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THE NICOSIA CONVENTION: A CRIMINAL JUSTICE RESPONSE TO OFFENCES RELATING TO CULTURAL PROPERTY

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SESSION III - GOOD PRACTICES AND EXCHANGE OF EXPERIENCES

Addressing the increasingly organised and criminal nature of offences in cultural goods through technological innovation

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In the Nicosia Convention, there is an implicit acknowledgment of the role of technology in addressing the challenges of cultural heritage trafficking. While not explicitly mentioning technology, the convention emphasizes the exchange of information on legal, policy, and technological developments among the parties (article 24).

Furthermore, the convention specifically mentions the use of certain technological tools in combating the illicit trade of cultural artifacts. It highlights the importance of creating databases and connecting separate national databases, promoting interoperability between national and global systems.

In essence, the Nicosia convention recognizes the significance of leveraging technology to combat looting, theft, and the illegal trade of cultural heritage, fostering collaboration and information sharing among the involved parties.

Apart from databases, there is a wide range of tools available today for combating looting and trafficking of cultural heritage. While some of these tools were already in existence when the convention was published in 2017, others have emerged more recently and have shown tremendous potential in the fight against criminal activities related to heritage.

Over the past few years, we have witnessed a significant advancement in technologies that can be harnessed to tackle these challenges. These innovative tools hold incredible promise and offer new avenues for combating illicit activities and safeguarding our cultural heritage.
Today, we will discuss some of the technologies that are currently being investigated and utilized in the fight against looting and trafficking.

In recent years, there have been significant developments in the creation of databases and digital tools aimed at identifying illicitly trafficked or stolen cultural goods. Various

Law Enforcement Agencies (LEAs) have established their own databases to track stolen objects. For instance:

- The Italian Carabinieri Art Unit has created LEONARDO, a database containing over one million stolen cultural goods now connected to the SWOADS project that further enhances and supplements the database. The database however is only partially accessible to the public.

- The French OCBC has developed TREIMA, a database accessible exclusively to Police Authorities, equipped with an image-based recognition tool.

- INTERPOL Stolen Works of Art Database is the first international database that can be searched entirely by the public. It currently contains 52,000 stolen objects, and the number continues to grow with the recent introduction of the ID-APP.

However, these databases primarily have a national focus (except for INTERPOL) and do not provide a comprehensive view of the actors involved in the art market. As a result, they fall short in capturing the full extent of the antiquities market phenomenon.

The emerging technologies that are gaining focus in identifying criminal networks are based on social network analysis and knowledge graphs. Social Network Analysis (SNA) methodology, rooted in the field of social sciences, examines the interactions between social actors. It utilizes graph theory, and it enables us to map and analyze social connections among individuals or groups.

SNA plays a crucial role in identifying and understanding the social networks and connections among members of criminal organizations involved in the illicit trafficking of cultural goods. It sheds light on the dynamics and operations of these groups, providing valuable insights into their activities. By leveraging SNA, we can gain a deeper understanding of the intricate web of relationships within these criminal networks engaged in cultural heritage crimes.

Let's take a closer look at the application of Social Network Analysis through the RITHMS project. The RITHMS project, financed last year by the European Union, is utilizing SNA methodology to develop and validate a cutting-edge digital resource aimed specifically at investigating illicit trafficking in cultural goods. This exciting initiative, which is based on interoperability and multifunctionality, allows for the identification, evaluation, and analysis of relationships that exists between both criminal and non-criminal actors of the art market.

One remarkable feature of the RITHMS system is its creation of the first comprehensive knowledge-based graph dedicated to the art and antiquities market. A KG is a way of organizing information that shows how different things are connected to each other. It's like a big web that links various pieces of knowledge together. In this graph, the focus is on people and their relationships, rather than just individual objects. It helps us understand how people are involved in activities like trading cultural goods and reveals the connections between them. By looking at this graph, we can gain valuable insights and better comprehend the complex world of cultural trade.

