

# Summary of the Working Group on AI for Safeguards Verification

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**Technical Meeting on Artificial Intelligence for Nuclear Technology and Applications**  
#AI4Atoms Virtual Event  
25–29 October 2021

# State of the art: two SG applications



- Two different applications in focus:
  - Verification of spent fuel
  - Video surveillance
- Same recipe: SG relevance, natural fit for AI, data availability for ML, interpretable results
- Similar problems: accuracy and false alarms

# AI for spent fuel verification

- High SG relevance: growing inventory, fissile material
- Fit for AI: gamma spectroscopy and Cerenkov imaging
- Numerical simulations provide training and test datasets
- Accuracy sometimes on a par with traditional instruments, but not enough to make autonomous decisions
- AI algorithms are interpretable and justified with Physics

# AI for surveillance

- SG relevance: high productivity gain sought
- Fit for AI: image and video processing
- Datasets from similar facilities under surveillance and from simulations / digital twins
- Accuracy: need to penalize false-negatives
- Methods exist to visualize the AI logic

# Next Steps

- AI will not replace SG inspectors, but can become a smart aid; need to identify key applications.
- Study how best to merge AI outputs with human perception and experience.
- Explore more AI applications for SG derived from the concept of digital twins.

# Accelerating Progress – IAEA's Role



- Successful AI implementation needs a blend of data science and physics throughout the lifecycle. IAEA SG has a pool of experts, but needs to acquire more of the moderating/stewarding role.
- AI future is likely open-source; IAEA SG may need to adapt its legal/procurement/work policy frameworks.
- IAEA SG could be a leading use-case/client for specific fault-proof AI R&D – to the benefit of other industries.

*Thank you!*

