# AI and sensor based automatic self-assessment tool

NATO HUMINT Centre of Excellence

– CS InnoHUB challenge –

| **Challenge title** |
|---|
| AI and sensor based automatic self-assessment tool |
| **What is the issue we want to solve ?** |
| The lack of an automated tool to facilitate self-assessment that could lead to performance improvement in the context of human-to-human interactions |
| **Who experiences the issue we want to solve ?** |
| NATO HUMINT Centre of Excellence (HCOE) |
| **Who are the possible benneficiaries of the developed solution ?** |
| **Military environments:** HCOE<br>**Civilian environment:** business (sales department and HR department) |
| **What are the expected results ?** |
| <u>A proof-of-concept software solution with the following capabilities:</u><br>1. The processing and analysis of data regarding the physiological characteristics** measured with the help of wearable devices, or recording devices (audio-video) from a human subject, exposed to a context*** that generates a reaction measurable by data variation. Data analysis means establishing a baseline and detecting variations relative to it.<br>2. Data correlation, using AI, to identify the type of reaction to stimuli, the intensity of the reaction and any patterns that may occur.<br>3. Graphic representation of the results.<br><br>*pulse, temperature, galvanic skin response, respiratory rythm, voice variation, pupil dilation, eye movement, skin color variation<br>** discussion with an interlocutor, watching a photo-video collage, etc<br>*Note: For the development phase, data may be artificially created. The inputs from a minimum of two sensors should be used.* |
| **How can the solution be tested/experimented?** |
| The solution can be tested as follows:<br>1. In the initial development phase – by HCOE, by organizing a dedicated workshop. In this framework, the HCOE members involved in the project will generate a simulated context (as close as possible to real conditions) that will provide data for testing the solution.<br>2. In a subsequent development phase – by the HCOE, with the support of the NATO HUMINT community, in exercises or training sessions, with the possibility of repeating the experiment in several iterations. The context is simulated, but as realistic as possible, and with concrete applicability, this time with numerous and diverse participation (NATO nations and organizations). |

Annexes: 1. Data correlations table
2. Examples of use cases

## Annex 1: Data correlations table

| | Context Stimuli | Reactions | | | | |
|---|---|---|---|---|---|---|
| | | Pulse variation (from baseline) | Other sensor – variation (from baseline) | Other sensor | Other sensor | |
| Subject 1 | S1 | 80 | X | Z | Y | CORRELATIONS |
| | S2 | 95 | Y | Y | X | CORRELATIONS |
| | S3 | 82 | Z | X | Y | CORRELATIONS |
| Subject 2 | S1 | 120 | Z | Y | Y | |
| | S2 | 115 | X | Y | X | |
| Subject 3 | S1 | 135 | Y | X | Y | |
| | S2 | 85 | X | Y | X | |

**Note:** **S1,** S2, S3 represent different stimuli applied to different individuals at different moments throughout the same conversations/exposures to video or photo collage.

### What are stimuli?

Definition - any change in the flow of events (conversation or exposure to video-photo collage) that is expected to cause a physiological reaction to the human subject from which data is collected. Examples: abrupt change in tone or volume in a conversation, exposure to sad/tragic images or videos, etc.

## Annex 2: Examples of use cases

### Example 1:

Military personnel (intelligence operators in particular, but not only) interact with the local population while deployed on a mission. The quality of this interaction influences to a large extent the success of the mission, and is directly dependent on the behavior of the military personnel. Being faced with many possible challenges, coming either from the interlocutor or from the environment, it is important for the military personnel to understand what their disproportionate reactions are, and to what inputs they react this way. Understanding where the weak points are, they can work on improvements. An automated tool for this type of self-assessment can be employed in training of military personnel.

### Example 2:

While interviewing for hiring or for periodical assessments of own personnel, the HR specialist has to master the art of human-to-human interactions in order to accomplish at the highest level the organization's objectives for the interview (be it to hire the appropriate human resource or to avoid hiring inappropriate one, or for re-negotiating a contract in the best conditions). The success of the interview therefore depends on the interviewer's performance, and this can be affected by a lack of self-knowledge and self-assessment. This shortfall can be addressed through training and an automated tool for this sort of activity can prove beneficial.

The same principle applies to sales representatives and many other functions of companies. Wherever the success rate of a business depends on the performance of employees that are tasked to reach the company's objectives through interacting with other humans, a training in this respect is essential. If it can be optimized and augmented through automation, this will always be considered a plus.