QAA

QUALITY ANALYTICS
ASSOCIATES
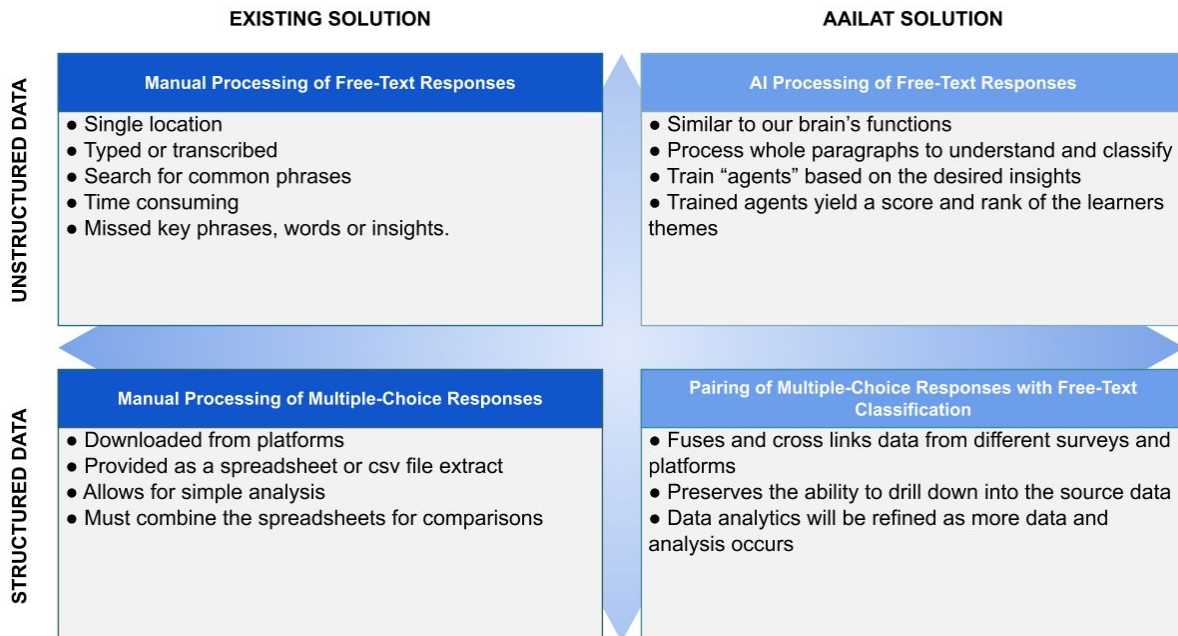
21st Century Training Solution White Paper

Gaining Training Value and Metrics through an AI System

Executive Summary

Our personalized Advanced AI Learner Analytics Tool (AAILAT) provides access, summarization, exploration, analysis and interaction capabilities to any training team. We collaborate with organizations to design and develop a solution based on needs and capabilities to assist in using AI to measure training to determine the return on investment (ROI).

How can our team do this? By asking questions to determine what insights to target for the textual data, we establish the baseline 'agents' for the text analytics. Other considerations include:
- Single interface or dashboard to view data.
- Interactive dashboards built to specific needs.
- Data extracted and appended within designated entities and sentiments.
- Supplement with an open source intelligence for context.
- Provide domain specific core concepts and themes using QAA's AI technology.
- Provide service through an organization's cloud or on-premise application.

	EXISTING SOLUTION	AAILAT SOLUTION
UNSTRUCTURED DATA	**Manual Processing of Free-Text Responses** ● Single location ● Typed or transcribed ● Search for common phrases ● Time consuming ● Missed key phrases, words or insights.	**AI Processing of Free-Text Responses** ● Similar to our brain's functions ● Process whole paragraphs to understand and classify ● Train "agents" based on the desired insights ● Trained agents yield a score and rank of the learners themes
STRUCTURED DATA	**Manual Processing of Multiple-Choice Responses** ● Downloaded from platforms ● Provided as a spreadsheet or csv file extract ● Allows for simple analysis ● Must combine the spreadsheets for comparisons	**Pairing of Multiple-Choice Responses with Free-Text Classification** ● Fuses and cross links data from different surveys and platforms ● Preserves the ability to drill down into the source data ● Data analytics will be refined as more data and analysis occurs

Even with these considerations, why would anyone choose AAILAT over the current learner analytics method? The current method works, but it is time consuming and misses insights due to human error. Our AAILAT system reduces resource strain and minimizes human error; therefore, reducing cost overtime and ensuring clear and concise analysis. Table 1 above briefly compares the existing method with our AAILAT system which is explained in depth later.

