Application for Collection of Handwritten Characters

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This talk is about...

- Representation of handwritten characters.
- Average handwritten sample.
- Hierarchy of a user profile of samples.
- How it's combined in the user interface for collection, storage and management of handwritten characters.
- More global infrastructure.

Digital *handwriting*

- Represented as a sequence of points
$$(x_0, y_0), (x_1, y_1), (x_2, y_2)\ldots$$
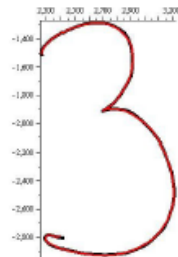
- Each point contains a value of certain channel
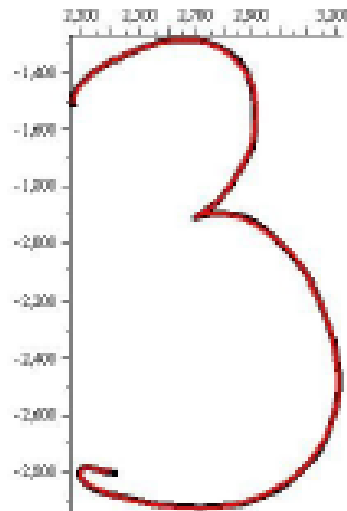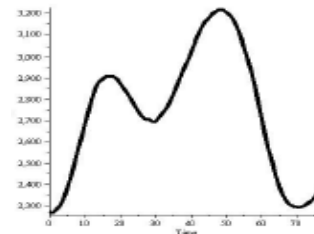
Decomposition of Channels

- Consider X and Y coordinates separately, as functions, say, of arc length:

$$(x_0, y_0), \qquad\qquad (t_0, x_0), \qquad\qquad (t_0, y_0),$$
$$(x_1, y_1), \qquad \longrightarrow \qquad (t_1, x_1), \quad \text{and} \quad (t_1, y_1),$$
$$(x_2, y_2)... \qquad\qquad (t_2, x_2)... \qquad\qquad (t_2, y_2)...$$
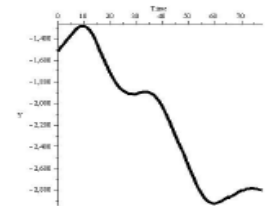
- Then

X(t)   Y(t)

Approximation of a Character

- A function can be approximated with orthogonal polynomials $P_0, P_1, \ldots$:

$$f(t) \approx \sum_{i=0}^{d} c_i P_i(t)$$

- We approximate $X(t)$ and $Y(t)$ and obtain

$$c_0^X, c_1^X, \ldots, c_d^X, c_0^Y, c_1^Y, \ldots, c_d^Y$$

Representation of a Character

- A one-stroke character is represented by 24 numbers:

$$c_1^X, \ldots, c_{12}^X, c_1^Y, \ldots, c_{12}^Y$$

Average character

- It was shown that a picture of an "average" face among a set of given faces looks "attractive".

- We follow the same concept to generate the perfect handwritten character, i.e. compute an average sample of a set of provided samples of the same character.

Example of an average "3"

How to find an "average" sample?

