**ScriptNet: An Integrated Criminological-Network Analysis Tool**

**investigator manual**

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9. **Acknowledgements**

ScriptNet is a software package for analysing the interfaces of the crime commission process and networks of association. The software is a collaboration between the University of Manchester (Nicholas Lord, Elisa Bellotti and Cecilia Flores Elizondo), Joshua Melville and Steve McKellar (Team Garlic). More specifically:

* Content developed by Nicholas Lord, Elisa Bellotti and Cecilia Flores Elizondo
* Software developed by Joshua Melville and Steve McKellar

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1. **Summary**

ScriptNet is a software package that facilitates an analysis of the organisational aspects of criminal enterprise together with an analysis of the network of people, organisations, places and resources that are in some way involved in the commissioning of these goal-oriented crimes. The tool can be used by a variety of groups - including law enforcement authorities, non-governmental organisations, academic and social researchers, and many more - to visualise the connections between the different stages of pre-planned criminal behaviours and the people or organisations who play different roles, in different places, using different resources to accomplish specified criminal goals.

ScriptNet is an amalgamation of the terms ‘script’ and ‘network’ that in turn represent two analytical approaches to understanding criminal and social behaviours:

**Script** derives from a criminological analysis technique termed **crime script analysis**, a powerful tool to generate and organise knowledge about the procedural aspects and procedural requirements of the crime commission process. It specifically identifies the different ‘scenes’ that make up the crime commission process including the decisions, actions and resources required at each stage, as well as the cast of actors involved. Scripts therefore provide a way of understanding the **steps** that take place across different scenes of the criminal enterprise.

ScriptNet use crime script analysis to enable the deconstruction of a) what has to be done, b) by whom, and c) under which (facilitative/conducive) conditions in order to accomplish serious and organised crimes. It facilitates a systematic approach to organising knowledge of criminal enterprise for the identification of critical points of vulnerability for enforcement and/or regulatory interventions.

**Network** derives from **social network analysis**, a framework that maps individual and collective actors, together with resources they can access and places where they are located, and the various types of relationships that may link them. It is a powerful tool to **formalise** actors and relationships, as to detect the structure that underlie their social activities. In a crime investigation, individuals and organizations can constitute suspected nodes, and can be linked by telephone calls, business transactions, goods delivery and the like. Social network visualizations are useful to detect which nodes may be pivotal in connecting criminal activities, which groups of nodes may collaborate in a criminal operation, or which nodes could substitute others in specific tasks.

ScriptNet uses social network analysis to observe suspected criminal networks by visualising nodes (person, location, resource or organisations) and the relationships (edges) that link them. In ScriptNet, the investigators can create a **node** for each entity involved in the crime (person, location, resource and organisation) and add a series of **attributes** to characterise the nodes, that are represented automatically by the shape and the colour of the node. The investigators can then link these nodes with **edges** that indicate the type of relationship in which nodes are involved (personal, communication, financial, business, ownership, working or geographical relationships) which again are represented automatically with different colours. In ScriptNet the investigators can assign each **node** (actor, organization, resource, and location) to a specific **scene** of the ‘crime script’, to visualise the connective points and bridges across the procedural steps of the crime commission process.

ScriptNet integrates these two analytical techniques to provide a structured and systematic approach for researchers and investigators of goal-oriented crimes. By using ScriptNet, you will be able to draw upon your knowledge of known and on-going criminal cases to visualise the entire network of people, organisations, places and resources that are involved at key stages during the commissioning of the crime. You will also be able to visualise which people play which roles during the criminal enterprise, to visualise the personal networks of individual people and their relationships to others in the criminal enterprise and visualise the geographical aspects of the criminal enterprise. These different layers of analysis will in turn inform your investigative processes by reinforcing your insights and enabling you to visualise your thought processes, or by generating new lines of inquiry into particular people or places.

The following sections provide you with further background knowledge about the origins of ScriptNet before providing a step-by-step guide to using the software.