Introduction

Quality Analytics Associates' (QAA) and Bintel, Inc (BEI) have teamed up to provide a learner analytics system known as the Advanced AI Learner Analytics Tool (AAILAT). The QAA team understands every organization's desire to maintain an agile training foundation while expanding to meet the ever-changing technology needs that includes all modalities, such as on-site training, eLearning, and virtual reality (VR). Given modality choices, global companies are anticipated to spend more than $31 billion on eLearning and $37 billion on mobile learning by the end of 2020. To successfully track and maintain learner standards, organizations use a learning management system (LMS). However, the LMS, even with recent advances of incorporating xAPI, is limited to what the LMS is able to track and share. The new generation of LMS, learning experience platforms (LXP), offer personalized, social learning experiences where users are provided course suggestions based on previous suggestions.

Our new system improves the training and education learning environment by providing organization's with the tools to help become better by providing desired known and unknown strategic insights and details about safety, sales, human resources (HR), customer service, new hire, etc. While continuing to allow organizations to track learner and individual instructors' performance, our program ensures the organization is getting the most out of the budget and learners' time.

As expected, the cost of training is dependent on the resources required to implement. However, our team considers the real cost is balanced not only by the bottom line but also by the overall return on investment by factoring in the metrics of the training effectiveness which considers behaviors, opinions, assessment scores and other data. Our AAILAT system provides the ability to access, explore, summarize, analyze and interact with not only on-site, instructor-led, eLearning training activities, but also, other training modality data through a customizable dashboard.
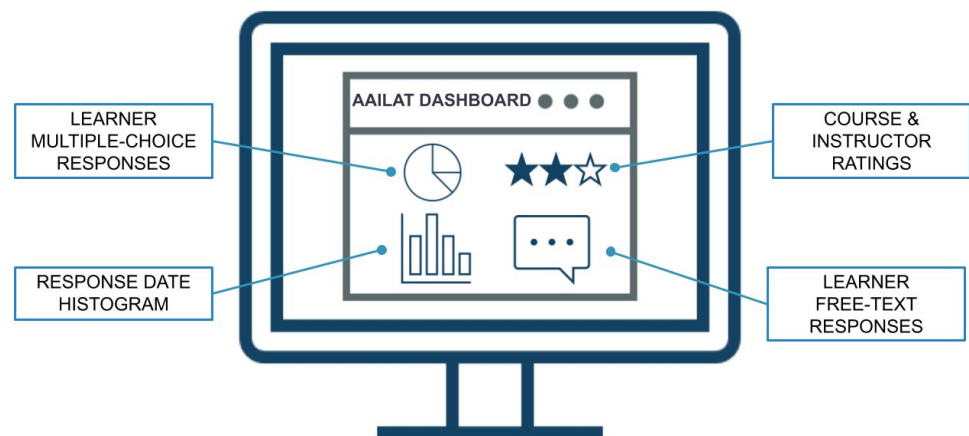
What Makes AAILAT Better?

Although AI is being used in multiple industries to gather data and analyze, it is not being used for training. Currently, to have a complete learner analytics view, training (L&D) teams must gather unstructured and structured data (defined in Table 2 below) in one location before review and qualitative and quantitative analysis.
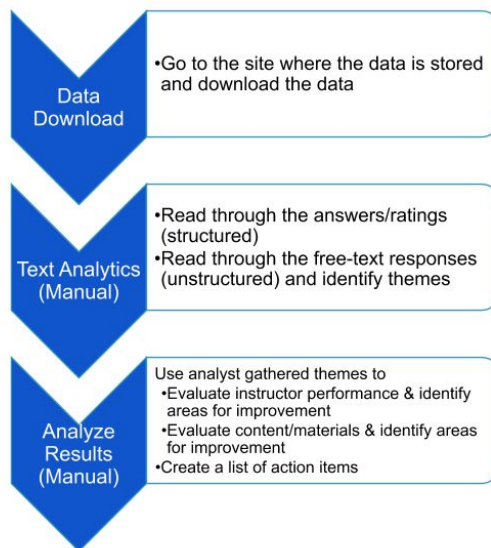
AAILAT assists organizations by gathering all unstructured and structured data into one dashboard while simultaneously performing the qualitative and/or quantitative analysis. This leads to the discovery of missed conclusions and data points.

