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The Roadmap to NLP Success



Introduction

In 2023, AI and NLP are no longer considered optional, but crucial technologies for achieving competitive advantage—now.

Natural language processing (NLP) is the key that unlocks the potential of AI to comprehend and utilize unstructured language data, bridging the automation gap between humans and technology. Together, they help leverage company assets—emails, contracts, customer service interactions, anything that contains text—for new insights that were previously unavailable. Its uptake is being driven by big data, digital transformation, and the rise in human-machine communications. Its use cases stretch across all business operations, from marketing to finance, customer care to sales.

Our recent state-of-the-industry report on NLP found that most—nearly 80%— expect to spend more on NLP projects in the next 12-18 months. Yet, organizations still face barriers to the development and implementation of NLP models. Our data shows that only 1% of current NLP practitioners report encountering no challenges in its adoption, with many having to tackle unexpected hurdles along the way.

With such rapid expansion will come the need for deeper understanding of all the elements at play in your NLP projects. Here's where expert.ai can help. Our experience with over 250 customers and 350+ engagements has taught us a few things about what teams need to be successful for this critical, transformational investment, and that's what we want to share here.

Ramona Aubry
Head of Customer Success, expert.ai

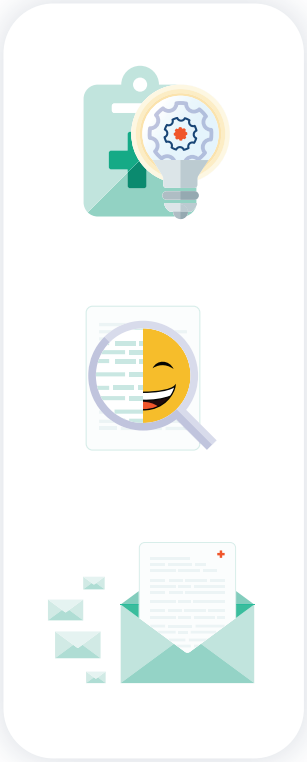
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Use cases:
Where are companies deploying Natural Language Processing (NLP) across the enterprise?

We have seen that investment in NLP is on the rise. The results from our recent survey of NLP practitioners with The AI Journal[1] show that companies have a strong preference for platforms that support multiple use cases, especially those with strong model development and maintenance capabilities and use cases that improve efficiency, provide faster go to market and allow them to meet their core challenge of delivering highly accurate results.

Natural Language Processing (NLP) is being deployed in the enterprise at different levels, depending on the needs of the department using it. IT and Product are typically the departments that embrace this type of NLP project and they are deploying a range of use cases in different categories. Here are some common examples:



A. **Automating language-intensive processes like reviewing medical records.** Insurance companies rely on Subject Matter Experts to analyze a large number of documents and extract key data that is needed to make faster decisions and to optimize time-consuming processes.

B. **Analyzing customer complaints and sentiment.** This use case can apply to any enterprise or organization that deals with customer satisfaction. AI helps remove any bias from customer surveys, and it can help identify the main sources of complaints and how the experts can act on the feedback collected to improve customer service.

C. **Triaging and routing emails quickly.** For organizations that have hundreds or even thousands of emails that they need to read and reroute daily, NLP technology can bring huge efficiency gains by classifying the emails in categories that are associated with specific actions that a department has to make. For example, consider the emails that an IT Support team has to triage daily for thousands of clients that run into issues with the Product they're using. If you're able to identify the issues being cited and rank them based on their level of severity, this allows the IT Support team to focus on solving the most urgent issues and therefore avoid any risk for customer dissatisfaction. It's just one example of how NLP technology can add value by automating a low-value task that can be very time consuming and that can boost the efficiency of teams that are struggling to sift through huge amounts of emails they're receiving daily.