1. **How to access the software**

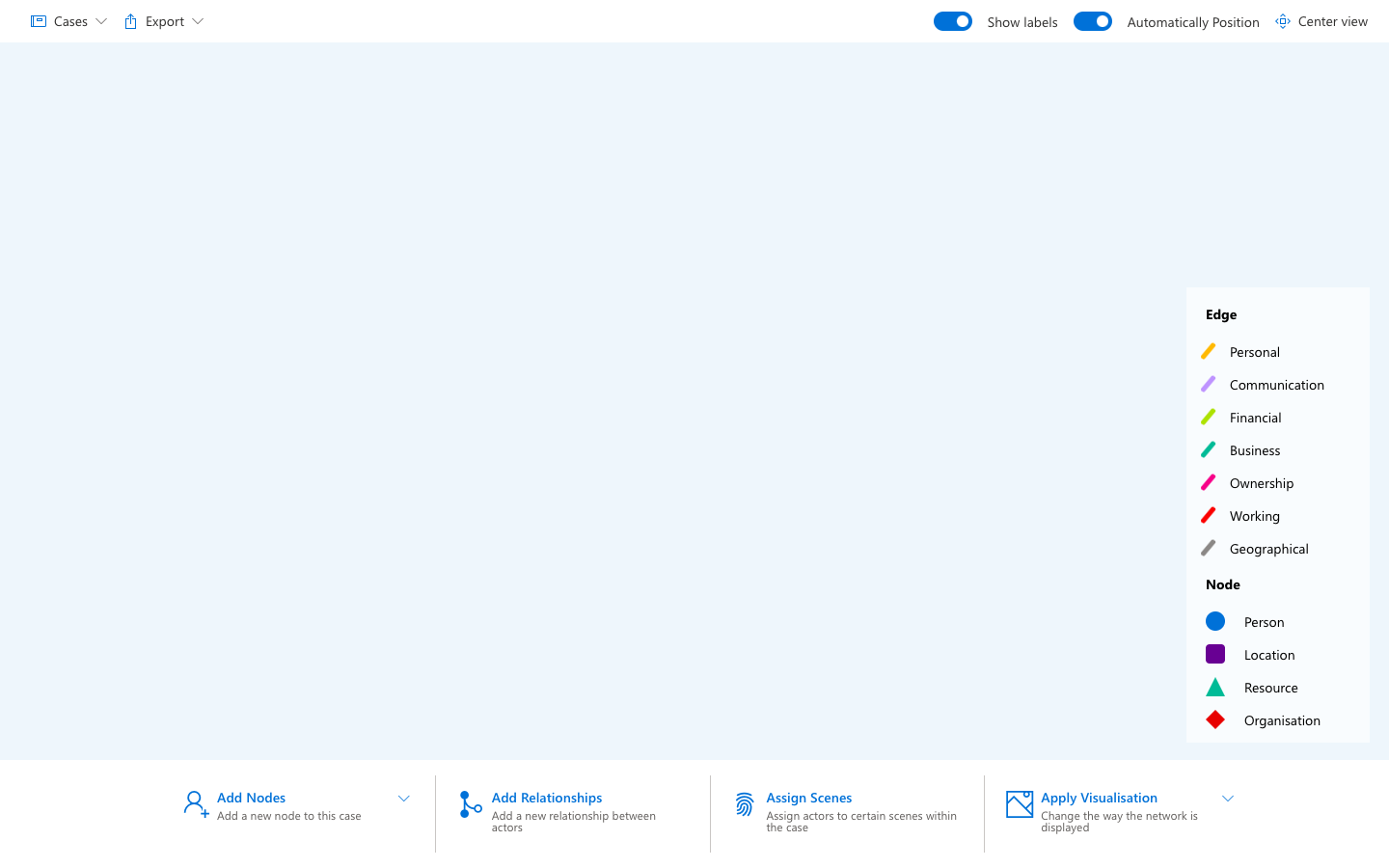
The ScriptNet software is available for use with Windows and Mac. Download the release here: <https://www.dropbox.com/sh/mwt37jto5pnlus4/AADRiYFIQBlbPx2bj8R4sK0Fa?dl=0>

Inside the ZIP file is an installer for the software. Double click it, and the software will install and then open. The software is not digitally signed, which might mean that Windows/Mac tells you that it is unsafe. You should force it to install the software by telling Windows/Mac you want to install anyway.

Once it is installed, you can open the software by looking for “ScriptNet” in your start menu or in your Mac applications list.