Average sample

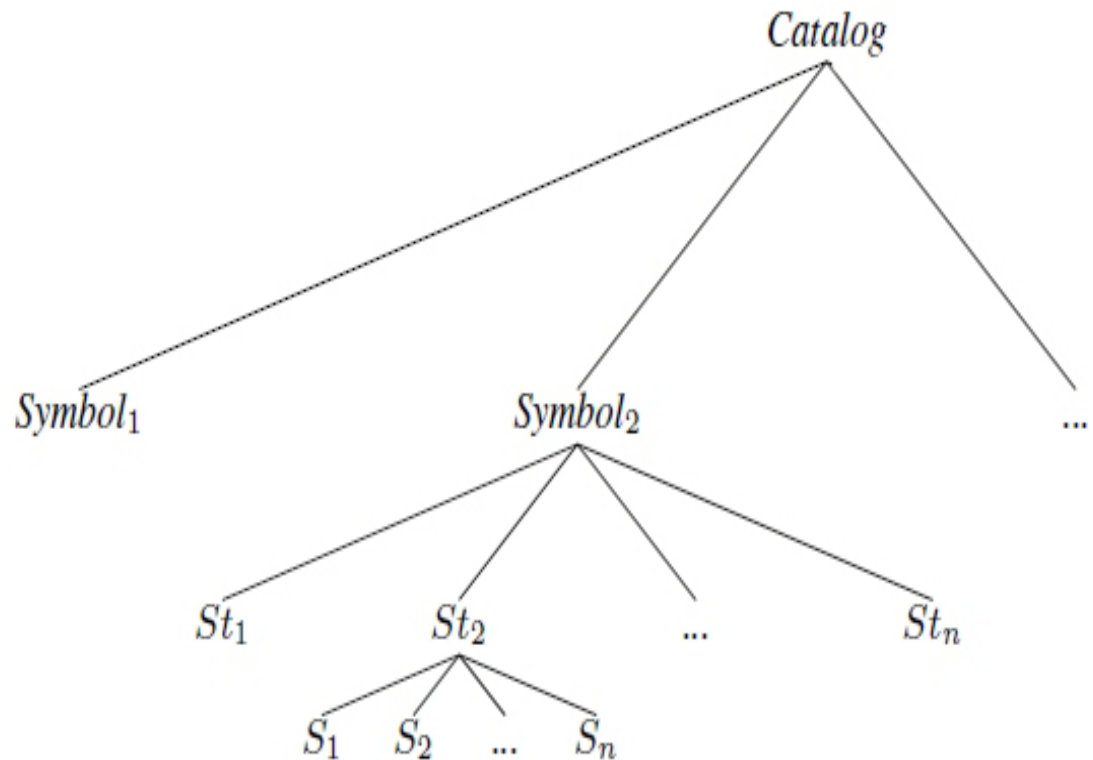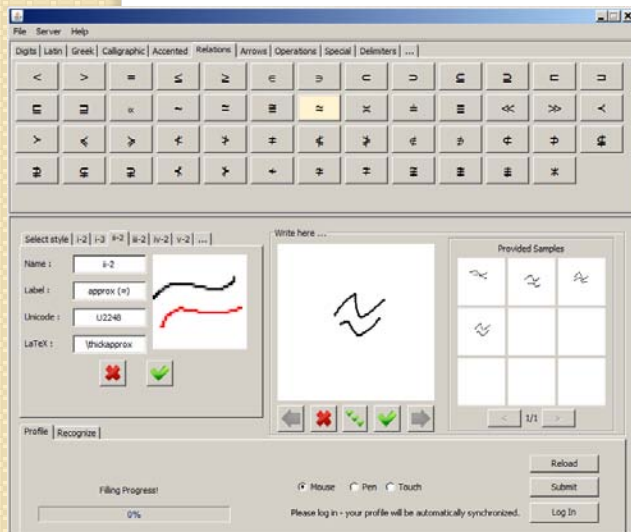- We compute the average