

FAULT RESILIENT AUTHENTICATION ARCHITECTURE FOR DRONE NETWORKS

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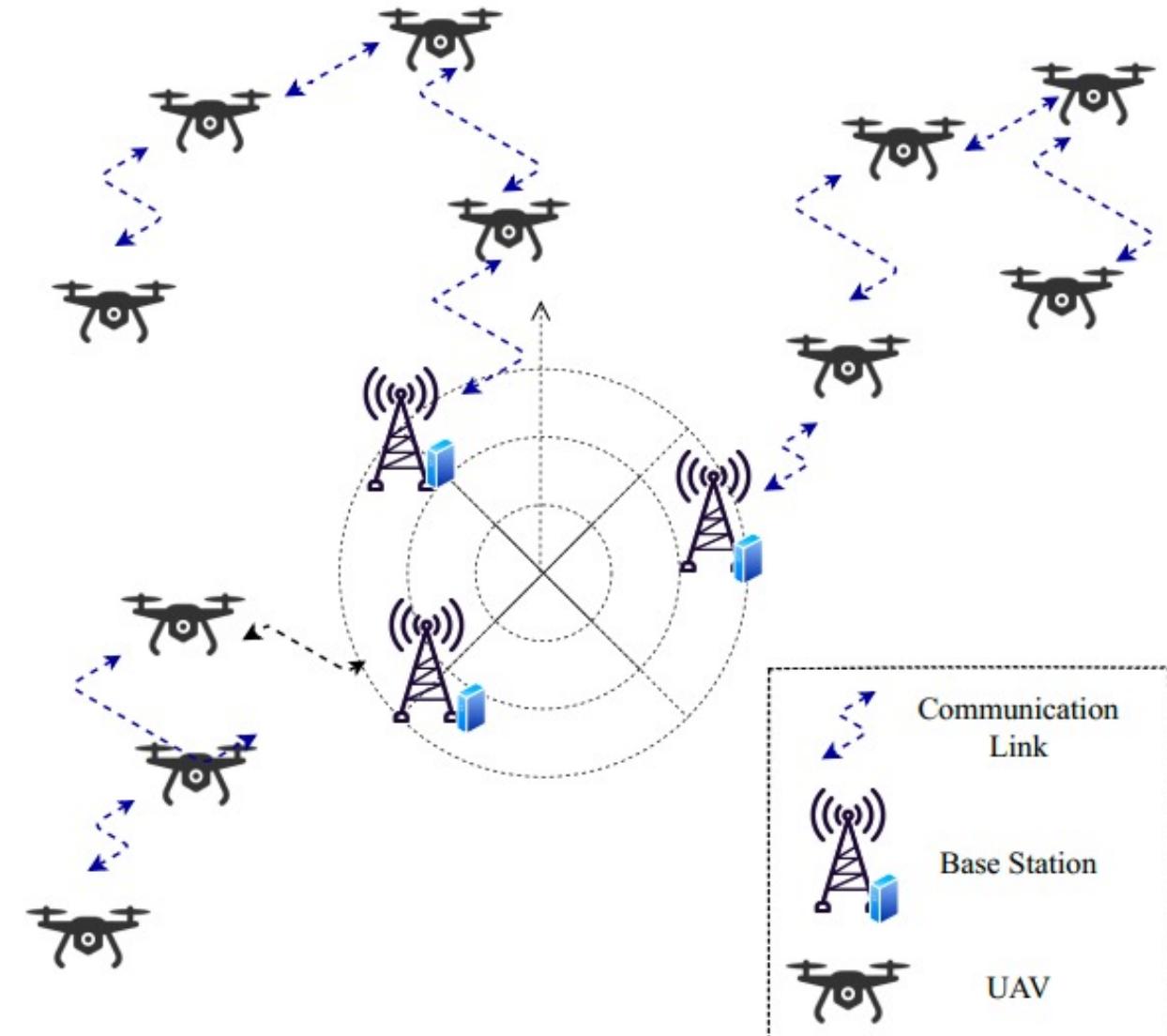




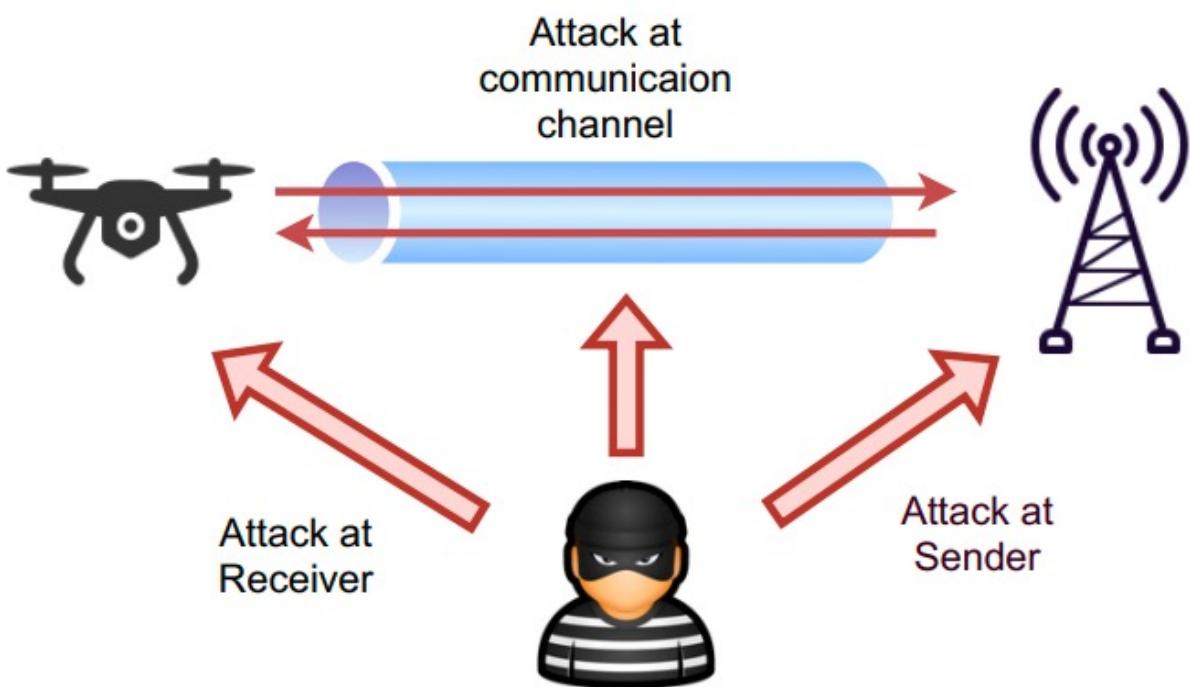
Unmanned Aerial Vehicles (UAVs)