1. **ScriptNet interface**

On opening, ScriptNet looks like a window interface, with menus at the top left; button for quick links to the top left and top right; a node and edge legend on the right of the visualization screen; and four main functions to generate networks and assign scenes at the bottom.



**The menu list**

* **File**. The only current option under file is to exit ScriptNet.
* **Edit**. Functions under this menu are
  + Undo: reverses the last action
  + Redo: repeats the last action
  + Cut: not implemented
  + Copy: not implemented
  + Paste: not implemented
  + Delete: not implemented
  + Select all: not implemented
* **View.** Functions under this menu are
  + Reload: reload the screen. UNSAVED DATA WILL BE DELETED
  + Force reload: reload the screen. UNSAVED DATA WILL BE DELETED
  + Toggle developer tools: opens a developer window to the right
  + Actual size: resize the screen
  + Zoom in: zoom into the screen
  + Zoom out: zoom out the screen
  + Toggle Full screen: hide the menu tools (to restore the menu, click on actual size).
* **Window**. Functions under this menu are
  + Minimize: reduces ScriptNet to an icon on the toolbar
  + Zoom: not implemented
  + Close: close the software. UNSAVED DATA WILL BE DELETED
* **Help**. Functions under this menu are
  + Learn more: opens a browser with the link to the developer page
  + Documentation: opens a browser with the link to the GitHub documentation page (ScriptNet manual: not implemented yet)
  + Community discussion: opens a browser with the link to the developer discussion page
  + Search issues: opens a browser with the link to the developer discussion page

**Quick link buttons**

Below the menu bar, there are a series of quick link buttons.

To the left:

* **Cases**: this button gives the user the options to
  + Create a new case: this opens a new ScriptNet case.
  + Save the current case: this allows the user to save the case currently open in ScriptNet. It opens a pop-up window with options to select saving folders. ALWAYS SAVE CASES AT THE END OF SCRIPTNET SESSIONS.
  + Open an existing case: this allows the user to open previously saved cases. It opens a pop-up window with options to select folders where cases were saved.
* **Export**: this button allows the user to export the data created in ScriptNet
  + Export screenshot: this allows the user to save the current visualization open in ScriptNet in a PNG format. It opens a pop-up window with options to select saving folders.
  + Export CSV: this allows the user to save the data created for case currently open in ScriptNet in a CSV format. It opens a pop-up window with options to select saving folders.

To the right:

* **Show labels**: this automatically turns nodes labels on and off
* **Automatically position**: this automatically position nodes in the centre of the screen
* **Centre view**: this automatically centres the network in the screen and optimise the network size.

**Legend window**

On the right of the screen, a legend summarises the colours and shapes used by ScriptNet to identify nodes and relationships (edges).

* **Edge**
  + Orange: Personal
  + Lilac: Communication
  + Light green: Financial
  + Dark green: Business
  + Pink: Ownership
  + Red: Working
  + Grey: Geographical
* **Node**
  + Blue circle: Person
  + Violet square: Location
  + Green triangle: Resource
  + Red diamond: Organisation

1. **Main functions**

The user interface has four main functions: Add Nodes, Add Relationships, Assign Scenes, and Apply Visualisation. These are the tools via which you will generate your integrated script-network analysis of the case you are investigating.

* 1. **Add node**

The first step for the creation of the network is to ‘add nodes’ and their corresponding attributes in the case.

***A ‘node’ refers to the different types of social entity, such as individuals and organisations as well as locations and resources.***

These nodes possess different characteristics or attributes, such as gender or role, and are connected through varied ties and relationships. For instance, in a given case of counterfeit alcohol, the node may refer to a particular person who is suspected to be involved in the criminal enterprise, or a particular location where the counterfeit products are stored. You can add all the relevant nodes to your analysis with the ‘add nodes’ function.

The ‘add node’ function is located in the bottom left corner of the user interface. Click here and select the type of node you wish to choose from the predefined list, and a separate window will open. This window will allow the user to assign the attributes in accordance with the predefined list for each node.

