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MONTEREY, CALIFORNIA

THESIS

AUTHOR DETECTION ON A MOBILE PHONE

by

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March 25, 2011

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AUTHOR DETECTION ON A MOBILE PHONE

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ABSTRACT

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CHAPTER 1:

Introduction

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CHAPTER 2:

Prior and Related Work

2.1 Introduction

Author detection is the process of analyzing documents to determine if that document was created by a pre-determined set of authors. Detecting authors on mobile devices requires selection of a feature set that distinguishes authors, selection of techniques that effectively uses these features to identify authors, and selection of efficient machine learning

2.2 Author Detection

“Automated authorship attribution is the problem of identifying the author of an anonymous text, or text whose authorship is in doubt” [1]. For this thesis, author detection and authorship attribution are synonymous. The explosive growth of communications and document storage on the Internet provides a vast amount of data to draw on for author detection. Books, articles, blogs, tweets, and emails are posted for public viewing in an electronic format every day. Some of these postings have verifiable authors. Many Internet authors use nom de plumes or are posted anonymously. Matching verified authors to anonymous Internet authors or mobile phone texters has numerous practical applications. The increased speed and storage capacity of computing devices allow analysis of these corpora for author detection. The methods of author detection fall within the science of machine learning.

2.3 Machine Learning

“Machine learning is programming computers to optimize a performance criterion using example data or past experience” [2]. Machine learning has been used famously to determine the authors of the Federalist papers, allow computers to “read” human handwriting, and to mine sales data for profitable trends. Two broad categories of machine learning are supervised learning and unsupervised learning. Supervised learning is “learning with a teacher.” The teacher can show the learner what to do based on examples or experience. Unsupervised learning is “learning with a critic” [2]. This thesis relies exclusively on supervised learning. Mobile device limitations demand author identification models be constructed on a platform more powerful than a mobile device. That model is then put on a device for ongoing author identification. The models require previous “teaching” instead of predictive “criticizing”.

Machine learning can be used for many tasks. Often, machine learning is used to assign a given data set to a specific class or predict an outcome value over a continuous range of values. This thesis uses machine learning to assign a given data set, a document, to a given class, an author. Classification machine learning is comprised of a set of classes, a classifier, a feature set, and data. In supervised learning, the machine learner uses a data input comprised of features trained to (or owned by) by a specific class. Based on creatively counting these features, the machine learner creates a model for each class based on the the behavior of the classifier. Finally, test data, consisting of sets of features, are processed by the classifier based on the previously built models. The classifier provides an output of the most likely class that fits the given features.

Machine learning is central to this thesis. Modeling corpora of emails and tweets from numerous authors on traditional workstation or server computers, and, then, testing prediction capability on mobile devices requires not just accurate machine learning, but efficient machine learning. The efficiency is needed due to the limits of even the most advanced mobile devices. Hardware specifications are not the only limiting factor in machine learning. There are competing strengths and weaknesses in the techniques chosen, as well.

2.3.1 Machine Learning Techniques

The techniques in this thesis are all supervised machine learning techniques. Specifically, the two supervised techniques used are Naive Bayes and Support Vector Machine (SVM). Naive Bayes was chosen because it is computationally lightweight compared to many other methods. Support Vector Machine was chosen because data for SVM can be stored in "sparse format". Sparse means that every feature does not have to be represented in the stored data for a model or test case. Features with a zero count can simply be excluded. SVM has been successful in many other authorship attribution experiments [3].

Naive Bayes

Naive Bayes is a supervised learning method that uses Bayes Rule of probability chaining over a set of features (words in a document) to arrive at an overall probability that a specific a set of features (words in a document) belongs to a particular class (specific author). Naive Bayes uses a strong independence assumption among the various features. This means that the classifier assumes that the probability of one feature appearing in a data set is completely independent of another feature showing up in the data set. While this assumed independence of features is unlikely to be actually true, the independence keeps the calculation of probabilities simple – meaning we do not have to store the full joint set of related words and their word relation

probabilities. In the case of documents and authors, Naive Bayes represents a bag of words model of a document where word order can be lost and only frequency or occurrence of words or word combination is captured. Lost word order occurs, for instance, if a unigram token is taken from a document and paired with the counts of that word in the document. In a bigram token model, word order is not lost within the bigram, but is lost between different bigram tokens. Based on a set of words, t , of size n , the probability that a document, d , belongs to a given class, c , is given by:

$$P(c|d) \propto P(c) \prod_{i < k < n_d} P(t_k|c) \quad (2.1)$$

To specifically apply the above equation to author detection, the classifier returns the class with the highest probability after executing the above formula. This turns the above equation into a maximum a posteriori (MAP) class c_{map} :

$$c_{map} = \arg \max_c \hat{P}(c|d) = \arg \max_c [\hat{P}(c) \prod_{i < k < n_d} \hat{P}(t_k|c)] \quad (2.2)$$

Since underflow is an issue when numerous float values are multiplied together over a set of features, the practical application of the above formula is:

$$c_{map} = \arg \max_c \hat{P}(c|d) = \arg \max_c [\log \hat{P}(c) + \sum_{i < k < n_d} \log \hat{P}(t_k|c)] \quad (2.3)$$

This Equation 2.3 is functionally equivalent to Equation 2.2.

Because the probability of each feature is multiplied by the probability of every other feature, a zero probability for any feature will make the overall probability zero. To handle this issue, a technique called smoothing is used. Beyond the arithmetic issue of multiplying by a zero, smoothing accounts for words the classifier has not seen due to the fact that we have incomplete data to train on. The simplest form of smoothing is Laplace Smoothing (Plus One Smoothing). In this method, each feature in the feature set is initialized with a count of 1 instead of zero. The denominator in the probability equation is increased by $1 * \text{number of features}$ to account for all the added ones. This method, attractive in its simplicity, often produces undesirable results. For this thesis, the counts from words in the Google Web1T corpus are used to smooth word counts in Naive Bayes. For example, the word "dog" appears 3,450,297 time in the Web1T corpus, so the count for "dog" is initialized to 3,450,297. The denominator for a Google Web1T

smooth Naive Bayes instance is 1,024,908,267 based on total count weight of all tokens in the corpus. The specific details of the Google Web1T corpus are covered in a later section of this chapter.

Support Vector Machine

A Support Vector Machine (SVM) is a supervised machine learning method that finds a separating line or shape through a set of data based on a selected feature set. This is based on finding a boundary between two types of data in a dataset, then computing the largest boundary between closest data points and the boundary. In cases where a clear boundary between two data sets is not possible, a "slack variable" provides an allowance of data points to be on the wrong side of the boundary. To create the boundary, SVM "maps the input vectors into some high dimensional feature space, Z , through some non-linear mapping chosen a priori" [4]

For the two situations that a SVM can encounter: data can be separated without error and data cannot be separated without error, the same equation can be used. In the first situation, where data can be separated without error, the SVM optimizes the SVM base equation with $C = 0$. For the second situation, where the training data cannot be strictly separated, $C > 0$:

$$\min_{w, \alpha} \frac{1}{2} \|\mathbf{w}\|^2 + C \sum_i^n \xi \quad (2.4)$$

where ξ is known as the slack variable, C is the error penalty, and the entire term $C \sum_i^n \xi$ is the soft margin. This is a quadratic programming problem to find ξ and C , often accomplished by a logarithmic grid search ($C = 2^{-5}, 2^{-3}, 2^{-1}, 2^1, 2^3, 2^5$ and $\xi = 2^{-15}, 2^{-10}, 2^{-5}, 2^0, 2^5$) with the best accuracy or F-Score determining where to continue refining the grid.

Historical Roots of Support Vector Machines SVM historical roots lie in the R.A. Fischer's pattern recognition work using a Variance/Covariance matrix [5]. Fisher's pattern recognition used the mean matrix (also know as the centroid of a matrix) and variance-covariance matrix (also known as the dispersion of a matrix) of two normal distributions, and found the optimal Bayesian solution was a non-linear function. Fisher simplified his non-linear function to a linear function for situations where the dispersion of both normal distributions are equal. He even found that his simplified linear equation worked satisfactorily when the distributions needing patterns recognized were not strictly normal.

From this basis, Fisher created a precedent of pattern recognition based on linear discriminating

surfaces within a multi-dimensional space. Fisher's work was furthered by perceptron work in the 1960's. This work created multiple linear discriminating surfaces to find a matching pattern. However, there was no method to optimize the separation between data using perceptrons. From the need to optimize the separation, feedback mechanisms were developed to refine the perceptron weights. By further developing the idea of feeding back to the perceptron weights, SVMs were created.

Optimal Hyperplane in Feature Space

The core of SVM is finding an optimal hyperplane in the higher dimension space mapped from the original feature space. That hyperplane is defined as:

$$\mathbf{w}_0 \cdot \mathbf{z} + b_0 = 0 \quad (2.5)$$

where w_0 are weights, z is the space, and b_0 is still a mystery to me. To that end, \mathbf{w}_0 "can be written as some linear combination of support vectors." This uses the following equation:

$$\mathbf{w}_0 = \sum_{\text{support vectors}} \alpha_i \mathbf{z}_i \quad (2.6)$$

and the decision function using those weights is given by

$$I(z) = \text{sign} \left(\sum_{\text{support vectors}} \alpha_i \mathbf{z}_i \cdot \mathbf{z} + b_0 \right) \quad (2.7)$$

meaning that $I(z) < 0$ for one class and $I(z) > 0$ for the other class.