- Small aerial devices
- No pilot required
- Wide range of applications.
 - Medical surveillance in natural disasters
 - traffic monitoring
 - military operations
 - delivery services
 - task offloading

System Model



Threats



- UAV communication's reliance on wireless channels makes it prone to many active attacks such as replay attacks, man-in-the-middle attacks.
- UAVs are located closer to the users; thus, they are more vulnerable to physical attack.

Attack Model

- Attacker can **hear all the unencrypted communication** between the receiver and the sender.
- An adversary has the **ability to masquerade** as a legitimate UAV
- Attacker **can tamper** with the ongoing message exchanges.
- An attacker **may try to eavesdrop** on the transmitted messages, modify these messages, or replay them in the network.
- The attacker can **also capture any UAV**, disrupt any communication, and use brute force computation to decrypt any secret information.

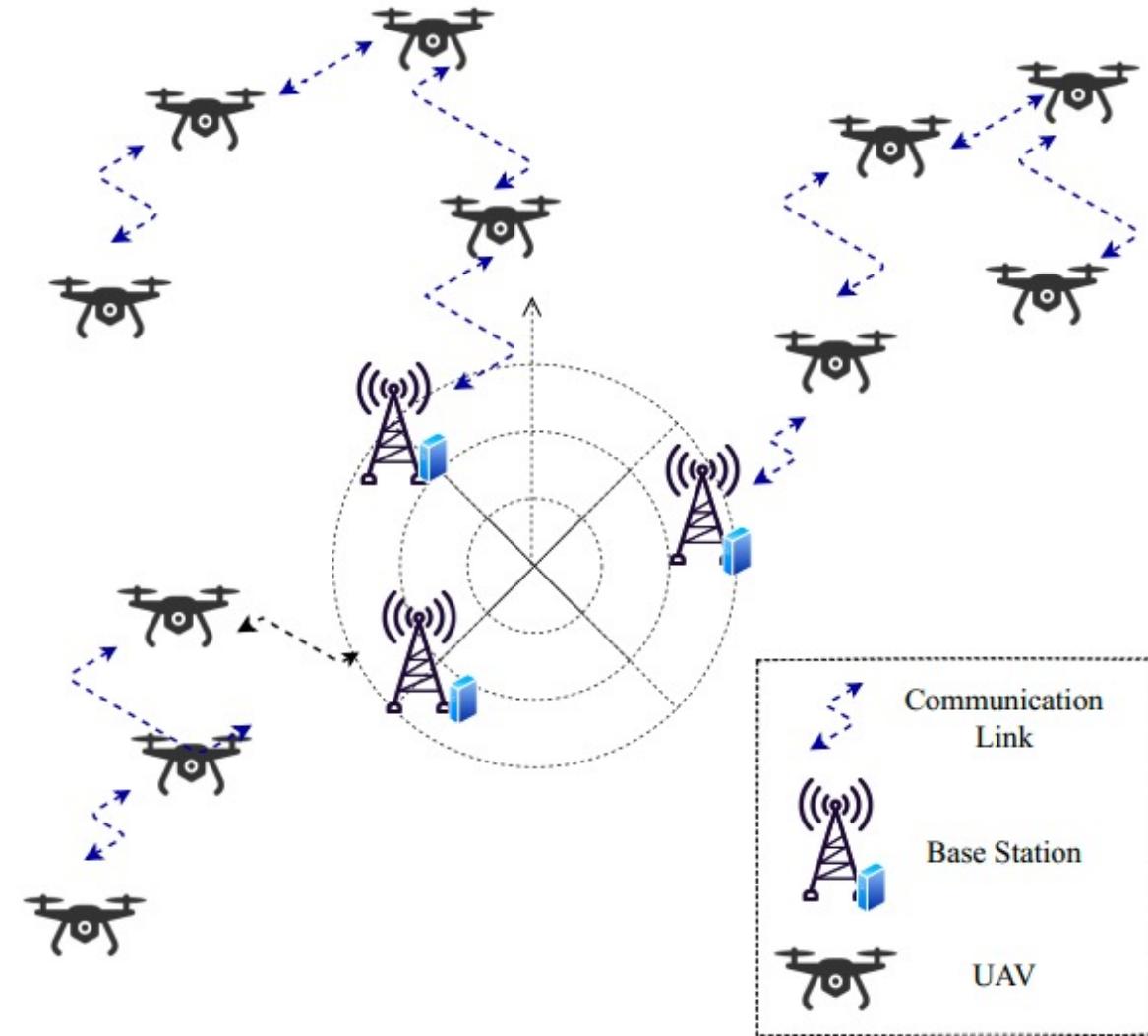


Authentication

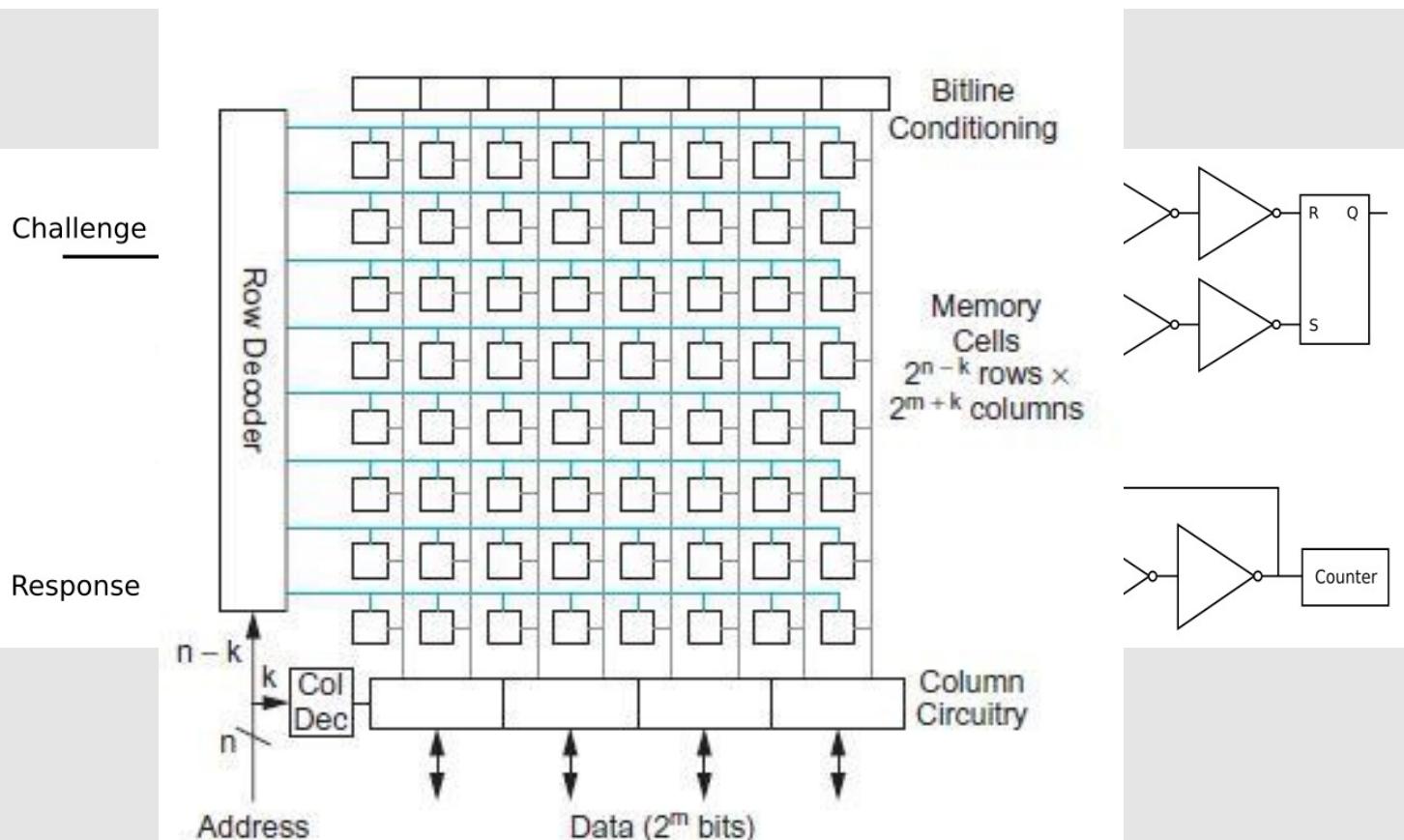
What researchers propose?

- Lightweight authentication protocol
- Scalability
- Supports dynamic topology & mobility

How?