While RITHMS primarily focuses on networks of people, similar methods can be used to investigate and build networks of objects. One approach involves gathering data from auction houses and art galleries, organizing the provenance information, and linking artifacts that have appeared in different marketplaces over time. This process allows us to create a comprehensive network that traces the ownership histories of these objects, revealing valuable insights into their journeys.

AI techniques are essential in this process. Through the use of Natural Language Processing (NLP), the provenance information is organized and tagged, creating a knowledge graph that shows how artifacts circulate. Social Network Analysis (SNA) and Machine Learning (ML) algorithms are applied to analyze the collected database and compare it with existing knowledge on trafficked objects. This helps identify potential red flags and detect potentially looted items. The resulting knowledge graph database, primarily focused on objects, can be integrated into platforms like the RITHMS one as an additional layer within its SNA framework.

Now let's explore other technologies that can support the fight against looting. Given the widespread and vast extent of this problem, it's often challenging to physically inspect all areas, especially those that are inaccessible or hazardous. That's where remote sensing comes in. Remote Sensing (RS) has recently emerged as the most effective approach to monitor instances of looting, both in the past and ongoing.
But what exactly is RS? It refers to the use of advanced technologies such as Unmanned Aerial Vehicles (UAVs), airborne platforms, and Earth Observation (EO) data to gather valuable information from a distance. By utilizing these technologies, we can expose instances of looting under favorable conditions. This means that through RS, we can gather data and detect looting activities on the imagery. It's a powerful tool that enables us to monitor and protect cultural heritage sites more effectively.

Remote sensing is a versatile technology that can be applied in various contexts. It proves especially useful for surveillance in the following situations:

1. Sites that are difficult to access, such as rural areas, deserts, and forests.

2. Sites that are too large to patrol manually.

3. Sites located far away from urbanized areas and transportation infrastructure.

By utilizing remote sensing techniques, we can identify instances of looting based on their distinctive features, which are often common across different locations. Although there may be some variations depending on the type of looted site and the surrounding environment, remote sensing allows us to detect these activities and take appropriate actions to prevent further damage to cultural heritage.

ALCEO (Automatic Looting Classification from Earth Observation) is a project funded by the European Space Agency (ESA) that focuses on the development of Artificial Intelligence (AI) methods for the automatic detection and classification of cultural heritage looted sites. It specifically utilizes multitemporal Earth Observation (EO) data for this purpose.

The primary goal of ALCEO is to leverage AI techniques to automatically identify and classify looted archaeological sites by analyzing EO data collected over different time periods. By incorporating multitemporal data, the project aims to enhance the accuracy and effectiveness of the classification process.

Through the use of advanced AI algorithms, ALCEO aims to provide a reliable and efficient means of detecting looted sites, contributing to the ongoing efforts in protecting and preserving cultural heritage. The project's findings and methodologies have the potential to significantly impact the field of cultural heritage preservation and surveillance.

There have been previous attempts to address similar challenges. What sets ALCEO apart is its scale and innovation. ALCEO utilizes a Machine Learning Model to automatically detect ongoing looting activity in newly acquired satellite imagery of archaeological sites. This advanced technology allows for the identification of looting in a large-scale and efficient manner.

The key innovation lies in the development of a robust Machine Learning Model, which forms the core of the ALCEO system. This model has been trained using a carefully curated dataset, enabling it to accurately identify signs of looting in satellite imagery. The output of the model will be used to generate early warning reports, providing timely information to Law Enforcement Agencies (LEAs) responsible for monitoring archaeological sites. By leveraging this innovative approach, ALCEO aims to enhance

the effectiveness of monitoring efforts and enable proactive actions to combat looting and preserve cultural heritage.

Satellite analysis plays a crucial role in predicting the type and period of antiquities that enter the market. This capability provides valuable intelligence for international efforts to combat the illicit antiquities trade. By analyzing satellite imagery, we can gain insights into the origin and characteristics of these cultural artifacts, enabling more effective policing and enforcement.