For distance ρ between projections defined by the support vectors, ρ is defined as:

$$\rho(\mathbf{w}, b) = \min_{x:y=1} \frac{\mathbf{x} \cdot \mathbf{w}}{|\mathbf{w}|} - \max_{x:y=-1} \frac{\mathbf{x} \cdot \mathbf{w}}{|\mathbf{w}|} \quad (2.8)$$

given that 2.5 it follows that the weights needed to create the optimal hyperplane are given by

$$\rho(\mathbf{w}_0, b_0) = \frac{2}{|\mathbf{w}_0|} \quad (2.9)$$

The best solution maximizes the distance ρ . To maximize ρ , you must minimize the magnitude of \mathbf{w}_0 . Find that minimum \mathbf{w}_0 is a quadratic programming issue.[4]

Procedure "Divide the training data into a number of portions with a reasonable small number of training vectors in each portion. Start out by solving the quadratic programming problem determined by the first portion of training data. For this problem there are two possible outcomes: either this portion of the data cannot be separated by a hyperplane (in which case the full set of data as well cannot be separated), or the optimal hyperplane for separating the first portion of the training data is found." If this first set is found to be linearly separable, then all the non-support vector values are discarded, a new batch of values are put into this set (these values do not meet the constraint of $y_i(\mathbf{w} \cdot \mathbf{x}_i + b) \geq 1, i = 1, \dots, l$)

Soft Margins In cases where the data is not linearly separable, the goal becomes to minimize the number of errors (the number of values on the wrong side of the hyperplane). Now a new variable $\xi \geq 0, i = 1, \dots, l$ is introduced along with the function $\Phi(\xi) = \sum_{i=1}^l \xi_i^\sigma$. The constraints are that the value ξ_i does not push values in the non-negative quadrant out of the negative quadrant ($y_i(\mathbf{w} \cdot \mathbf{x}_i + b) \geq 1 - \xi_i, i = 1, \dots, l$). Also, ξ_i is zero or a positive number ($\xi_i \geq 0$). ξ here represents "the sum of deviations of training errors" The central equation for minimizing the number of errors is:

$$\frac{1}{2}\mathbf{w}^2 + CF\left(\sum_{i=1}^l \xi_i^\sigma\right) \quad (2.10)$$

In cases for ξ_i^σ where $\sigma = 1$, we are dealing with the soft margin hyperplane. Cases where $\sigma < 1$, there may not be a unique solution. For values of $\sigma > 1$, there are also unique solutions, but $\sigma = 1$ is the smallest value and that allows the term $CF(\sum_{i=1}^l \xi_i^\sigma)$ from (2.10) to not overwhelm the $\frac{1}{2}\mathbf{w}^2$. [4]

Multi-Class SVM SVM is an inherently binary classifier. However, SVM can process multi-class data sets using SVM. There are two approaches to applying a binary classifier to a multi-class data set: one-versus-all and one-versus-one. In one-versus-all, each class in the training set is singled out against the conglomerated remaining classes in the training set. Whichever class achieves the best separation is labeled as the correct class for that data. In one-versus-one, the data classes in the training set are paired against each other and the best comparison among pairs is labeled as the correct class for that data.

It is important to define what is meant by "best" in the classification process. Best is defined as the class that nets the most positive results from individual data instances in the training set.

Settling ties, should they occur is implementation dependent, sometimes as simple as making a random choice among the tied classes.[6].

2.3.2 Machine Learning Tools

There are many machine learning toolkits available. These tools come in both open source and proprietary forms. Tools are chosen based on techniques used, so, for this thesis, libSVM and libLinear were examined as SVM tools. Naive Bayes was constructed from scratch for customization with Google Web1T.

LibSVM

LibSVM attempts to optimize the basic SVM equation:

$$\min_{\mathbf{w}, b, \xi} \frac{1}{2} \mathbf{w}^t \mathbf{w} + C \sum_{i=1}^l \xi_i \quad (2.11)$$

$$\text{subject to } y_i(\mathbf{w}^t \phi(\mathbf{x}_i) + b) > 1 - \xi_i \quad (2.12)$$

$$\text{and } \xi_i > 0 \quad (2.13)$$

For all kernels used in SVM a variable that must be solved for prior to optimization, the penalty term, C . Other kernels have additional variables that must be solved for prior to optimization, such as γ in the RBF kernel. While there are sophisticated methods to find C and other required variables, LibSVM takes a simple, straightforward approach: grid search. The grid for this search is a log grid search. As the local minimum is found on each pass of the grid search, libSVM reduces the grid size to home in on the minimum C value.

To make libSVM more efficient and more likely to converge on a solution, data in the training set should be scaled to either span 0 to +1 or -1 to +1. While test data may show up outside the original training data range, libSVM will extend the normalized range to accommodate. For example, if the range of the training data was -100 to +100, libSVM would scale that range to -1 to +1 by dividing by 100. If there was test datum with a value of -110, then libSVM would scale that datum to -1.1. While it is stated here that libSVM scales data, that function is not automatic within libSVM itself, but is rather part of the libSVM.

LibSVM was originally constructed in C and employed with python tools to support. LibSVM is not available in a wide array of languages, including Java. A Java version of libSVM makes

libSVM functional on many of the mobile operating systems available today, including Android. For this reason, libSVM was originally chosen as the SVM tool for this thesis.

LibLinear

While libSVM has numerous kernels to improve results, the inclusion of code to accommodate these kernels slows libSVM down. To increase processing speed for libSVM for linear kernels, libLinear was created. LibLinear is heavily modeled on libSVM but without non-linear kernel support. The kernels, represented within the ϕ function in SVM equations is not dealt with at all in libLinear, thus cutting down on checks and processing time. A linear kernel has been found to give as good or nearly as good a result as other kernels such as RBF, parabolic, and radial for text classification, especially when the corpus being used is large. The reduction in code can produce results 100-200 times faster than using LibSVM.

LibLinear has also been studied for large data sets that produces models which cannot be fit into memory. the application of "chunked" data on a mobile platform with very limited RAM, but significant storage (due to microSD cards) makes libLinear even more attractive for mobile device use.

2.4 Features

2.4.1 Feature Types

Feature types for natural language processing can be as simple as keeping counts of individual characters within a document to complex tracking of word combinations. There are three feature types used in this thesis, N-Grams, Gappy Bigrams, and Orthogonal Sparse Bigrams. These feature types vary in complexity and effectiveness for author detection.

N-Grams

N-grams are word groups or character groups of size N within a document. These word groups can include sentence boundaries, often denoted as < S > for sentence start and < /S > for sentence end. For instance, in the phrase "the quick brown fox" the set of 2-grams (bigrams) are shown in Table 2.1:

To further illustrate, the 3-grams (N=3 N-grams) of the phrase "the quick brown fox" are shown in Table 2.2:

Table 2.1: N-grams (N=2) of "the quick brown fox" with sentence boundaries

< S > the
the quick
quick brown
brown fox
fox < /S >

Table 2.2: N-grams (N=3) of "the quick brown fox" with sentence boundaries

< S > the quick
the quick brown
quick brown fox
brown fox < /S >

The larger the N-Gram, the lower the probability of finding that N-Gram in a document. A specific 5-Gram may be very rarely repeated, even by the same author. That makes a 5-gram distinctive, but unreliable for author detection. A 1-Gram like "the", "of", "a", etc occurs frequently across almost all authors, but is not discriminating. Finding discriminating words groupings without the unreliable low probability of large-N N-Grams drove the creation of a modified N-Gram grouping called a Gappy Bigram.

Gappy Bigrams

Gappy Bigram definitions vary between the sources cited in this thesis. For the purposes of this thesis, a Gappy Bigram will be composed of two tokens (words) found within a distance of words. A Gappy Bigram of distance 0 reduces to an identical set to 2-Grams (also know as bigrams). Just like N-Grams, Gappy Bigrams can extend beyond a sentence boundary, include punctuation, etc. However, for larger distances, the distinction between Gappy Bigrams and regular bigrams is clear. For instance, in the phrase "the quick brown fox" and a Gappy Bigram distance of 2, the Gappy Bigrams are given in Table 2.3:

To further illustrate, Gappy Bigrams of distance 1 are given in Table 2.4:

The Gappy Bigram is able to preserve distinctive word groups for an author without the extremely low probability of occurrence. However, an author may distinctively used a two word group at exactly an interval of 3 words or 2 words or 1 word. That distinctiveness could be a key attribute for that grouping and is lost in Gappy Bigrams. To capture that distinctiveness, Orthogonal Sparse Bigrams are employed.

