Can MT really help the Department of Defense?

Nicholas Bemish
Sr. Human Language Technology Advisor
Defense Intelligence Agency
Washington, D.C.
nabemis@dia.mil

Abstract

The DoD already makes extensive use of machine translation and language support tools in a many environments to address a variety of communications, training, and intelligence challenges, and has done so for over 30 years.

Mr. Bemish draws on his personal experience deploying MT, as well as his broad exposure to how translation technology is used in the branches of service and in military intelligence, to describe current uses of translation technology across a range of organizations within the DoD. He also addresses the technical issues that slow deployment and the cultural challenges involved in setting expectations and introducing technology that changes the way people work.

Can MT Really Help DoD?

I chose this subject because it is probably near and dear to everyone that deals with MT, regardless of whether you are a researcher, commercial developer, or government user. Mike Dillinger our current Association President, has addressed this topic in his classes at various Universities and can attest to the challenges we face when explaining the need, capability, maturity, and effectiveness or current MT tools

This topic sounds like I am taking a skeptical viewpoint and that is because this is the typical question I receive at most venues that I attend where MT is mentioned. I am constantly providing clarifications and educating people on the value of MT within the confines of their DoD related business process and specifically the intelligence analytical and exploitation process overall.

MT results within DOD are not as tangible as those found in the commercial world. We don't typically measure the results against bottom line costs and how much we may save in our overall manpower numbers. A success within DOD can be as simple as a soldier using an MT tool to break down the cultural barrier when talking to locals on patrol and possibly defusing a potentially dangerous situation or using MT tools in workflow business processes that handle gigabytes if not petabytes of foreign content data. We attempt to capture some metrics that show a value of the entire process or represent the exploited volumes as aggregate totals; 5 terabytes captured a week, 1000 documents gisted per day, 300 translations completed per month etc... These are mainly used to show overall production value and not as an example of how well tools or processes are working.

1 Observations

Most of my "customer base", those within my agency that I support, and within the greater IC and DoD, are skeptics and reluctant to change from their tried and true methods which typically involve linguists as the only solution. Defining the capability that best fits the collection and exploitation requirement as well as mitigating concerns of the customer as to how the tools will benefit them and increase their production capacity in a meaningful way are some of our more significant challenges. Researchers will say that finding the correct algorithm and developing the tool is pretty significant, but I have to submit that talking someone into using something new and "foreign" can be even more difficult.

Determining needs and requirements is an integral part of the process in getting MT solutions into the hands of users. The National Intelligence Priority Framework and the Strategic Language Lists developed by DoD and federal agencies prioritize the Intelligence Community's needs and can change, sometimes rapidly, causing additional problems in meeting those needs. Oftentimes we do not effectively capture the stated and validated requirements to implement a tool that could streamline the manual process it takes to exploit foreign language information. In some cases, understanding the need from the user's perspective and being able to "translate" that into an enabling tool that supports their business process can be challenging. Most times when looking at how

people perform their basic tasks when dealing with foreign language, whether it is someone that performs a basic "triage" synopsis; conducts a full translation, or only requires a "gist" to determine the contents value and make an assessment, we overlook the simplest means to provide them assistance. That is not to say that MT solutions, regardless of their current state or expected capability, are simple solutions. They present challenges with adoption, integration, accreditation, and general acceptance by a community that is not always ready for change.

Current MT tools being employed by DoD like IBM Mastor, SRI IraqComm, Fluential Speaking Minds, Marine Acoustics Phraselator, and Polar Rain's Kenai III have and still prove their value on the battlefield and with units in Iraq and Afghanistan.

Can MT help DoD? I believe the answer is a qualified, YES it can. We have proven this through numerous specific instances and with technology solutions where the underlying MT engines can be found in several of the following programs. You have seen and heard throughout this past week numerous examples of their value to DoD and other federal agencies. I will discuss and recap only a few of the programs that are currently being used within DoD. I will discuss specific examples where their value assisted in the Intelligence process; all unclassified and available through open sources.

