

The ODNI-OUSD(I) Xpress Challenge: Machine Generation of Analytic Products

This is your secure and confidential Project Room for the Challenge. From here, you can receive the Challenge details, submit your solution proposal, ask questions, and receive answers confidentially from the InnoCentive team.

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The ODNI-OUSD(I) Xpress Challenge: Machine Generation of Analytic Products

Award: **See details**
Status: **Under Eval**
Active Solvers: 387
Posted: Apr 06 2017
Type: RTP
Challenge ID: 9933982

Agreement (/ar/workspace/agreement?challenge=9933982) 1 Messages (/ar/messageSolver/index/9933982) Share

Detailed Description & Requirements

The logo for the Xpress Challenge. It features a stylized 'X' composed of four parallel diagonal lines in blue and gold. To the right of the 'X' is the word 'XPRESS' in a large, bold, blue sans-serif font. Below 'XPRESS' is the word 'CHALLENGE' in a smaller, blue sans-serif font, with each letter spaced out.

XPRESS CHALLENGE

Background

In general, an analytic product is generated any time a person digests information and produces a report based on that information. This activity occurs in businesses large and small, as well as government agencies from the federal government on down to local governments. Quality reports go beyond simply restating the facts, providing unique analytic insight on how and why a topic of interest is relevant to the consumer(s) of the report. Basic reports involving strictly numbers are now routinely generated using automated systems as simple as spreadsheet macros. Reports based on textual information, however, are much more difficult to produce. This means many hours are spent by analysts generating the product rather than working to understand its implications, interacting with others, and developing options that a policymaker could consider should they choose to take action.

Intelligence products crafted and used within the U.S. intelligence community (IC) are generally focused on topics with national security implications. As such, these products provide insight on how and why an event or series of events can affect the interests of the United States, addressing the provided question(s) in a manner that is relevant to U.S. policymakers and that goes beyond the facts to identify the impact for the United States or its allies. Generally, intelligence products include (a) a main point that includes a “what” and “so what” along with new insights or new information for a generalist, (b) implications for the United States (the “so what” for the United States), and (c) perspective to understand the event, trend, situation, or story through context or comparisons.

The internet provides us with some insight into current capabilities for machine-generated intelligence products. A primary goal of the Seekers, the Office of the Director of National Intelligence (ODNI) and the Office of the Under Secretary of Defense for Intelligence (OUSD(I)), for this Challenge is to discover current capabilities and spur interest in, and further development of these capabilities from both familiar and unfamiliar sources. This Challenge is in some ways similar to the Grand Challenge issued by DARPA designed to generate interest in development of autonomous vehicles. We would likely not be where we are today in terms of the sophistication of those vehicles had DARPA not issued the first challenge in 2004.

The Challenge

ODNI and OUSD(I) seek to uncover current capabilities and the ultimate feasibility of using natural language processing (NLP) and related artificial intelligence technologies to craft intelligence products with national security implications. Solvers are requested to generate algorithms capable of addressing the following general question:

What developments related to “field x” (where “field x” = cyber threats, artificial intelligence, etc.) are most impactful to the national security of the United States?

A **sample response** addressing the above question related to cyber threats and scored using the scoring rubric presented below is provided to aid Solvers in understanding the nature of the Analytic Product sought. The sample is available as an attachment in *Sample_Analytic_Product_Xpress_Challenge.pdf* (<https://www.innocentive.com/ar/workspace/viewAttachment?challengeAttachmentId=634>). **Scored evaluation** of the sample response is provided as an attachment in *AIS_Response_Evaluation_of_Analytic_Product_Xpress_Challenge.pdf* (<https://www.innocentive.com/ar/workspace/viewAttachment?challengeAttachmentId=631>).

For the competition, Solvers are asked to craft machine-generated responses to the below question:

What developments related to artificial intelligence are most impactful to the national security of the United States?

Solvers must **utilize only the content provided** specifically for this Challenge contained in the Challenge attachment *SIGNAL_Articles_Xpress_Challenge.zip* (<https://www.innocentive.com/ar/workspace/viewAttachment?challengeAttachmentId=626>) available through the Attachment sidebar at right.

This content consists of approximately 15,000 articles and blog entries from the SIGNAL website (<http://www.afcea.org/content/?q=signal>) presented as individual files zipped for download. The Seekers gratefully acknowledge the assistance of AFCEA International (<http://www.afcea.org/>) in executing this Challenge by providing SIGNAL (<http://www.afcea.org/content/?q=signal>) content for use by Solvers participating in the Challenge. AFCEA is a member-based non-profit organization that provides thought leadership, education, engagement and networking opportunities in a variety of areas, with a focus on Intelligence, Defense and Security. Please see the **Data Use Agreement** within the Challenge-Specific Agreement for this Challenge for acceptable use of the provided data.