Other examples include:

D. **Automatically tagging content to drive user engagement by improving content navigation**

E. **Cross-linking information that is spread out across different silos to facilitate content discovery**

F. **Extracting key information around themes, individuals, and locations that drive useful insights for an organization's decision-making processes**

G. **Standardizing the way content is classified based on controlled vocabularies and lists that are industry-specific**

All of these use cases are often tied to business objectives that are focused in a few main areas:

- Increasing revenue
- Reducing cost
- Mitigating risk
- Improving employee and client experience

NLP initiatives are also linked to digital transformation programs where unstructured data is at the heart of the business processes and where there is an urgent need to transform this content into language data to streamline workflows that are dependent on this type of content.

It's encouraging to know that four out of five (80%) organizations surveyed have NLP models in production.



Plan for NLP project success: What should teams do to prepare for NLP project success?

Start with Measurable Goals

What we have learned at expert.ai over the last 10 years is that having a success plan really helps ensure a successful NLP Project.

We use joint success plans to translate our product into business value for our customers. It's straightforward and it focuses on three or four key elements. First and foremost, we define the objectives and the desired outcomes that the NLP project will achieve. What this means is that we're associating a key objective that a project is addressing with two or three key results that are measurable.



For example, if the objective is to automate time-consuming manual workflows, we map this objective with a time reduction from 1 hour to 15 minutes to run a business process. This really sets the project for success because we have a measurable goal that we're driving toward.

In addition to objectives and key results, we're helping our customers define the strategy or the plan to achieve these goals and also list the techniques that we'll use. For instance, we can use multiple AI methodologies to build an NLP Solution that extracts key financial information for companies that go through mergers and acquisitions. If there is clarity on what the NLP engine will use (e.g., symbolic AI or machine learning), this builds confidence for our clients that understand HOW we will help them achieve their goals and how we will measure them. Lastly, the success plan lists the key milestones of the NLP project, the action items and the events that need to be executed to enable success.

The first step is the Joint Success Plan that builds alignment between the vision of the NLP project and the expected outcomes. This is our starting point.

Understand the WHY

The next step is to work with the Team to make this happen. An important part of this process is obtaining proof that the organization really understands WHY we're doing this NLP project and how it will impact the organization at multiple levels.

Over the last several years, AI and NLP have rapidly evolved from being aspirational technology to something that is fairly mainstream. This means that there is a lot of education that must happen for organizations that embark on AI / NLP initiatives.

An important area/concept to understand here is that the methodology you choose to implement your NLP model matters. The key is being able to understand the pros and cons in order to make the best choice—this is where you will save time and money.

Rather than being limited to a one-size-fits-all approach, you can choose multiple methodologies to fit your needs. In fact, this is a common approach. Data from NLP practitioners shows that 79% of NLP projects rely on ML while 52% leverage a mix of ML & symbolic or rule-based approaches.

The hybrid approach is now considered a competitive advantage because it combines the best of all worlds: speed, scalability, accuracy and explainability. A recent Forrester report named hybrid AI "the best of both worlds" choice for natural language AI applications:



> "For a future fit, adaptable NLP solution that is out of the box, only requires moderate support and can continuously learn and self improve, look for an NLP solution based on hybrid AI."
>
> —Forrester[2]

Combining approaches allows you to leverage the strengths of ML, LLMs and knowledge-based techniques. Working hand in hand, ML and LLMs can bring quick adaptability and scalability to symbolic AI. On the other side, symbolic is explainable and can help you reach very high accuracy goals. Hybrid scenarios have proven to help solve model drift and/or data drift problems and they are able to deal with the pace at which we receive new information, which is critical for so many enterprise use cases.

In a best of all worlds approach, the different technologies complement one another in important ways. Symbolic can support ML by auto labelling text content to create training data for modeling purposes. Machine learning can be of great support for enriching knowledge graphs or learning from user feedback.

Being able to address multiple use cases is clearly a differentiator. In a survey with The AI Journal, 71% of respondents report using a natural language platform that supports multiple use cases. But this isn't the only important factor. Responsible AI considerations—how explainable, energy efficient and unbiased an approach is—was a consideration in the planning phase for 74% of respondents.

