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ANALYST 2.0

REDEFINING THE ANALYSIS TRADECRAFT

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Making Sure Artificial Intelligence Works for the Mission

Artificial intelligence (AI) and other advanced analytic approaches are rapidly becoming integral to the intelligence mission. As our nation's security posture grows more complex, and we need to keep our eyes on more people and places, the volume of critical intelligence data is expanding exponentially. It is becoming difficult for analysts alone to keep pace – there is simply too much data to be brought together and analyzed in the short time frames required by the mission.

The military and intelligence communities recognize that advanced analytics hold great potential, and they are beginning to adopt these emerging technologies. With AI, for example, instead of an analyst spending hours poring over a stream of satellite photos, looking for significant changes, the computer might complete the task in seconds. This frees up the analyst to spend more time on higher-level analysis – reviewing what the computer has found, and then preparing reports for decision-makers that are both timely and comprehensive. In essence, the machines are doing what they do best, so that people can do what they do best.

But this shift – turning over much of the repetitive work to a computer – is also presenting defense and intelligence organizations with a significant challenge. How can they be sure the outputs from the computer are both accurate and relevant to the mission? How can organizations be confident the analytic tools are working for them? The stakes are of the highest order. The expertise of the analyst is vital to national security, and if it is lost or diminished in the human-machine connection, the risk can be significant. What if the computer doesn't have it quite right, and faulty analytic outputs are used by commanders or other decision-makers down the line?

Yet another challenge is that analysts may not accept and use AI-informed analytics – either because they don't trust the outputs, or because they fear that the computers will put them out of a job. There are already examples of this in some organizations. New technology systems are introduced with great fanfare – and then promptly ignored by analysts, who are free to pick the tools they want. And yet without the new technologies, decision-makers won't be able to take full advantage of the available data – something that is essential to keep pace with today's threats.

IDEALLY, AN ANALYTIC SHOULD "THINK LIKE AN ANALYST." BUT THAT CAN'T HAPPEN IF THE ANALYSTS – AND THEIR HARD-EARNED WISDOM AND EXPERIENCE – ARE AN AFTERTHOUGHT.

Unfortunately, most current approaches to AI and other advanced analytics don't resolve these dilemmas – in fact, they only make them worse. With all the hype around AI, data scientists and others are caught up in what the technology can do. For example, they try to build better and better models for pattern recognition, or object identification. But this research is largely academic and theoretical, and not tied to the specific mission at hand. Yes, the tool can look for changes in photos – but is it the kind of change the analyst is looking for? Too often, such contextualization is missing. And when that happens, the tools simply can't be relied upon to support decision-making. Automation and speed count for nothing if the computer gets it wrong.

Most current approaches also do little to win the trust of the analyst. The analytics tools tend to be opaque, so that analysts don't know how much confidence to place in the outputs. And too often, the tools are so complex and user-unfriendly that they require a data scientist or computer programmer to make sense of the analytic results. All of this can give analysts the impression that the real purpose of AI and other advanced analytics is to put them out of a job – rather than freeing them up to do the kind of high-level analysis that attracted them to the profession.

The various problems with current approaches can be traced to the same root cause. In the rush to bring AI and other technologies to intelligence missions, the analyst has been largely left out of the equation. The impulse has been to develop the technologies first, and then figure out later how to deploy them. Ideally, an analytic should "think like an analyst." But that can't happen if the analysts – and their hard-earned wisdom and experience – are an afterthought.

Putting the Analyst First

It doesn't have to be this way. We believe that it's possible – and in fact highly practical – to successfully bring AI-informed analytics to intelligence missions. The solution is not to leave the analysts out, but to make them central to every aspect of developing and deploying AI and other technologies. When analysts play a key role in bringing analytics to the mission, the analytic outputs are much more likely to be accurate and contextualized to the mission. The tools are more likely to be transparent and accessible – and trusted. And the analysts themselves can more clearly see the value of their changing role – and that the goal of the analytics is not to replace them, but to free them up for higher-level work. By putting the analyst first, defense and intelligence organizations can harness AI and other technologies to achieve mission success. This new paradigm is what we call "Analyst 2.0."

One of the chief characteristics of Analyst 2.0 is that there is a close connection between the people who understand the mission – the analysts—and the data scientists and other computer experts who build the analytics. Analysts help guide every stage of the design, implementation, and continuous enhancement of the systems that will serve them. To achieve this, a certain amount of education is necessary. Though analysts need not be data scientists, they must have enough basic knowledge of the underlying technologies and models to articulate their needs. This is similar to the way financial managers must understand the formulas of Microsoft Excel so that they can create worksheets that are customized to their needs.

In the Analyst 2.0 model, the technical teams charged with creating and maintaining algorithms move fluidly between the analytic back office (where AI and other technologies are tasked with discovering and processing data) and the analyst's front office (where analysts review machine-prepared and annotated data). This helps to ensure that the underlying software is catering to operational and mission needs. Bridging the divide between engineers and end-users through regular collaboration is essential. Over time, technical and analyst teams acquire a working understanding of each other's skill sets and gain a growing appreciation of the possibilities and limitations in AI's applicability to the mission.

In addition to powering enhanced machine analytics, AI serves as an important knowledge-management capability, bridging the retiring generation of baby boomers with the digital natives entering the analyst corps. If AI can be trained by experienced practitioners to "think like an analyst" as it processes raw intelligence, hard-earned analytic techniques developed over decades can be captured and disseminated for the benefit of incoming analysts.