The question(s) used to validate Solvers' responses will be similar to that above, but will address a separate technical area. The same database content will be used for the validation stage of this Challenge.

Systems used to address this Challenge must meet the following **Technical Requirements**:

1. Must generate analytic product using **no human intervention** other than input of the question to be addressed.
2. May **only utilize content provided** for this Challenge available through the link above.
3. Must execute **without internet access**.
4. Must be able to address other questions posed in the format presented above without human alteration of the system.

Analytic Product Guidelines

In general, quality submissions will provide unique analytic insight on how and why an event or series of events can affect the interests of the United States, addressing the provided question(s) in a manner that is relevant to U.S. policymakers and that goes beyond the facts to identify the impact for the United States or its allies. Wherever possible, submissions should include (a) a main point that includes a "what"¹ and "so what"² along with new insights or new information for a generalist,³ (b) implications for the United States (the "so what" for the United States), and (c) perspective to understand the event, trend, situation, or story through context or comparisons.

While Solvers should, in general, structure their analytic products per the format provided below, deviation (for the purposes of the **Creativity Award**) is allowed as long as the Literal, Inferential, and Evaluative elements offered in the Evaluation Methodology and Award Schedule (attached) are included. In general, Solvers' submission should adhere to the following guidelines:

1. The main point of the analytic product leads to distinct, forward-looking **implications for US national interests**. Moreover:
 - Implications for the United States can include both **why it (the main point) matters for the United States, how it relates to US policy/interests, and what opportunities/levers/options exist for the policymakers to consider should they chose to react to/influence the situation either unilaterally or by leveraging others.**, and
 - Implications may be short- or long-term, and may include warnings (e.g., to avoid, or mitigate the effects of, threats or dangers) or opportunities (e.g., to gain advantages), and
 - The implications for the United States may be implicit, but in such a case a generalist should be able to grasp them without confusion or doubt and articulate them explicitly, and
 - Immediate or critical implications should be described or at least foreshadowed in the lead.
2. The product provides sufficient perspective⁴ to understand the event, trend, situation, or story and its implications through context or comparisons. Moreover:
 - Understanding can be enhanced by explanations of why something has occurred, or how it is different or the same—e.g., noting unprecedented events, and
 - The product identifies fundamental changes, including changes in our assessments, and the reasons for the changes. This can include explanations of causation or key drivers (of actors, circumstances, or interactions).
 - Context and comparisons can be qualitative or quantitative, and can include:
 - a. recent and historical events, or
 - b. background information, or
 - c. a sense of scale, or
 - d. historical or cross-national comparisons, or
 - e. analogies
 - Some useful comparisons are:

- a. different activities or conditions of the same country (or organization) at the same time (e.g., how do country X's tax revenues last year compare to its spending last year; or how does country X's defense spending last year compare to its GDP last year), or
 - b. similar activities of the same organization at different times (e.g., how many tons of heroin were handled by cartel X last year compared to previous years), or
 - c. similar activities among different groups at the same time (e.g., how does terrorist group X's use of social media over the last three months compare to that of other terrorist groups in the same time period), or
 - d. similar activities among different individuals at different times (e.g., how often do senior military officers in country X run for political office compared to senior officers in other countries).
3. The product makes judgments about the message, and does not just provide reports or simple factual claims. Moreover:
 - Applicable judgments must concern at least one of these: (1) the "what," (2) the "so what," or (3) the implications for the United States, and
 - Judgments are typically inductive generalizations or deductive conclusions (based on analysis, logic, and substantive expertise) that explain the facts or reports or their import, and
 - Judgments often are indicated by the use of certain words or phrases, including "because," "we assess," "probably," "likely," or "almost certainly means."
4. The product provides credible, compelling, and objective reasons for accepting its factual claims⁵ and judgments. Moreover:
 - Reasons can be **data, information, reporting, assumptions,⁶ precedents, or inferences,⁷** and
 - For reasons to be **credible** and **compelling**
 - a. Information is relevant and clearly sourced appropriate to the format of the product. This may include
 - b. Explanations of the quality, reliability, and access of the sources of information, and
 - c. The product explicitly notes key assumptions⁸ and inferences, and
 - d. Precedents are relevant and applicable, and are themselves based on credible evidence.
 - The product **links the reasons** for accepting a judgment to the judgment **logically, consistently, and clearly**. Additionally:
 - a. **All key judgments are supported** by convincing **argumentation** that
 - i. Identifies critical weaknesses of reasons, counter-examples or counter-evidence, critical information gaps, or the potential for deception and the potential effect on judgments, and
 - ii. Avoids contradiction, bias, or advocacy in reasons, logic, and presentation, and
 - iii. Avoid logical pitfalls such as tautologies and circular logic, and
 - iv. Anticipates and addresses readers' critical questions that arise from judgments. Readers would not have any obvious, unanswered questions about why they should accept the arguments in support of analytic judgments, and
 - b. Qualifiers used in judgments (probably, may) are explained and justified, and
 - c. All "if ..., then" and "because ..." logic statements are clear and plausible in the linkages they make, and
 - d. The argumentation may express and explain uncertainties and may offer confidence levels in judgments, and
 - e. Argumentation is enhanced when reasons and linkages from multiple disciplines are brought to bear.