Find the NLP Champion

There are a few things that can help teams be successful when implementing such initiatives. First of all, from a human perspective, it's important for the initiative to have a Champion. This is the person who understands the business value of the initiative and the impact that it can potentially have for the organization. The Champion also builds the vision and educates the rest of the organization on what the benefits will be over the short and long term and how they will be measured. To sum it up, you must start by making sure that the champion of the NLP project has all the support they need to prepare the path to success for the NLP project.



Focus on the Team

Our second recommendation is to work with the Champion to build the team that will lead the NLP project, both from the business side and the technical side. There are three pillars to an NLP project:

- **Technical.** This team knows what NLP/ AI is, they understand that this is a journey that will require collaboration across different parts of the organization, and they also understand the dependencies that this project has with other parts of the organization.
- **Business.** This team supports the initiative and needs to be continuously aware of the risks for the initiative not to succeed. They can serve as an escalation point but also as evangelizers / advocates of the NLP project.
- **Subject matter experts / End users.** This team is the direct beneficiary of the NLP solution and they need to feel comfortable using the solution but also challenge it if it doesn't meet their expectations. In the end, it's the end users who make or break the NLP solution. Their voice is as important because they will be the ones who will measure the impact on their daily jobs.

Once you have the teams in place, you can start working with them and make sure there is alignment on what problems the NLP project is solving and why they need to be solved NOW.

In other words, break the siloes across the organization and get everyone behind the vision of the NLP Project.

Choose Projects with a High ROI

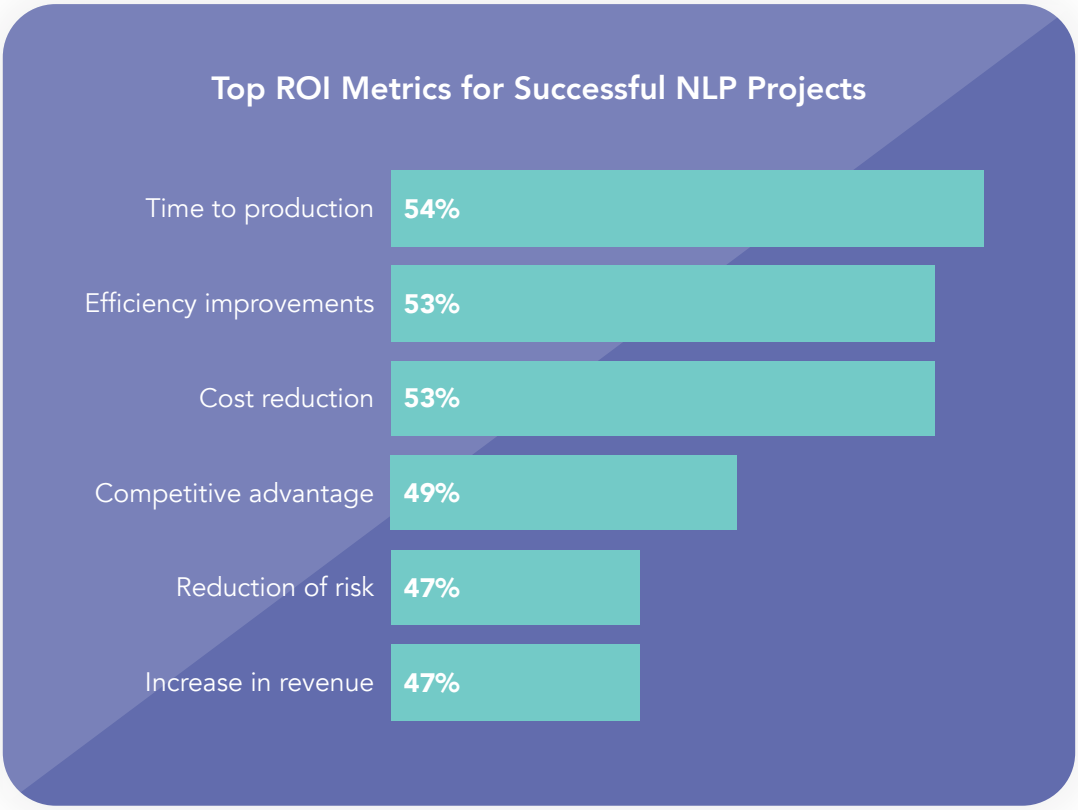
From our experience, choosing the NLP projects that have a high ROI determines the success of the initiative as well. This is something we've seen over and over again in successful implementations.

