

Quantifying Latent Quality

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Is this poor quality?



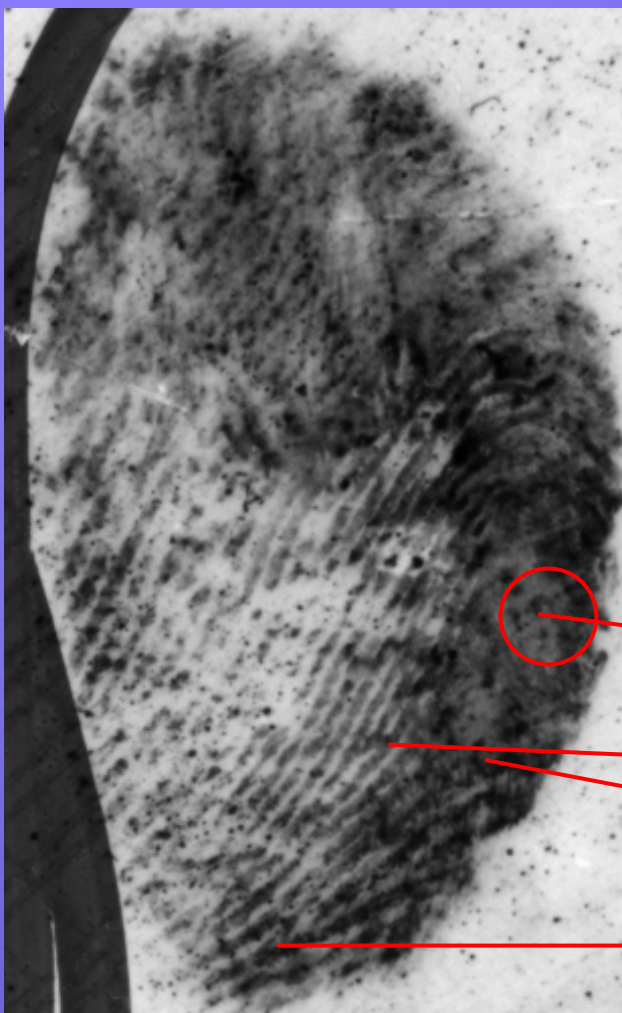
- For most automated matchers:
 - **Poor**
- For a latent examiner:
 - **Very good**
- Quality depends on how the fingerprints are being used
 - Especially true for latents

Is this poor quality?



- AFIS and human matching both depend on the quantity and quality of features
 - AFIS uses features that fit the predefined feature set
 - Human matching can take advantage of distinctive features, even if they don't fit a predetermined model
- Quality and quantity of features are linked

What does quality mean?