While the following formatting specifications should be, in general, followed by Solvers for structuring their Analytic Products, deviation (for the purposes of the Creativity Award) is allowed as long as the Literal, Inferential, and Evaluative elements offered in the Evaluation Methodology and Award Schedule (attached) are included

- I. **Title:** Up to 2 lines
 - a. Includes the **Country(ies) or Region(s)** involved and conveys a sense of the main development and a **so what, why, impact, or implications**

b. Reflects the **Bottom Line**

II. **Lead (1st) Paragraph:** Key points are in ***boldface italics***

- a. Lead sentence is **analytic**
- b. Builds on the title without being redundant
- c. Provides a **current peg or hook** (What is new?)
- d. Provides **what** is happening **and why** or **why now**
- e. Identifies the **main actor(s)**
- f. Provides **what next** and **implication(s)**

III. **Second (2nd) Sentence and Supporting bullet(s):**

- a. Provide information from reporting that shows **what is happening**
- b. Provide facts that satisfy the expectation created by the lead sentence
- c. Bullets provide **relevant supporting evidence** drawn from all sources

IV. **Following Paragraph(s):** Key points are in ***boldface italics***

- a. Explains **why** the main actor is acting (motivations, intentions, goals)
- b. Explains **what** is likely to happen next, provides more **what** or other evidence or background that put the development in context
- c. Bullets provide **relevant supporting evidence** drawn from all sources

V. **Final Paragraph:** Key points are in ***boldface italics***

- a. Provides the **implications** for the US
- b. Discusses the **impact** of the new development,
- c. Provides an **outlook** for the situation
- d. Bullets provide **relevant supporting evidence or reasoning**

Notes and Definitions

¹ **“What”**: A description of the event, trend, situation, or story. It may cover what is happening, has happened, or assess what appears to be happening.

² **“So what”**: An explanation of how or why the “what” matters; “what’s next,” the outlook, or alternative outcomes; or risks, opportunities, or other implications for **foreign actors**.

³ A **generalist** is a customer who is actively engaged on world issues but does not follow in detail the subject matter covered in the product.

⁴ The amount of **perspective** should not obscure the key points or focus of the main point.

⁵ **Factual claims** typically are assertions that merely restate or aggregate reporting. Some products assert a “what” by claiming the straightforward occurrence of an event or existence of a condition. Less commonly, some products assert the “so what” as a factual claim. Even factual claims should be backed by reasons—typically some form of reporting from credible sources.

⁶ **Assumptions**: Judgments that are merely asserted, believed, or accepted in the absence of convincing evidence or logic.

⁷ **Inferences** are conclusions reached on the basis of reasons or logic. If a product states that the reason it judges a military unit is an inactive reserve unit is a pattern of absence of activity at the unit’s garrison location that is a logical inference based on indirect evidence.

⁸ A **key assumption** is an assumption that must be true for the argument to be sound.

⁹ **Reasons** (including inferential claims) can be direct evidence, assumptions, precedents, or logical inferences.

Evaluation Methodology and Award Schedule

Xpress Challenge awards are structured to recognize and reward increasing levels of analytic sophistication. Solver submissions will be evaluated using ODNI’s *Rating Scale for Evaluating Analytic Tradecraft Standards (RSEATS)*. Specifically, Solver’s submissions will be evaluated based on how they describe the quality and credibility of underlying

sources, demonstrate national security **relevance**, properly express and explain **uncertainties** associated with major analytic judgments, **distinguish** between underlying information and the assumptions and judgments of analysts, incorporate analysis of **alternatives**, and demonstrate and use clear and logical **argumentation**.

