Data-Driven Decision Support for Disease Diagnosis and Progression

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SUMMARY

Coming up with the correct diagnosis and anticipating the progression of a certain disease per patient profile could make a difference. On a daily basis, physicians have to make critical diagnosis decisions under time and workload pressure. The decision itself is influenced, among others, by the patient profile, patient-doctor relationship, tests availability / hospital resources or experience of physicians. Using predictive analytics, the efficiency of the diagnosis process will improve, positively impacting the level of assistance and monitoring of the patient.

In this sense, an early disease diagnosis and progression prediction will also help physicians to anticipate the potential evolution of the disease, allowing them to take early actions to mitigate the expected effect on patients. It will also help in limiting the most invasive medical tests to the right patients. This increases the diagnostic accuracy and reduces the number of unnecessary invasive tests, benefitting the patients and ensuring a better allocation of resources.

Knowing in advance the potential number of patients that will require certain services or potential changes between out patients and in patients, will also help hospitals and care centers to allocate the resources more efficiently; from personal resources, to facility management and medicines and equipment procurement.

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This paper explains the approach of the TAZI Disease Diagnosis and Progression Solution. The solution is based on TAZI's patented Continuous and Explainable, No-Code, Automated Machine Learning platform. How continuous learning explores the patient patterns and trends will be discussed. Moreover, how the physicians will approach the risk of the potential diseases and how could improve the services provided is to be explained. Conclusively, the customization level of this solution will be explained and potential improvement in resources allocation will be discussed.

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INTRODUCTION

Machine Learning is especially important for situations where the signals and indicators of a medical issue are hidden by the noise that obscures the actual problem from physicians. Data-driven diagnosis decisions based on routine medical check and electronic medical records can help physicians in identifying in advance patients at risk. Through early diagnosis, progression estimate and personalized treatment, patients can be eligible for receiving less aggressive treatments, which leads to improved patient care, patients' mental health at the time it is also beneficial for both payers and care providers.

The data for an accurate diagnosis and progression prediction can be gathered from electronic medical records, past health insurance claims, previous hospital visits, and demographics. By combining multiple data sources, a patient's extensive history with many attributes can be prepared.

Whenever a patient orders a medical test at a hospital, the disease diagnosis and progression models can be run automatically in order to check for any life-threatening diseases and assess their risk. By using the predictions of machine learning models, clinicians can learn in advance to faster take the right actions and prevent any life-threatening situation,

Many companies nowadays have large data science teams for predictive analytics. Building analytical models, as well as maintaining them may consume large amounts of time. The traditional Machine Learning pipelines are able to detect complex patterns with high accuracy. However, these pipelines are very complex, hard to maintain, and not interpretable. TAZI's Continuous AutoML platform is designed to be understood by clinicians,physicians and other caregivers. The platform is continuously synchronized with the environmental changes thanks to its continuous learning technology. This allows users to receive continuous feedback on the models they build, and consequently take actions from the understandable predictions.

TAZI Disease Diagnosis and Progression solution is a no-code, easy and ready to use, understandable, machine learning solution for the healthcare industry. The goal of the solution is to predict the highest-risk patients for certain types of

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diseases and provide a progression estimate of the disease for the next 6 months.

Specifically, a patient's historical data is used to determine the current risk status for a certain type of disease. Then, if the patient is at risk for such a life-threatening disease, a progression estimate is provided to physicians to support their critical decision making. Note that the goal of this solution is not to diagnose a patient but to help physicians in anticipating accurate, data-driven decisions for the patient at the time that provides grounds for a more efficient allocation of resources.

TAZI Disease Diagnosis and Progression Solution

TAZI utilizes the Automated Disease Diagnosis and Progression Solution approach as shown in Figure 1:

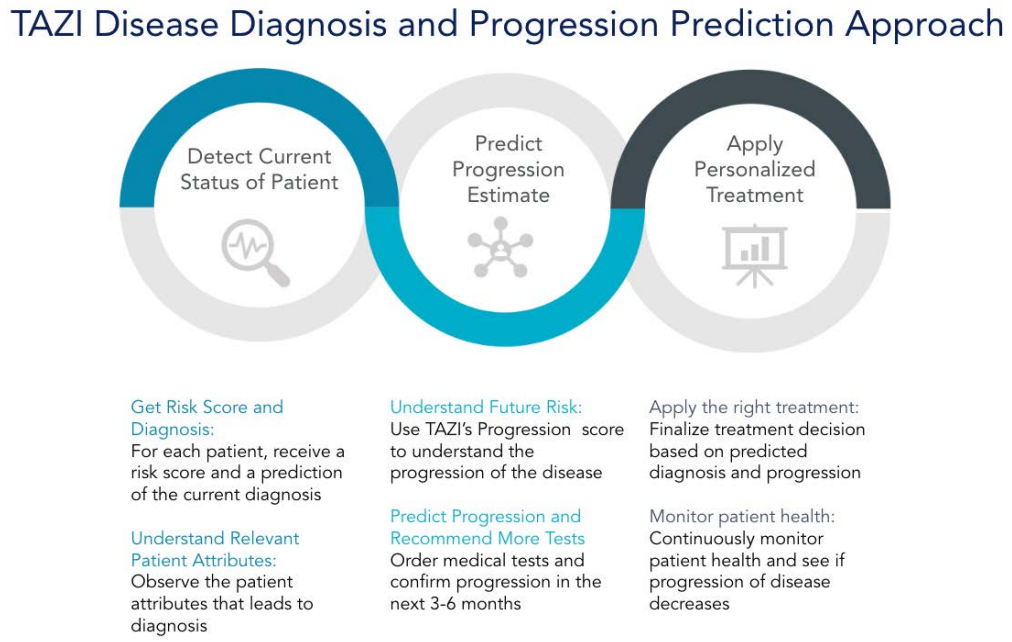

Figure 1. TAZI's approach for disease diagnosis and progression prediction.

TAZI supports critical decisions of clinicians by providing risk assessment of patients and their progression estimates. For each patient, current medical results and patient history is analyzed in order to detect the current status of the patient. TAZI provides a risk score for each patient with relevant patient

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attributes in order to support clinical decision making. Clinicians can use the risk score and explanation for current status to confirm their own diagnosis.

After detecting the current status, if the patient has been diagnosed with a certain disease, TAZI estimates the progression of the disease for the next 6-month period by providing a progression score. If the progression score is very high, for example, clinicians can visit the patient or order additional medical tests to confirm if the patient needs different actions or treatment for the next 6 months.

In the end, clinicians can use the predictions and explanations provided by TAZI Disease Diagnosis Solution to anticipate the right treatment helping them to continue improving patients' lives.

As stated, TAZI's live explanation model provides insights for different patients. A micro-segment can consist of patterns that cannot be directly identified. An example micro-segment could consist of a patient predicted to have Dementia because of a wide range of factors. An example of a dementia pattern is highlighted in the figure below:

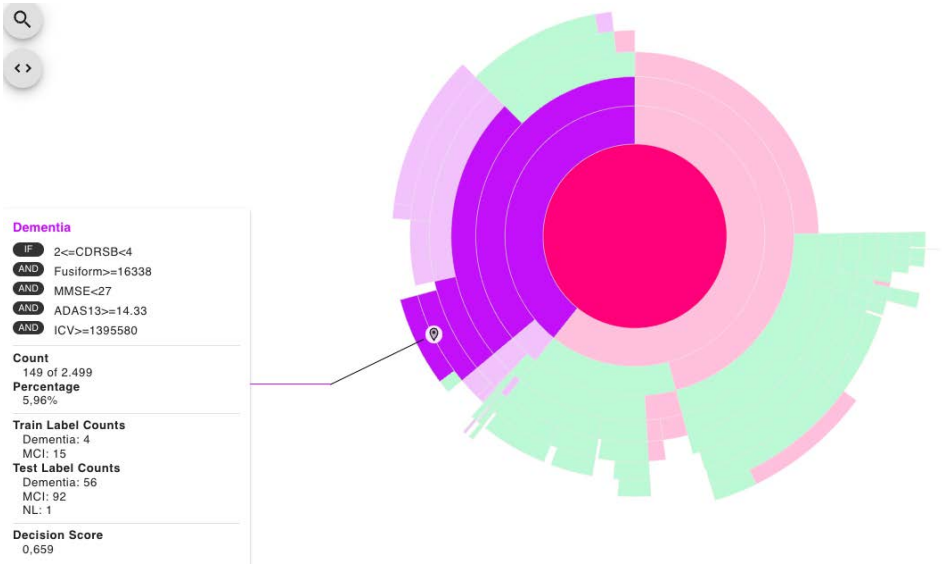

Figure 2: Explainable AI interface showing predicted dementia, Mild cognitive impairment (MCI), and normal patient segments and highlighting a particular dementia micro-segment.

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Following the segmentation of patients with similar disease-related attributes, physicians and caregivers will be able to see the current situation of their patients and the ongoing resources in any hospital from a high-level view.

Different disease indicators and the relationship between cognitive assessment surveys and diagnosis predictions can be observed from TAZI's Business Dashboards.