Table 2.3: Gappy Bigrams (of distance 2) of "the quick brown fox" with sentence boundaries

< S > the
 < S > quick
 < S > brown
 the quick
 the brown
 the fox
 quick brown
 quick fox
 quick < /S > brown fox
 brown < /S >
 fox < /S >

Table 2.4: Gappy Bigrams (of distance 1) of "the quick brown fox" with sentence boundaries

< S > the
 < S > quick
 the quick
 the brown
 quick brown
 quick fox
 brown fox
 brown < /S >
 fox < /S >

Orthogonal Sparse Bigrams

Orthogonal Sparse Bigrams (OSB) are similar to Gappy Bigrams in how they are constructed except that the distance between words in the OSB is included in the OSB. Just like N-Grams, Gappy Bigrams can extend beyond a sentence boundary, include punctuation, etc. For instance, in the phrase "the quick brown fox" and a OSB distance of 2, the OSBs are given in Table 2.5:

To further illustrate, OSBs of distance 1 are given in Table 2.6:

It is important to note that in the cited references, the distance for OSBs is placed between token 1 and token 2 instead of after token 1 and token 2 as shown in Tables 2.5 and 2.6. The distance is placed after the tokens in this thesis for more convenient parsing within reference files. Also, for OSBs, there is an issue of how to count OSBs. The two approaches are to strictly use on the distance that a token pair is found. In "the quick brown fox", the OSB of distance 2 of "quick

Table 2.5: Orthogonal Sparse Bigrams (of distance 2) of "the quick brown fox" with sentence boundaries

< S > the 0
 < S > quick 1
 < S > brown 2
 the quick 0
 the brown 1
 the fox 2
 quick brown 0
 quick fox 1
 quick < /S > 2
 brown fox 0
 brown < /S > 1
 fox < /S > 0

Table 2.6: Orthogonal Sparse Bigrams (of distance 1) of "the quick brown fox" with sentence boundaries

< S > the 0
 < S > quick 1
 the quick 0
 the brown 1
 quick brown 0
 quick fox 1
 brown fox 0
 brown < /S > 1
 fox < /S > 0

brown" has one instance, with a distance of 0. For the other approach, using lesser-included distances for OSB of distance 2 , "quick brown" has three instances: quick brown 0, quick brown 1, and quick brown 2 because quick brown is a lesser included OSB of distance 2.

If file or database of OSBs is constructed, then a file or database of Gappy Bigrams also exists by default. The count of maximum distance OSBs equals the count of Gappy Bigrams, assuming the lesser included version of OSBs is used. This can be useful for conserving space in a system when both OSBs and Gappy Bigrams are needed.

2.4.2 Feature References

Once a scheme is determined for managing features, the features required must be selected. Feature selection is the process of deciding which features to include during classification. A set of features can be built from the training set, such as selecting N most used words in a training set. Features can be further refined by using outside references. For instance, a feature

set could be built as the N most used words in a training set and filtered for stop words. In this case, stop words could be defined by other researchers work or some standard stop word set. Another option is to build all features from a reference set. This thesis made heavy use of the Google Web1T Corpus to act as a feature filter and a feature reference.

Google Web1T Corpus

The Google Web1T Corpus is a massive corpus of English language N-grams ranging from N=1 to N=5. The corpus was created from a snapshot of Google's search databases that took place during January 2006. The corpus consists of text files with the N-grams accompanied by a count of those N-grams. Each set of N-grams is stored in its own folder. The N-Grams are organized alphabetically by the first word in the N-Gram. For instance, "a cat" comes before "a dog" in the 2-Grams of the corpus.

The unique folder within the corpus is the 1-Gram folder. There are two files within the 1-Gram folder. One file is organized alphabetically like the rest of the corpus, but the other file is organized by count. The largest count comes first. This folder serves as both a 1-Gram source and an authoritative reference of all types within the Google Web1T corpus.

Punctuation is included in the corpus. Sentence boundaries are indicated by <S> and < \S >. To qualify for corpus inclusion, a 1-Gram needed to appear in the Google search databases at least 200 times. Additionally, to appear in a 2-Gram or greater, a gram had to appear in the database at least 40 times. For 2-Grams and greater that appeared 40 times or more, but one of the words in the gram did not individually appear at least 200 times, the tag <UNK> is used to replace that word. The characters used in the corpus are UTF 8. Tokenization was "similar" to Penn Tree Bank except that hyphenated words were separated.[7] From working with the corpus, it becomes apparent that contraction within the corpus does not exactly match Penn Tree Bank. No "'t" contractions were kept intact during tokenization. The authors were contacted regarding this tokenization issue, to determine if this was intentional, but no reply has been received.

The Google Web1T is massive. This size makes Web1T both powerful to employ and cumbersome to use. The statistics for this corpus are listed in Table 2.7.

Table 2.7: Token and Type Counts in Google Web1T Corpus

Number of tokens:	1,024,908,267,229
Number of sentences:	95,119,665,584
Number of unigrams:	13,588,391
Number of bigrams:	314,843,401
Number of trigrams:	977,069,902
Number of fourgrams:	1,313,818,354
Number of fivegrams:	1,176,470,663

2.4.3 Feature Compression Techniques

Due to the large size of the corpora and feature reference used in this thesis, an efficient way to represent words and N-grams was needed. After surveying general literature on representing large data sets, the search for this thesis was narrowed. Two methods of efficiently representing large sets were investigated: bloom filters and minimal perfect hash functions. Minimal perfect hash functions were ultimately chosen as the tool for representing data in this thesis.

Bloom Filters

Representing a large dataset in a small memory space requires trading off between probability of a false positive, probability of a false negative, processing time, and size of representation. Bloom filters allow efficient storage of a list of values with zero probability of false negatives and a minimum probability of false positives. A Bloom filter consists of an array of m bits and k hash functions. Each hash function has an output range of 0 to $m - 1$. Each hash function must provide an equal probability distribution for each value 0 to $m - 1$. At the beginning of the construction of the Bloom filter, all m bits are set to 0. Each value to be a member of the Bloom filter is processed by each hash function. The output of the hash function corresponds to the array position of one of the m bits, which is then set to 1. If an output bit is already set to 1, that bit remains a 1. After all Bloom filter member values have been processed by the hash functions, the array of bits should be a mix of 0's and 1's.

To determine if a value belongs to the Bloom filter, that value is run through all k hash functions. If each array position output by the k hash function contains a bit set to 1, then the value probably belongs to the Bloom filter. If any of the m bits is a 0, that value does not belong.

There are variations on the Bloom filter that can use parallel architectures to advantage. For example, if the array of m bits is a multiple of k , then each hash function can have a range of 0 to $\frac{m}{k}$. Then each hash function can be run in parallel instead of in series. This scheme has no

effect on the probability of a false positive, but can be appreciably faster to process in parallel processing platforms.

The work in a Bloom filter comes from determining the minimum values required for k and m to represent the expected set of values for a required false positive rate. The trade offs are, the larger the number of bits, the lower the probability of a false positive, but the larger the storage of the Bloom filter becomes. Likewise, an increased number of hash functions provides a lower probability of false positives, but larger numbers of hash functions increases the computational cost of the Bloom filter. Given a required maximum false positive probability, p , and a maximum number of items, n , the minimum number of bits, m , is given by:

$$m = \frac{n \ln p}{(\ln 2)^2}. \quad (2.14)$$

Once the number of bits, m , is determined, the minimum number of hash functions, k , must be found. The required minimum of hash functions is given by:

$$k = \ln \frac{m}{n}. \quad (2.15)$$

Bloom filters are flexible and compressible. They are flexible because the number of bits, m , can be changed on the fly based on a changing number of items, n . Various compression techniques can be used to compress the bits, m , in the filters for transmission between computers. The filters can be processed in serial or parallel based on hardware architecture. Unfortunately, while flexible, Bloom filters are not as compact as their closely related cousin, the minimal perfect hash function.

Minimal Perfect Hash Functions

A minimal perfect hash function is the culmination of three concepts: a hash, a perfect hash, and a minimal hash. A hash function is a function that maps values from a set, U , with a number of values, k , to a range of values, m [8]. Hashes are normally associated with mapping a large universe to a small universe, but hashes can map between spaces of equal size. Hashes are often used in computer science for cryptography, efficiently mapping values, and myriad other tasks.

A hash function is a perfect hash function if there are no hashing collisions. A collision occurs when different values from U result in the same output value. More formally, in perfect hashes, there are m distinct values resulting from applying the hash function to all k values in U such that $k = m$. In short there must be a 1-1 mapping between each value in U to each resulting

value in the range, m – no collisions to be handled (load factor $\alpha = 1$). A perfect hash function is called a k -perfect hash function if the ratio of possible values in the mapped space is not larger than k times the original space. This means the range, m , must be k time larger than U to ensure there are no collisions.

A perfect hash function is called a minimal perfect hash function if there are no "blank" spaces in the hash table – meaning that no space is wasted in storing the hash. This is the same as a k -perfect hash function where $k=1$. Less formally, the size of the range, m is equal to n , the size of the universe, U .

The time required to compute a value in m from a value in U is known as evaluation time. The required to construct the minimal perfect hash function is known as construction time. Along with representation space, evaluation time and construction time are the three performance parameters used to judge the efficiency of a minimal perfect hash function.

Minimal perfect hash functions (MPHF) are comprised of a set of hashing functions and a lookup data structure. The set of values (the universe, U) to be hashed must be known in advance. Those values are mapped, one-to-one to a unique range of numbers. At the end of the mapping, there is exactly one unique numerical hash for every provided input. The required number of bits for the hash is the minimum number of bits possible to uniquely identify all the items. The theoretical lower bound is $1.44n$ bits, where n is the number of elements in U .

A lower bound of $1.44n$ bits is the advantage of the MPHF, the data structure is extremely compact once created. The disadvantage is that any value submitted to the MPHF will result in a hash value. This requires a second discriminating function to determine member in the correct value set, such as a second, traditional, hash. This second hash undermines the compact size of the MPHF. However, combining a MPHF with a single traditional hash provides an extremely small probability of a false positive during a membership check and a fast lookup time.

