

Training

Testing

Writings of Enrolled Users
e.g., 5 seconds Input

Writings of Testing Users
e.g., 90 seconds Input

Outlier Elimination

Word Segmentation

Sample Generation

Outlier Elimination

Word Segmentation

Sample Generation

Data Processing

Frame-Level Feature

Frame-Level Feature

Frame-Level Feature Extraction

Component-Level Feature

Component-Level Feature

Component-Level Feature Extraction

Component feature
Quantization

Vocabulary of
Primitives

Component Indices

Component Indices

Sample-Level Feature

Sample-Level Feature

Sample-Level Feature Extraction

SVM
Binary-Class
Training

SVM
Model(s)

SVM Binary-Class
Classification

Label: User
Identity

*Aliens /
Legitimate users*

Alien Rejection

Legitimate users

SVM
Multi-Class
Training

SVM
Model

SVM Multi-Class
Classification

Label: User
Identity

User Identity

User Identification