Options are:

* **Person:** refers to individuals who are significant nodes in the network (e.g., suspected offenders, victims, regulators or enforcement authorities, facilitators).
* **Location:** refers to the place of the alleged crime activity or place where the resources used in the criminal activity are found (e.g., a playground, a website, a factory, a warehouse, or storage facility).
* **Resource:** refers to products/goods, things, etc. that are used to facilitate the crime or are the object of the crime. (e.g., a van, a website, money, distillery, products and goods).
* **Organisation:** refers to both businesses as well as other types of organisations such as trade associations, non-governmental organisations, etc. that are involved in criminal activities as main actors, facilitators, victims, etc.

Once you have selected the type of node, ScriptNet opens up a new window where you can add details about the node. Once attributes (i.e., the node’s details) are assigned, ScriptNet automatically creates a node on the screen of shape and colours indicated in the legend window (e.g., a blue circle for a person).

For each type of node, the user can assign the following attributes:

* + 1. **Person**

A ‘person’ relates to individuals who are in some way involved or implicated in the criminal enterprise (e.g., suspected offenders, victims, regulators or enforcement authorities, facilitators).

Each person will be represented with a blue circle in the visualisation panel.

The predefined attributes for the ‘add person’ function are name, role, geographical location, jurisdiction and sex.

* **Name** indicates the name of the person, as known by the investigators. This option is mandatory when adding a node.
* **Role** indicates the role that the person covers in the crime commission process. This option is mandatory when adding a node. Options are:
* Suspected Primary Offender

refers to individuals who are perceived to be highly important to the functioning of the criminal enterprise, in that they are key instigators.

* Secondary /Co-offender

refers to individuals who are perceived to be of lesser importance to the functioning of the criminal enterprise, in that they are key participants, but not the instigators of the enterprise per se.

* Suspected Facilitator

refers to individuals who are not perceived to be primary or secondary offenders, but whose involvement facilitates, knowingly or unknowingly, the functioning of the criminal enterprise.

* Victim

refers to individuals who have been deceived or cheated, or in some way suffer from the criminal enterprise.

* Regulator

refers to individuals, organisations or agencies that play a part in preventing, detecting or responding to the criminal enterprise. This might include public authorities, such as law enforcement, but also private companies or other organisations.

* Other

users can also add ‘other’ where the above options are deemed to be unsuitable.

* **Geographical location** indicates where the person is (e.g., where s/he lives, where s/he has been associated with the crime, etc.). Options can be selected from a drop-down window of countries. If unknown, the option can be skipped.
* **Jurisdiction** relates to specific location of the primary criminal act and the relationship of people to this specific location. The purpose of this attribute to determine the spatial connection or separation of individual people to the primary offending location. For instance, if the main criminal act (e.g., the adulteration of a foodstuff, or the mislabelling of a product) takes place in Bolton or Dundalk, then other people in the criminal enterprise who are equally located in Bolton or Dundalk should be labelled ‘local’. People who are located in the region (e.g., Greater Manchester [Bolton], or County Louth [Dundalk]) but not the specific city/town should be labelled ‘regional’. People who are located outside of the region but within the same country should be labelled ‘national’. Finally, people located in other countries should be labelled ‘transnational’.
* **Sex** indicates the sex of the person. Available options are male, female, and unknown.
  + 1. **Location**

This refers to the place of the specific locations that are involved throughout the criminal activities. For instance, this could be a place at which illicit goods were exchanged, or where a resource that was used in the criminal activity was found - a factory, a warehouse, a meeting place, a pub, or a storage facility.

NB: WHILE EVERY NODE CAN HAVE A GEOGRAPHICAL LOCATION AS AN ATTRIBUTE (e.g., a business located in Dublin), THIS FUNCTION ALLOWS YOU TO ADD LOCATIONS AS NODES (e.g., seizure locations, meeting places, etc.).

Each location will be represented with a violet square in the visualisation panel.

The predefined attributes for the ‘add location’ function are name, geographical location, jurisdiction and function.