By taking AI topic agents and data analytics, the AAILAT system allows training teams to decipher the data collected and determine actionable steps for the organization and individual instructors. There are a few key components included in the AAILAT system to differentiate from existing systems:

PROCESS

EXISTING SOLUTION

Data Download
• Go to the site where the data is stored and download the data

Text Analytics (Manual)
• Read through the answers/ratings (structured)
• Read through the free-text responses (unstructured) and identify themes

Analyze Results (Manual)
Use analyst gathered themes to
• Evaluate instructor performance & identify areas for improvement
• Evaluate content/materials & identify areas for improvement
• Create a list of action items

AAILAT SOLUTION

Data Download
• Automatic - no action by user

Text Analytics
• Create Topic Agents at the beginning of the project & then run against the results
• Topic Agents identify frequency of themes automatically

Analyze Results
• Display results in a dashboard for quick analysis and simple relationship association
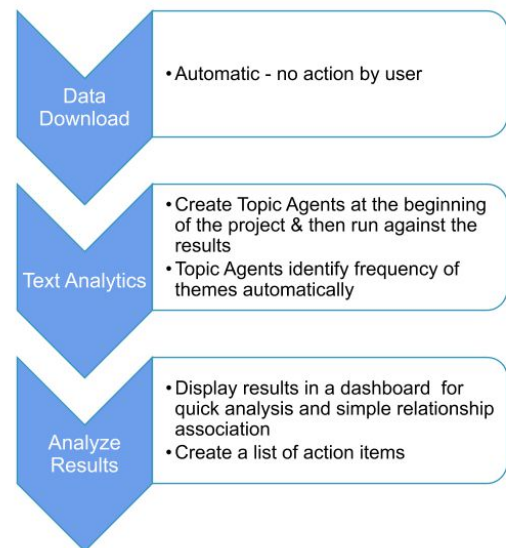• Create a list of action items

- Instructor Subjects and Material
  - Organization internal libraries (i.e. on-boarding materials, training materials, standard operating procedures, handbooks, job specific documentation, etc.). The ability to easily navigate the archives and supplement any training by using the topic agents to find more information.
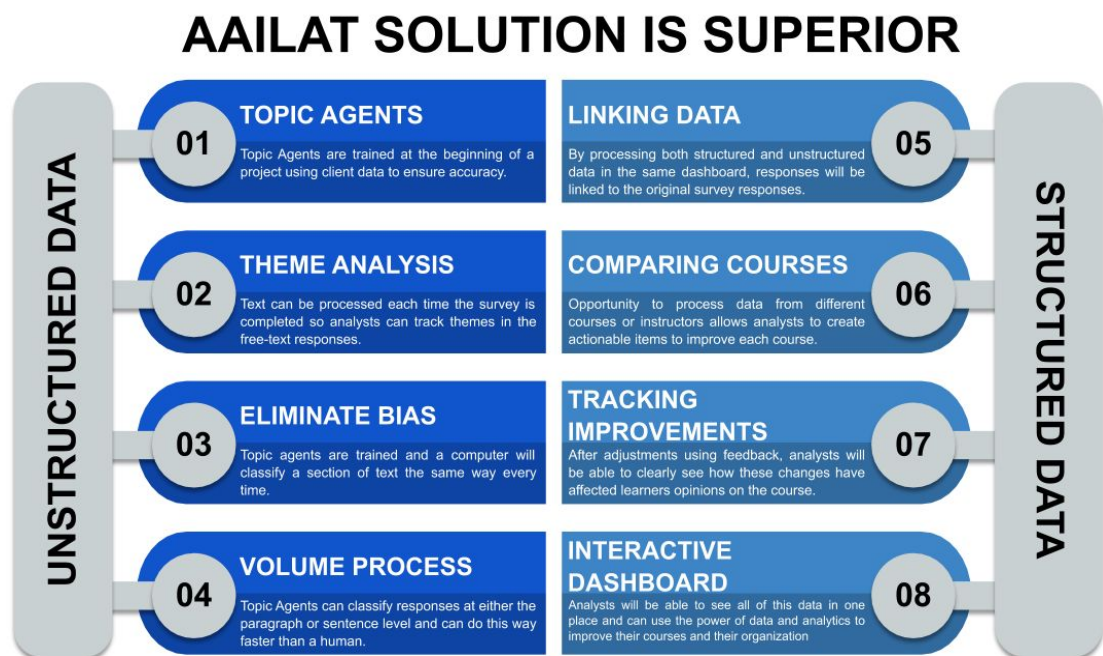 - Audio files may be transcribed (including recordings of training sessions) and added to this library as a search option.