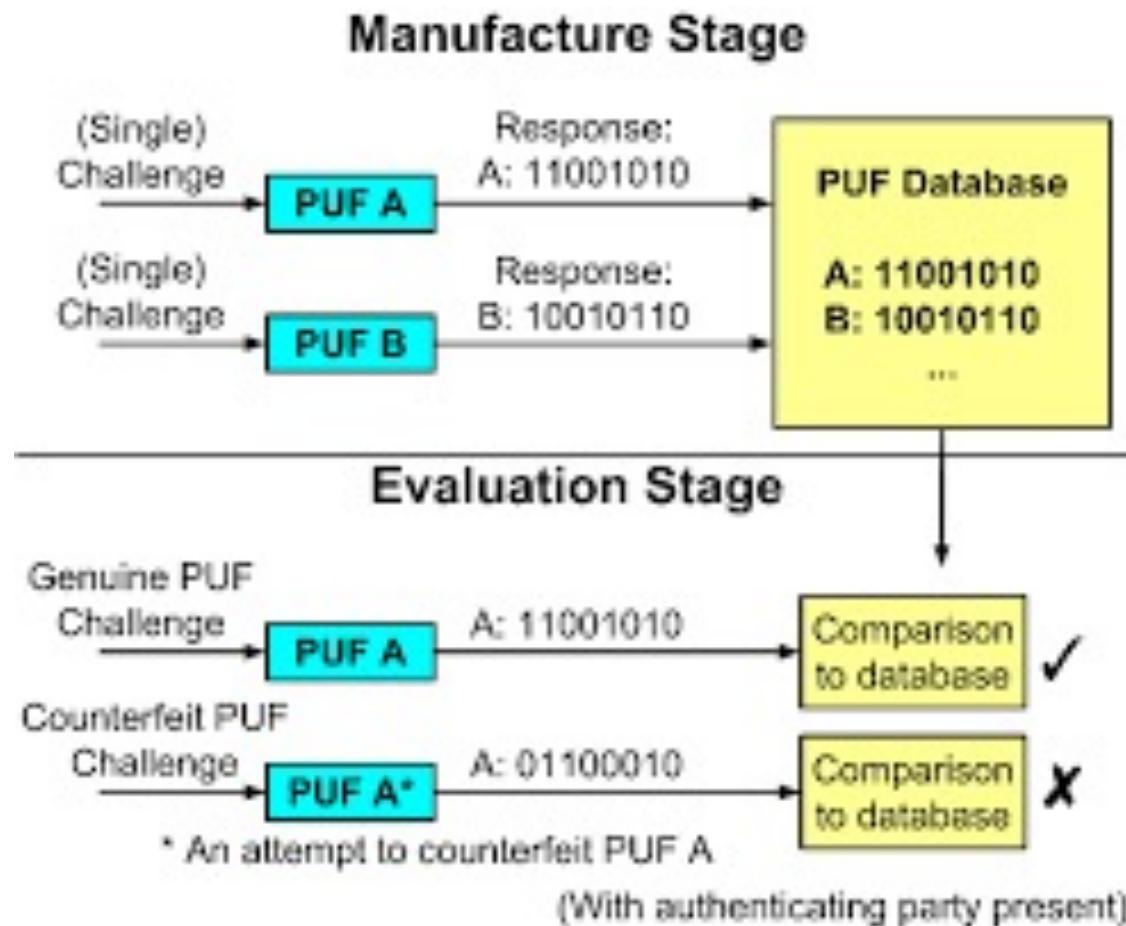


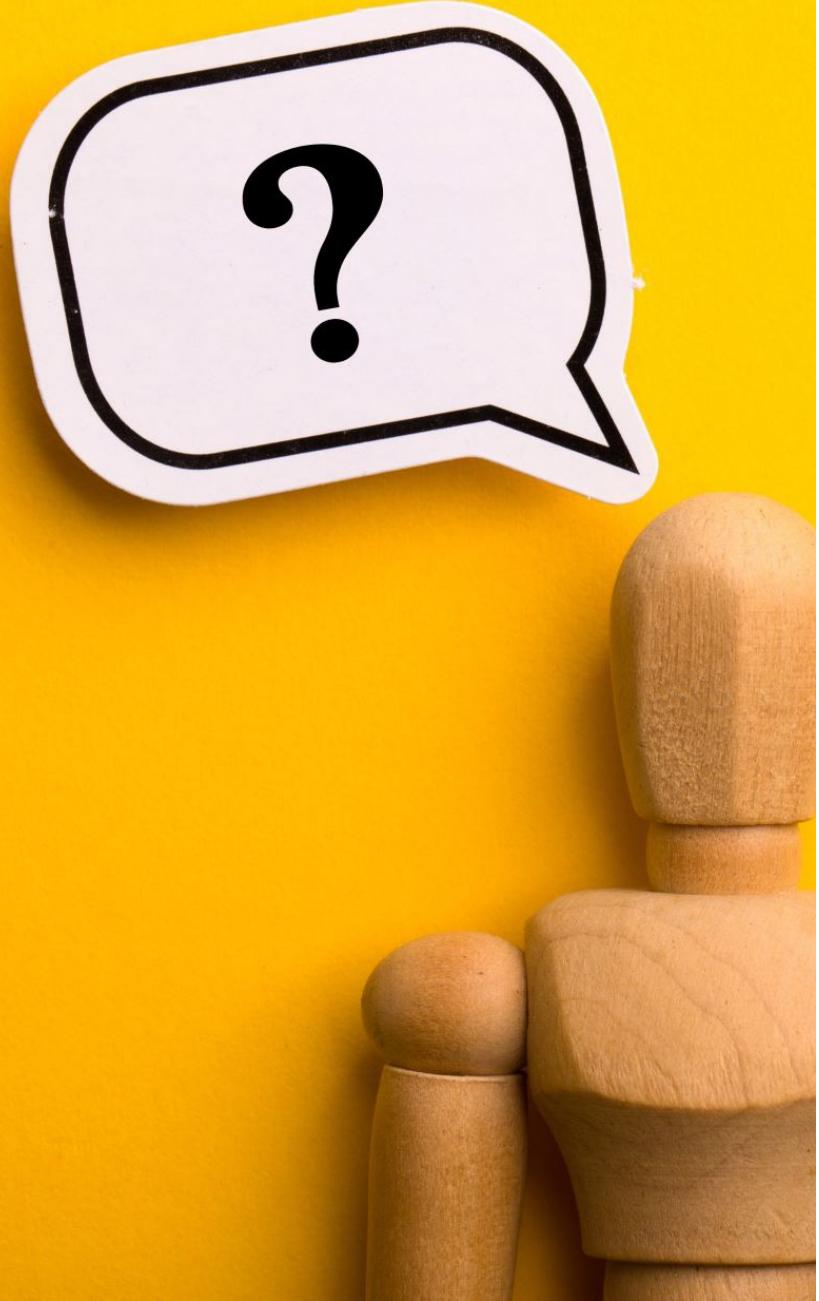
PUFs



- Physical unclonable functions can be considered as digital fingerprints of integral circuits.
- PUFs exploit the inherent randomness that is unique to a device and cannot be cloned or forged.
- This intrinsic randomness is generated during the fabrication of the chip.
- A PUF can be modeled as $R \leftarrow PUF(C)$, where the PUF uses its internal characteristics to map a challenge C to response R .

