Statistical Models and Time Series Forecasting on Crime Data in Nepal

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Abstract : Throughout the 20th century, new governments were created where identities such as ethnic, religious, linguistic, caste, communal, tribal, and others played a part in the development of constitutions and the legal system of victim and criminal justice. Acute issues with extremism, poverty, environmental degradation, cybercrimes, human rights violations, crime against, and victimization of both individuals and groups have recently plagued South Asian nations. Everyday massive number of crimes are steadfast, these frequent crimes have made the lives of common citizens restless. Crimes are one of the major threats to society and also for civilization. Crime is a bone of contention that can create a societal disturbance. The old-style crime solving practices are unable to live up to the requirement of existing crime situations. Crime analysis is one of the most important activities of the majority of intelligent and law enforcement organizations all over the world. The South Asia region lacks such a regional coordination mechanism, unlike central Asia of Asia Pacific regions, to facilitate criminal intelligence sharing and operational coordination related to organized crime, including illicit drug trafficking and money laundering. There have been numerous conversations in recent years about using data mining technology to combat crime and terrorism. The Data Detective program from Sentient as a software company, uses data mining techniques to support the police (Sentient, 2017). The goals of this internship are to test out several predictive model solutions and choose the most effective and promising one. First, extensive literature reviews on data mining, crime analysis, and crime data mining were conducted. Sentient offered a 7-year archive of crime statistics that were daily aggregated to produce a univariate dataset. Moreover, a daily incidence type aggregation was performed to produce a multivariate dataset. Each solution's forecast period lasted seven days. Statistical models and neural network models were the two main groups into which the experiments were split. For the crime data, neural networks fared better than statistical models. This study gives a general review of the applied statistics and neural network models. A detailed image of each model's performance on the available data and generalizability is provided by a comparative analysis of all the models on a comparable dataset. Obviously, the studies demonstrated that, in comparison to other models, Gated Recurrent Units (GRU) produced greater prediction. The crime records of 2005-2019 which was collected from Nepal Police headquarter and analysed by R programming. In conclusion, gated recurrent unit implementation could give benefit to police in predicting crime. Hence, time series analysis using GRU could be a prospective additional feature in Data Detective.