- ○ Open source materials such as news articles, PDFs, presentations and libraries can also be added to the library.
- ● Learner Feedback
  - ○ The full value in the feedback surveys given after a course is not often used. Giving organizations and instructors the power of AI topic agents assigned to track themes and sentiment in learner feedback would have a positive impact in two big ways:
    - ■ At the instructor level: Instructors can modify their course content and methodology to ensure the best experience for their learners and track whether learners like the improvements.
    - ■ At the organization level: An organization will have data for all of the instructors.Who is performing best? With the data demonstrating, why the instructor(s) are performing well? This data can be used to help an organization pinpoint what learners are looking for in their training courses and provides the opportunity for the organization to share good techniques with instructor teams to ensure that performance and learner experience is positive across the organization.

Organizations have all of this data available in a dashboard, with visualizations showing the scores, sentiment and topics discussed in free text responses over time. Depending on each organizations' needs and requirements, some customizations can be added to answer other specific training questions (i.e sales, leadership, HR, etc.). Integrating all of these features to gain training metrics and/or learning purposes requires a technical challenge that can be overcome by our team, but the reward

AAILAT SOLUTION IS SUPERIOR

UNSTRUCTURED DATA

01 TOPIC AGENTS
Topic Agents are trained at the beginning of a project using client data to ensure accuracy.

02 THEME ANALYSIS
Text can be processed each time the survey is completed so analysts can track themes in the free-text responses.

03 ELIMINATE BIAS
Topic agents are trained and a computer will classify a section of text the same way every time.

04 VOLUME PROCESS
Topic Agents can classify responses at either the paragraph or sentence level and can do this way faster than a human.

05 LINKING DATA
By processing both structured and unstructured data in the same dashboard, responses will be linked to the original survey responses.

06 COMPARING COURSES
Opportunity to process data from different courses or instructors allows analysts to create actionable items to improve each course.

07 TRACKING IMPROVEMENTS
After adjustments using feedback, analysts will be able to clearly see how these changes have affected learners opinions on the course.

08 INTERACTIVE DASHBOARD
Analysts will be able to see all of this data in one place and can use the power of data and analytics to improve their courses and their organization

STRUCTURED DATA

for organizations leads to better instructors, training and overall strategically better organizations.

Data Leading to Potential Insights

As training teams prepare for analysis, they consider the most pertinent training questions needing the quick solutions. That is, the training questions the team most often hears about and has placed at the top of the list in the search for answers. When considering the questions and answers, the training team knows that current programs are not sophisticated enough to discover nuanced answers or insights if questions are misinterpreted (i.e. simple, short questions and answers are best).

After looking through the data, the team attempts to answer questions and determine missed insights from previous training sessions. Unfortunately, one or two questions will not fit every training program because answers are specific to organizations. Potential questions for consideration include:

- Did the training modality influence the retention/assessment score?
- Did the learners who completed a "specific" training course score higher annual reviews in a specific section (i.e. marksmanship)?
- Did the training course (i.e. an optional prerequisite) provide a higher completion or higher assessment rate for learners who completed versus those who did not complete?

AAILAT System Requirements

The AAILAT system leverages Tableau BI and other visualization platforms and integrates directly with multiple survey data programs. This gives our team the ability to customize a dashboard that complies with any organization's learner analytics requirements while meeting multiple objectives in order to provide an overall training value and metric solution.

Setting-Up the AAILAT System

Our team provides the AAILAT system either as a cloud-based or containerized software application running on private networks or single PCs. Therefore, organizations require only one of the following hardware solutions:

1. a single PC for use as a terminal for a web application running on a cloud solution, or
2. a container-based version of the application with the ability to run anywhere on an organization's network.