PUF Working



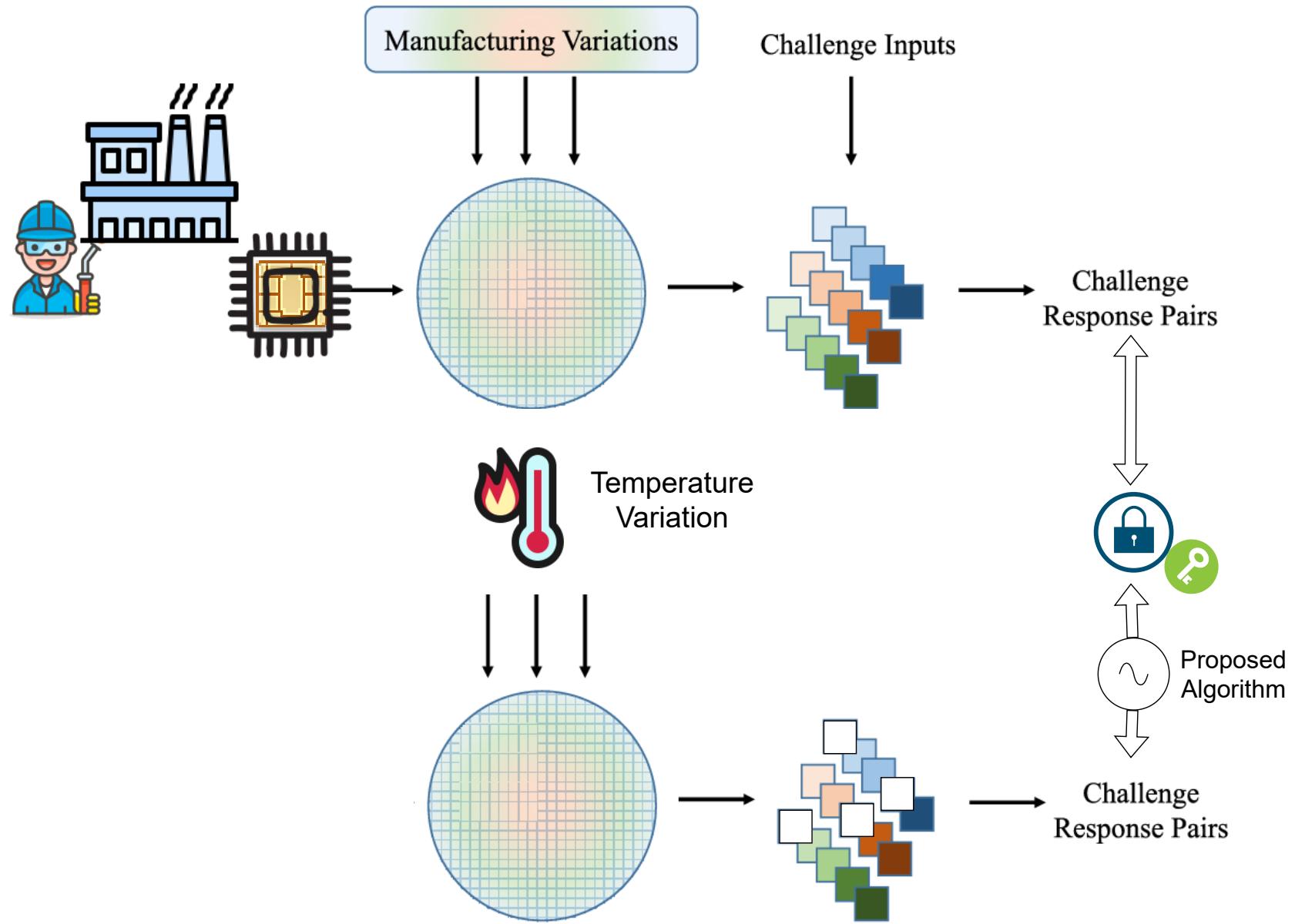


Are PUF immutable?

Answer : NO

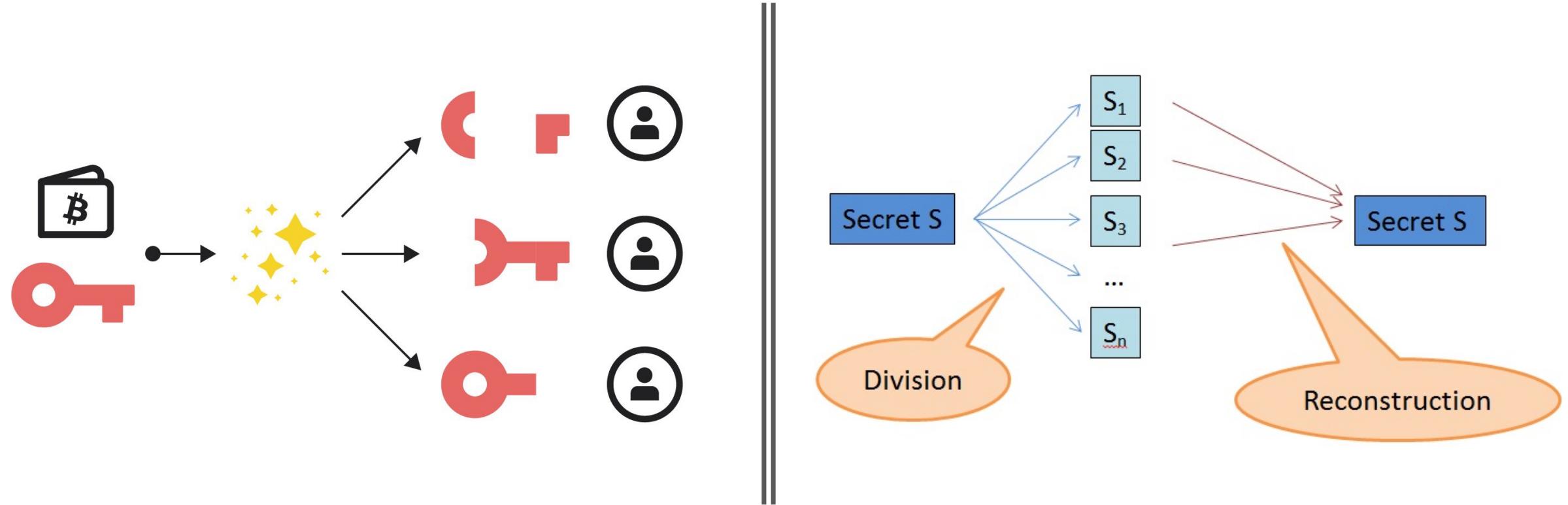


PUF are
mutable !!

