Image Obfuscation with Quantifiable Privacy

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https://webpages.uncc.edu/lfan4

https://liyuef.github.io/imageprivacy/

Award #1755884 CRII: SaTC: Image Publication with Differential Privacy

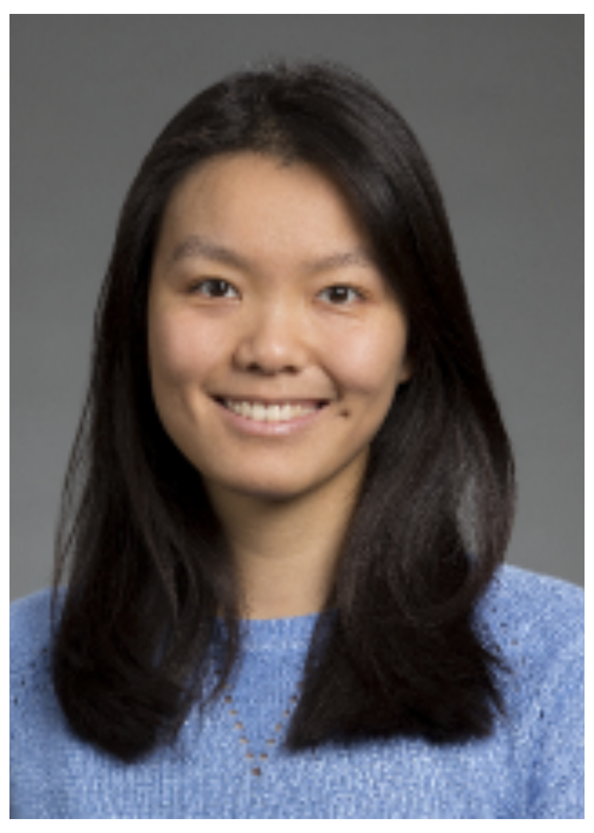
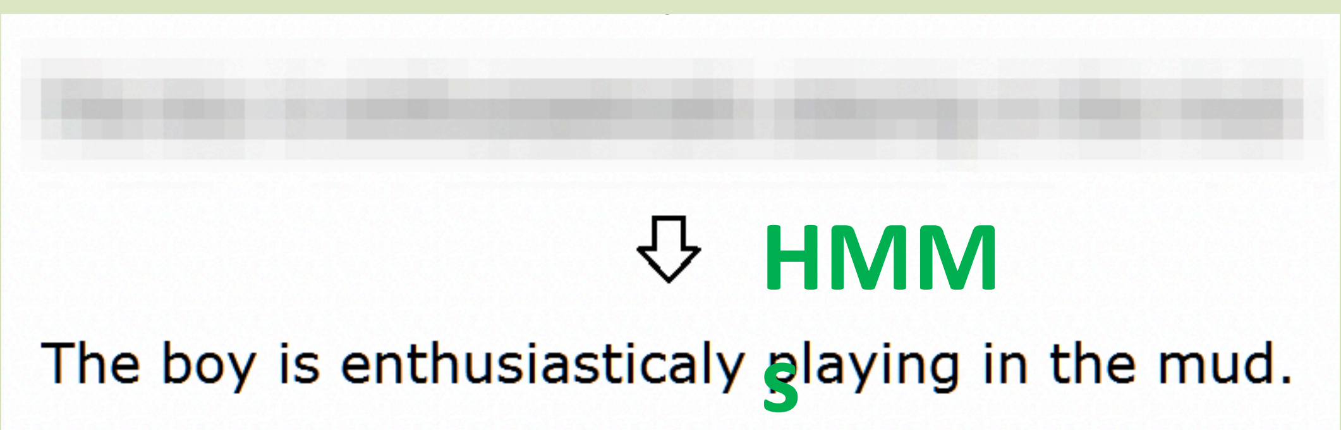