Our recommendation is to focus on problems that an NLP initiative can solve quickly, and most importantly, on problems that have an immediate meaningful economic impact on the organization.

Let me give you an example. Let's say that the NLP initiative would help end users reduce the time they spend on repetitive and time-consuming manual tasks and allow them to focus more on making decisions based on the data trends that the NLP project made available for them. Everyone is aware of the problem, from the end users to top management who are looking for efficiency gains from a team that is pulling data points manually by reading a ton of documents on a daily basis.

If they can get this time back and start focusing on what the data is telling them, there is an immediate gain for the organization and for the users themselves. And obviously, if there is a way to quantify the economic implications of solving this problem and show, for instance, how much money is saved because the experts are able to focus on more valuable tasks, then there will be support for the NLP initiative because everyone is aware of just how NLP is helping solve an urgent problem that affects the company's bottom line.

A project that solves a well-known problem and gets results can also inspire excitement from the rest of the organization and direct even more widespread support. One of the biggest mistakes is to choose a problem that gets solved quickly but nobody cares if it gets resolved, thus there is no associated impact.



The 2023 Expert NLP Survey Report by The AI Journal

Understand the Change Management Process

An NLP Project is often part of a major digital transformation that will change the way that people work. Such projects can be very disruptive and if not managed well, this can lead to low adoption.

Our recommendation is to enable the teams that are part of the NLP project to get trained, skilled and certified, essentially making sure that they get their hands on the technology. This would avoid the anxiety and lack of understanding of how the NLP project will change the processes that were developed before the project started – this hedges the risk associated with upsetting the status quo. Give the team the freedom to invest in getting those skills and as they tackle AI projects, they see the success, personal growth and development.

Supporting changes in the way people work with technology by upskilling the team can turn into a huge advantage. We see cases where we build an initial NLP project for the team, and they scale up the projects because they've become autonomous in leveraging the technology. End users go from overcoming the fear of change to empowered users that evangelize the NLP success – how they did it, why it helps, how they can help others. Everybody wins!



Prepare for the challenges ahead: What are the most common challenges that a NLP project team will likely face?

The challenges that a project team will face vary according to the level of AI maturity for each organization. For those just starting with NLP in an experimentation phase, the main challenges are around data security and governance.

Data

Data is usually owned by a different team than the team for which the NLP project is being built. As a result, it takes a tremendous amount of time to gather the right data to build for instance training and testing sets for implementation and experiments. There have been cases where we lost weeks without getting access to the right data to start implementing our NLP models, which, as you can imagine, can be very frustrating.

To avoid this issue, we recommend that each organization builds a responsibility assignment (RACI) matrix for an NLP project where we very clearly define the responsibilities that each department has in getting the data and resources they need for the NLP project. More importantly, we position our Champion as the "trait de liaison" (translation: connecting line) with the right Department Heads who are crucial to the NLP Project. This way, we can easily establish accountability from the team who owns the data, controls the quality of the data and eventually transfers the data to the NLP project team.

Conversely, when we get close to the minimal viable project (MVP) stage and we have an NLP project that we can test, we know exactly what department or team we'll work with to integrate the output in the business workflows and start demo-ing the work. This fills the gap with Solution Architecture, and it's a huge accelerator before we go live.

I would add that the same challenge applies for early phase NLP organizations.