In general, there are three stages of creating a minimal perfect hash function or any k -perfect hash function. These three stages are mapping, ordering, and searching. The mapping stage maps the set of keys in universe, U , to some other values. For example mapping a set of strings to an integer value or creating a set of vertices in a graph could serve as the mapping step. Ordering involves finding the buckets, vertices, etc that have been mapped with the most keys. These highly mapped entries become levels or child graphs in a further refined hashing scheme to develop into the final data structure. The final step, searching, involves assigning

keys to positions within the mapping. The mapping is often multilevel allowing duplication from hashing to be "backed off" and retried to continue building the hash.

There are many MPHf implementations available in the open source world. The implementation claiming to be the closest to the theoretical minimum for representation space is called the Compress, Hash, and Displace (CHD) algorithm[9]. CHD maps keys into buckets. Each bucket is assigned its own hash function, ϕ to create an index into the final data structures. The buckets are ordered by magnitude (number of values in the bucket) for placement into the data structure. The theoretical lower bound of storage for a minimal perfect hash is $1.44n$ bits [8]. CHD's lower bound of storage is $2.07n$ to $3.56n$ bits depending on generation time allowed for the data structure.

2.5 Evaluation Criteria

Results from classifying data are computed from four basic categories of results: true positives, (tp), true negatives (tn), false positives (fp), and false negatives (fn). These four basic results are combined into accuracy, precision recall and F-Score for this thesis. While there are other evaluation criteria, these chosen criteria are clear enough and sufficient for measuring results.

2.5.1 Accuracy

Accuracy is a widely used and intuitive performance measure for classification. Accuracy, however, is flawed. Accuracy poorly represents the effectiveness of a classifier when the number of true negatives is large compared to the number of true positives. Missing all the true positives, but calling everything a negative, true or otherwise, yields a high accuracy without actually being effective at finding correctly labeled positives. Accuracy is defined as:

$$accuracy = \frac{tp + tn}{tp + fp + tn + fn} \quad (2.16)$$

[10]

2.5.2 Precision and Recall

Due to the weakness of accuracy as an evaluation criteria, precision and recall (also known as sensitivity) is used. Precision measures how often a document that belongs to the class being sought is actually labeled as that class. In other words, for all the actual documents written by the target author, how often are those documents labeled by the classifier as being written by

the author. For all the documents said to be true by the classifier, what percentage are actually true.

$$precision = \frac{tp}{tp + fp} \quad (2.17)$$

Recall determines how well the classifier picks out true documents. In other words, for all the true documents in the set, how often does the classifier detect those true documents? Recall is given by:

$$recall = \frac{tp}{tp + fn} \quad (2.18)$$

[10]

2.5.3 F-Score

F-Score is the harmonic mean of precision and recall. It is a superior indicator to accuracy in evaluating a classifier. The definition of F-Score used in this thesis is:

$$F - Score = \frac{2}{\frac{1}{p} + \frac{1}{r}} \quad (2.19)$$

This definition is a variant of the standard definition of:

$$F - Score = \frac{(\beta^2 + 1) * 2pr}{\beta^2 * (p + r)} \quad (2.20)$$

The full definition of F-Score involves an additional term, β , which is a weighting value. A β value greater than one favors precision and a β value less than one favors recall. This thesis values precision and recall equally. This makes $\beta = 1$, thus the simpler equation for F-Score is used:

$$\frac{2pr}{p + r} = \frac{2}{\frac{1}{p} + \frac{1}{r}} \quad (2.21)$$

F-Score will be the primary evaluation criteria for this thesis.[10]

2.6 Mobile Device Platforms

There are numerous mobile device platforms ranging from the near ubiquitous mobile phones to tablets to personal digital assistants. Even within the category of mobile phones, there is a wide ranging array of capability and popularity. For newer mobile phones, capabilities often include access to storage, a network, phone services, GPS, and multimedia. Storage can be both onboard phone storage or removable storage such as a micro-SD card.

Often, there network access to more than just the mobile provider GSM or CDMA network. Modern phones often have WiFi access. GPS services provide position updates to the phone. Multimedia capability varies dependent on display size, resolution, battery consumption, processing speed, memory, and network availability. Mobile phones have not yet reached the level of commonality expected in desktop and laptop computing devices.

2.6.1 Mobile Devices by Popularity

To determine an effective development strategy for author detection on a mobile phone, it is sensible to determine what development language would support the largest number of mobile phones. By device popularity, the most dominant mobile operating systems, in order, are Symbian (Nokia phones), Research In Motion (Blackberry), iOS (Apple iPhone, iPad, iPod), and Android (Droid, Evo, Galaxy Tab). These four OS platforms constitute 88% of the mobile device market for first quarter of 2010.[11] Symbian, RIM, and Android all accept applications built on Java, or at least a variant of Java. Based on this vast market share, using Java as the development language for author detection on a mobile device has the largest potential for use.[12][13][14] Only iOS uses exclusively Objective C.[15]

2.6.2 Android Operating System

Based on its popularity and ease of installing test applications, Android is used as the development platform for this thesis. Android applications are not written, strictly speaking, in Java. Android applications are written in Dalvik which implements most of the syntax and structure of Java. Dalvik development is targeted at mimicking recent stable releases of the Java Development Kit (JDK). The core of the Android operating system is built on Linux, but is not built as a traditional Linux environment.[14]

Android applications consist of a combination of Activities, Services, Intents, and Content Providers. Activities are processes that users can see and interact with. Activities create the windows, tabs, and dialogs for user interaction.

Services run in the background with no user graphical user interface (GUI). Android Services are not equivalent to traditional Unix services. Unix services are, by nature, persistent process within the operating system. Android Services are just as prone to being killed by the operating system as an Activity.

Intents are messages passed around by processes and Java Virtual Machines within the Android operating System. Typical Intents are created by Content Providers for actions such as incoming calls, incoming Short Messaging Service (SMS) messages, GPS, etc. Other typical Intents are passed between Activities in an application or between Services and Activities in an application. Intents can start, stop, and pause Activities as well as just pass along data such as a String or integer. Applications use Activities, Services, and Intents in combination to provide functionality on an Android Mobile device.

The lifecycle of an application in Android varies from a standard PC application lifecycle. Activities and Services continue to run in Android while sufficient resources remain on the mobile device. When resources become exhausted, the Android operating system will shut down Activities and Services it deems as less important or less used. This is why Android applications often lack a "Quit" or "Exit" function in their menus – developers expect that the application can continue to run so long as the operating system has sufficient resources. Contents providers, on the other hand, are persistent processes driven by items such as GPS receivers, mobile networks, and WiFi networks. Content providers are accessed and listened to by applications. A Content Provider can also be built by a developer to act as a data provider for other application as an abstraction instead of an actual physical device like GPS or WiFi.[16]

2.7 Corpora

A major portion of validating a method of author attribution is securing a corpus of usable data. There are some tried and true corpora openly available, such as the ENRON Email Corpus, which are well know, well studied, and useful for comparison. With a focus on mobile devices, this thesis needed a more short text relevant corpus. For this need an in-house corpus of Twitter posts, known as Tweets, was used. Using these two corpora provides a standard corpus to judge effectiveness and a newer corpus to anticipate future capability in the evolving medium of mobile computing.

2.7.1 ENRON Email Corpus

The ENRON email corpus is a set of emails collected by the Cognitive Assistant that Learns and Organizes (CALO) Project. The original corpus contains 619,446 emails from 158 users. These emails were posted on the web by the Federal Energy regulatory Commission during the investigation of ENRON. Issues with the raw posting were corrected by several people at MIT and SRI to arrive at the form of the current corpus. The emails are organized in folders, by user. The folder organization used by the original user is kept mostly intact (Inbox, Sent Items, etc)

except for some computer generated folders that were seldom used by the actual users. Each email is contained in its own text file. Each text file contains the full email header as well as any threaded conversation headers (replies and forwards).[17]

The ENRON corpus is a frequent target for natural language processing. Author detection performance for character and word N-grams, SVM, Naive Bayes and other classifiers on the ENRON corpus is well documented. For this reason, all methods used in this thesis were attempted on the ENRON email corpus as a benchmark of performance, before moving on to the more mobile-centric corpus of Twitter.

2.7.2 Twitter

Twitter is a short message micro-blogging services that users can access from traditional computers as well as mobile devices. Originally designed for use over Short Message Service (SMS), Tweets (vernacular for message sent on Twitter) are limited to 140 characters. Unlike other social networking sites, Twitter has no requirement for users to post their real names. Author detection on a corpus of Tweets will be challenged by the short duration of each Tweet (Tweets would constitute a document in this case) and the non-standard use of language. Also, users do not have to formulate original content for their Tweets. Just like as email forward, users can re-Tweet a Tweet they have already received.

