**TIGERGRAPH PROJECT WRITE-UP**

Write-Up. Provide a written defence of your project, explaining its strength in each of the four judging criteria (see Judging and Criteria in the Rules). Provide supporting facts and statistics as appropriate. The response for each criterion may be up to 250 words. The four criteria are:

* Impactfulness:
  + The degree to which the graph solution betters people’s lives via positive impacts in one or more domains. This includes: Reach (number of people helped), Value (social/economic benefit), and Depth (addressing root issues)
* Innovativeness:
  + The degree to which the graph solution offers either a novel approach to the problem or a novel use of graph. This includes: Novelty (new way to frame complicated problems with graph) and Creativity (resourcefulness in overcoming challenges)
* Ambitiousness:
  + The degree to which the graph solution pushes the boundary of scale and scope of graph to solve real world problems. This includes: Schema scope (graph schema size), Scale (graph data size), and Functional scope (coverage of functional features)
* Applicability:
  + The degree to which the graph solution is ready to be adopted and applied with reasonable resources and investment. This includes: Adoption (ease of putting the solution into real-world use) and Breadth (number and size of industries that could adopt this)

**Impactfulness**

Serious and organised crime is estimated to cost the UK economy at least £37 billion a year, hence the public funds which would be freed up as a result of identify and disrupting members of these organisations can be repurposed towards projects that can improve quality of life and infrastructure.

A major activity undertaken by these criminal organisations is drug trafficking, this inevitably leads to thousands of people succumbing to addiction. As such, reducing the illegal import of drugs would inevitably result in an increase in public health, as well as increased workforce participation from individuals who might have otherwise become addicts. Furthermore, reduction in the occurrence of violent crimes would make for a safer environment for the general public.

Therefore, it is clear to see that the identification and subsequent disruption of these criminal organisations would greatly improve society both socially and financially.

On the other hand, this use case of graph technology could drastically reduce the time taken for the structure of a crime organisation to be uncovered, and hence lead to faster and more plentiful abolition of such organisations. As well as a cleaner and more dedicated law enforcement agency.

**Innovativeness**

One use case of graph technology is to handle data pertaining to individuals, although this seems to currently focus on the management of identity and access authorizations for employees across the growing range of cloud-based and on-premises apps and systems within one organisation/company.

What we propose would take this to the next level, by allowing data pertaining to individuals across a multitude of organisations and locations to be aggregated into one schema.

We have drawn the focus towards the identification of the structure of criminal organisations. By allowing links to form between criminals, law enforcement agents and members of the public, the idea is to allow law enforcement agencies to see how these criminal organisations span their influence across different sectors of society with greater ease. This could allow for weak points to be identified with the purpose of disrupting the activities conducted by these organizations.

The main issue with this endeavour is the acquisition of data and then the subsequent problems related to GDPR for sensitive data acquired relating to the individuals in the database. We overcame this by randomly generating all our data, essentially manufacturing a fictitious criminal organisation, police members and general public. A similar process could be undertaken in order to mask the real data acquired when the system went live such as to protect the data pertaining to individuals.

**Ambitiousness**

Our project pushes the boundaries of what it means to be connected. We draw connections between individuals on a multitude of categories with varying importance, the connections generated go beyond what could be feasible with the naked eye.

Our schema encompasses data pertaining to members of the public, law enforcement agencies and criminal organisations. Ideally every citizen would be represented on this graph, thus allowing us to see how people link to one another, may it be through family ties, a transaction made regularly or once a few years ago, a message sent, or even a call received. The network generated from all these links would allow no connection to go unseen.

Imagine a police force where all corrupt agents can be easily identified and perhaps even used without their knowledge to reach the criminals, imagine being able to determine all individuals belonging to these organisations and their structure, imagine the ability to determine location hotspots for criminal recruiting, and subsequently being able to implement government programmes to pacify such regions, in essence cutting these organisations from their supply of henchmen.

Implementing such a tool could allow a drastic reduction in the number of illicit activities and thus lead to a safer and more righteous society.

**Applicability**

Despite the fact that this project remains at a proof-of-concept stage, the ability to implement it successfully is nonetheless present. There are two main obstacles that stand in the way of successfully implementing a system such as this.

The first is the issue pertaining to the data protection of the individuals reported on the system. The government would already be in possession of most of the data required, the law enforcement branch of the government would therefore have no problem in accessing this data. However, there would need to be a transparent collaboration between the government and private institutions such as banks, this would permit access to sensitive data such as financial records for all citizens, as a result this could pose a serious GDPR problem.

The second would be the logistics behind storing and subsequently querying such vast amounts of data within applicable timeframes. If the data takes too long to be analysed via the use of graph technology it could defeat the purpose of the system, as current methods of investigation would be more appropriate. The use of systems such as Kafka could make this problem a thing of the past by exploiting several nodes to run complex queries in a fraction of the time.

Ultimately, this is a system that could find itself very useful in law enforcement agencies throughout the world. Military applications in counter-terrorism measures are also not beyond the scope of the capabilities of this system.