Managing AAILAT

To successfully manage the AAILAT system, our experienced team has developed a new approach (shown in image) to build an enriched database/index of unstructured and structured training metrics, learning analytics, lessons learned and survey


Data & Design → Train → Classify → Analyze → Report
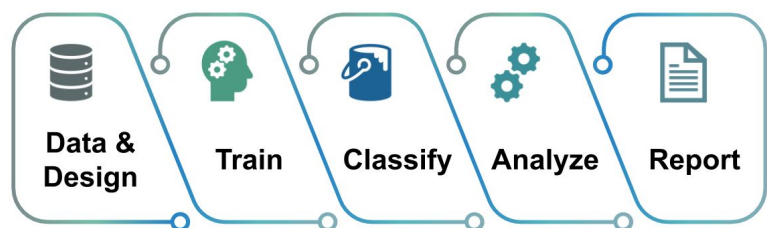
data with it's core consisting of new AI technology for topic discovery. Developed by Bintel, Inc., these AI topic agents combine with document metadata and entity extraction to classify a wide variety of content.

We begin with the *Data & Design* phase. Our training analyst collaborates with organization experts to determine which training courses (or group, section, practice, etc.) would be most beneficial. For example, an organization may desire to compare three new VR training resources or a new VR training method against an established eLearning and/or on-site training method. Establishing these early, helps our team determine initial themes for the analytics.

Data & Design
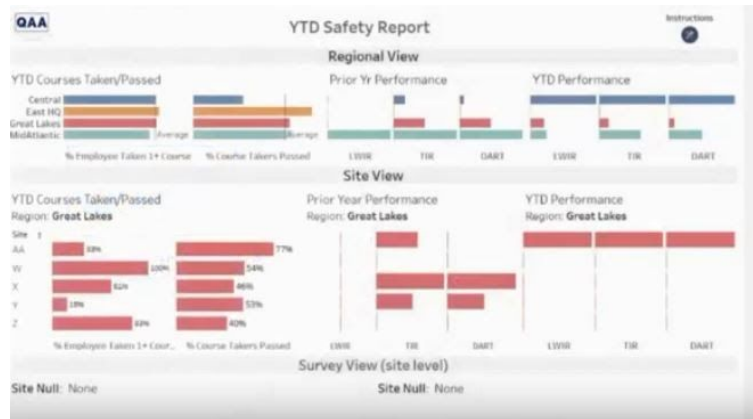
Based on meetings and reviews with experts, our analyst team (training and data analysts) design and develop a baseline dashboard for use as the initial database results. At the same time, our training analyst assists in determining the structured and unstructured data that fulfills the required parameters to answer the desired question(s). As the data is gathered, our team works to normalize any unstructured data.

As we move into the *Train* phase, our team uses the data to identify themes and train agents for each theme. By training directly from the target survey content, the agents ensure consistency with the organization's existing ontology. A key differentiator for our AI system includes our decision to use supervised machine learning. This supervision provides an intuitive flexible tool that once trained delivers consistent results as part of the processing pipeline. QAA's team process for agent training consists of supplying the agent with keywords and samples of the desired topic from the training (or other) content, including sentences and paragraphs.

Train

Organizational approval is given for the taxonomy of the themes and any groupings desired across all training defined.

After completing the first two phases, we transition to the *Classify* phase where our training analyst begins by collaborating with the data analyst to review results. We place the themes in rank order while scoring them based on similarity. Keep in mind, each agent has the ability to analyze millions of paragraphs and return a similarity score (between 0 and 1.5) for each, dependent on how closely the paragraph reflected the topic. Specifically, this technology focuses detection of topics or themes at the paragraph and sentence level as a means to accurately define the context of the text before performing more specific analyses such as sentiment, grammar, entity extraction, etc. This context adds substantial clarity to the structured response data.
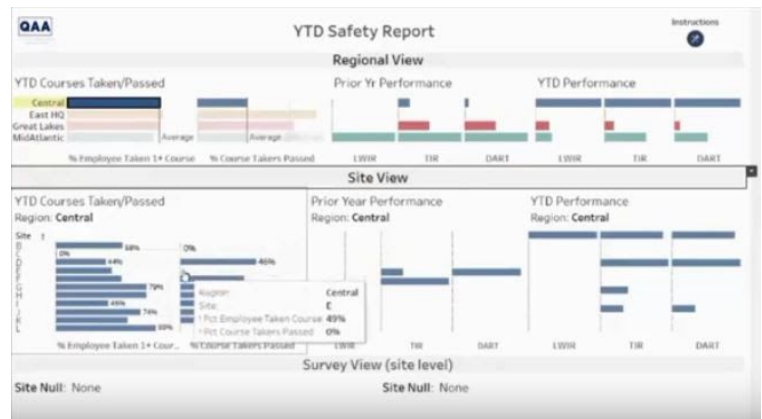
Classify