Tweets are formatted for use with a JavaScript Object Notation (JSON) format. The JSON formatting provides numerous fields containing language, Twitter id, geocode (latitude and longitude of sender). The Twitter API contains both streaming and RESTful methods. Using the Twitter API, Tweets can be pulled from the TwitterSphere using a free, rate limited service called Garden Hose or via a fee-based, rate unlimited service called Fire Hose. The rate limit for Garden Hose is 150 messages per hour. Those messages are randomly chosen from Twitter accounts that make themselves viewable by the public. The Twitter API allows for filters to affect the stream of Tweets to avoid getting Tweets that do not meet your needs and would otherwise impact your rate limit. The length limitation and mobile nature of Tweeting, makes Twitter a reasonable model of SMS behavior for testing purposes.[18]

2.8 Recent Work in Author Detection, Google Web1T, and Mobile Devices

:NOTE: I just found a slew of related work that is worth studying some more, but I don't want to hold up the process of getting feedback on the bulk of this chapter 2. The below incomplete sentences are placeholders for me on what I have for related work right now. There is a patent on author detection based on a compressed hash, there are articles solely on managing and querying the Web1T, and a paper on chunking data on memory constrained systems. :ENDNOTE:

Google Web1T has been used as a smoothing reference in other machine learning studies. XXXXXX used a backoff method based on Google Web1T XXXX counts to Google Web1T has also been a reference for spelling correction[] and semantic classification[]. There has even been a paper on just managing the Google Web1T corpus effectively[].

Author detection across varied information sources using a normalized compressor distance has been patented. This method creates a bitwise compression of content from web pages, emails, texts, or any electronic document and uses clustering, based on this patented distance measure, to arrive at probability of various documents being from the same author.[?] Author detection on mobile devices has not shown up in patent or paper searches. There are author detection papers that reference the prevalence of text messages in author attribution, but none on using the mobile platform itself to conduct processing. Despite a breathtaking pace of application development on mobile device platforms such as iPhone and Android, using mobile computing capability for traditional machine learning has appears to be a wide open question.

Recent SVM work has included....

2.9 Conclusion

There is a rich body of work on author attribution, SVM, Naive Bayes, and on the ENRON Email corpus. Applying traditional document and email author attribution tools to the short message environment of mobile phones is an area ripe for exploration.

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CHAPTER 3:

Experimental Design

This chapter documents the concepts and technical approaches used in this thesis, as well as procedural concepts for understanding the experiments of this thesis.

3.1 Experimental Design Overview

Thesis Goals The central goal of this thesis's experiments is to compare size and speed of different author detection methods against the effectiveness of those same author detection methods on a resource constrained device such as a mobile phone. Size and speed are critical to this thesis. This is due to the restrictive nature of mobile phones. However, the nature of these experiments allows the results to be applied to other computing platforms with limited resources such as nano-computers, mobile sensors, or yet unimagined devices.

Experimentation Phases To achieve the thesis goal, experimentation will be conducted in two phases: parameter evaluation and mobile phone performance evaluation. In parameter evaluation, the effectiveness of different combinations of classification methods, features sets, group sizes, and smoothing/filtering to compare prediction performance against model size and processing requirements. During the mobile phone performance evaluation, the combinations of classification methods that are both feasible and effective are used on mobile phones to determine the overall performance and impact of running author detection on an actual mobile phone.

3.2 Phase One: Parameter Evaluation

This phase will evaluate numerous combinations of two classification methods, five feature sets, six grouping sizes, three grouping methods, and two corpora to determine the computing requirements and effectiveness of these combinations. Preparing for these evaluations takes several steps including determining the required combinations, organizing and compressing the feature references, preparing the training and prediction data, building the models, and, finally, running the prediction tests. The results for all prediction test will be stored in a MySQL database which will also store the resulting f-score, precision, recall, and size of model for each test.

3.2.1 Creating the Testing Combinations

The classification methods to be compared are Naive Bayes and Support Vector machines (SVM). Naive Bayes is fast and uses a relatively small amount of RAM and disk storage. SVMs, are slower, use greater RAM and disk storage, but often yield higher f-scores. There are numerous feature sets that can be chosen. For this thesis, 1-grams, 2-grams, 5-grams, gappy bigrams, and orthogonal Sparse bigrams will be examined. The intuition is that 1-grams are simple and use less space, but will be less effective than bigger feature sets such as gappy bigrams or 5-grams.

For this thesis, two feature reference sets will be examined, a bootstrapped bag of words and the Google Web1T corpus. Bootstrapped bag of words simply means finding all the unique types within a training set and making each type a feature in the feature set. Since the Google Web1T corpus is huge, a parameter of that feature reference which can be adjusted is the percentage of a given feature set that might be used. These experiments will permute through these numerous options to determine size, speed, precision and f-score. The end result will be an analysis of the utility of these various approaches to author detection on a mobile phone. A graphic of the parameter combinations is given in Figure 3.1.

	1-gram	2-gram	5-gram	3-osb	3-gb
	5 10 25 50 75 150	5 10 25 50 75 150	5 10 25 50 75 150	5 10 25 50 75 150	5 10 25 50 75 150
SVM Bootstrap					
SVM Web1T (1%)					
SVM Web1T (2%)					
SVM Web1T (4%)					
SVM Web1T (16%)					
SVM Web1T (100%)					
Naive Bayes Bootstrap with Laplace Smoothing					
Naive Bayes Web1T Smoothing (1%)					
Naive Bayes Web1T Smoothing (2%)					
Naive Bayes Web1T Smoothing (4%)					
Naive Bayes Web1T Smoothing (16%)					
Naive Bayes Web1T Smoothing (100%)					

F-score:

Precision:

Recall:

Disk Size:

Time*:

* Time measure only for classifier/feature set combinations that perform well enough to be tested on actual mobile phones

Figure 3.1: Parameter Combinations for Testing

The small numbers "5 10 25 50 75 150" given under each column heading in Figure 3.1 indicate that all authors will be tested in groups of 5, 10, 25, 50, 75, and 150 using three different

grouping strategies: small-to-large, small-and-large, and random. In small-to-large, the authors with the smallest amount of training data are grouped together. In small-and-large, small authors and large authors are paired together. In the random grouping, the authors are grouped together by a pseudo-random selection. The reasoning for these three grouping strategies is to provide insight into the effect of prolific authors versus less prolific authors. If results are similar for the same author for each group, the prolific writing may not impact the outcome of author detection with these methods. This is needed information to rule out that the test author detection methods simply select the most prolific author instead of the actual author.

3.2.2 Organizing and Compressing Feature References

A key element to this testing is the use of the Google Web1T corpus. The Web1T corpus contains billions of types with a token mass of just over 1 trillion. The size and breadth of the Web1T corpus makes it appealing as a source for smoothing in Naive Bayes and a tool for creating models in SVM. However, due to the huge size of the Web1T corpus, the text files comprising the corpus must be compressed and managed for use on desktop workstations, servers, and especially mobile devices. Managing the corpus requires determining what portions of the Web1T corpus will be used. Using the choice of 5-grams as an example for illustration purposes, suppose only the 5-grams portion of the Web1T corpus might be used. The 5-grams constitutes 118 text files containing up to 10 million lines of text each. Each line of the Web1T 5-gram files contains space separated words (making up the type) followed by a count, separated from the words by a tab. The lines of text are organized alphabetically by token where uppercase letters are distinct from lowercase letters. Even using only one size of gram from Web1T, a reverence of this size is slow and bulky for machine learning use. Therefore, a subset of the reference is needed.

Sizing the Feature Reference Set To manage the size of Web1T, a small portion of the 5-grams could be chosen – 1%, 2%, 4%, etc. To choose which part of the reference to use (largest, smallest, random) this thesis takes advantage of Zipf’s Law. Zipf’s law states that the highest frequency word occurs approximately twice as often as the next most frequent word. By that reasoning, a list of the types with the highest counts is needed to capture the largest use of words in a natural language corpus. To get this count ordered list, the complete set of Web1T n-grams are recreated. The recreated files list each type organized by count instead of alphabetically. If two or more types have the same count, then those types are list alphabetically. The types are still listed first as a group of space separated words followed by a tab and ended with a count.

Three Tiered Hashing Scheme Even once the feature set of types to be used for classification has been determined, the smaller set of text is still too slow to process and very bulky to store. To further compress the data, a three tiered hashing scheme is used. The structure of the three tiered hashing scheme is shown in Figure 3.2.

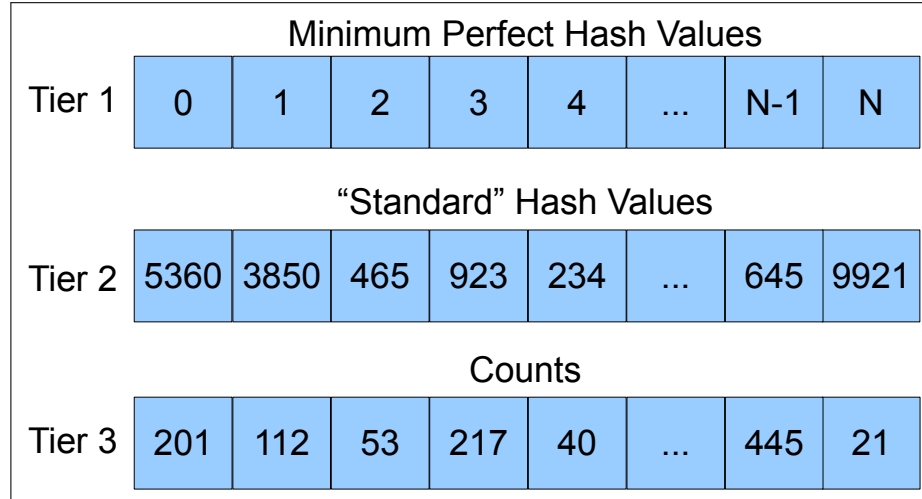


Figure 3.2: Three Tiered Hashing Scheme Structure

The first tier is comprised of minimal perfect hash (MPH) values of the selected feature set. The second tier of the scheme is comprised of a 64 bit hash of the original type. This second tier's job is to reduce the probability of a false positive in the first tier. This issue arises because no matter what string is input to the MPH function, a valid MPH value will be produced. The second tier's traditional hash is accessed by mapping the MPH value to the index of an array that comprises the second tier. That array cell contains the 64 bit hash of the original text used to create the MPH value. This makes the false positive rate for a given type $\frac{1}{2^{64}} * \frac{1}{\text{range of MPH values}}$ which is deemed an appropriate risk of collision in this hashing scheme. The third tier is simply an array of long values. The MPH value from tier 1 is used to access this array which holds the count value for a given type. An example of converting a phrase, "the quick brown", is shown in Figure 3.3.