* **Name** indicates the name of the location, as known by the investigators. It can be as specific as the name of a geographical location (e.g., Stoke), or as general as a common location name (e.g., warehouse). This option is mandatory when adding a node.
* **Geographical location** indicates where the location is. Options can be selected from a drop-down window of countries. If unknown, the option can be skipped.
* **Jurisdiction** relates to specific relationship of this location to the primary criminal act. The purpose of this attribute to determine the spatial connection or separation of specific locations to the primary offending location. For instance, if the main criminal act (e.g., the adulteration of a foodstuff, or the mislabelling of a product) takes place in Bolton or Dundalk, then other identified locations in the criminal enterprise that are equally located in Bolton or Dundalk should be labelled ‘local’. Locations that are located in the region (e.g., Greater Manchester [Bolton], or County Louth [Dundalk]) but not the specific city/town should be labelled ‘regional’. Locations that are located outside of the region but within the same country should be labelled ‘national’. Finally, locations in other countries should be labelled ‘transnational’.
* **Function** indicates the function that the location has in the criminal offence. Options are
  + Offending location
  + Meeting
  + Storage
  + Hideaway
  + Unknown
    1. **Resource**

This refers to products/goods, things, etc. that are used to facilitate the crime or are the object of the crime (e.g., a van, a website, money, distillery, products and goods).

Each resource will be represented with a green triangle in the visualisation panel.

The predefined attributes for the ‘add resource’ function are name, geographical location, jurisdiction and function.

* **Name** indicates the name of the resource, as known by the investigators. It can be as specific as the name of a brand (e.g., XXXX Vodka), or as general as a common item (e.g., van, money, distillery, etc.). This option is mandatory when adding a node.
* **Geographical location** indicates where the resource is. Options can be selected from a drop-down window of countries. If unknown, the option can be skipped.
* **Jurisdiction** relates to specific relationship of this resource to the primary criminal act. The purpose of this attribute to determine the spatial connection or separation of specific resources to the primary offending location. For instance, if the main criminal act (e.g., the adulteration of a foodstuff, or the mislabelling of a product) takes place in Bolton or Dundalk, then identified resources in the criminal enterprise that are equally located in Bolton or Dundalk should be labelled ‘local’. Resources that are located in the region (e.g., Greater Manchester [Bolton], or County Louth [Dundalk]) but not the specific city/town should be labelled ‘regional’. Resources that are located outside of the region but within the same country should be labelled ‘national’. Finally, resources in other countries should be labelled ‘transnational’.
* **Function** indicates the function that the resource has in the criminal offence. Options are
  + Production
  + Distribution
  + Acquisition
  + Exchange
  + Facilitation
  + Finances
    1. **Organisation**

This refers to both businesses as well as other types of organisations such as trade associations, non-governmental organisations, etc. that are involved in criminal activities as main actors, facilitators, victims, etc.

Each organisation will be represented with a red diamond in the visualisation panel.

The predefined attributes for the ‘add organisation’ function are name, geographical location, jurisdiction, type, function, role, and sector.

* **Name** indicates the name of the organization, as known by the investigators. It can be as specific as the name of a business company (e.g.: Smith Properties LTD), or as general as a business descriptor (e.g.: storage company). This option is mandatory when adding a node.
* **Geographical location** indicates where the organization is. Options can be selected from a drop-down window of countries. If unknown, the option can be skipped.
* **Jurisdiction** relates to specific relationship of this organisation to the primary criminal act. The purpose of this attribute to determine the spatial connection or separation of specific organisations to the primary offending location. For instance, if the main criminal act (e.g., the adulteration of a foodstuff, or the mislabelling of a product) takes place in Bolton or Dundalk, then identified organisations in the criminal enterprise that are equally located in Bolton or Dundalk should be labelled ‘local’. Organisations that are located in the region (e.g., Greater Manchester [Bolton], or County Louth [Dundalk]) but not the specific city/town should be labelled ‘regional’. Organisations that are located outside of the region but within the same country should be labelled ‘national’. Finally, organisations in other countries should be labelled ‘transnational’.
* **Type** indicatesthe ownership type
  + Private
  + Public
  + Other
* **Function** indicates the function that the organization has in the criminal offence. Options are
  + Production
  + Distribution
  + Trading and Wholesale
  + Transportation
  + Retail
  + Disposal
* **Role** indicates the role that the organisation covers in the crime process. This option is mandatory when adding a node. Options are:
  + Suspected Primary Offender
  + Secondary / Co-offender
  + Suspected Facilitator
  + Victim
  + Regulator
  + Other
* **Sector** indicates the sector in which the organization operates. The available options are displayed in the drop-down window (e.g., construction, food and beverages, healthcare, etc.).
  1. **Add Relationships**

The function ‘add relationship’ enables the investigator to create links between the nodes (person, location, research or organisation) according to the type of relationships between them.