The similarity scores returned by each agent for each paragraph are consolidated into a final classification of topics. We accomplished this by adjusting the cutoff value for the consolidated similarity scores. This adjustable cutoff feature for classification provides the analyst with more flexibility working across dissimilar survey (or other topic) language.
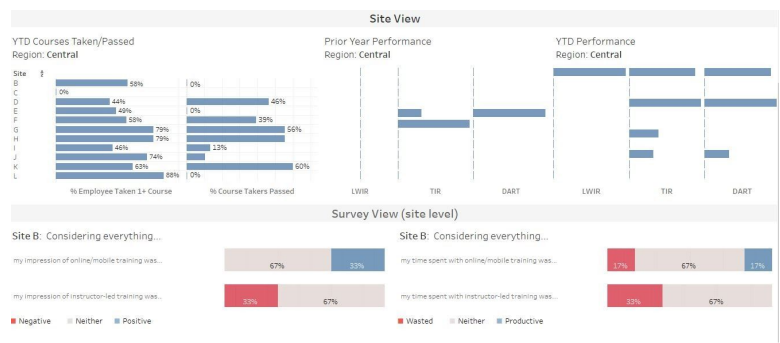
QAA's team reviews the dashboard and results with the organization allowing for feedback. We note any desired adjustments to be made with adjustments to themes. The process allows the analysts to drill down from a consolidated organization global view to the details of a single learner/instructor. The chain of custody and transparency of the data in the underlying database is a standard feature of the AAILAT solution.

During the *Analyze* phase, our data analyst reviews data at intervals to identify relationships, anomalies within themes, and new themes. The data analyst adjusts the themes from the unstructured data as more analysis occurs and more data is received. Our

Analyze

agent training process allows for the boost in score if any specific obvious keywords or regex expressions are found. These additional word patterns discover topics previously missed with a Boolean search. Agents are retrained periodically to integrate relevant new terms and language patterns. Using a normalized similarity score, our AAILAT system is more flexible across large variances in language so the same agents can be used for short survey responses and long form interview analytics.

Our AAILAT system adapts to become more insightful and ascertain more patterns in the data; thereby, expanding the analysis possibilities.

Report

In the final *Report* phase, the data is collected for the identified organizational experts to review. In addition, our training analyst provides monthly, quarterly and annual reports based on the desired training metrics, learning analytics and periodic reporting plan. These reports include details of the questions asked as well other insights not realized until the data was gathered and analyzed. Other details include a summary of the conclusions, data points, insights of learners' needs and recommendations for future training goals or objectives.

Conclusion

The QAA team understands the need to evaluate training solutions. Training resources are limited by cost, time and team; therefore, cumbersome, time-consuming data collection and learner analysis efforts can no longer be the status quo. AI has proven itself to be a solution for achieving reliable and valid results, without human bias and at scale. Because the AAILAT system provides a better method to fuse data from digital and language formats, learning and development teams will be able to analyze and respond more quickly to the training needs of the employees.

QAA is confident that our system provides a cost-effective method by delivering reliable, consistent training metrics and learning analytics to support ROI decisions. It's potential use as a learner analytics include the government, industry, and corporate organizations. Current users of the original technology AAILAT is using include FedEx, NASA, Boeing and SwissRe.

Appendix A: AAILAT Demonstration Videos

QAA developed a small test solution using data from an LMS, survey and generic report information. This may be reviewed in the provided demo links.

	Descriptions
AAILAT Short Demo Version	● Length - 0:58 ● High Level Product Review ● https://youtu.be/0Jy-gsc7UvQ
AAILAT Long Demo Version	● Length - 2:55 ● Product Review ● https://youtu.be/JwubhQMb9tQ

Contact Us to Schedule a Personal Demo & Learn More:

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