These different tiers are not contained in a single data structure. The MPH data structure, tier 1, is contained in a file called "keys.mph". The array of hash values, tier 2, is contained in a file called "signature". The counts are contained in a Java object file called LongCountsArrayFile. The Naive Bayes experiments use all three tiers of this structure for smoothing values. The SVM experiments only use tier 1 and tier 2 to verify that a string encountered actually belongs to the

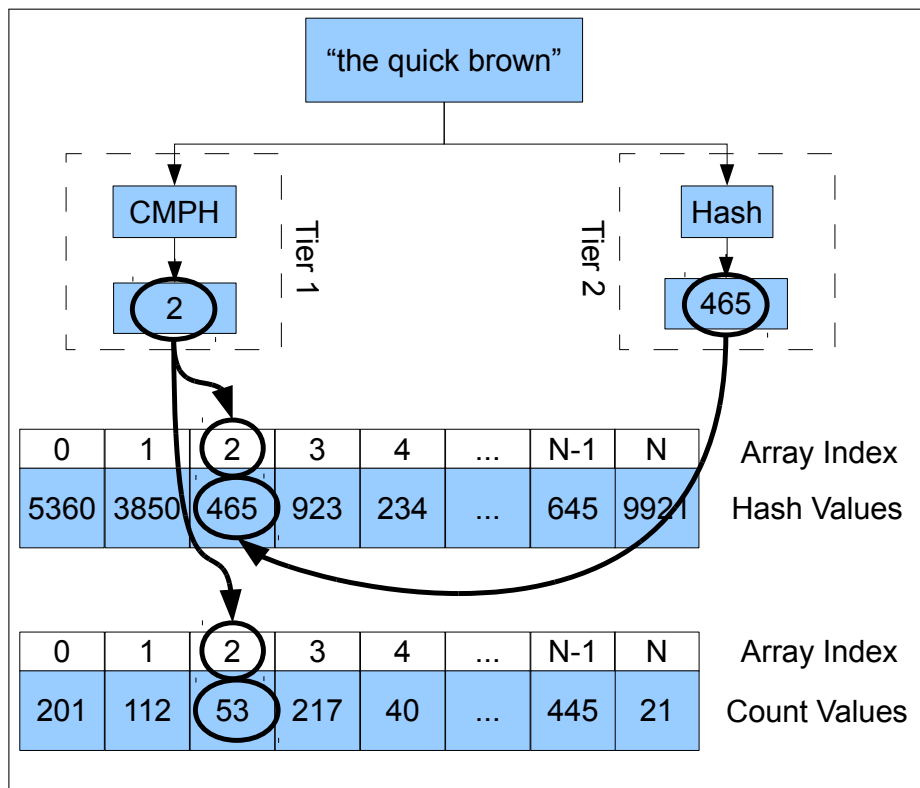


Figure 3.3: Three Tiered Hashing Scheme Example

feature set. These hefty data files comprise the bulk of storage required on the mobile device. Since these data files get loaded into RAM during the prediction process, the file sizes also impact RAM requirements. The impact on RAM and disk storage makes management of the size of keys.mph, signature, and LongCountsArrayFile an important aspect of the experiments.

Choosing Artifacts for the Three Tiered Hashing Scheme One impact of using MPH to reduce the size of storing types is a loss of flexibility with the text artifact selection process. Before the MPH data structure is created, the creator must determine if punctuation, capitalization, sentence boundaries, or "unknown" words will be allowed. The omission of each of these artifact types brings its own unique challenges. A binary style number scheme was adopted for each of these features where capital letters hold the 1 position, punctuation the 2 position, unknown word tags the 4 position, and sentence boundaries hold the 8 position. The complete matrix of artifacts allowed in the MPH model is included in Figure 3.4.

MPH Label	Remove Sentence Boundary Tags	Remove Unknown Word Tags	Remove Punctuation	Remove Capital Letters
0	FALSE	FALSE	FALSE	FALSE
1	FALSE	FALSE	FALSE	TRUE
2	FALSE	FALSE	TRUE	FALSE
3	FALSE	FALSE	TRUE	TRUE
4	FALSE	TRUE	FALSE	FALSE
5	FALSE	TRUE	FALSE	TRUE
6	FALSE	TRUE	TRUE	FALSE
7	FALSE	TRUE	TRUE	TRUE
8	TRUE	FALSE	FALSE	FALSE
9	TRUE	FALSE	FALSE	TRUE
10	TRUE	FALSE	TRUE	FALSE
11	TRUE	FALSE	TRUE	TRUE
12	TRUE	TRUE	FALSE	FALSE
13	TRUE	TRUE	FALSE	TRUE
14	TRUE	TRUE	TRUE	FALSE
15	TRUE	TRUE	TRUE	TRUE

Figure 3.4: Matrix of CMPH Models by Artifacts Included

Omitting Punctuation Omitting punctuation provides two options for dealing with the corpus: replace punctuation with "< UNK >" or drop the punctuation altogether. If punctuation is dropped, then any type containing a punctuation mark in the feature reference set must be completely ignored. If the punctuation is replaced with < UNK >, then a search within the existing count structure must be conducted for a corresponding entry for < UNK > and any non-punctuation words in the type. While dropping punctuation is much simpler to implement than employing "< UNK >" tags, however, Google did count punctuation as a word in type construction, so correlation between n-gram counts in the Web1T corpus and the trained/predicted documents is slightly affected. To maintain simplicity, the simple drop approach was used in these experiments.

Omitting Capitalization Omitting capitalization is straightforward for construction of tier 1 and tier 2, the inputted text for the type is converted to all lower case and a check is conducted to see if that type is already in the MPH data structure. For tier 3, which contains the counts, the lower case versions of the word must have its count mass added with its corresponding uppercase types. This adds complexity to the insertion process for MPH but is easily managed. Another option would be to simply drop all types that contained capitalization, but that would remove a large count mass from the Web1T corpus. Adding counts was the method used in this thesis to deal with omitting capitalization.

Omitting Sentence Boundaries Sentence boundaries are denoted in the Web1T corpus as < S > and < \S >. Dropping sentence boundaries is straightforward since there is no replacement or count mass issues to deal with. Since the tools for locating sentence boundaries make use of their own machine learning processes, no sentence boundaries were used in these experiments.

Omitting Unknown Words In the Web1T corpus, "unknown" words have a specific meaning. To be included in any corpus n-gram set, a word must have appeared as a 1-gram at least 200 times in the Google database. By contrast, to be 2-gram, 3-gram, 4-gram, or 5-gram, that gram had to appear at least 40 times in the Google database. This created a situation where a word would need to appear in a 2-or-higher-gram, but was not allowed into the corpus because it did not appear 200 times in the overall database. Words that fall into that category are replaced with the tag < UNK > in the Web1T corpus. Removing < UNK > words from the MPH has no effect on the counts in tier3 and is a straightforward process.

Choosing N-Grams N-grams can be as small as a 1-gram and grow, theoretically, to any size N imaginable. The preferred reference set for this thesis, the Web1T corpus, uses 1, 2, 3, 4, and 5-grams. While it is tempting to test all 5 N-gram sizes available in the corpus, only three were used. 1-grams and 5-grams were chosen to represent opposite ends of the size N gram spectrum available. 2-grams were used as a strong comparison to gappy bigrams and orthogonal sparse bigrams discussed below. Future work could focus on 3 and 4-grams to determine if there is a performance to size advantage in using those size of N-grams.

Gappy Bigram and Orthogonal Sparse Bigram Construction Once the 3 tier structure is created and functional, there are still two type of features remaining to be created. The Web1T corpus only contains standard n-grams, not gappy bigrams or orthogonal sparse bigrams. To

create these more exotic types of bigrams, a rule for counting distance and a notation scheme was needed. It was decided to use "lesser included counts" for both the gappy bigrams and the orthogonal sparse bigrams. This means that a word1 word2 pair would count for osb-0, osb-1, osb2, etc. While previous papers placed the distance for an OSB between word1 and word2 [19], this thesis constructed the OSBs with the distance after word2 for easier parsing. The gappy bigrams and OSBs were constructed from the 2, 3, 4, and 5-grams in the Web1T Corpus. Word pairs from a distance of 0 (a traditional bigram or an OSB-0) to a distance of 3 (an OSB-3 or the first and last word in a 5-gram) were built from the Web1T corpus. This process only looks at the first and last words in a 3-gram, 4-gram, or 5-gram since the inner words of this gram are already captured in the 2-gram. Using the inner 2-grams would double count 2-grams and throw off the count mass. The same is true for 3-grams inside of 4 and 5-grams as well as 4-grams inside of 5-grams.

