

Artificial Intelligence and Environmental Compliance Assurance

New tools to make the regulatory action more efficient and effective

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Introduction



In recent years, **Artificial Intelligence (AI)** has occupied the technical, scientific and legal landscape in an overwhelming way. It seems **not the same in the Environmental Compliance Assurance (ECA) field.**

It is appropriate to intensify the **studies and dissemination of information and good practices** relating to the use of AI, in a realistic way, alongside the more traditional Data Analytics systems.

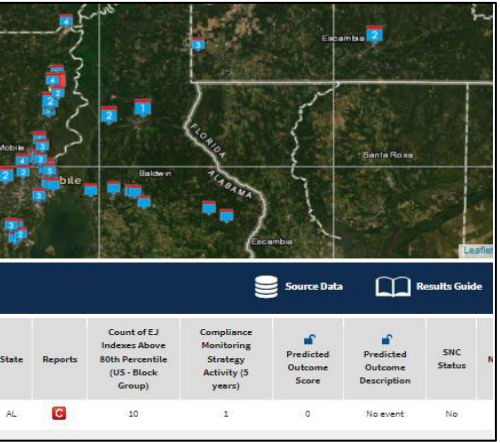
These efforts should be accompanied by **considerable attention to the use of AI in Jurisdiction**, as emerge from the numerous initiatives of many Organizations and Authorities, worldwide, including the **European Union regulation “AI Act”** that take into care the respect of **Citizens’ fundamental rights.**

Examples of uses of AI: Risk Analysis



Inspection programming

- AI can be used to perform **risk analysis** with the aim to prioritize facilities to be submitted to inspection. System developed by US EPA to maximise the percentage of inspections detecting non compliances.
- Areas of application discussed with colleagues:
 - Inspection at facilities discharging **liquid wastes**
 - Inspection at installations managing **solid wastes**, hazardous and non hazardous
- In both these cases, the Inspection Planning is based on the **Risk Analysis** and the **Relative Ranking of the Installations**, carried out using **Machine Learning tools** trained with information available in huge data bases of characteristics / compliance history of installations.



Remarks and challenges

- The Systems are based on the **great availability of good quality historical data**, thanks to **USA Next Generation Compliance program (2013 -'17)**; not always the same data availability in other Countries
- Risk of **excessive mechanism, paradoxical effects** and the use of these AI Tools may require to be **blended with man made programs** to tackle specific issues.





Examples of uses of AI: Computer Vision

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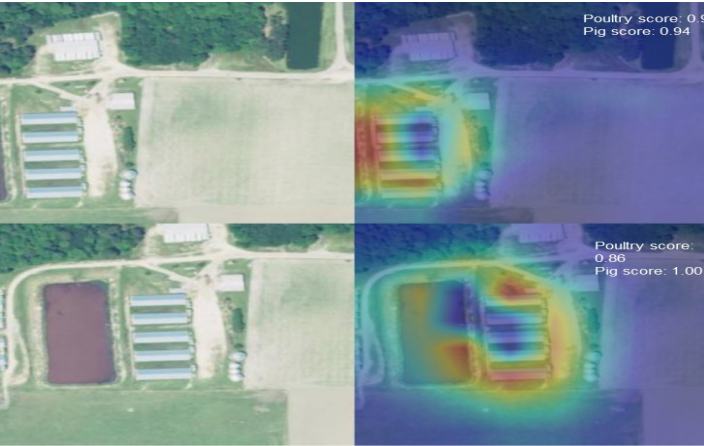


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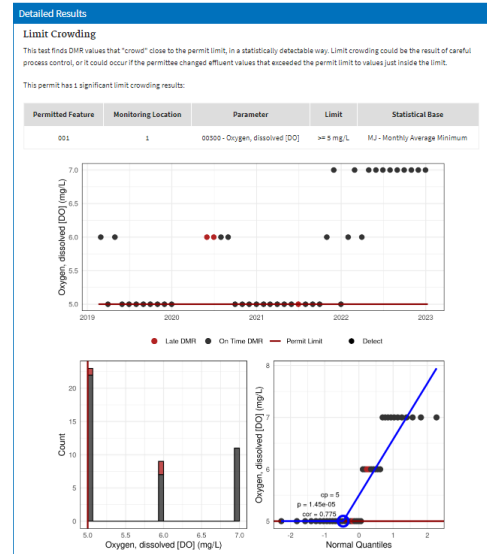
Tackling of offence through Earth Observation techniques