coefficients of given samples to obtain the "Golden Mean Character"
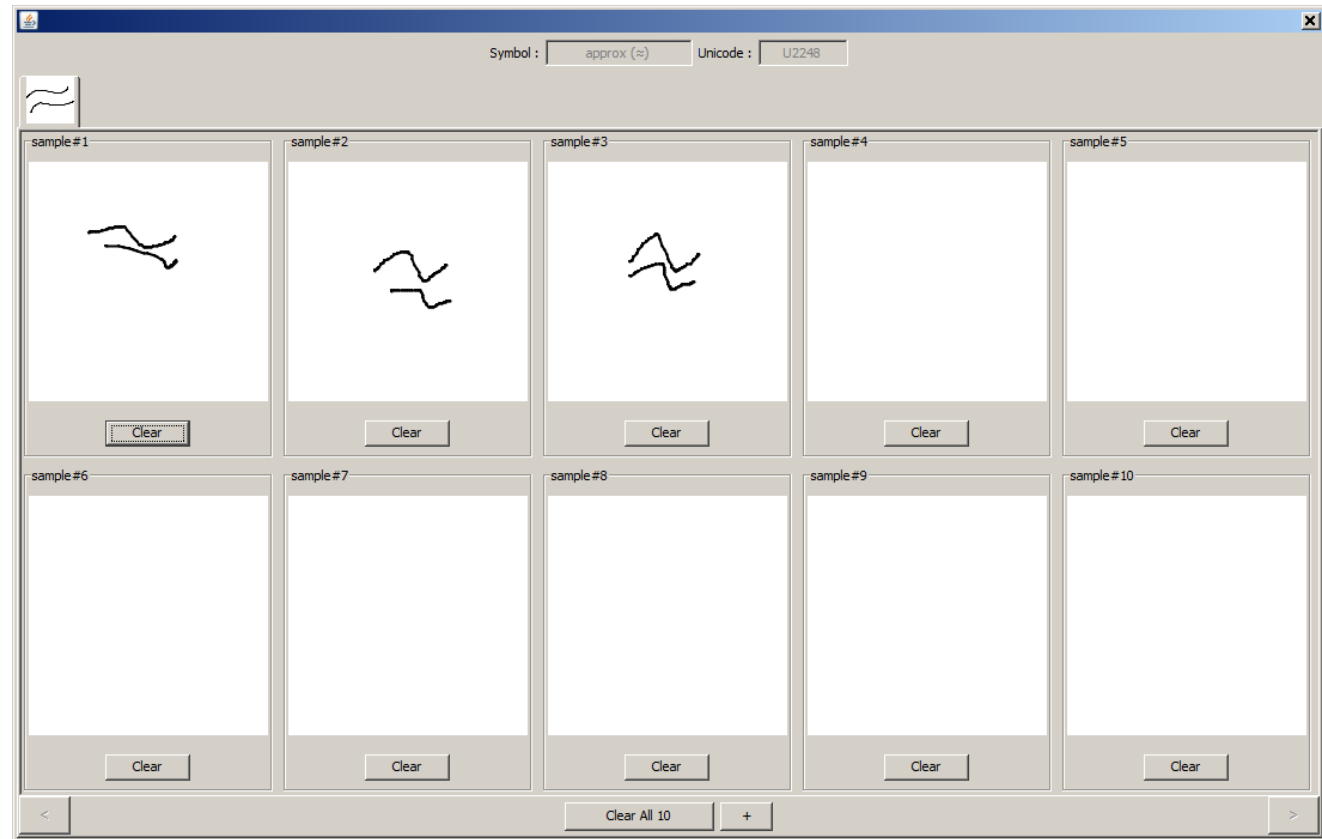
Examples