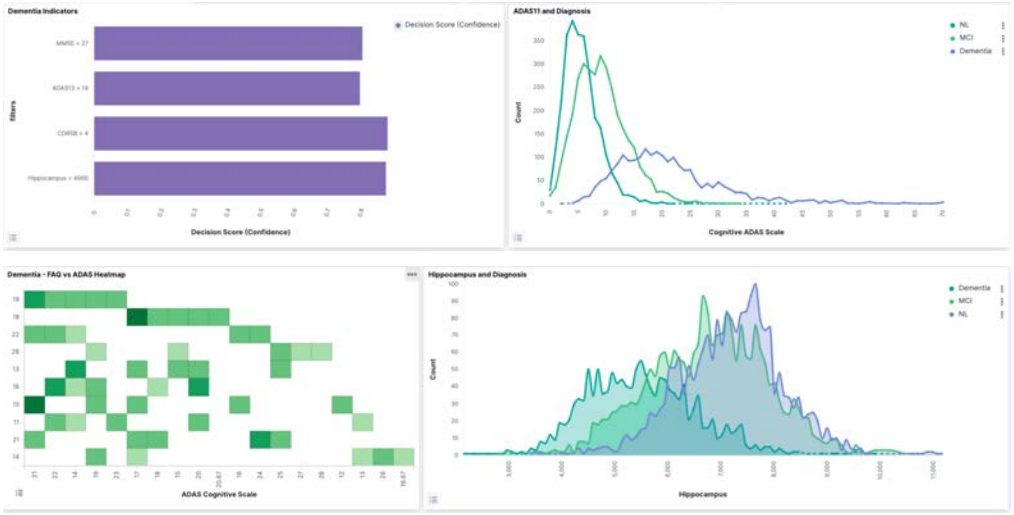

Figure 3: Clinicians can understand why patients are diagnosed for a certain disease

By using TAZI's Disease Diagnosis Solution, physicians can anticipate data-driven treatment decisions and improve patient experience across your health organization.

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CONCLUSION

TAZI decreases the amount of uncertainty linked to a disease diagnosis and disease evolution by providing continuously updated analytics, trends, and predictions.

For patients, Tazi helps physicians in offering more accurate and personalized treatments, anticipating recommendations, more targeted tests or avoiding unnecessary invasive examinations.

For healthcare providers Tazi delivers understandable outcomes to support a more efficient allocation of resources, deeper knowledge of different pathologies, treatments efficacy per patients' profile or real-world evidence for a precise disease.

Our Adaptive Machine Learning ensures a faster analysis of the most updated clinical and demographic information available. Key stakeholders' decisions can now be backed and complemented by solid and understandable analytics.

To understand and quantify the impact on your organization, please visit the TAZI Disease Diagnosis web page.

Do you want to learn

Whether you have sufficient and clean data to predict certain diseases?

How you can build your own evolving disease prediction models within 10-30 days?

How you can start decreasing mortality rates in 1-2 months?

How you can up-skill your business and data teams to adopt machine learning?

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ABOUT TAZI

Artificial intelligence (AI) is a source of both huge excitement and apprehension, transforming enterprise operations today. It is more intelligent as it unlocks new sources of value creation and becomes a critical driver of competitive advantage by helping companies achieve new levels of performance at greater scale, growth, and speed than ever before, making it the biggest commercial opportunity in today's fast changing economy.

TAZI is a leading global Automated Machine Learning product/solutions provider with offices in San Francisco. TAZI is a Gartner Cool Vendor in Core AI Technologies (May 2019) and is considered as "The Next Generation of Automated Machine Learning" by Data Science Central.

WHO WE ARE

Founded in 2017, TAZI has a single mission which is to help businesses to directly benefit from Automated Machine Learning by using TAZI as a superpower, shaping the future of their organizations while realizing direct benefits like cost reduction, increasing efficiency, enhanced (dynamic) business insight, new business (uncovered), and business automation.

WHAT WE OFFER

Through its understandable continuous machine learning from data and humans, TAZI is supporting companies in banking, insurance, retail, and telco industries in making smarter, more intelligent business decisions.

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TAZI solutions are based on a most compelling architecture that combines the experiences of 23 patents granted in AI and real-time systems, proven at different global implementations.

Some unique differentiators of TAZI products are:

- Business users can automatically configure custom ML models based on their KPI and the available data. TAZI's Profiler accelerates this process through data understanding and automated cleaning, feature transformation, engineering, and selection capabilities.
- TAZI models learn continuously, and are suitable for today's dynamic, realtime data environments.
- TAZI models are GDPR compliant (no black-box models). They provide an
- explanation in the business domain's terminology for every result they produce.
- TAZI supports multiple (heterogeneous) data sources, i.e.,.: external, batch, streaming, and others.
- TAZI can learn both from human domain experts and from data, which speeds up accuracy improvement.
- TAZI's hyper parameter optimization feature reduces human time spent for model configuration. TAZI products contain algorithms that are developed and coded to be lean, efficient, and scalable.

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