CS 440/ECE 448 Artificial Intelligence
Assignment 3: Naive Bayes Classification

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Contents

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1 Part 1: Digit Classification

1.1 Single Pixels as Features (For Everybody)

1.1.1 Implementation

We treated this problem as a special case of *pixel group as features* where the pixel groups are simply disjoint and of size 1 by 1. Please see the next section for details.

1.1.2 Smoothing Constant

1.1.3 Classification Rate and Confusion Matrix

1.1.4 Posterior Probabilities: Highest and Lowest

1.1.5 Visualization of Likelihoods and Odds Ratios

1.2 Pixel Groups as Features (For Four-Credit Students)

1.2.1 Accuracy on Test Set

1.2.1.1 Disjoint Patches

1.2.1.1.1 Size 2 by 2

1.2.1.1.2 Size 2 by 4

1.2.1.1.3 Size 4 by 2

1.2.1.1.4 Size 4 by 4

1.2.1.2 Overlapping Patches

1.2.1.2.1 Size 2 by 2

1.2.1.2.2 Size 2 by 4

1.2.1.2.3 Size 4 by 2

1.2.1.2.4 Size 4 by 4

1.2.1.2.5 Size 2 by 3

1.2.1.2.6 Size 3 by 2

1.2.1.2.7 Size 3 by 3

1.2.2 Trends for Different Feature Sets

1.2.3 Running Time for Different Feature Sets

1.2.3.1 Training

1.2.3.2 Testing

1.3 Extra Credit

1.3.1 Ternary Features

1.3.2 Naive Bayes Classifier on Face Data

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2 Part 2: Audio Classification

2.1 Binary Classification: Hebrew words of "yes" and "no" (For Everybody)

2.2 Multi-Class Classification: Audio Digits 1-5 Spoken by Four Different Speakers (For Four-Credit Students)

2.3 Extra Credit

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3 Statement of Individual Contribution

Table 1: Statement of Individual Contribution

	NetID	Contribution
Haoen CUI	hcui10	visualization, report, and ideas generation
Guohao DOU	gdou2	part 1 (algorithm design and programming) and ideas generation
Chuchao LUO	chuchao2	part 2 (algorithm design and programming) and ideas generation