Grouping By Size With references built and sized, an efficient structuring of the authors and documents needs to be devised. During data file construction, the grouping and conversion processes happened simultaneously. The grouping sets built were: small-to-large, small-and-large, and random.

Small-To-Large The small-to-large group matched the least prolific authors together with increasing size up to the most prolific authors. For example, of the 5 authors in the ENRON corpus with 5 total kilobytes worth of text are group together while the 5 authors with greater than 1 total megabyte of text are group together. No author is picked more than once. An example is shown in Figure 3.5.

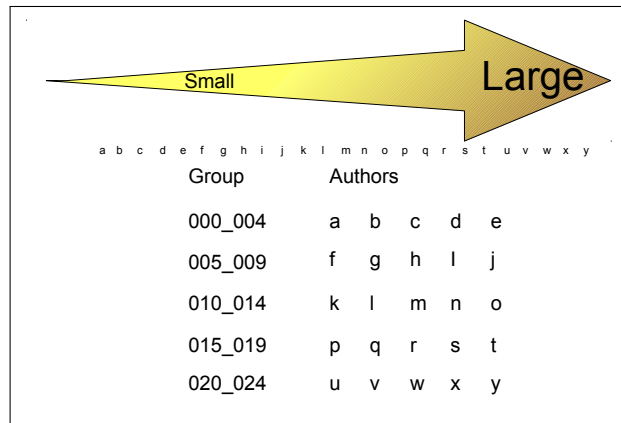


Figure 3.5: Small-To-Large Group for Group Size 5, 25 Authors

Small-And-Large The next group, small-and-large, is created by binning the authors by size. Then one author from each bin is picked to be group with one author from each other bin. For example the least prolific author is paired with one author from the most prolific bin and one author from each bin in between. In this situation, the selection from each bin is not random. The least prolific remaining author from each bin is picked for grouping. No author is picked more than once. An example is shown in Figure 3.6.

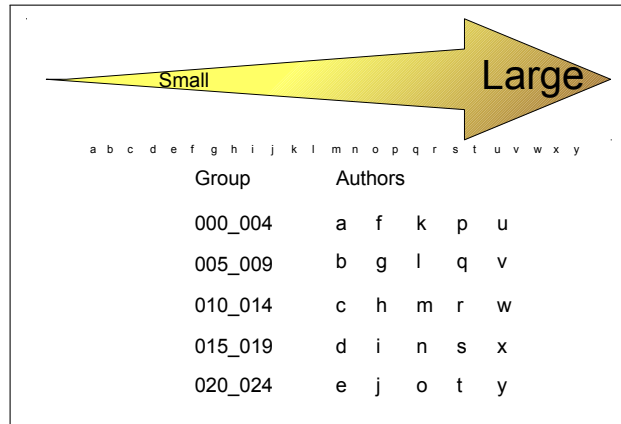


Figure 3.6: Small-And-Large Group for Group Size 5, 25 Authors

Random This grouping simply produces a random number in the range of available authors and places the selected author into a group until that group is full. Then the next group is filled the same way until no authors remain. No author is picked more than once. No author is picked more than once. An example is shown in Figure 3.7.

Group Sizes Based on having 150 authors in the ENRON Corpus, the six following group sizes were used: 5, 10, 25, 50, 75 150. These six group sizes coupled with the three grouping types, small-to-large, small-and-large, and random creates 18 grouping types. Examples of these grouping types are 5 small-to-large, 5 small-and-large, 5 random, 10 small-to-large, ..., 150 small-to-large, 150 random. Although using all 150 authors in a grouping set makes the procedure of how the 150 were grouped redundant, all three size 150 tests were conducted as a check on the experiments. If the 150 author grouping provides different results, then there may be an issue with the classifiers.

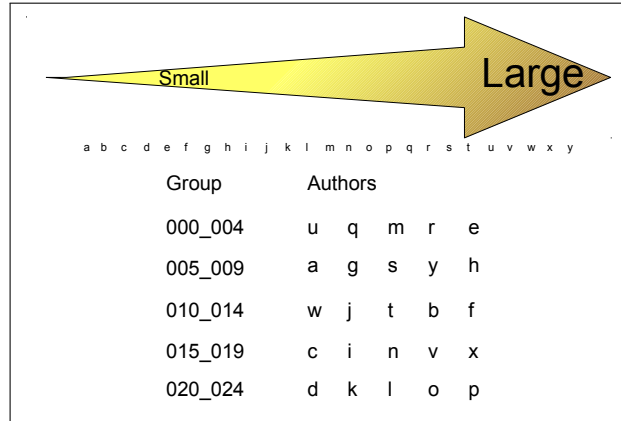


Figure 3.7: Random Group for Group Size 5, 25 Authors

After these grouping types were constructed, there were 171 totals sets (30 sets of 5 small-to-large, 15 sets of 10 small-to-large, ..., 1 set of 150 small-to-large, 1 set of 150 random.) Each of these sets were intended to be run through Bootstrapped SVM, Web1T SVM, Laplace Smoothed Naive Bayes, and Web1T Smoothed Naive Bayes. Assuming that only one MPH model is chosen to represent Google Web1T, that results in 684 experiments. Since there are 16 different MPH models based on the combinations punctuation, capitalization, sentence boundaries, and unknown words, the number of experiments could rise drastically. However, only two MPH models will be used during the experiments resulting in only 1,368 per feature type. Using 1-grams, 2-grams, 5-grams, 3-gb, and 3-osb results in 6,840 totals experiments.

Data File Format With combinations of features, artifacts, and group sizes chosen and the MPH data structures created, the actual documents must be converted into a format that can be used by the classifiers. The LibSVM file format was used since that it is the native format for LibLinear, the tool used for SVM in this thesis. The Naive Bayes classifier was built specifically for this thesis and was designed to use LibSVM format for convenience. The format of the data files consisted of an integer representing the author followed by a space, followed by a number representing the MPH value, followed by a colon, followed by another number representing the count. Each succeeding instance of a MPH value coupled with a count is separated by a space. Each document in the corpus is represented by a single line. Each line's mph number is in increasing order from left to right. The data files store the word/count pairs in a sparse fashion. This means that a zero count is not included in the data file. Absence of a word/count pair constitutes a zero count without needlessly using up space in the file. An example of this file format is provide in Figure 3.8.

```

83 362112:1 2216672:1 4609969:1 5582887:1 6141348:1 13588391:0
115 2334923:1 4077269:1 4759253:1 10878308:1 13069356:1 13588391:0
47 902626:1 1820755:1 10686459:1 12596717:1 13588391:0
80 1648944:1 1979998:1 2205090:1 2334923:1 2478205:2 13588391:0

```

Figure 3.8: LibSVM File Format

Running SVM With the data files created, the classifiers can be applied. The chosen tool for author detection using SVM is LibLinear. LibLinear was chosen for its speed compared to LibSVM. The LibLinear source code was slightly modified to allow training a model from a data set, then running prediction on a separate set without using the built-in cross validation function. During the training phase, each author has a SVM model built for it from a training file in a directory labeled "train". During the prediction phase, document contained in another file are used to predict the mostly likely author. That file is contained in a folder called "predict". The SVM author result is printed to a result file in a directory labeled "result". The f-score, precision, and recall for each file is recorded in a file inside a folder labeled "analysis". The analysis file also contains a full confusion matrix, time of prediction, size of original file, and other statistics. This file is finally pulled into a mySQL database for storage and calculation of precision, recall, and f-score..

The size of the author models impacts RAM usage and disk space. LibLinear stores SVM models as an array. RAM and storage are not the only limits. An array of integers representing token counts can be sizable, especially when token counts are long numbers (64 bits) instead of integers (32 bits).

RAM and disk storage are not the only limits. By specification, arrays in Java are limited to $2^{31} - 1$ entries. This means the model cannot contain more than $2^{31} - 1$ features. Also, the model must be loaded into RAM, so the number of authors coupled with the size of the author model must be weighed against the available RAM and disk storage.

Running Naive Bayes The Naive Bayes classifier has been specifically built for this thesis. The classifier reads in a pre-built array of long values from a file. The two types of arrays are a Laplace Smoothing array, which is comprised of all 1's. the second type of array is the Google Smoothing array comprised of the count values from the Web1T corpus. Using an array to hold the smoothing values for Naive Bayes has an impact on RAM usage. There must

be enough available RAM to hold the smoothing array. To prevent having numerous copies of the smoothing array in memory (one for each author being trained) a hashmap is used to create the author models instead. The process for training put each encountered feature type into a hashmap along with a count of *1 plus* the array smoothing value. If that feature type is encountered, the the count is simply incremented. Once all the training documents have been read and counted, the hashmaps of feature types and counts is converted into a hashmap of feature types and log of probability.

During the prediction process, each encountered feature type is queried against the author hashmap first. If the feature type is found in the hashmap, then the hashmap *log probability* is used. If not, then the smoothing array containing log of probabilities is used. An example of this hashmap/array process is shown in Figure 3.9. The result of the prediction process is outputted to a file in the corresponding results directory. Those results are then processed into a file in the corresponding analysis folder where all data is then read into a mySQL database for evaluation of precision, recall, and f-score.