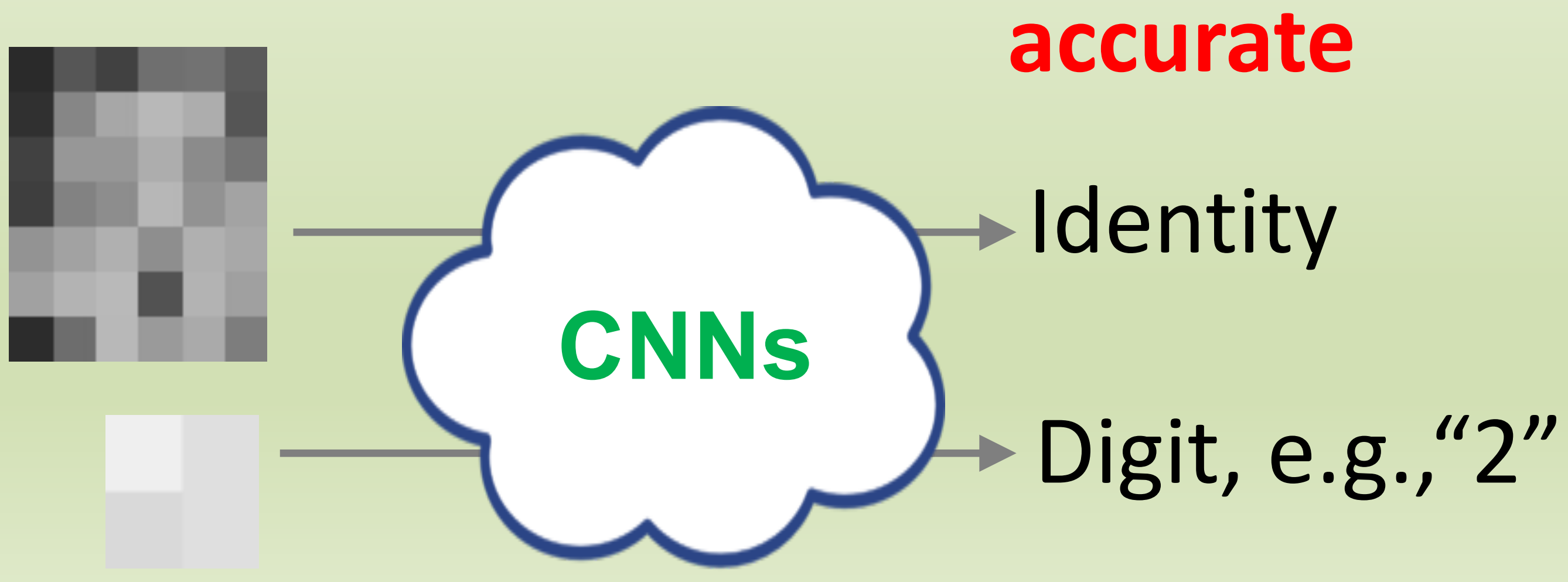
Image obfuscation is widely used to protect private content in photos, such as in Google street view [1] and journalism [2]. Some popular obfuscation techniques are blurring, pixelization, and blacking. **However,** machine learning models can *adapt to* standard obfuscation. For example:

- Hill et. al [3]



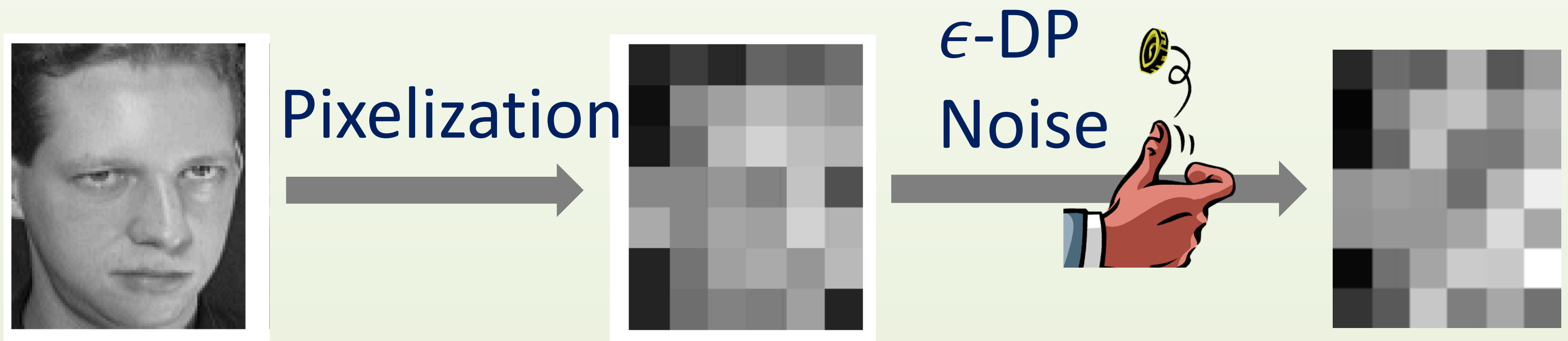
- McPherson et. al [4]