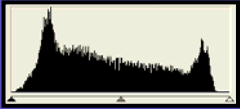


Overall aggregate metrics

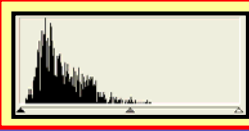
"Good" NFIQ=5

Representation-based metrics

27 Minutiae 16 good minutiae Ridgeflow 45



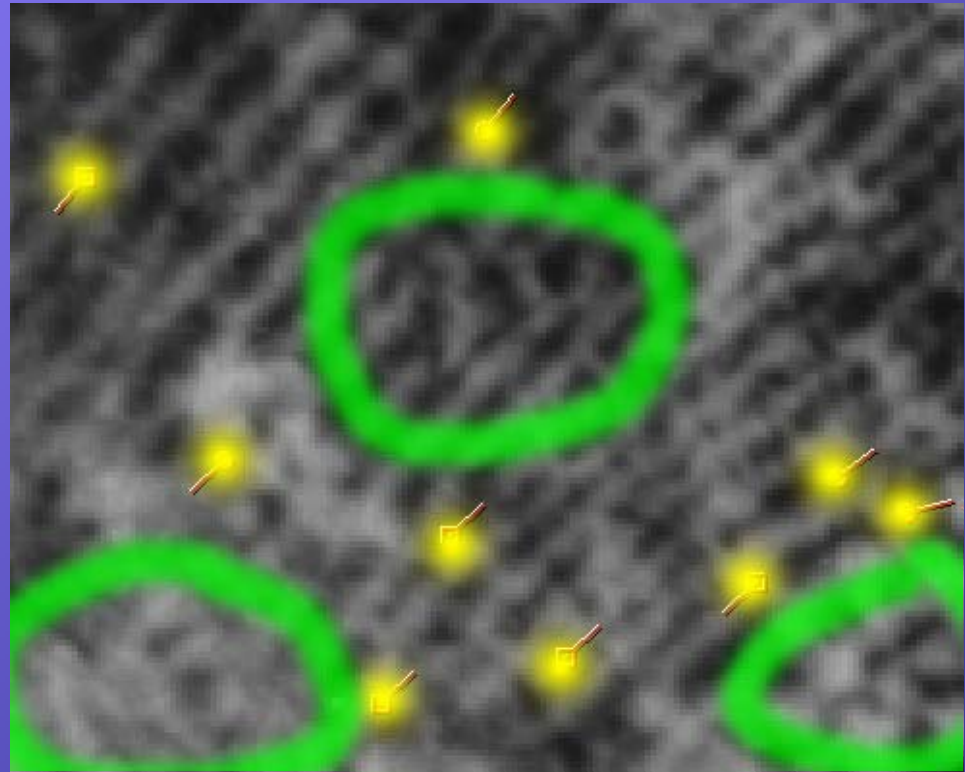
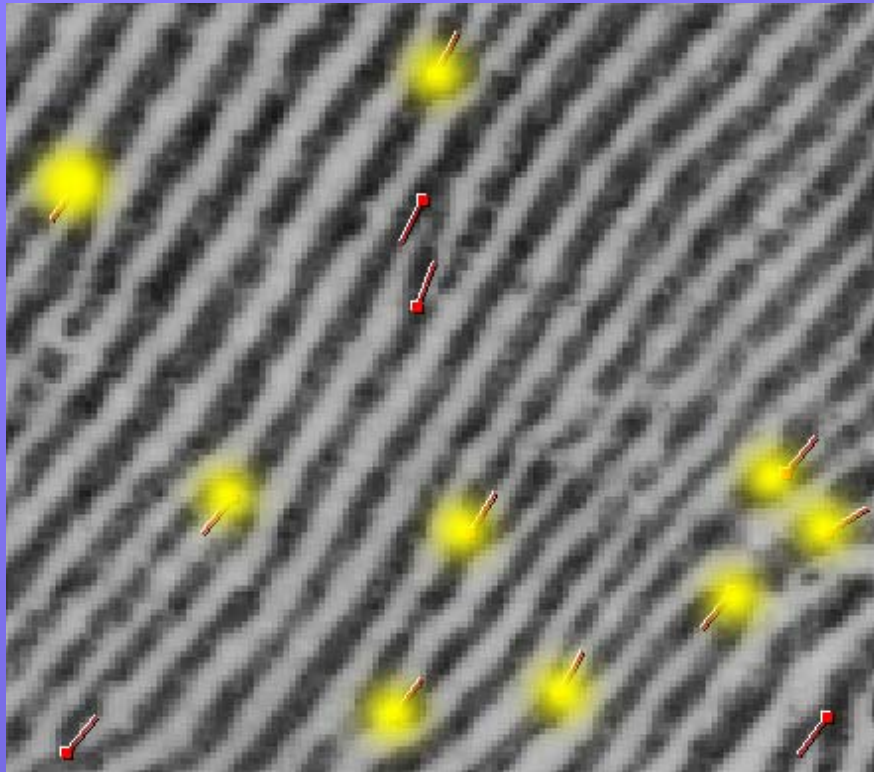
Feature-specific and localized quality metrics