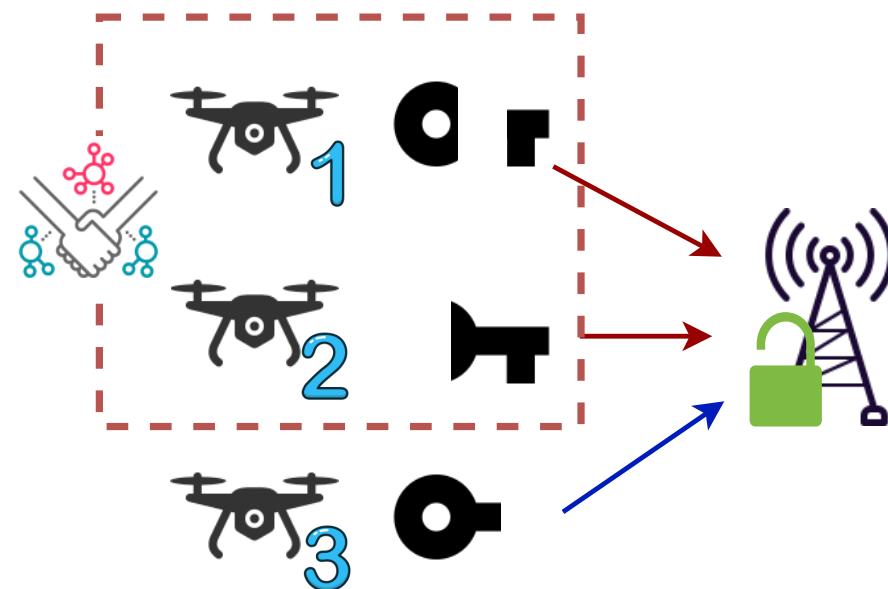
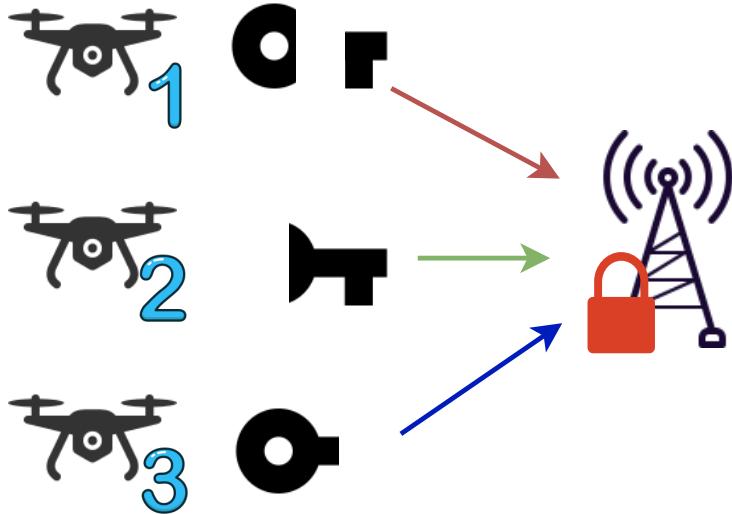
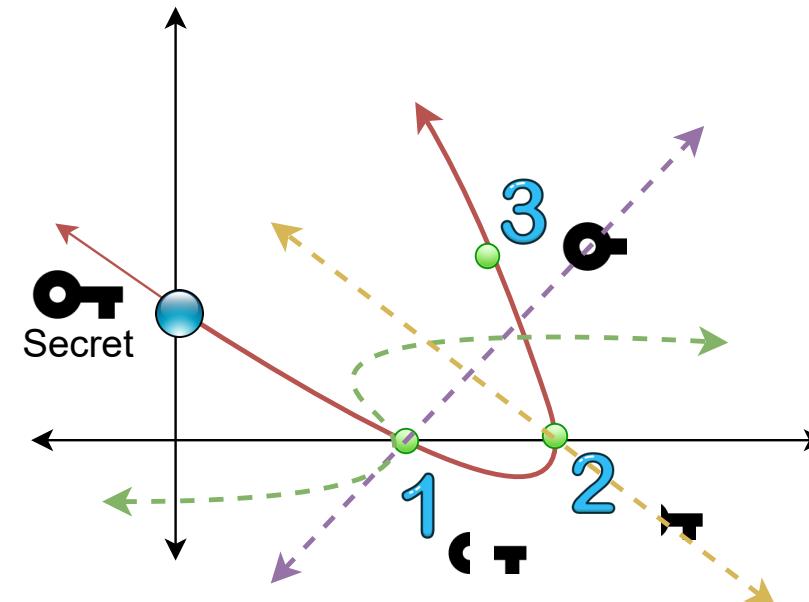
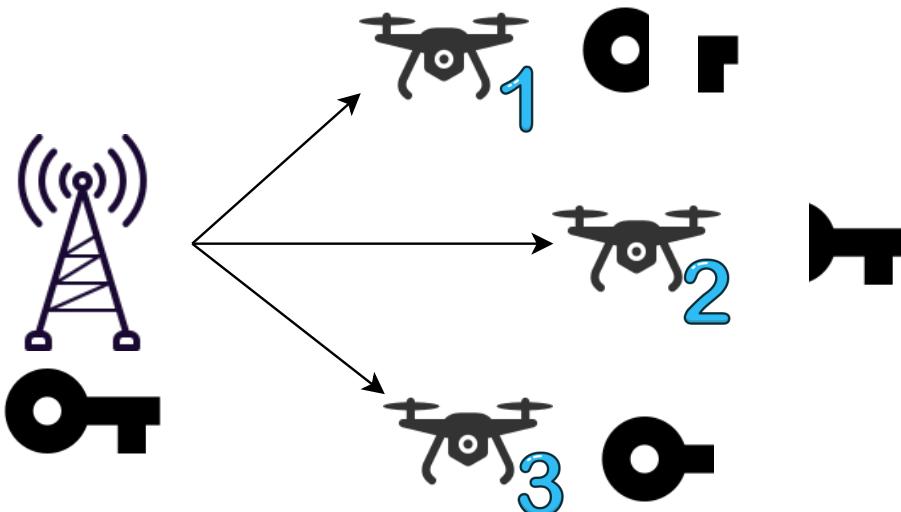


A close-up, high-angle shot of a yellow puzzle piece being fitted into a dark grey or black puzzle frame. The yellow piece has several interlocking notches and is being slid into place. The background is a solid dark grey.