ScriptNet has seven ***predefined types of relationships*** (edges): personal, communication, financial, business, ownership, working or geographical relationships. Each of these relationships is assigned a colour for the lines connecting the corresponding nodes (see below).

Click on ‘add relationship’ and a window will open on the left-hand side of the screen. Select from the list of relationships that best describes the connection between the nodes. For each pair of nodes, multiple relationships can be added (i.e., personal AND communication).

The relationships are defined as follows:

* **Personal relationship:** refers to relationships based on family, friendship, acquaintances, etc.
* **Communication relationship:** refers to an exchange with another node in person, in writing, by email or telephone, social media, etc.
* **Financial relationship:** involves purely financial transactions (e.g., a payment from one person or business to another person or business, a transfer of money between bank accounts, an exchange finalised to launder money, etc.).
* **Business relationship:** refers to a formal and external relationship from one person or business to a different business or person within a different business (e.g., contractual obligations for the provision of goods or services).
* **Ownership relationship:** refers to the legal rights for the possession of a thing (e.g., between a person/organisation and real estate, a business, resources, or intellectual property, etc.).
* **Working relationship:** entails a relationship between two employees within the same business, or between an employee and the organisation for which they work.
* **Geographical relationship:** refers to connections between locations and other nodes (e.g., to describe that adulterated food (resource) was found on a cold store (location).

Once the type of relationship has been selected, **drag a line** between the nodes in order to create links between them. The relationship type between nodes will appear in the visualisation panel in accordance with the scheme of colours corresponding to each relationship type (as described in the legend).

* 1. **Assign Scenes**

ScriptNet incorporates four **predefined ‘scenes’, or stages,**of the criminal activities under investigation: preparation, pre-activity, activity, post-activity. Users can assign each node (i.e., person, location, resource, organisation) to the particular scene or stage within which it is mainly relevant. The scenes are described below:

* **Preparation:** Which nodes were involved in the preparation of the criminal enterprise? This question requires the user to ‘think thief’ and consider how the criminal opportunities were recognised and visualised. For instance, which people saw the opportunities for committing the food crimes and identified which activities, conditions and requirements were needed? In essence, which nodes were key to the planning stage of the criminal enterprise (e.g., determining which substances, equipment, people or other resources will be needed to accomplish the crimes).
* **Pre-activity:** Which nodes were involved in the pre-activity stage? This relates to questions about the logistical or transactional steps that needed to be carried out prior to the actual criminal activity in order to make sure all the pieces were in place as determined in the preparation stage (e.g., obtaining adulterants or inferior products for substitution).
* **Activity:** Which nodes were involved in the main criminal acts? This relates to the specific criminal events and can take the form of various offences or non-compliance. In the activity stage, the actual criminal offence will happen (e.g., the act of mislabelling, adulteration, and so on).
* **Post-Activity:** Which nodes were involved in the post-activity stage? This refers to the logistical or transactional steps necessary to exit from the illegal activity (e.g., this might involve the obscuring of paper trails, the management of the proceeds of crime, covering one’s tracks, and so on).

In order to assign scenes to different nodes, click the assign scene function at the bottom of the screen. A window will appear at the left-hand side of the screen with a list of predefined scenes. Select the scene from the four options provided and tap nodes to add them to them. Once scenes have been ascribed, the user can select a scene from the window (e.g., Pre-Activity), and all the nodes that are involved in this stage of the crime commission will appear highlighted with a yellow circle in the visualisation screen. Nodes can be removed from scenes by tapping nodes to remove the yellow circles. Nodes can also be assigned to more than one scene where relevant to do so.

*SCENE PROMPTS: In annex 1, the user can find a series of prompts in relation to each of the scenes and examples about the potential actions or considerations that could be taken in each of the pre-defined scenes.*

* 1. **Apply Visualisations**

ScriptNet allows the display of criminal networks according to five visualisations. Click ‘apply visualisation’ at the bottom right corner of the window and the user will be given the following options: visualise scenes, filter by relationship, focal individual, visualise jurisdiction and visualise geography.

