Predicción del Rendimiento en Redes Celulares con Segmentación

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In 5G and beyond systems, Network Slicing (NS) enables the deployment of multiple logical networks customized for specific verticals over a common physical infrastructure. In the radio access network, mobile operators need models to forecast slice performance for an efficient and proactive slice redimensioning. This task has not been addressed yet due to the absence of public datasets from live 5G networks with NS comprising historical measurements of Key Performance Indicators (KPIs) collected on a slice basis to test on. This work presents, a slice-level KPI dataset created with a dynamic system-level simulator that emulates the activity of a realistic 5G network with NS. The dataset comprises historical measurements for several KPIs collected per cell and slice for 15 minutes of network activity. Then, a thorough analysis of the dataset is presented considering correlation- and seasonality-related features, aiming to characterize slice-level KPI time series for different slices and data aggregation resolutions. Results have shown that some key aspects for designing slice-level forecasting models (e.g., seasonal KPI behavior or relationship among KPIs) strongly depend on slice and data time resolution. Slice-specific multi-KPI forecasting models with automatic seasonality detection are expected to achieve the best performance.