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“FLAIR: Storing Unbounded Data Streams on Mobile Devices to Unlock User Privacy at the Edge”

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Abstract

Mobile devices are producing larger and larger data streams, such as location streams, which are consumed by location-based services to deliver personalized content to end users. Such data streams are generally uploaded and centralized to be processed by third parties, potentially exposing sensitive personal information. In this context, existing protection mechanisms, such as Location Privacy Protection Mechanisms (LPPMs), have been investigated. Alas, none of them have actually been implemented, and practically deployed, in mobile devices to enforce user privacy at the edge. We believe that the effective deployment of LPPMs on edge devices faces a major challenge: the storage of unbounded data streams.

This paper introduces FLAIR, a new piece-wise linear approximation technique that increases the storage capacity of mobile devices by relying on data modeling. Beyond the FLAIR storage layer, we also introduce Divide & Stay, a new privacy-preserving technique to execute Points Of Interest (POIs) inference, and we deploy both of them on Android and iOS to finally demonstrate a real deployment of LPPMs at the edge.