Data Article

# Exploration of daily Internet data traffic generated in a smart university campus

Oluwaseun J. Adeyemi [a], Segun I. Popoola [b,*],
Aderemi A. Atayero [b], David G. Afolayan [a], Mobolaji Ariyo [a],
Emmanuel Adetiba [a,b,c]

[a] Center for Systems and Information Services, Covenant University, Ota, Nigeria
[b] Department of Electrical and Information Engineering, Covenant University, Ota, Nigeria
[c] HRA, Institute for Systems Science, Durban University of Technology, Durban, South Africa

## ARTICLE INFO

## ABSTRACT

In this data article, a robust data exploration is performed on daily Internet data traffic generated in a smart university campus for a period of twelve consecutive (12) months (January–December, 2017). For each day of the one-year study period, Internet data download traffic and Internet data upload traffic at Covenant University, Nigeria were monitored and properly logged using required application software namely: FreeRADIUS; Radius Manager Web application; and Mikrotik Hotspot Manager. A comprehensive dataset with detailed information is provided as supplementary material to this data article for easy research utility and validation. For each month, descriptive statistics of daily Internet data download traffic and daily Internet data upload traffic are presented in tables. Boxplot representations and time series plots are provided to show the trends of data download and upload traffic volume within the smart campus throughout the 12-month period. Frequency distributions of the dataset are illustrated using histograms. In addition, correlation and regression analyses are performed and the results are presented using a scatter plot. Probability Density Functions (PDFs) and Cumulative Distribution Functions (CDFs) of the dataset are also computed. Furthermore, Analysis of Variance (ANOVA) and multiple post-hoc tests are conducted to understand the statistical difference(s) in the Internet traffic volume, if any, across the 12-month period. The robust data exploration provided in this data article will help Internet Service Providers (ISPs) and network administrators in smart campuses to develop empirical

* Corresponding author.
    E-mail addresses: segun.popoola@covenantuniversity.edu.ng, segunpopoola15@gmail.com (S.I. Popoola).

model for optimal Quality of Service (QoS), Internet traffic forecasting, and budgeting.

## Specifications Table

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|---|---|
| Subject area | *Engineering* |
| More specific subject area | *Information and Communication Engineering* |
| Type of data | *Tables, graphs, figures, and spreadsheet file* |
| How data was acquired | *For each day of the one-year study period, Internet data download traffic and Internet data upload traffic at Covenant University, Nigeria were monitored and properly logged using an open source software, Free-RADIUS, Radius Manager web application, and Mikrotik Hotspot Manager.* |
| Data format | *Raw, analyzed* |
| Experimental factors | *Internet data download traffic and Internet data upload traffic were monitored and logged for only nineteen (19) days in December, 2017 because the university proceeded to end-of-year break afterward.* |
| Experimental features | *Descriptive statistics, boxplot representations, time series plots, frequency distributions, correlation and regression analyses, Probability Density Functions (PDFs), Cumulative Distribution Functions (CDFs), Analysis of Variance (ANOVA) test, and multiple post-hoc test are performed to explore the dataset provided in this data article. All statistical computations were done using the Machine Learning and Statistics toolbox in MATLAB 2016a software.* |
| Data source location | *The dataset on Internet data traffic provided in this article were collected at Covenant University, Canaanland, Ota, Nigeria (Latitude 6.6718° N, Longitude 3.1581° E)* |
| Data accessibility | *A comprehensive dataset is provided in Microsoft Excel spreadsheet file and attached as supplementary material to this data article for easy research utility and validation* |

## Value of the data

- The data provided in this data article can be used to accurately predict Internet data traffic in a smart campus environment. Predictions of Internet data traffic will help network engineers to improve the Quality of Service (QoS) of computer networks and also ensure efficient utilization of the networks in a smart university campus [1,2].
- Availability of dataset on Internet data traffic obtained from real scenarios will facilitate more empirical research in the areas of computer networking and Internet traffic engineering [3,4].
- This dataset is made available to give correct facts and figures on Internet data traffic in a Nigerian university campus that is driven by Information and Communication Technologies (ICTs) [5,6].
- Free access to daily Internet data traffic of a period of one year will facilitate the development of empirical prediction models that can be used by Internet Service Providers (ISPs) and Internet subscribers in a smart university campus for effective network planning and traffic forecasting [7–12].
- Robust data exploration that is performed in this data article will help the university network administrators to gain useful insights about the traffic peak and off-peak periods. Also, the descriptive statistics, frequency and probability distribution plots, correlation analysis, ANOVA test and multiple post-hoc test results will give better understanding of the relationships between the Internet data download traffic and the Internet data upload traffic in a smart campus [13–15].