Additionally, satellite analysis helps in modeling criminal behavior related to antiquities trafficking. By studying patterns and trends observed in satellite data, we can better understand the strategies and activities of those involved in this illegal trade. This knowledge empowers law enforcement agencies to develop targeted strategies and interventions.

Furthermore, as technology advances, the revisit time of satellite images is expected to become faster, and data availability will increase. This progress sets the stage for even more comprehensive and timely satellite analysis, enhancing our ability to monitor and address the illicit antiquities trade.

In summary, satellite analysis not only enables the prediction of antiquities entering the market but also contributes to international policing efforts. By leveraging this technology and the insights it provides, we can take significant steps towards combatting the illegal trade and safeguarding our cultural heritage.

3D scanning is a valuable tool in the fight against trafficking of cultural heritage objects. It offers several capabilities that contribute to this effort. Here are some key points to consider:

- Ability to scan cultural heritage objects in 3D: 3D scanning technology allows for the creation of detailed and accurate digital representations of cultural artifacts.

- Variety of tools available for scanning: there are different techniques used for 3D scanning, including photogrammetry, laser scanning, and structured light scanning. Each method offers unique advantages and can be selected based on specific requirements.

- Preserves and documents cultural heritage objects: 3D scanning helps in preserving and documenting cultural heritage objects digitally. This ensures that their physical characteristics and details are captured and stored for future reference.

- Enhances accessibility and virtual exploration: the digital representations obtained through 3D scanning enable virtual exploration of cultural artifacts. This enhances accessibility for researchers, enthusiasts, and the public, allowing them to engage with the objects remotely.

- Facilitates research and analysis: 3D scanning provides researchers with a wealth of data for in-depth analysis and study. It enables measurements, comparisons, and examinations that can contribute to further research and understanding of cultural heritage.

In summary, 3D scanning offers a range of capabilities that support the fight against trafficking by preserving, documenting, and enhancing accessibility to cultural heritage objects. Its use facilitates research and analysis, contributing to the protection and appreciation of our shared heritage.

The use of 3D models greatly enhances the identification of objects for sale on the internet. Here's how it works:

- Imagine an amphora that has been stolen and is being sold on platforms like eBay. If the seller only provides a single photo (left image), and we only have a different photo (right image), it becomes challenging to accurately identify the object and potentially lose the opportunity to recover it.

- However, with a 3D model of the amphora, we can easily match it with any picture provided by the seller. Having a complete digital representation of the object allows us to make precise comparisons and increase our chances of identification.

- Additionally, 3D models enable us to spot fakes or restoration work by examining small details that may not be visible in simple 2D images. For example, by zooming in, we can detect cracks or other subtle features that help us make informed judgments.

3D models empower us to confidently match and identify objects being sold online, ensuring a better chance of recovering stolen items. They also aid in distinguishing fakes and evaluating restoration work based on close examination of intricate details.

With the advancements in 3D scanning technology, we can create detailed virtual representations of cultural heritage objects. These 3D models not only enhance image identification and enable easy matching of objects for potential recovery but also

serve as a comprehensive digital record. By combining 3D models with Blockchain technology, we can create a universally recognizable and secure platform. Blockchain, a new emerging technology that uses a decentralized and immutable database, ensures the integrity and protected access to important information such as ownership, certificates, location, contracts, and conservation data. Together, 3D scanning and Blockchain present powerful tools in the fight against cultural heritage crimes, providing advanced support for restoration, verification, and preserving our shared heritage.

Today, we have explored the innovative technologies that are revolutionizing the fight against looting and trafficking of cultural heritage. By leveraging these advancements, we are strengthening our ability to detect, prevent, and combat cultural heritage crimes. Collaborative efforts among researchers, law enforcement agencies, and cultural institutions are crucial in implementing these technologies effectively, as well as investing in and exploring the potential of these technologies, working together to safeguard and preserve our shared cultural heritage.