* + 1. **Visualise Scenes**

Click on ‘visualise scenes’ and a window will open at the left-hand side of the screen. The visualisation mode will select all of the scenes by default, but the user can deselect scenes in order to have a clearer picture of the groups. Each scene has been ascribed a colour and by selecting a scene, all the nodes involved in such scene will appear in a container. In the right-hand side of the screen, there is a legend with the colours assigned to each scene.

Yellow: Preparation

Red: Pre-Activity

Blue: Activity

Purple: Post-Activity

* + 1. **Filter by Relationships**

Click on ‘filter by relationships’ and a window will open at the left-hand side of the screen. The visualisation mode will select all of the relationships by default, but the user can deselect relationships in order to have a clearer picture of the ties between nodes. Each relationship type has been ascribed a colour and where nodes are involved in multiple relationship types, this will be visualised with multiple lines connecting two nodes. In the right-hand side of the screen, there is a legend with the colours assigned to each scene.

Yellow: Personal

Purple: Communication

Light Green: Financial

Dark Green: Business

Pink: Ownership

Red: Working

Grey: Geographical

* + 1. **Focal Individual**

Click on ‘focal individual’ and a window will open at the left-hand side of the screen describing focal individual mode. You can then click on any node to see the ego-net surrounding them. That is, the personal network of the selected node. As you choose a node you will be able to see the relationships of that individual node with other nodes.

* + 1. **Visualise Jurisdictions**

Click on ‘visualise jurisdictions’ and a window will open at the left-hand side of the screen. The visualisation mode will select all of the jurisdictional levels by default, but the user can deselect jurisdictional levels in order to have a clearer picture of which nodes are located within different jurisdictional levels. As you select a particular jurisdictional level, the corresponding nodes will be included in a coloured container to clearly visualise the jurisdictional connections. Each jurisdiction has been ascribed a colour. In the right-hand side of the screen, there is a legend with the colours assigned to each jurisdiction.

Yellow: Local

Pink: Regional

Blue: National

Purple: Transnational

* + 1. **Visualise Geography**

Click on ‘visualise geography’ and a window will open at the left-hand side of the screen. The visualisation mode will leave all countries deselected by default. The user can then select particular countries to visualise. As you select a particular country, the corresponding nodes will be included in a coloured container to clearly visualise the geographical connections. Each country will be ascribed a colour to aid in distinguishing between countries.

1. **Saving and Exporting the Script-Nets**

Save your work by clicking ‘cases’ in the top left-hand corner and selecting ‘save case’ from the drop-down menu.

Export screen shots of your visualisations and of your network by clicking ‘Export’ in the top left-hand corner and selecting ‘Export Screenshot’ from the drop-down menu.

You can also export your data into a .csv file for use in other social network analysis software. Select ‘Export’ in the top left-hand corner and then select ‘Export CSV’.

1. **Editing and Deleting Nodes**

To edit a node, select the node on the visualisation panel. A window will open at the left-hand side of the screen with all the values attributed to the node. The window has two boxes corresponding to the editing and deleting options. Select ‘edit’ to amend a node. A separate window will open for the selected node, amend and update. The change will be reflected on the representation in the visualisation panel.

For deleting a node, select ‘delete’ and the node will be deleted from the network.

1. **Final Remarks**

ScriptNet is intended to facilitate the investigative process and provide novel ways of visualising data on criminal enterprise and networks. When using the app, investigators should bear in mind that the scope of the software is limited. For instance, an advanced social scientific application of either crime script analysis or social network analysis would involve a more robust set of procedures and processes in relation to the development of targeted research questions and corresponding research strategies and designs, in addition to rigorous data collection, data analysis, and theory building. In addition, there are limitations in terms of the practicalities of the software. For instance, users are restricted to a predetermined set of nodes and relationships, and a predetermined set of visualisations. As this software is open source, developers may wish to build on the ScriptNet foundations to introduce new and more advanced analytical features.

Instead, ScriptNet provides a more intuitive software tool to guide and inform the intellectual efforts of investigators, prompting ideas for new lines of inquiry and visualising significant aspects of individual cases.

Annex 1 – Scene Prompts

Below you will find prompts and examples for assigning nodes to different scenes.

