Visual Abstraction of Dynamic Network via Improved Multi-class Blue Noise Sampling

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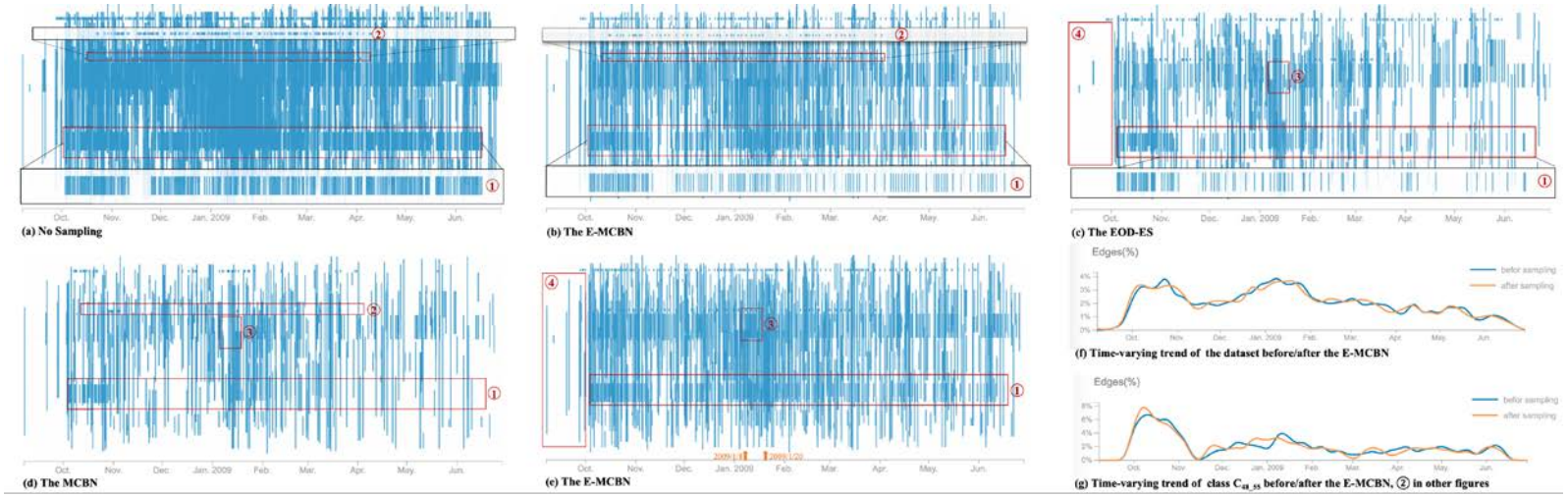
Problems & Ideas

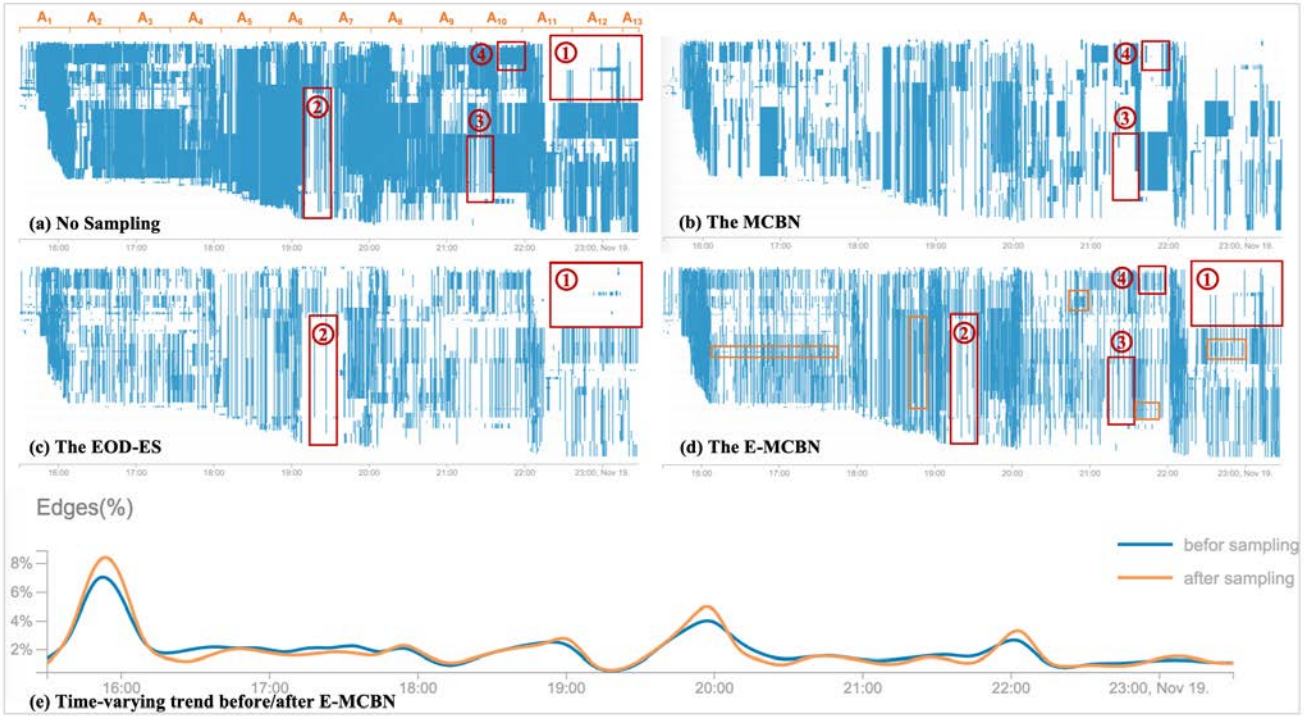
- Disadvantages of existing sampling method used for reducing visual clutter in massive sequence view (MSV):
  - Instability of sample results with the same sampling rate.
  - Imbalance of relative densities between node pairs.
  - Loss of outliers.
- Ideas: An edge-based (E-) and multi-class blue noise (MCBN) based sampling scheme (E-MCBN) is adopted to make the sample result stable and balanced and preserve outliers.



The students' phone call dataset. (a) MSV before sampling, the MSV suffers from mass overplotting or overlapping edges; (b) and (d) MSV after applying the E-MCBN sampling algorithm; (c) MSV after EOD-ES sampling; (d) MSV after MCBN sampling; (f) Distribution of the edge counts of phone calls before and after E-MCBN. (g) Distribution of the edge counts of C_{48_55} before and after E-MCBN.

Main Contributions

- Contributions:
  - An edge-based MCBN (E-MCBN) sampling algorithm is used to improve the readability of MSV;
  - Two indicator named class overlap degree (COD) and inter-class conflict degree (CCD) are utilized to measure the overlapping and mutual exclusion degrees, respectively, between edge classes.



The high school student face-to-face contact dataset. After MCBN (b), the local block effect of some edges (see (a) ③ and ④) nearly disappear in (b) ③ and ④. After EOD-ES (c), many invisible contact pairs in (a) with frequent communication stand out. However, numerous outliers in (a) ① and ② are lost in (c) ① and ②. (d) After the E-MCBN sampling algorithm. (e) The distributions of the edge counts of the high school dataset before and after E-MCBN.