up to 96% accurate

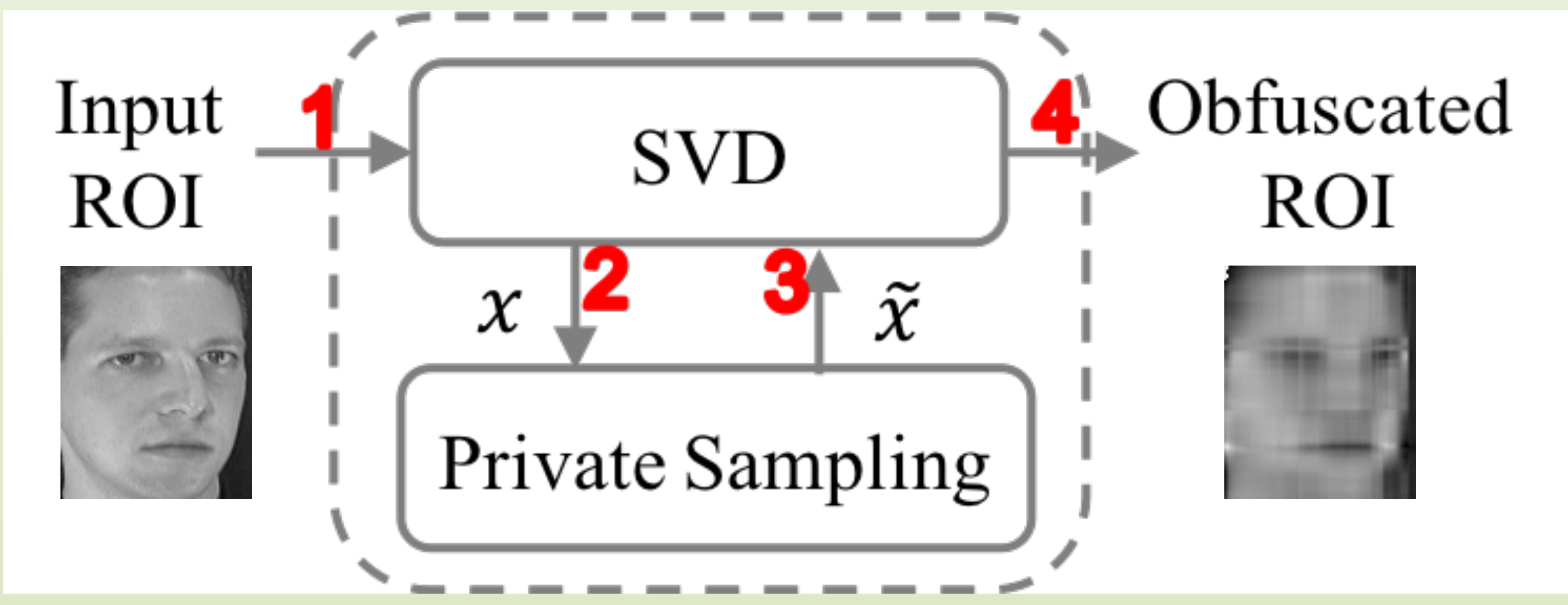


In this project, we aim at providing formal privacy guarantees, e.g., differential privacy, for obfuscating individual-level image data.

