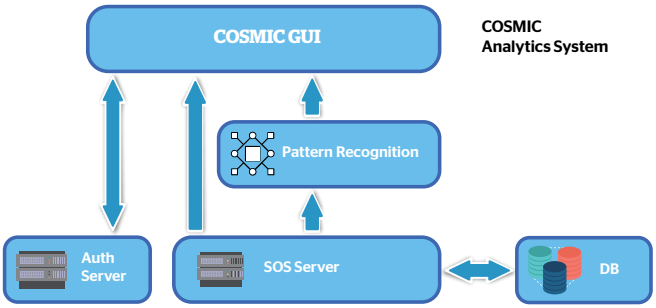
COSMIC New sensors and Analytics System

Introduction

The COSMIC Analytics System is the data collector and analyser of COSMIC project. It is the key integrator component dealing with all information and data gathered from the COSMIC sensors in order to be: stored, processed and visualized in a Dashboard (COSMIC GUI). The data collected from the new COSMIC sensors (chemical, biological, radiological, nuclear and explosives), will be injected in the COSMIC Analytics System following the SOS Standard interface. The existing sensors (X-Ray and RPM) as well as the information included in the Container Manifest, will be entered manually in the Analytics System by the end-user (Customs Operator).



In a nutshell the Analytics System collects data from:

- **COSMIC Primary Sensors** Data and measurements from the COSMIC primary chemical, biological and explosives sensors will be injected into the Analytics System to be stored and processed. In the biological sensor case, processing techniques including machine learning (artificial neural networks) will be applied, allowing to classify biological samples (virus/bacteria).
  Data from the new COSMIC sensors (Chemical, Biological and Explosives), from the existing sensors such as X-Ray and RPM, and information included in the Container Manifest, will be jointly analysed for inspection of the container.
- **COSMIC Secondary Sensors** Those containers that triggered a CBRNE alarm during the Primary Stage inspection, will be inspected through the COSMIC Secondary Sensors. The data collected from the Secondary Sensors: Chemical, Biological, Radiological, Nuclear and Explosives, will be injected in the Analytics System over the SOS interface, in order to be stored and processed.

The **COSMIC GUI** will support Customs Operators of sea-borders in their daily work, displaying all CBRNE alarms for those containers that have been inspected. In addition, the Customs Operators will be able to manually add feedback about the cargo (e.g., after exploring the X-Ray images and the Manifest information). The COSMIC GUI will display a summary of the inspection status per Containers. This view will allow end-users to know the stage (Primary, Secondary or Manually) which is being applied to the container, the raised alarms from the sensors of that stage, and which will be the recommended next inspection that should be applied.

The **COSMIC Analytics System** will apply machine learning techniques for pattern recognition. The system will gather data from the sensors and look for certain predefined patterns, applying artificial neural networks techniques.

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