Automated Deauthentication using Web Transaction Analysis

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Same device or user account can be used by several people, some possibly unauthorized.

Detecting account impersonation and applying automated deauthentication mitigates the threat.

Web transactions are characteristic for a user and their analysis can be used for deauthentication.

Challenges in detecting account impersonation

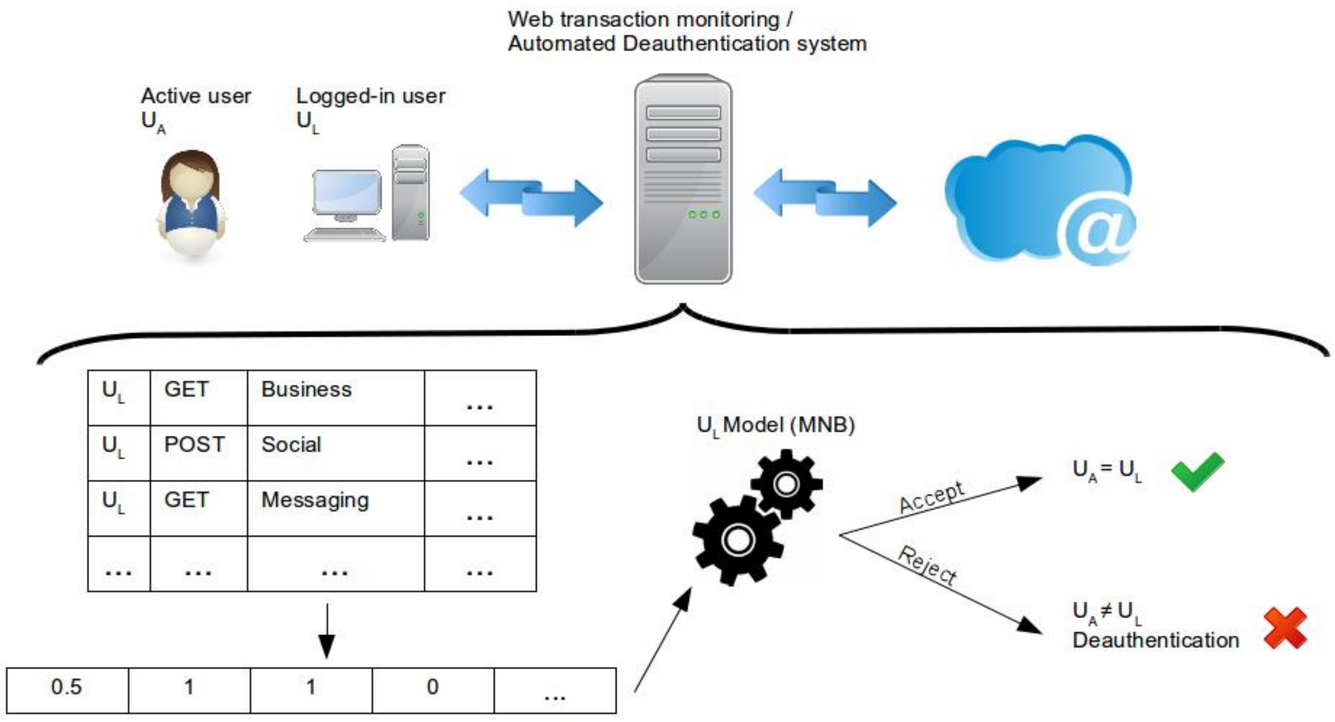
- Discriminative user behavior modeling
- Scalable solution (100s of users)
- Fast decision making
- Low overhead in deployment

Current solutions:

- Automated deauthentication:
  - Mostly relies on biometrics: keystroke, touchscreen, face, cloth color analysis
  - Needs local software / additional hardware
  - Does not prevent malicious behavior of authorized users

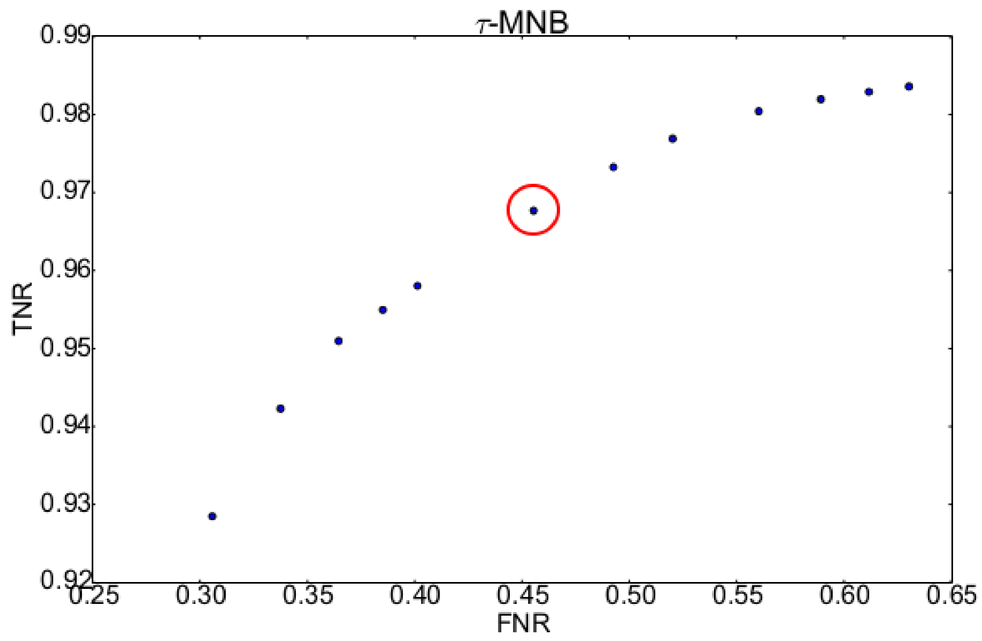
Solution: Profiling users by modeling web transactions

- User-specific profile (built from historical web transaction logs) using Multinomial Naïve Bayes
  - Applied to new web transactions — Scalability
- Consider sequences of transactions (60s window = 1 transaction window)
- Context-aware modelling: URI, URI categories, applications, media types, …
- Centralized monitoring (gateway) — Low overhead
- Works on top of an existing Authentication system



Performance

- Speed: 5.5 minutes (10 consecutive transaction windows) for deauthentication — Fast
- Accuracy (tested on real-world dataset containing 40 users):
  - Deauthenticates an illegitimate user with the probability: Recall = 54.5% — Discriminative
  - Deauthenticates a legitimate user with the probability: False positive rate = 3.3%



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