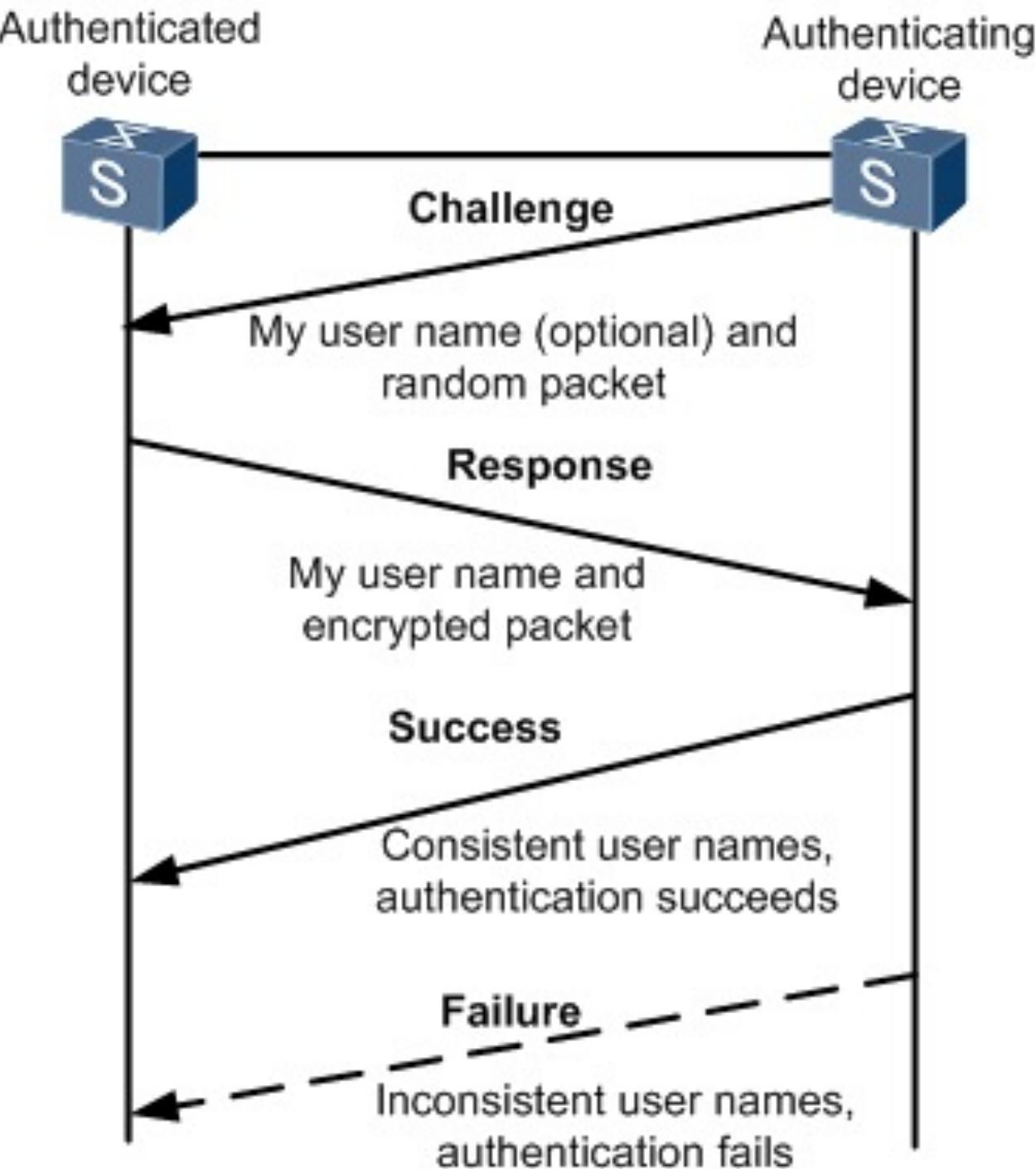
Solution?