Top 3 Challenges by NLP Maturity Level

Evaluation and experimentation phase (no NLP models in production)	Early phase NLP implementation (under two years in production)	More mature NLP models (two years-plus in production)
Data security and governance	Aligning with business stakeholders on which NLP uses cases to prioritizegovernance	Building the business case/ ROI for NLP projects
Building the business case/ ROI for NLP projects	Data security and governance	Achieving the level of accuracy/quality needed to put NLP models in production
Choosing which artificial intelligence approaches to use to achieve the desired model result	Costs associated with NLP modeling and tools	Costs associated with NLP modeling and tools

The 2023 Expert NLP Survey Report by The AI Journal

Data Security and Governance

Regardless of your level of AI maturity, it's important to identify the security and governance issues for each data source or set. This should include information about the provenance of your data, the nature of the information it contains as well as how you plan to use the data. For example:

- Does it include personally identifiable information or other implications for privacy?
- Does it contain images as well as text?
- Is it sourced from data that you own or hosted by third party sources?
- Is it structured, unstructured or both?

Security

- Will you host or have your data hosted in the cloud?
- Is your data protected from unauthorized access?
- Does your approach comply with internal guidelines?
- Is your approach GDPR compliant?
- Are your vendors Certified (e.g. SOC 2, Type 2; ISO/IEC 27001)

Privacy and Legality

- Does your data include any personally identifiable data (PII)?
- Does your training data include anything that could be considered under copyright?
- Do you have practices in place to remove PII or copyrighted material from your data sets?
- Have you allowed for humans in the loop during the training process and beyond?

Methodology

- Do you know where your data comes from?
- Do you know how your data has been labeled?
- Can you explain how your model reached its results?
- Does your model have safeguards for preventing algorithmic bias?

Data Security Governance Considerations



Visibility and Internal Alignment

There are multiple challenges that we see in the enterprise world when deploying NLP Projects and they usually are linked to the visibility that an NLP project has at an organizational level.

The ideal scenario is when the NLP initiative has been presented across the organization as a strategic one, with economic implications for the group. As I mentioned before, if all critical departments are aware of the WHY of the NLP project, then there is an NLP mindset that facilitates the cross-collaboration and teamwork. Obviously, this is the case for organizations that have a certain AI maturity and that understand the importance of keeping things transparent across the board for all the stakeholders that are affected by the NLP project's outcomes.

A second challenge is around the internal alignment across the teams on the expected benefits of the NLP project. Most NLP projects start with a team or two who are aware of how the NLP project is being built, how it's tested and the benefits that this project ultimately has for the organization.

If the NLP project has implications for teams that have not been involved in the early stages of the project, this is a huge risk for the adoption of the project.

We've seen this situation in cases where the NLP project has been built with stakeholders who were not the direct beneficiaries of the NLP project. In these scenarios, there was no alignment between the vision that the executive stakeholder had in mind and the actual end users who were supposed to use the NLP solution. This created a huge gap between the expectations of what the NLP projects should be and what it was.

In this case, we recommend involving the end users in the implementation of the NLP project from the very beginning. We should educate them on how the NLP works, how it will create value for them and, most importantly, this will remove the fear and anxiety of changing another process in the daily lives of the end users.

One advantage of this approach is that we can create great advocates of the NLP solution within the end user base, which will help with the adoption and the optimization of the NLP solution. If the end users understand what's in it for them, this will build alignment with the executive goals and objectives for the NLP project.

Adoption across the organization can only be achieved if there is excitement to get after these challenges, move fast, solve challenges and deliver ultimately a better experience for their customers.

ROI and Costs

For more mature organizations that have experience in deploying NLP, the challenges are different. They need to demonstrate how the value for the NLP projects is quantified, or more precisely, provide a view on the return on investment for that initiative from the very beginning. More importantly such organizations have a long history of experimenting with the technology and they can also position themselves with lessons learned and traps to avoid that would be an obstacle to the success of the initiative.

Organizations with NLP deployment experience also struggle with justifying the costs associated with building or scaling up NLP modeling and tools. Our recommendation for such companies is to leverage the past success with other NLP initiatives and how those helped the organization. If they can demonstrate positive ROI for a specific NLP initiative, it will be easier to advocate for more funding for such projects because we know that NLP projects can be successful and they pay off.