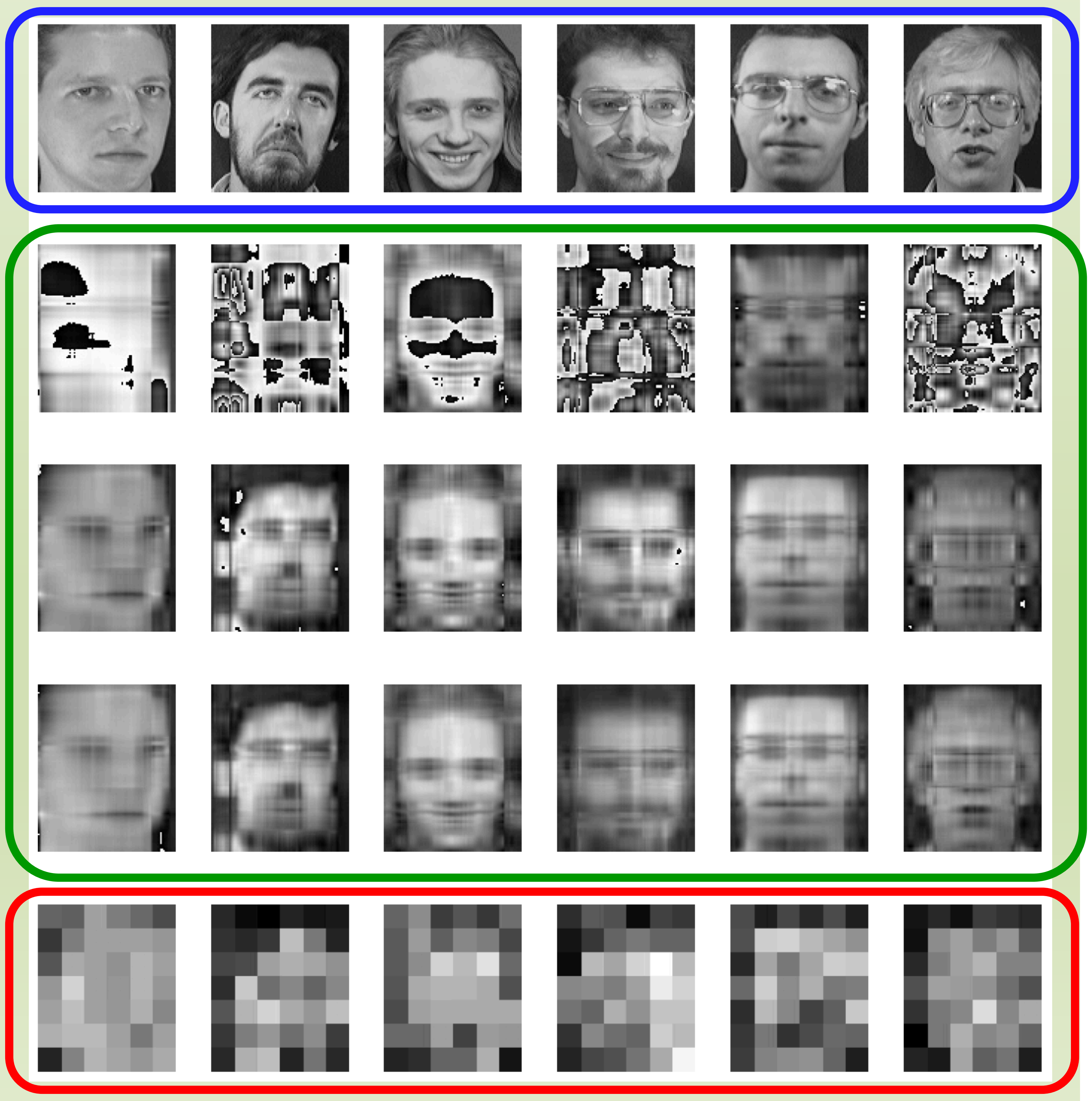
- Fan [5] achieves rigorous **ϵ-Differential Privacy** for image pixelization.



- Fan [6] improves the utility by adopting a relaxed privacy model, **metric-privacy** [7].



Results: Row 1 – original AT&T faces; Row 2 – Fan [6], ϵ = 0.1; Row 3 – Fan [6], ϵ = 0.3; Row 4 – Fan [6], ϵ = 1; Row 5 – Fan [5], ϵ = 1.



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