

Content-based Fuzzy Access Control

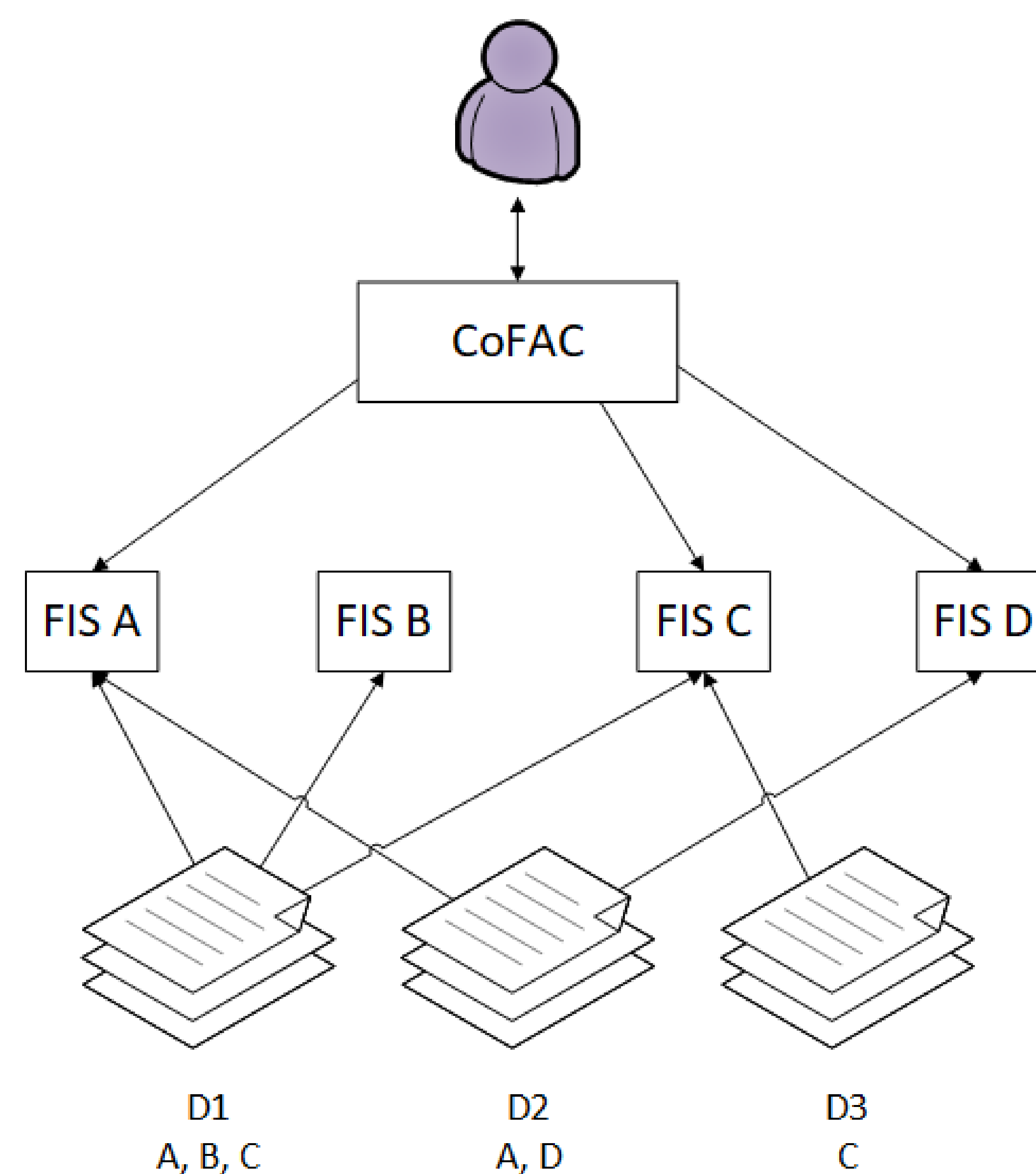
Network Applications and Services

Background and challenges

- With the advent of IoT and 5G, the quantity and complexity of data available that needs to be stored and processed has increased considerably.
- However, access to this increasing amount of information is hard to secure, specially in situations where the conditions for allowing or denying access are vague and hard to define.
- Securing this data from attacks, misuse and vandalism is key to enhance its quality and availability.

Description and main innovation

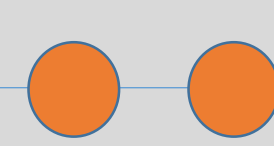
- To describe vague concepts in a manner usable for access control, fuzzy logic and rules are used. Fuzzy logic was created to define concepts that can be partially true or false, which allows subjects to be partially associated with vague concepts, such as their *Expertise* and *Trustworthiness*.
- An access control system that makes decisions based on this information was designed, called Content-based Access Control System (CoFAC).
- CoFAC associates different Fuzzy Inference Systems (FIS A, FIS B, etc.) to different sections of stored documents automatically.
- Depending on the subject's query, the relevant FIS is executed given the subject's parameters. The FIS uses a set of fuzzy rules to determine the subject's level of association to each defined vague concept and to make access control decisions based on them.



Subject query processing diagram in CoFAC.

Achievements

2015



2019

- Conference
- Book Chapter
- Journal (Submission)

- A fuzzy inference system specialized to make binary decisions was designed, along with an optimized auditing algorithm to determine the access decision based on the system's inputs.
- A standard definition language (FCL) was extended to support the definition of such systems.
- A CoFAC prototype was built using Wikipedia page vandalism prevention as its application scenario.
- Submitted journal papers: 1. Other published conference papers: 8. Published book chapters: 1.