**4.3.1 Preparation**

Activities that could be assigned to the preparation stage are:

**Recognise the criminal opportunity:** the investigator can consider the type of criminal activities that offer the most amenable profit-making potential and the reasons behind its profitability. Here the investigator can also consider whether the crime occurs predominantly within or outside of legitimate food systems.

**Identify suitable target / victim:** the investigator can consider the suitability of targeted foodstuff for crime (e.g., products that are easier to counterfeit or adulterate, companies that are easier to defraud due lack of due diligence, traceability in transnational operations, etc.).

**Identify co-offenders and facilitators:** the investigator can consider what type of collaborations are needed for the fraud to be committed, for example, the involvement of logistic companies either wittingly or unwittingly; connections to an employee with access to facilities (e.g., establish relationships in the pre-activity scene based on a timeline of communications in social media).

**Identify offending and facilitating locations:** investigator can consider the kind of operational and infrastructural costs of activities. (e.g., suspected offenders searching for information on the Internet, Purchasing equipment, etc.).

**Identify responsible ‘guardians’:** this relates to questions about the authorities that have responsibility for the regulation or enforcement of the offending either domestically or internationally. There could also be other types of guardianship (trading associations, standards bodies, etc.).

**Identify gaps or vulnerabilities in guardianship:** the investigator can consider what kind of transactions can take place without appropriate guardianship and the regulatory loopholes that allow the crime to be concealed (e.g., brokerage, cold stores, etc.)

**Identify optimal jurisdictions:** the investigator can consider whether some jurisdictions provide more ready-made opportunities for the commission of a crime that would be taken into account by suspected offenders (e.g., lesser inspections of premises, liaisons with other jurisdictions, etc.).

**4.3.2 Pre-activity**

Pre-activity relates to the logistical or transactional steps that need to be carried out prior to the activity. This can include for example availing of the required materials for the adulteration, ensuring access to facilities, accomplices or the creation of publicity materials – website or otherwise – that are needed to commit the crime.

Some of the activities that could comprise the pre-activity state are:

**Recruit co-offenders:** This scene entails the consideration of how co-offenders are recruited and managed (e.g., Previous connections known to the investigators, family or acquaintances, etc.)

**Collect data / information on targets and victims:** information about the resource (e.g., goods, website, etc.) and the targets (company, ownership, workings of the company, etc.)

**Obtain required materials and equipment:** this requires investigators to consider the kind of equipment, data, information, materials, etc. that are needed for the offending and how and where are these obtained from (e.g., screen wash for adulteration of alcohol, bottles, tags, etc.).

**Instigate transactional steps:** consider the types of locations that are involve in the crime (e.g., workplaces, storage, logistics, digital, illicit premises), where the offence is to be carried out (e.g., domestically or overseas locations, with or without physical presence in jurisdictions, etc.), and how finances for criminal activity will be obtained and managed.

**Neutralise capabilities of guardians, enforcement and/or regulation:** considerations about the kind of actions or information that is necessary in order to prevent being caught.

**4.3.3 Activity**

Activity relates to the commission of the criminal events and can take the form of various offences or non-compliance. (e.g., the adulteration, sale and distribution of the product, the commission of a commercial fraud against a company, etc.).

Some of the actions that could comprise the activity state are:

* **Crime commission:** (e.g., fraud, mislabelling, adulteration). The commission of the criminal event necessitates considering the skillsets, knowledge, expertise and capacity of the offenders to commit the crime, their likely motivations, the facilitators or enablers (willingly, knowingly or incompetently), the roles (legitimate or illegitimate) that each actor plays during the commission of the crime, and the nature or organization of the network collaborations and relations.
* **Minimise immediate enforcement risks and detection operations:** (e.g., neutralize regulators through skill, corruption, legal arbitrage, cross-border obstacles, etc.).

**4.3.4 Post-activity**

Post-Activity refers to the logistical or transactional steps necessary to exit from the illegal activity (e.g., how to conceal the proceeds of the crime).

Some of the activities that could comprise the post-activity stage are:

**Manage proceeds of crime:** (e.g., how are proceeds of crime concealed, converted and controlled?)

**Cover tracks:** (e.g., concealment of activities, lifestyles of those involved, etc.)

**Minimise medium-long term enforcement risks:** (e.g., use of different jurisdictions, port shopping, etc.)