1.1 US Army INSCOM's DOCEX Suite employment worldwide

In 2002, the Army, specifically their Intelligence Command, determined that their subordinate units required some level of MT capability to offset the deficiencies they faced in having the required number of available linguists with the requisite skills needed to exploit large collections of foreign data. They contracted to have built a tool suite that could ingest foreign documents and push the information to various nodes in their workflow – part machine and part human intervention. This is as it should be. In building and testing this capability, and using Army Intelligence TTP as the model, it was determined that with the combination of tools and personnel, 14 steps in their workflow were eliminated and time and costs were saved. This led to the limited adoption of the "proof of concept" and cleared the path for further development and refinement of the tool suite so that it could be deployed in support of Operation Iraqi Freedom. Initially, it supported the various detainee operations in theater and then assumed the function of performing the task of "looking" for WMD information in the large cache of documents collected throughout Iraq. This DOCEX tool suite was instrumental in helping Dr. David Kay complete his findings on WMD for Congress and was featured as an integral part of the mission on Tom Brokaw's NBC evening news broadcast in 2003. That initial "prototype" evolved into what is known today as the DHDS DOCEX Suite and is used throughout the IC as a workflow management tool moving information from ingest to screening to translation to the Harmony repository for analysts to review and exploit.

1.2 DIA's TripWire Analytic Capability (TAC)

TAC or TripWire, is an emerging platform that DIA is employing within its functional analytical divisions. TAC enables users to comprehensively, persistently, and collaboratively examine problem sets in real-time. TAC employs SysTran language tools to perform MT of selected foreign language RSS alerts and is in the process of integrating Language Weaver to enable MT results for Arabic and Chinese.

1.3 Counterintelligence Field Activity (CIFA) (now DIA's) GlobalView

This capability was initially developed to support the collection and consolidation of counterintelligence case files from all the services and was intended to support both current CI investigative actions and past "Unknown Subject" or UNSUB investigations that were quite dated and needed to be closed out. It is being actively used by multiple federal agencies collaborating jointly on Red Eye Task Force; has supported the DoD Abu Gharib Investigations; consolidated CI Espionage Case information; and provides support to various DoD Service and DCIS investigative cases. GV has integrated MT engines supporting 60+ languages. The use of imbedded MT tools within the GlobalView system provided counterintelligence and federal law enforcement investigators from Defense Criminal Investigative Service, Naval Criminal Investigative Service, OSI, FBI, the Office of Export Enforcement and many others the information they needed to prosecute several Conspiracy cases with the past few years. Examples of these include: Ko-Suen "Bill" Moo, a Taiwan national plead guilty to charges of violating arms export control laws and for being a covert Chinese agent. Moo conspired with a French broker (Voros) to sell China AGM-129 advanced cruise missiles, missile bodies and components, and helicopter and fighter jet engines. Andrew Huang ran an Export "front" company in Connecticut and was indicted on conspiring with Chinese officials to sell $27 million in telecommunications equipment to Iraq from 1999 to 2001. Four owner-operators of a N.J. "front" company, Laurel Industries, were sentenced in federal court after pleading guilty to charges that they illegally transferred export-controlled technology used

in radar, "smart" weapons, jamming and communications to China. All four are of Chinese origin and are naturalized citizens of the United States. They admitted they falsified shipping documents to conceal the type of the technology they were selling. Iranian businessman Abbas Tavakolian was sentenced to 57 months in prison after pleading guilty to export violations to sell Iran components for F-4 and F-14 fighter jets. The protection of U.S technology is a significant are of interest and has seen increased activity by foreign governments to acquire controlled technologies. Using advanced tools like MT has allowed analysts and investigators to see data that would have taken years to translate and compile. They have been able to relate various forms of information produced in multiple languages into understandable "leads" that has led to numerous arrests and convictions and has served as a deterrent for others attempting to engage in these activities.

1.4 ARGUS

The ARGUS application has gained beneficial use within the past 3 years across DoD and the federal medical intelligence community. The primary purpose of ARGUS is to exploit foreign information data sources for information related to global biological events and provide indications and warnings. Analysts, through the use of this capability are able to apply social network analysis, data mining, RSS exploitation, Video/Audio Exploitation, and All-Source analysis to support the intelligence process. ARGUS applies a Bayesian Network approach to collection and analysis. By searching across the web for any foreign media reporting that provides indications of disruptive biological outbreaks, we can determine the extent and severity of the activity. In some cases, we can determine through open source reporting, the indicators of possible outbreaks and provide recommendations or solutions to decrease the spread of the event. Applying this model allows analysts to focus on the relevant data through the use of "alerts" or "morning reading lists" and to be able to make sense of the actual articles and information highlighted. Currently, ARGUS supports 13 indexed languages and has integrated 8 MT engines.