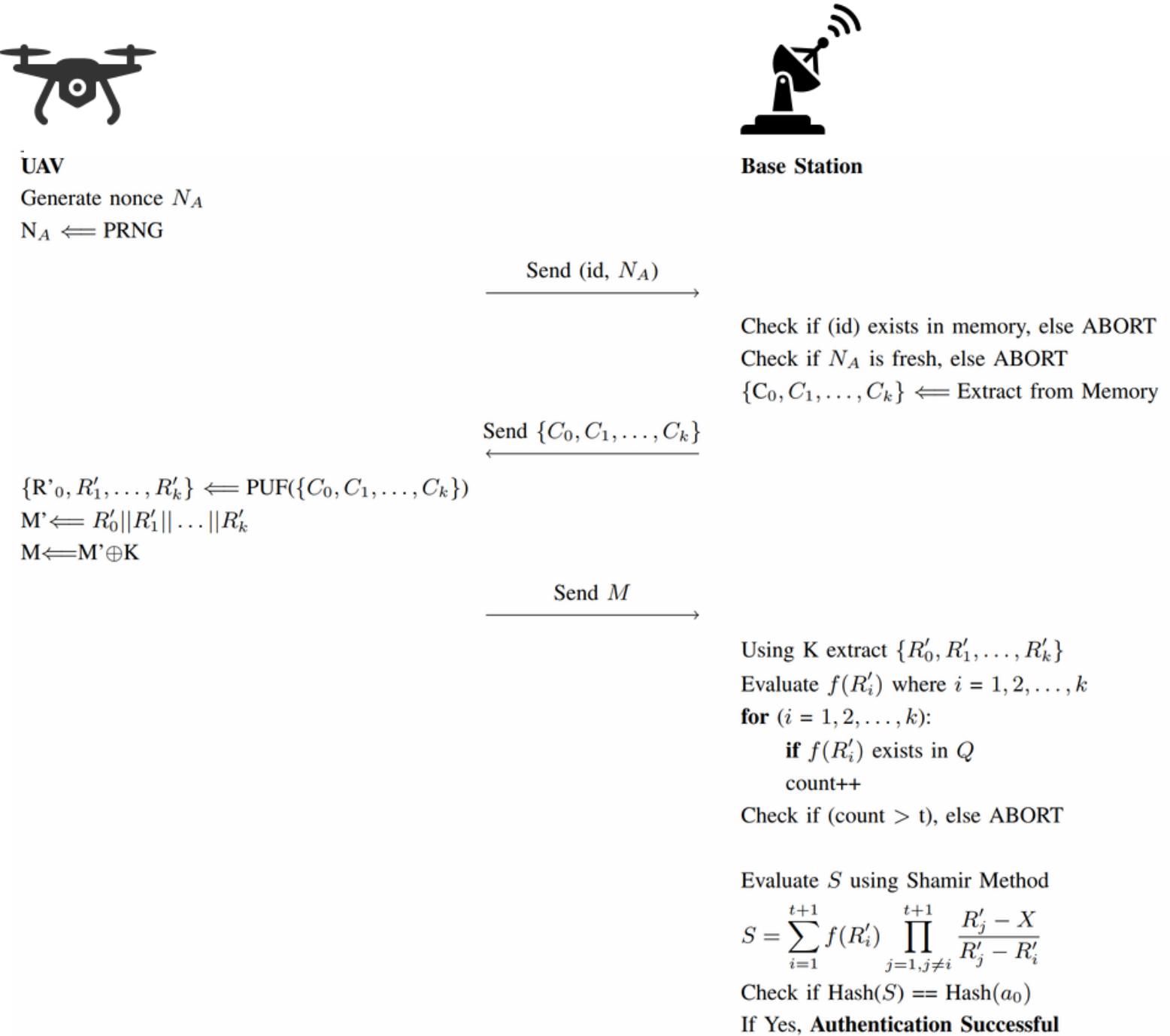
Shamir Secret Key Sharing



Overview of Protocol

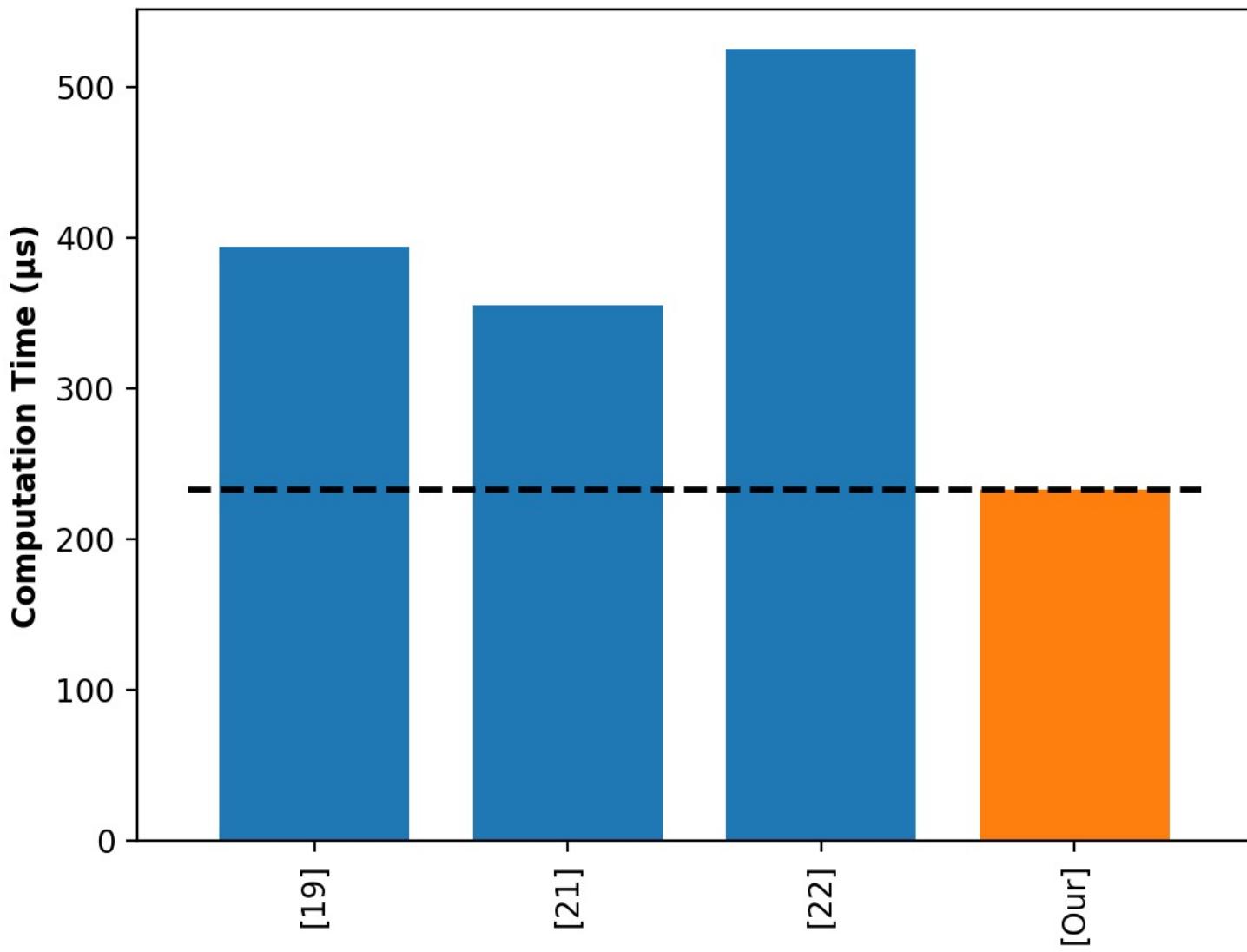


Protocol



Results

Comparison of total computation time with previous works



Questions!!!



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A photograph of a serene landscape. In the foreground, a dark wooden boat is moored on the left side of a calm, dark blue lake. The lake's surface is still, reflecting the surrounding environment. On the far left, the trunk and branches of a large tree frame the scene. The background features a range of misty, green-covered mountains under a clear blue sky with wispy white clouds. The overall atmosphere is peaceful and natural.

Thank You..