Accuracy

Another challenge is around attaining a certain level of accuracy for the projects. For mature NLP organizations that have experimented with the technology, the expectations are for high accuracy and high reliability of the outcomes of the NLP solution. Time to value can actually be longer than for less mature organizations because there is a continuous need to fine-tune and perfect the results to get closer to an ideal state. In this case, we'd recommend sticking to the 80/20 rule and rather than delay the go-live time, adjust expectations, push the NLP model in production, collect feedback from the end users and improve the solution by small increments. Better is the enemy of good.



Plan for the future: How can NLP teams "future proof" their NLP projects?

One dimension that I believe is underrated is the way that organizations understand AI and NLP initiatives in general. It's what I call AI readiness or AI maturity.

Organizations that embark on the AI / NLP journey need to be aware of where they stand on the AI readiness scale. They need to understand what AI can do and cannot do, to make sure they bring to the table all the stakeholders who will be involved in the journey or who are affected by the journey. And most



importantly, that everyone is aligned on WHY we need NLP, the root problem that will be solved, the desired outcomes, how they will be measured and what happens if we don't solve the problem NOW.

While there are a lot of tools on the market that allow you to assess your organization's level of AI maturity, in the end it all comes down to a few elements that are central for measuring your AI readiness: Culture, Skills and Resources.

Culture

The WHY that I described earlier is very specific to an organization's culture. Is everyone in the organization aware of the impact of AI and how it can benefit the organization? Do they also understand that running an AI/NLP project means investing time and effort in getting and validating the desired outcomes, whether this is owned by the organization or outsourced? The WHY goes hand in hand with the HOW, so each organization that is starting an NLP / AI project needs to educate all the users that will be impacted by the project and get some level of accountability defined from the very start. An NLP project's success is determined by the way that teams work across the organization, the way they help each other get access to data, notifying of problems they encounter with the implementation early on, sharing lessons from iterations of the same project. Culture is vitally important to accelerate the adoption of the NLP projects and AI-mature / ready organizations put Culture and teams at the heart of their AI initiatives.

Skills

A real Champion understands the importance of the NLP project and the implications it has on the organization if successful. If we want NLP projects to succeed, we need to work with Champions or educate Champions that know what NLP is, how it works (at least at a basic level) so they can explain the problems that NLP solves. Most importantly, the Champion can inform on how to build / hire the skilled team that will implement the project or will leverage the benefits of the NLP project.

A lot of organizations fail because they underestimate the skills that are needed to build and deploy and maintain, optimize and adopt NLP projects. They either force their teams to become proficient in AI / NLP too early without understanding the stress and pressure of learning a new technology in addition to doing your daily job, or they choose to keep the teams that implement the NLP project isolated from the end users until the implementation is finalized. We've seen cases where we built a perfect NLP solution that was never adopted because the end users were not aware of the benefits of the solution and they were not educated early enough on how it works and how it will make their lives easier.



Therefore, our recommendation is to build and enable upskilling not only for the technical teams that know how NLP project works but also for the end users / beneficiaries of the NLP project you're building. Competency building is one of the most important criteria for the successful adoption of NLP projects.

Resources

Whether you choose to implement your NLP project or you outsource it to companies that live and breathe NLP like us, there is a critical factor that is often underestimated in the success of such initiatives: the resources that your NLP project will need, whether in terms of accessing the data, sharing it or running experiments with it. As a best practice, we recommend that each organization accurately document how the NLP solution works, how it's connected to other workflows within the organization, and most importantly, how it's maintained and optimized.

We've seen cases where an NLP Solution that was successfully deployed ends up not being optimized because everyone is afraid that if they make any changes to the NLP project, the whole workflow will fall apart, and no one will know how to fix it. To counter this risk, we build frameworks and user guides that will provide a deep understanding of how the NLP project can be further developed and optimized.

The Importance of Responsible AI

Finally, regardless of the business challenges that you are trying to solve with AI, not knowing how your solution arrives at a particular decision is not only a business problem, it will likely be a regulatory problem at some point in the future. That's why it is absolutely critical that the underlying AI solution is able to provide outcomes that are easily explainable and accountable. This is Responsible AI.