Avg(3 3 3 3 3 3 3) = 3

Avg(8 8 8 8 8) = 8

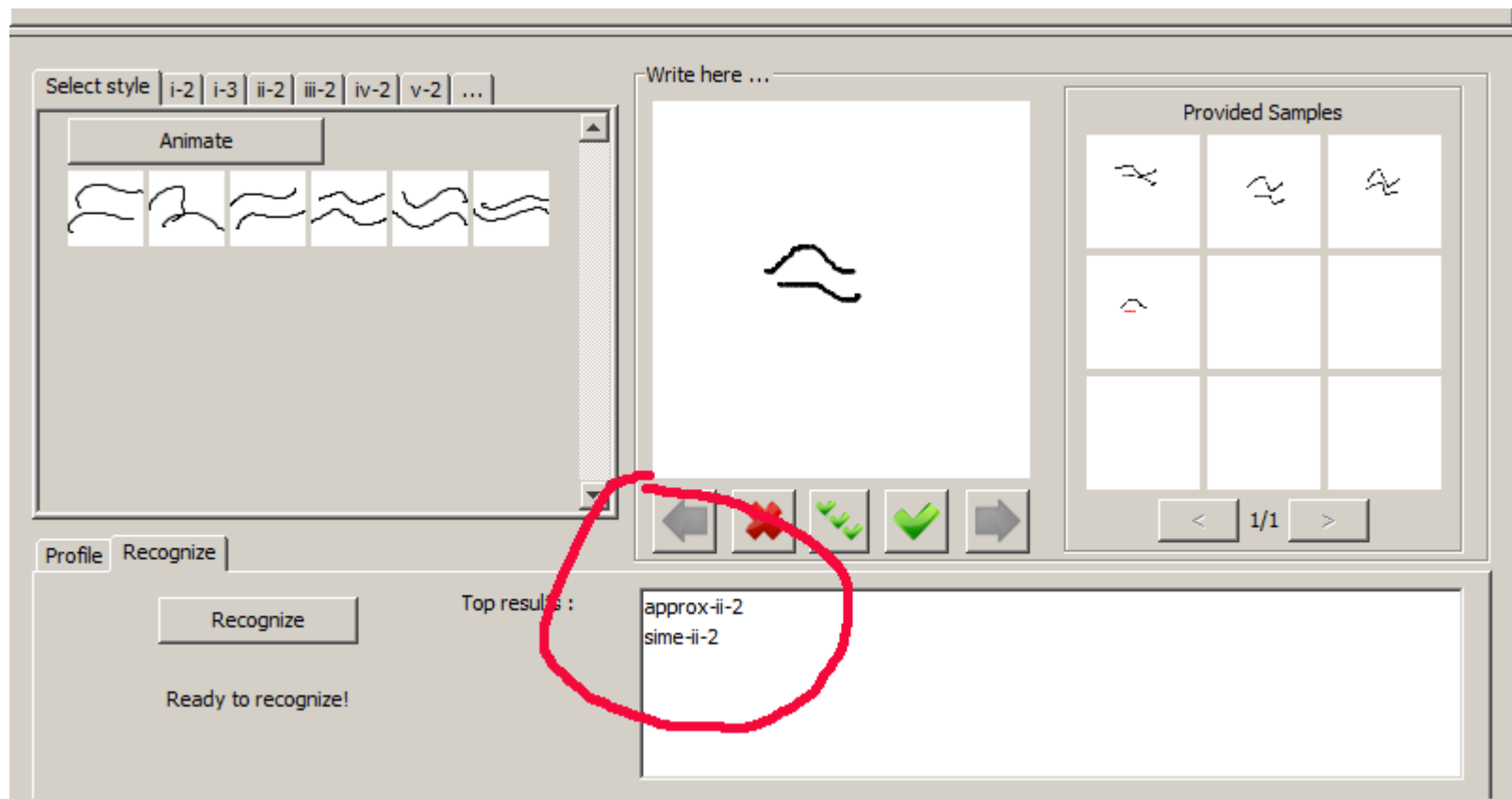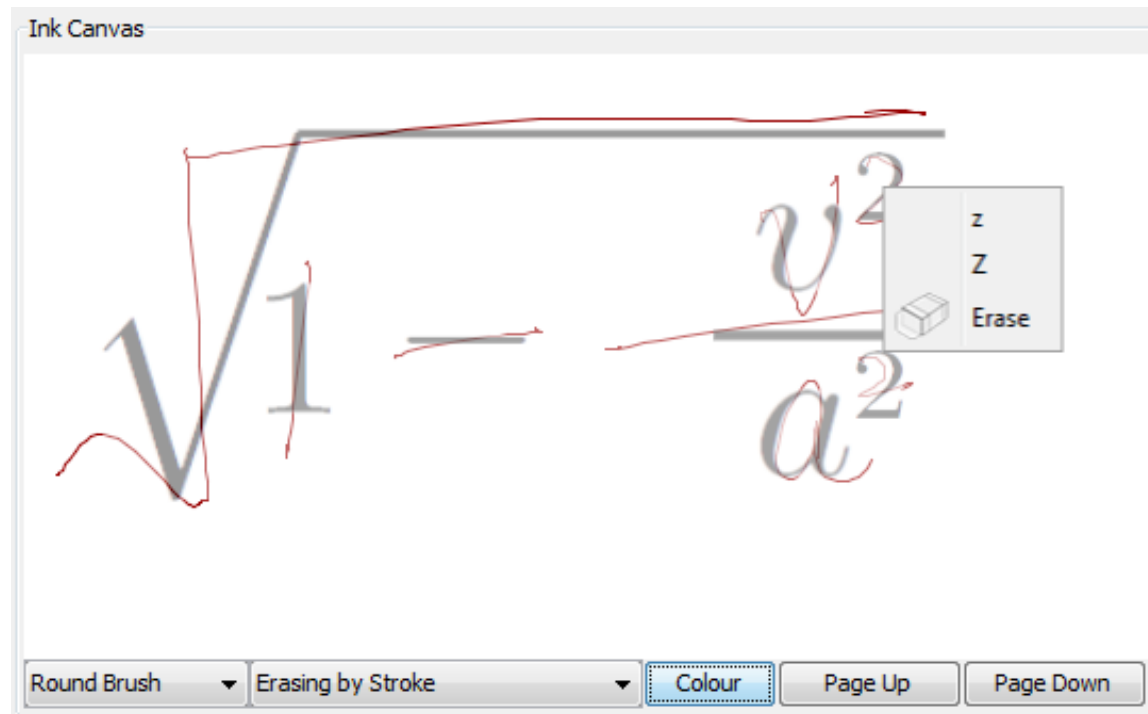# The Application for Collection of Characters
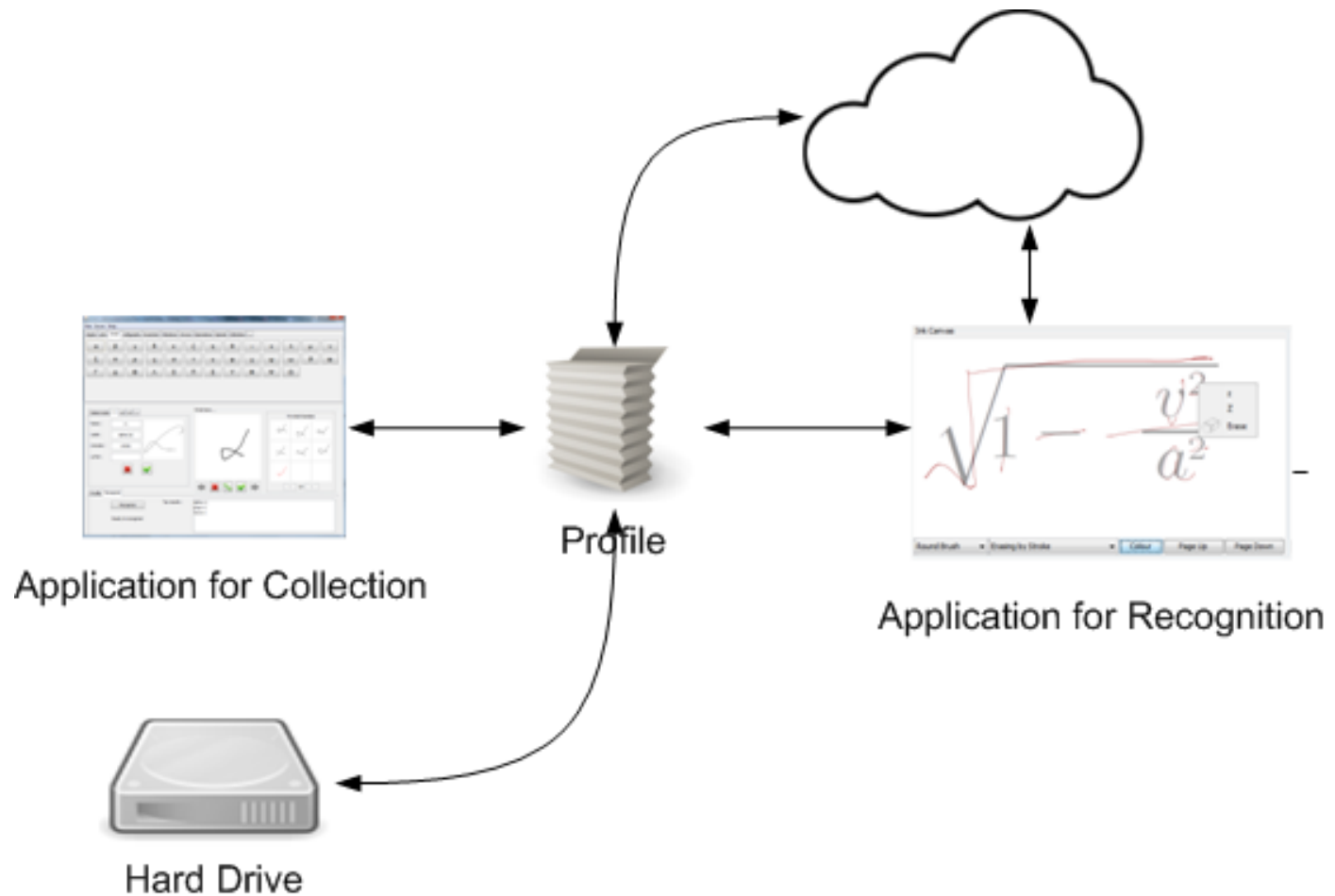
Training the Application

Testing Recognition

- How this application fits into recognition infrastructure?

User Interface for Recognition

Recognition Infrastructure

Application for Collection

Profile

Application for Recognition

Hard Drive

Conclusion

- Compact representation of samples.
- Average sample.
- User profile.
- User interface for collection of samples.
- More global infrastructure.

THANK YOU!