With the exception of the **Creativity** award, Xpress prizes will be awarded in the areas and amounts shown below based on a blind review by ODNI’s Analytic Integrity and Standards (AIS)—the IC’s established body for reviewing IC-wide analytic products. The **Literal**, **Inferential**, and **Evaluative** award areas are derived from AIS’ existing RSEATS evaluation criteria and progressively gauge the narrative sophistication of Solvers’ submissions. The **Creativity** award area will be based on a selection by a panel of senior USG officials chosen by the Seekers. In an effort to promote early science, technology, engineering, and mathematics (STEM) education, the **Early STEM Education** awards will be awarded to the highest-performing high school team Solvers that produce the best cumulative score from AIS evaluation of the **Literal**, **Inferential**, and **Evaluative** award areas. The **Overall Best Submissions** award area will be awarded to the Solver(s) that produces the best cumulative score from AIS evaluation of the **Literal**, **Inferential**, and **Evaluative** award areas. To be eligible for an **Overall Best Submission** award the submitted Analytic Product must receive a score of **Fair (1)** or above for each evaluation criteria. Winners in the category award areas of **Literal**, **Inferential**, and **Evaluative** are determined by the highest score for the criteria in the respective category regardless of performance in the other categories. Full details of the evaluation criteria are presented in *Evaluation_Methodology_and_Award_Schedule_Xpress_Challenge.pdf* (<https://www.innocentive.com/ar/workspace/viewAttachment?challengeAttachmentId=632>) in the attachments to this Challenge.

Xpress Challenge Award Schedule

Award Area	Award Criteria	Prize Award
Literal	Ability to craft sound written material in response to the posed intelligence question	\$50,000
Inferential	Ability to discern and characterize how offered reasons ⁹ support analytic judgements and conclusions	\$50,000
Evaluative	Ability to make reasoned assertions and incorporate alternative analysis	\$50,000
Creativity	Selection from Xpress Challenge Steering Group members	\$50,000
Early STEM Education	Three highest cumulative scores of Literal , Inferential , and Evaluative award areas from high school student teams	\$15,000, \$10,000, and \$5,000*
Overall Best Submissions	Five highest cumulative scores of Literal , Inferential , and Evaluative award areas	\$100,000, \$75,000, \$50,000, \$30,000, and \$15,000
Total		\$500k

*Awarded directly to the students’ represented school.

A product may perform well in one or more of the three categories but fall short of standards in one or more of the others. For example, a product may have a strong message that addresses the posed intelligence question, but express weak argumentation that obscures or undercuts its value. Evaluators will do their best not to conflate categories.

Project Criteria

The Seekers are interested in determining just how far along we are toward achieving the goal of machine-generated finished intelligence. This Challenge poses a representative question to be answered using a completely automated system to generate a finished intelligence product. ODNI and OUSD(I) **do NOT seek any rights in the systems** used to generate the product and only wishes to assess the state of the art in the area of machine-generated intelligence. Systems capable of winning this Challenge will be of use not just in the intelligence community, but across government agencies and the business world.

Final submission packages will be composed of three parts—a Detailed Description, an Analytic Product, and a Bibliography. Although Solvers' Bibliographies will be reviewed by the Seekers, only the contents of Solvers' Analytic Products will be evaluated. Solvers will have 90 days from the posting of this challenge to prepare their response packages. Solvers should adhere to the following formatting requirements:

1. **Analytic Product:** A substantive, focused, machine-generated analytic product (limited to 2 pages in minimum 12-point Times New Roman font, appropriate for single-sided, single-spaced 8.5 by 11 inch paper, with 1-inch margins;
2. **Bibliography:** A numbered list of citations (any significant claims or reports of success must be accompanied by citations, and titles and file numbers to the relevant sources **MUST** be provided);
 - a. Information is portrayed accurately as reported
 - b. Information has appropriate source attributions
 - c. Footnote citations are visible in the Analytic Product text (for the AIS evaluation team)
3. **A detailed description** of the system and how it addresses each **Technical Requirement** presented in the Detailed Description of the Challenge. The project documentation should include a well-articulated rationale for the methods used. **No proprietary information should be included** in this documentation.
4. A completed **Academic Institution Acknowledgement Letter** if required. See Eligibility for details and Challenge Attachments for a letter template (<https://www.innocentive.com/ar/workspace/viewAttachment?challengeAttachmentId=627>).

The award is contingent upon evaluation and validation of the submitted Solutions by the Seekers. Solvers with the highest-ranking submissions will be asked to provide source code and documentation in sufficient detail to reproduce the submitted **Analytic Product** and to enable validation of the automated system using a validation question similar to, but different than, the question posed in the Challenge. During the validation effort, Solvers may be asked to assist InnoCentive in its attempts to compile and execute the submitted system. Validation will be performed on commodity hardware running Windows or Linux with no internet access.