WHAT DOES THE ANALYST 2.0 WORKPLACE LOOK LIKE?

New tools and technologies are most effective and lasting when tailored to the analyst's operational environment and mission, so they are embraced rather than ignored. The "killer app" for an analyst is a single interface that fuses multiple streams of raw intelligence at various classifications into a curated, intermediate product that the analyst can work from. Rather than analysts spending most of their time processing raw intelligence, this prepared data is pushed to the analyst, preassembled through a combination of predefined search criteria and automated processes.

Natural language processing allows analysts to task and query the system with a familiar user interface, similar in ease-of-use to what they expect from their personal smart devices. Based on an analyst's specific operational needs, the analytics might, for example, highlight anomalies among relevant data sets, suggest similarities between the analyst's target of interest and other data sets, or call out threats and opportunities that might otherwise go unnoticed. The ease with which searches are tasked and results are viewed allows frequent experimentation, fostering new approaches for tackling difficult intelligence problems.

The user interface accommodates varying levels of expertise and progressive mastery of its features, much in the way that most users of Microsoft Excel derive immediate value in its most basic features and can learn additional functions or extend its capabilities through scripting and third-party plug-ins as needed. Likewise, intelligence analysts operate within a technical framework in which they can incrementally exploit underlying technologies and attach new data sources and data models as they become available, regardless of source or vendor.

To do this, Analyst 2.0 also features open platforms and other architectures, as well as agile, iterative software development. Analysts are not locked into static, proprietary approaches that require frequent vendor interventions to update. Rather, the analytic tools operate within an open architecture design that accommodates multiple current and future technologies, more expansive arrays of intelligence sources, and regular, easy feature modifications. At the same time, AI models are developed on a continuously iterated loop of agile development, where embedded feedback mechanisms enable analysts — working closely with programmers and data scientists — to adjust and fine-tune them to their needs.

EARNING THE TRUST OF ANALYSTS

The Analyst 2.0 workplace we describe constitutes significant change; the real question is whether analysts come to view it as beneficial change that enhances, rather than complicates, their roles and jobs. In transitioning to an Analyst 2.0 environment, it is critical to build and maintain analysts' trust along the way — without it, analysts will simply revert to the tools and workflow they already know and use. Successful automation of rote tasks can be an early test: as analysts experience first-hand that time is being returned to them for higher-value tasks, suspicion and resistance typically fade.

Still, steps to enhance trust among analysts are needed all along the journey. The Mercury Project astronauts who undertook the U.S.' first man-in-space program famously insisted on a window for their spacecraft, in part so that they could manually orient themselves during an emergency. Similar "windows" need to be offered to analysts so they can confidently reorient themselves to new workflows. These "windows" can come in many forms, but their purpose is to reassure analysts they are seeing all relevant information that they need to see. Such systems are so common in the civilian world that they go almost unnoticed. When Google's Gmail service introduced automatic spam filtering, many users did not trust it to pick the right emails for removal. To address these concerns, the interface included a "window" in the form of a segregated spam folder, through which users could verify the algorithm's results. Combined with frequent human feedback to continuously improve the algorithms, the system is now so effective that most users rarely bother to verify its accuracy.

If an analytic has already winnowed down terabytes of data to a humanly manageable level, it should not be taxing for an analyst to manually dismiss the false positives that an AI-assistant will inevitably

produce. But the possibility of false negatives — the failure of AI to flag relevant data — represents a real and mission-critical problem. These concerns can be addressed through trust windows built into the interface that allow the analyst to exercise judgment over how the AI operates. A slider control, for example, can allow an analyst to calibrate the precision of an AI-informed analytic according to the importance of the task, so that even imperfect matches to a query are returned if desired. In time, with regular user feedback about the quality of the algorithm's inferences, the machine learning behind the AI will provide a much greater percentage of useful results and the analyst will come to trust its assistance.

There is only so much that good design will address. Trust also must be earned the old-fashioned way: through frequent and open communication among stakeholders. Such a large change in the institutional culture can be disruptive, so attention to change management and effective strategic communications is essential to minimizing uncertainty among the workforce. With Analyst 2.0, analysts are encouraged and empowered at all stages to take ownership over these changes to their workflow.

MOVING FORWARD WITH ANALYST 2.0

AI and other analytic approaches have the potential to fundamentally alter human work patterns, and analysts are justifiably wary of these changes. With the hype surrounding the promise of AI, some analysts may worry that the intention is not to assist them, but rather to replace them. The reality, however, is there is no AI technology on the horizon that can replace human judgment, and there has never been a greater need for the expertise of human analysts than today.

But without Analyst 2.0 tools, analysts will continually fall behind in their capabilities relative to their potential. Readiness will degrade as analysis fails to keep pace with incoming data and the expanding needs of military and other national security decision-makers. In an age where anything that can be sensed is recorded, it is simply impossible to make sense of the known digital world without the assistance of AI-informed analytics.

Technology is an important piece of Analyst 2.0. But technology alone will not enhance national security. By making sure that new intelligence tools are not just AI-informed, but analyst-informed as well, organizations can tap the potential of advanced analytics to empower analysts and enhance operational and mission effectiveness.

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