1.5 Language Learning

Language learning, sustainment and maintenance, is an area that DIA has made significant strides. Through the use of web-based language training tools and state of the art testing facilities, DIA is able to provide its workforce the tools needed to maintain and achieve acceptable levels of competence in a multitude of Tier 1 or "critical need" languages. DIA also offers employees access to virtual and distant language learning tools that provide basic language and culture learning to more advanced studies. Online, virtual, and DOD provided accounts to language learning providers like SCOLA, offer our civilian workforce the ability to maintain languages that would atrophy with time and limited use. Providing access to tools like BBN's Broadcast Monitoring System and IBM's TALES also provides our language learners the ability to see and hear real-world content that is relevant and meaningful.

1.6 HLT as an Enabler

Key to making HLT an enabler to DIA is coordination of effort and a centralized approach to HLT development and implementation. All too often, elements have varied missions that require specialized tools that in some cases can be mutually supportive or adapted to other uses. These tools, specifically language related technologies, come from a finite group of developer companies and are generally in use throughout other IC activities. Leveraging the development costs, implementation solutions, open code architecture, and enterprise wide government use licenses will benefit "the many vice the few".

DIA's goal is to deliver HLT solutions to the collection managers, analysts, collectors, and decision makers that make data more useful and timely. Proper use and employment of MT tools and other HLT capabilities will result in data discovery and exploitation in a matter of days and hours vice weeks and months. HLT will not replace the "human" factor in exploiting foreign language information, but if properly implemented and incorporated into a sound business process, it can reduce costs in both time and manpower and increase efficiency and productiveness.

Within DoD, the Joint Intelligence Preparation of the Operational Environment (JIPOE) process is being used to develop strategies for employing tools and technologies across a wide range of collection initiatives. A broad spectrum of the DoD community as well as the research and commercial development communities are working together to determine the best approaches and practices that will help us retrieve predictive or inferential data on domains such as WMD and terrorism connections. Using MT tools similar to the ARGUS approach and others, we should be able to discern patterns, identify key indicators, link both state and non-state actors attempting to do harm, and influence the operational decision making process.

Everyone usually states that MT is not the panacea to solve our problems in addressing the exploitation of foreign language information. We always hear that we should minimize the level of the capabilities and manage expectations of what the technology can do for the

customers. Don't oversell the tools. Educate and explain their benefits and drawbacks.

Within DoD we face many persistent challenges in employing MT tools that could produce effective results; the challenge of adopting new technology; the challenge of changing our business process and doctrinally proven methods; the challenges of funding sources, and how we can pay for development and implementation in an era of competing priorities; the challenges of security and bandwidth; the challenges of acquisition systems and procedures; the challenges of coordinating within the IC and DOD CIO framework; and the challenges of collaboration across multiple government partner agencies competing for the same goals and objectives.

These are not easy challenges to overcome. As we continue to employ those MT tools that provide benefit to the US government, within DoD and the IC, we will learn lessons that we can hopefully share amongst ourselves, researchers, developers, and users alike, that will enable us to develop even better systems that produce better results and eliminate the "fear of the unknown" when dealing with MT and all the related Human Language Technologies.

Closing

Can MT really help DoD? It can when used correctly. It can when used for the purposes that it was designed. It can when employed with other tools to include the human kind to ensure accuracy and maximize its effectiveness. I have shown you some examples of how we are using it in support of the IC. Can we do more? Yes. We will continue to balance the usefulness of the tools with the varied and somewhat nuanced missions that we perform and look forward to a continued dialog with the community of experts assembled here to help us achieve that goal.

Acknowledgments

Dr. Christina Brown, CI/LE DOCEX, DIA
Mr. Dale Johnson, CACI, CI/LE DOCEX, DIA
Dr. Kristen Summers, CACI
Ms. Deborah Farroha, PM, TRIPWIRE, DIA
Mr. Frank Connors, PM ARGUS, DTRA
Mr. Paul Lehner, MITRE, Project ARGUS