To receive an award, Solvers **will NOT have to transfer IP rights or grant a license to the Seekers** – the purpose of this Challenge is to gauge how far technologies have come in solving this important problem. With broad participation, this Challenge has the potential to provide ODNI and OUSD(I) with insights on the best next steps to stimulate research for solving this challenging problem.

Unless otherwise stated by the Solver in their submission, by making a submission to this Challenge **Solver(s) are providing written consent to the Seekers to publicly disclose their identity if their submission is chosen for an award and they choose to accept the award.** Disclosure will not occur until the Challenge has been fully completed, that is, all submissions have been evaluated, rejected or accepted, and any awards have been transferred to the Solver(s). In addition, the Seekers may wish to share winning submissions and corresponding Solver information with other U.S. government agencies. Solvers may opt-out of this and request the Seekers not share their submission and information by making a written request.

Submissions to this Challenge must be received by 11:59 PM (US Eastern Time) on **July 5, 2017**.

Late submissions will not be considered.

Eligibility

Federal entities or Federal employees acting within the scope of their employment are eligible to compete but are NOT eligible to receive a monetary award for this Challenge.

Please note that winners will have to submit an Academic Institution Acknowledgement Letter acknowledging the role of ODNI in this Challenge **if** you are: (i) a U.S. Academic Institution at the high school, college, or university level, (ii) an employee of such institution who is participating on behalf of that institution, or (iii) an employee of such institution who is

participating in their personal capacity if they are using the resources of such institution to respond to this Challenge. A template for this letter is included as an attachment to this Challenge.

Early STEM Education awards are limited to U.S. based high school student teams. High school student teams must be represented by a teacher or school official and all submissions made through an InnoCentive Solver account owned by the teacher, school official, or represented high school. **Early STEM Education** awards will be made directly to the represented high school, and eligibility for such awards will be confirmed during the Solver verification process for winning submissions. **Please note** the information contained in the Detailed Description and Project Criteria sections of this Challenge is considered to be publically available and therefore exempt from the confidentiality provisions in the CSA, thus enabling teachers and school officials to share this information with their students for the purpose of participating in this Challenge.

Entities or employees of entities from the following countries subject to U.S. economic sanctions are not eligible to participate in this Challenge: Iran, Syria, Sudan, Cuba, and North Korea. In addition, individuals and entities listed on the U.S. Government's Consolidated Screening List (available at http://export.gov/ecr/eg_main_023148.asp (http://export.gov/ecr/eg_main_023148.asp)) are not eligible to participate in this Challenge.

This Challenge is open to all others (18 years of age and over) not addressed above. Only one submission per team should be submitted.



About the Seekers

This Challenge is sponsored by ODNI's Office of the Director of Science and Technology (DS&T), in partnership with the Office of the Under Secretary of Defense for Intelligence (OUSD(I)) and in collaboration with the Air Force Research Laboratory (AFRL). DS&T leads the Intelligence Community's (IC's) efforts to enhance the returns on investments in technology—its mission is to deliver innovative, technology-based capabilities which solve intelligence challenges today and in the future. OUSD(I) serves as advisor to the Secretary and Deputy Secretary of Defense for intelligence, counterintelligence, security, sensitive activities and other intelligence-related matters. AFRL is the Air Force's only organization wholly dedicated to leading the discovery, development, and integration of warfighting technologies for our air, space and cyberspace forces.

[Submit Solution \(/ar/solution/9933982\)](/ar/solution/9933982)

Profile completeness

Your profile is 100% complete

Solver Agreements

These are the Solver Agreements you have signed for this Challenge.

- [Solver Terms of Use \(/ar/contract/view\)](/ar/contract/view)
- [Challenge-Specific Agreement \(/ar/workspace/agreement?challenge=9933982\)](/ar/workspace/agreement?challenge=9933982)

Share This Challenge



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Information for Academics

If you are a US University or College Professor, student (graduate student or undergraduate), or you work at a similar type of institution...

- [Click Here for Important Info](#)

Information for Academics

- [Frequently asked questions \(https://www.innocentive.com/our-solvers/faqs/\)](https://www.innocentive.com/our-solvers/faqs/)

Challenge Attachments

- [SIGNAL_Articles_Xpress_Challenge.zip \(/ar/workspace/viewAttachment?challengeAttachmentId=626\)](/ar/workspace/viewAttachment?challengeAttachmentId=626)
- [Academic_Institution_Acknowledgement_Letter_Template_Xpress_Challenge.docx \(/ar/workspace/viewAttachment?challengeAttachmentId=627\)](/ar/workspace/viewAttachment?challengeAttachmentId=627)
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