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EUROPEAN BORDER AND COAST GUARD AGENCY

Third Advance Information Working Group
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Research and Development Unit - Capacity Building Division

The assessment process has to support the decision making process:

- By using all relevant data/intellingence at hand
- By providing meaningful insight
- By simplifying it
- By avoiding cognitive or judgement biases
- By enabling additional risk awareness for uncovering new risks

... Unfortunately no single method excels in all at the same time

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Rules define how we match each driver against the data collected

- Drivers are treated as **differentiated events** (but not independent)
- Each driver is assessed separately, either in a **Boolean or stochastic** form
- Because drivers need not be stochastically independent events, **Bayes law applies**

Four main strategies are being used by practitioners:

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A single clause that encapsulates all the evaluation rules and assessment logic

1. Each Driver is assigned its own assessment rules
2. A single logic clause is defined as a function of drivers, i.e. if ((D1 and D2) or D3) and D4, then TRUE
3. The Clause is evaluated to True ("Hit") or False ("No Hit")

This is the formal representation of the "Smart Filtering" approach often used in early stages of implementation

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Risk is calculated by aggregating the contribution of each driver

1. Each Driver is assigned its own assessment rules and a relative weight (i.e. X%)
2. An overall risk threshold is defined
3. Each Driver is evaluated in stochastic form (i.e. X% probability-confidence) and risk contribution is calculated (Weight x Probability)
4. An overall figure of merit for the profile by adding all the independent contributions
5. Any result exceeding the threshold is a "Hit"

Very intuitive and straightforward method, also giving good insight.

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A broad scenario is defined based on a small set of indicators

1. A scenario is defined according to a number of **Indicators**
2. Indicators are defined as a function of several drivers (evaluated as in the previous case)
3. A threshold is defined for each indicator
4. Indicators are assessed separately in Boolean form
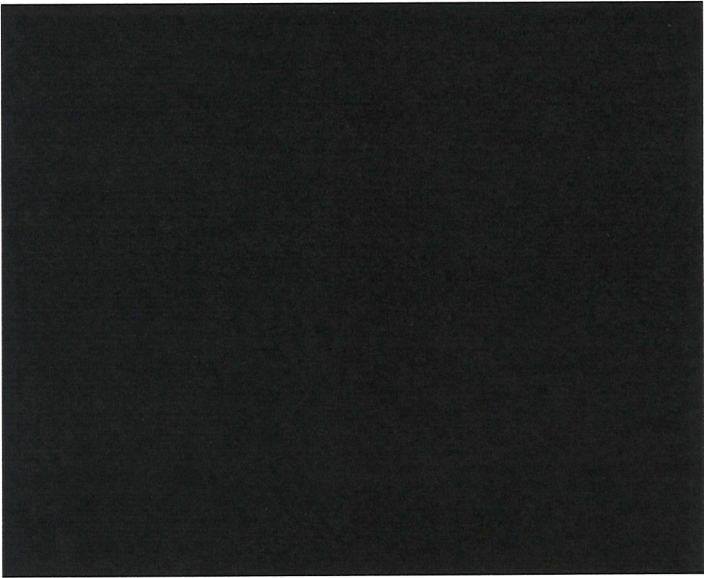5. If a minimum number of indicators are hit, then the Scenario is a "Hit"

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The assessment is based on a smart set of rules that better resemble the human decision making process

1. Each Driver is evaluated as in the ███████████ case
2. A Fuzzy logic set of rules are defined for the drivers
3. A closed set of "Hit" (inclusion), "No-Hit" (exclusion) and ███████████ ("May Be") rules are defined and prioritized
4. Drivers are assessed against the rules set and results are generated
5. Results can go beyond the ''Hit''/''No-Hit'' (e.g. they can include risk flags or specific awareness messages)

This method combines all the previous principles
It is powerful and insightful, but complex and costly to maintain

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Thank you!

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