- AI enables machines to interpret the same information that humans can get through their senses
- AI enhances enormously Earth Observation potential, speeding up territory analysis and increasing precision.
- Identified present areas of application:
 - Search of non registered pollutants installations – CAFOs (discussed with US EPA Colleagues)
 - Detection of illegal waste landfills and storage sites (discussed with ARPA Lombardia Colleagues)
- The systems lend themselves to further developments, for example by connecting georeferenced information to databases, including territorial vulnerabilities, for the creation of hybrid AI systems as part of effective



Remarks and challenges

- The system substitutes efficiently man operations (x 10 – x 100 or more)
- Probably, some systems can be shared without the need of further training
- Need of agreement into the whole compliance chain to optimize actions and make judiciary action robust



Examples of uses of AI: Data Analytics



Tackling non-conformities hidden in datasets and databases

AI enables analysis and search in digital files and archives hardly or impossible to execute by humans, even through traditional computer systems.

- AI can be enabled in **identifying patterns, non congruency and connections** in datasets and databases: a **big potential**, speeding informatic survey/investigations
- Identified present and perspective areas of application:
 - Fraud detection in mandatory **Discharge Monitoring Reports** sent by duty holders to US EPA (DMR Integrity) implemented through **statistical filters and AI data analysis** (discussed with US EPA Colleagues)
 - **Waste related database cross-analysis** in search of **irregularities and non-visible connections** between subjects and situations (discussed with Fondazione Vittorio Occorsio – ITA Colleagues)



Remarks and Challenges

- **Large Language Model (LLM)** based on AI can be prospectively used to **interpret documents** and digitalizing relevant information for further analysis **and to draft reports and docs**
- **Many databases with high potential** are in **poor quality and maintenance condition**; important documents **not digitalized nor accessible**



These are **only some examples** of the current use and advanced hypothesis for the use of AI in ECA activity

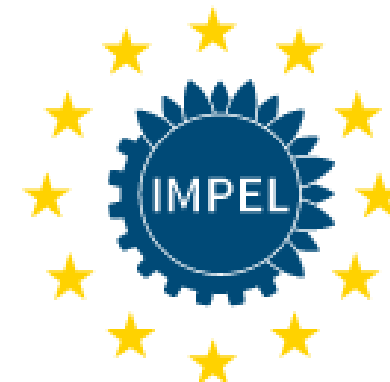
One of the main aims of the project is to **investigate the uses of AI also in other fields of ECA** and anyway in **other fields of interest** of our colleagues in ENPE, EUFJE, EnviCrimeNet.

A **common works of the 4 Networks** is fundamental because it is needed to consider the needs and issues of all of the component of the ECA Chain and avoid unjustified and duplications, overlapping and lack of consideration of colleagues issues and challenges that could prevent the rational introduction of the use of AI in ECA activities

The **needs and proposal of our colleagues** should be investigated and collected, to identify the **opportunity for the development of new common AI instruments**, seeking for adequate financial support, on the basis of an adequate critical mass of interested organizations

Because of these reason and other well founded needs.....

- IMPEL deem appropriate to **open a window on AI use in ECA**, encouraging its **dissemination and use of AI tools** and for the development of a **culture, suitable for managing the related arising challenges** among ECA practitioners.
- **For these reasons, IMPEL designed and launched ARTIC project, with the following objectives:**
 - **Identifying existing AI practices** useful for the ECA sector and the needs of IMPEL Members
 - Give the information to the IMPEL Members on how **information systems related to ECA should be shaped to enable them for the use of AI**
 - Facing **legal issues and challenges** related to the **Jurisdiction** and that ones related to respect of human rights, as dictated by the AI Act
 - Provide IMPEL members with the necessary **literacy and basic knowledge** to adequately **address the risks related to the use of AI tools**, or devices equipped with AI controls, both by them and by the Duty Holders in Environmental Compliance Assurance activities
- The Project has been conceived to obtain the **cooperation of the European Networks ENPE, EUFJE, EnviCrimenet**, considering the close interconnection between their activities and **it is open to the widest possible collaboration**. Contacts and agreements ongoing with EU Comm JRC, US EPA, INECE



online project kick-off meeting: detailed presentation and discussion on project governance and programs. Write us to take part in the meeting and project!

Contact information:

- ✓ **For joining this project:** If you work for an IMPEL member organisation and would like to join the project or receive further information, **please contact the National Coordinator of your country and the Project Managers at g.sorbati@arpalombardia.it, f.carella@arpalombardia.it**
- ✓ **For becoming a member of IMPEL:** If you are from an Environmental Authority or association of authorities that is based in a member state of the EU, a candidate country or another country applying Community law and would be interested in becoming a member of IMPEL, **please contact IMPEL Secretariat at info@impel.eu** for more information.
- ✓ **For all other interested parties:** please check out our new website for further information! www.impel.eu



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