When it comes to Responsible AI, as a business owner you should look for platforms that:

- Know (and can demonstrate) how the AI is going to produce the results and without bias (Explainable)
- Provide effective results without excessive energy consumption (Sustainable)
- Ensures the AI approach is able to solve real-world problems (Practical)
- Ensures that humans are in control from the outset and the solution provides them an advantage (Human–in–the loop AND Human-centered)

At expert.ai, Responsible AI is a four-pillar approach:

- **Transparent:** A system that performs tasks and reaches results that are not auditable presents an unacceptable level of operational risk. The 'black box'



phenomenon where it cannot be determined how a model arrived at a particular decision and why something happened inside an AI system is an internal problem, and increasingly a regulatory problem.

- **Practical:** Companies want tools that can transform their ideas into real-world applications that solve business problems at scale, not experiments that never make it into production. As a result, AI-powered solutions must solve real-world problems and provide tangible value to actual users.
- **Sustainable:** Whether driven by shareholders, their own climate pledges or regulations, enterprises want AI systems that are both effective and less energy intensive. Addressing power usage is an easy and logical starting point and this will be a factor in choosing the AI approach, especially when it comes to how data is trained.
- **Human-centered:** AI must capture expertise and humanize the work people perform, allowing them to be more productive, efficient and, most importantly, engaged. Only explainable-by-design and interpretable-by-design AI models offer humans full control during the development and training phases.

Because it includes an option for an open, interpretable set of symbolic rules, hybrid AI offers a simpler way to correct insufficient performance. So, if an outcome is misleading, biased or wrong, users can intervene to prevent future mistakes and achieve the success metrics most valuable for each use case and improve accuracy, all by keeping a Human in the Loop (HITL) who is a subject matter expert. NLP/AI projects will always rely on the human in the loop. The role of the human changes according to how sophisticated technology gets but it's the human that is at the core of each NLP initiative.

We talked about the importance of the teams, the role of each team in the value realization process for the NLP projects. The purpose of AI will never be to replace humans. It's about making humans smarter and their lives easier. Smart AI applications like Natural Language Understanding are powerful because you match technology to people and not the other way around. The future of artificial intelligence is a hybrid model where domain experts pair with technology to provide authentic applications that are the product of human expertise and humane intelligence.

Conclusion

The results of our survey of NLP practitioners tell us that companies' needs for their NLP projects must be able to adapt to the complexity and speed of their business. The issues they are addressing—bringing efficiency to data-intensive processes, being able to respond quickly and even anticipate customer needs—are simply too important to be left to chance or ineffective solutions. Because of the very nature of the challenges you're addressing with NLP, these projects can be transformative for your business. Here, success doesn't happen by accident, but is a result of a clear strategy, the right technology, measurable goals, a plan for the known pitfalls along the way and lots and lots of collaboration.

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[1] Expert.ai, 2023 State of NLP Industry Survey, November 2022. https://www.expert.ai/resource/the-2023-nlp-survey-report/?

[2] Forrester Research, "Hybrid AI Delivers Best Results For NLP Applications," November 2022. https://www.forrester.com/report/hybrid-ai-delivers-best-results-for-nlp-applications/RES178429

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About us

Expert.ai (EXAI:IM) is a leading company in AI-based natural language software. Organizations in insurance, banking and finance, publishing, media and defense all rely on expert.ai to turn language into data, analyze and understand complex documents, accelerate intelligent process automation and improve decision making. Expert.ai's purpose-built natural language platform pairs simple and powerful tools with a proven hybrid AI approach that combines symbolic and machine learning to solve real-world problems and enhance business operations at speed and scale. With offices in Europe and North America, expert.ai serves global businesses such as AXA XL, Zurich Insurance Group, Generali, The Associated Press, Bloomberg INDG, BNP Paribas, Rabobank, Gannett and EBSCO.

www.expert.ai **info@expert.ai**

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