Ridge flow poor Bifurcation, quality 75%

Ridge flow good

The need for localized quality



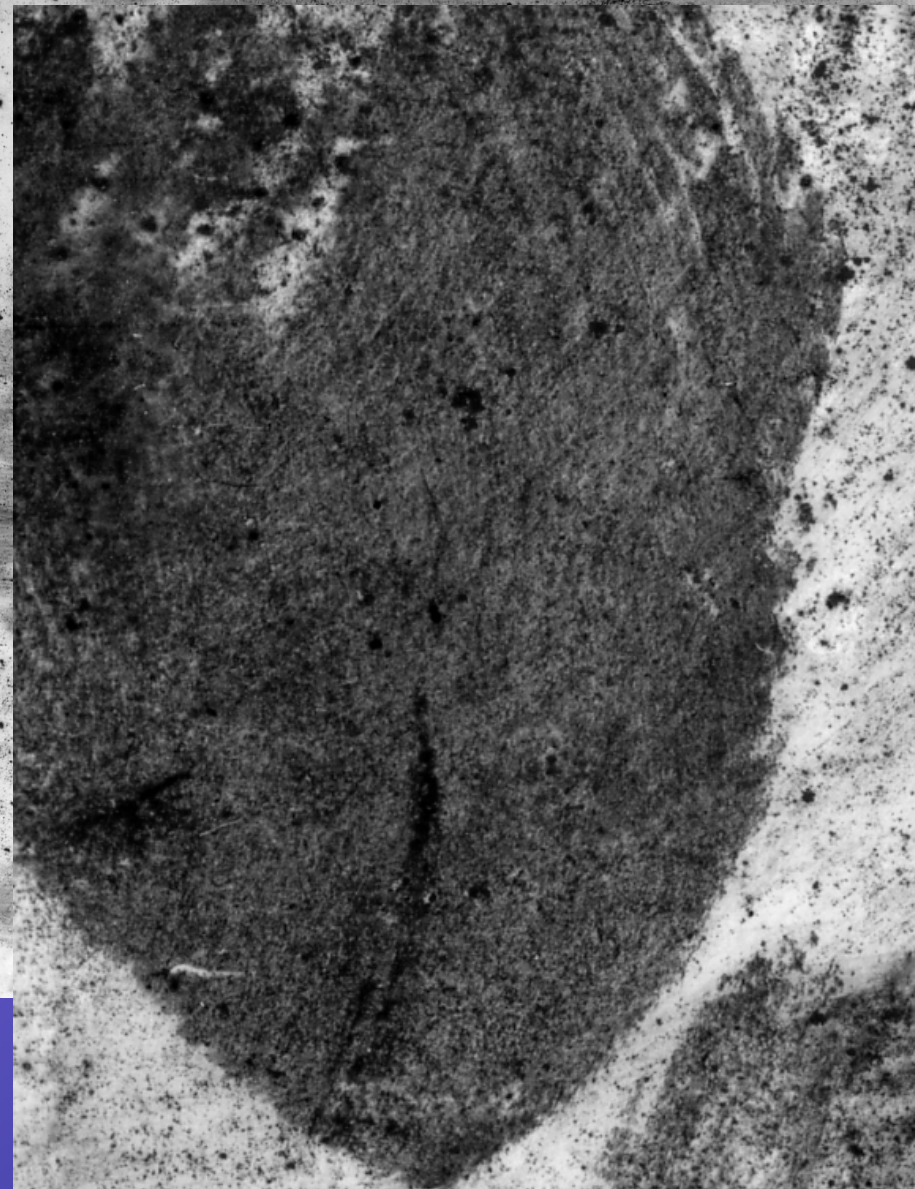
For latents, localized quality metrics are as important as the features

... maybe not just for latents

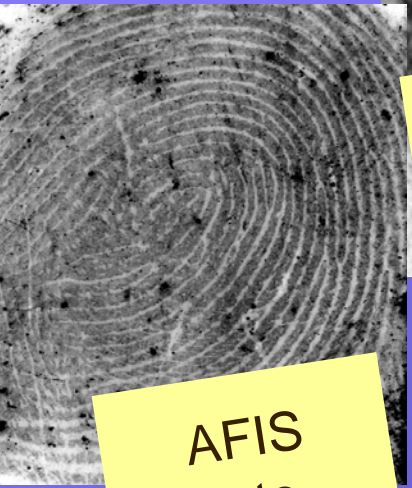
Representation-based measures

- Size
- Continuity
- Minutiae
- Non-minutiae areas
- Centering
- Pattern class
- Ridge flow
- Ridge path clarity
- Ridge detail clarity
- Superimpositions
- Smearing

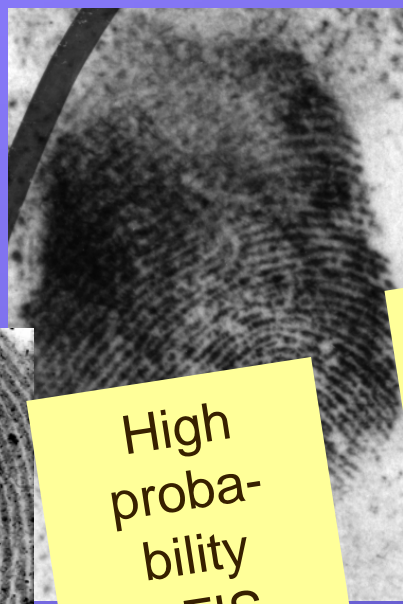
Note these
measure both
quality and quantity



Overall aggregate quality



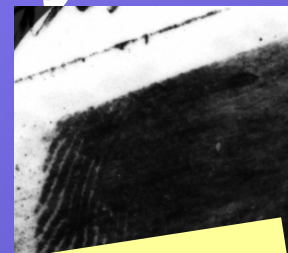
Exc
AFIS
Auto-
encode



High
proba-
bility
AFIS
search



Medium
proba-bility
AFIS
search



Low
probability
AFIS
search



Not AFIS
Quality



Unusable

Unusable

Uses for overall latent quality

- Determining how a latent might be used:

	AFIS use	Examiner use
Excellent	Auto-encode	Easily identifiable by any examiner
Good	High probability	Identifiable by any examiner
Bad	Medium probability	Identifiable by an expert examiner
Ugly	Low probability	Difficult for an expert examiner
Non-AFIS	None	Difficult for an expert examiner
Exclusion only	None	For exclusion, not individualization
Unusable	None	None

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