3.3 Phase Two: Android Implementation

To manage files on the mobile device, a rudimentary file manager was built with a text viewer added. A button was also added to the File Manager to execute prediction against a document on the phone. An Android Service was also constructed that listens for incoming SMS messages. When an SMS Message is "heard", it is processed for author detection. The Service can be turned on and off using a button on the File Manager.

To measure CPU and RAM impact caused by the author detection processing, the third party applications, and Memory Usage, was installed on the phones. The method is to take a baseline of the phone's CPU and RAM usage with no Widgets or Applications running, the phone is attached to a recharging device, and no calls or texts are being sent. The same phone conditions are being set for the processing tests where the only application that will run on the phone will be the SMS capture and author detection application for this thesis. This will yield some basic metrics of author detection impact on the phone's capabilities.

3.4 Corpora

Two corpora are used for this thesis: the ENRON Email Corpus and the Naval Postgraduate School (NPS) Twitter Corpus. The aim of this thesis is to examine author detection using a mobile device. Two of the most common text communications on a mobile device are email

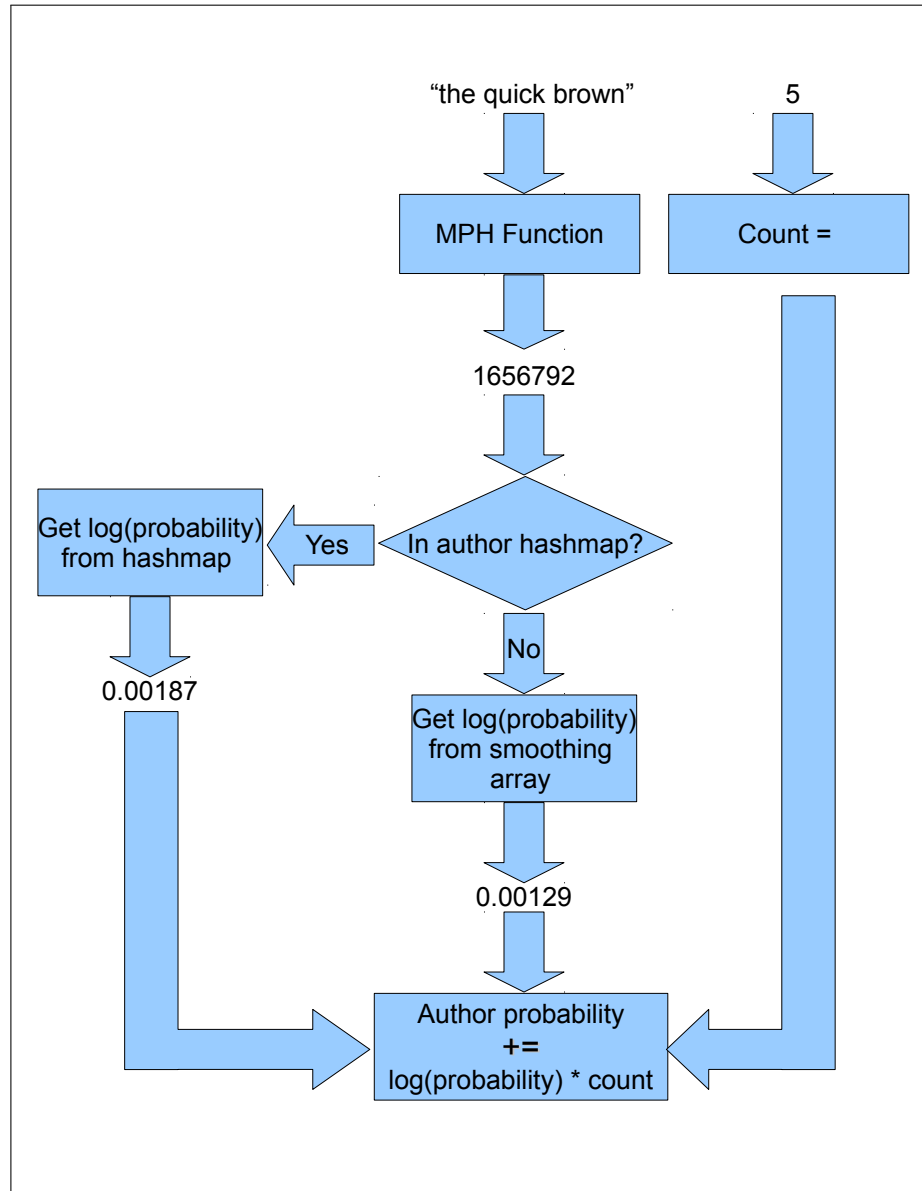


Figure 3.9: Naive Bayes Hashmap and Smoothing Array Flow Chart

and SMS (texting). The ENRON Email Corpus has been widely examined and has been used to author attribution in other studies. This makes the ENRON Corpus a suitable standard to measure the author detection techniques used in this thesis. The NPS Twitter Corpus is smaller and newer than the ENRON email corpus, but texting is extremely popular as a communications medium. Determining the effectiveness of author detection over this rapidly expanding text standard is important for analyzing the effectiveness of author detection on mobile devices.

ENRON Email Corpus Each ENRON email was stored in a single text file within a folder labeled with the author's first initial, second initial, and last name. Prior to processing each ENRON email, a systematic attempt was made to distill each email down into just the author's words. To support this distillation, the email header was stripped from each email. A search was conducted throughout the remaining text to find additional email headers. These are the embedded headers caused by email replies and forwards. Also to prevent biasing the author attribution, an attempt was made to systematically detect an email closing such as "Sincerely, Dave" or "Yours Truly, Jane".

Naval Postgraduate School Twitter Short Message Corpus All tweets from a single author were stored in a single text file. Each tweet from that author was contained on its own line. Each line begins with a date-time stamp with the content of the text following. Prior to constructing the corpus, all "re-tweets" were removed to ensure the text came from a single author, not just from a single Twitter account.

3.5 Intended Comparison

Once all tests are complete, performance of the different combinations of feature and classifiers will be compared for both the ENRON email corpus and the Twitter Corpus. This is to allow any differences in performance against the two primary media used on mobile phones. The completed test results should provide insight into the possibility of author detection on a mobile phone against both email and short messages.

CHAPTER 4:

Results and Analysis

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CHAPTER 5:

Conclusions and Future Work

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APPENDIX A:

LibLinear Results for the ENRON Email Corpus

GM1									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.8269	0.9531	0.4815	0.0979	0.6864	0.9842	0.0000	0.2414
	1	0.8233	0.9578	0.4444	0.1003	0.6859	0.9826	0.0000	0.2384
	2	0.8216	0.9570	0.4444	0.0971	0.6881	0.9819	0.0000	0.2377
	4	0.8298	0.9590	0.4444	0.0949	0.6950	0.9821	0.0000	0.2315
	8	0.8298	0.9570	0.4444	0.0980	0.6878	0.9819	0.0000	0.2406
	16	0.8239	0.9732	0.4444	0.0987	0.6901	0.9878	0.0000	0.2316

Table A.1: liblinear-enron-GM1-ALL-ALL-5

GM1									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.7611	0.9312	0.3776	0.1130	0.6122	0.9778	0.0000	0.2463
	1	0.7610	0.8890	0.3878	0.1109	0.6081	0.9699	0.0000	0.2490
	2	0.7594	0.9068	0.4388	0.1080	0.6093	0.9660	0.0000	0.2437
	4	0.7602	0.9086	0.4388	0.1074	0.6093	0.9692	0.0000	0.2451
	8	0.7578	0.9025	0.4388	0.1080	0.6113	0.9684	0.0000	0.2415
	16	0.7622	0.9187	0.3878	0.1142	0.6116	0.9698	0.0000	0.2425

Table A.2: liblinear-enron-GM1-ALL-ALL-10

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.6845	0.8073	0.4430	0.1031	0.5251	0.9640	0.0000	0.2550
	1	0.6847	0.8064	0.4574	0.1071	0.5233	0.9572	0.0000	0.2567
	2	0.6873	0.8364	0.4500	0.1092	0.5256	0.9645	0.0000	0.2538
	4	0.6819	0.7836	0.4483	0.1057	0.5237	0.9558	0.0000	0.2554
	8	0.6862	0.8013	0.4599	0.1044	0.5291	0.9566	0.0000	0.2512
	16	0.6861	0.7925	0.4483	0.1033	0.5223	0.9568	0.0000	0.2620

Table A.3: liblinear-enron-GM1-ALL-ALL-25

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.6411	0.7476	0.4341	0.0905	0.4800	0.9509	0.0000	0.2558
	1	0.6364	0.7280	0.4234	0.0982	0.4746	0.9561	0.0000	0.2571
	2	0.6420	0.7214	0.4287	0.0911	0.4764	0.9475	0.0000	0.2577
	4	0.6356	0.7052	0.4327	0.0888	0.4751	0.9532	0.0000	0.2578
	8	0.6419	0.7127	0.4376	0.0917	0.4780	0.9559	0.0000	0.2608
	16	0.6437	0.7524	0.4406	0.0913	0.4771	0.9504	0.0000	0.2576

Table A.4: liblinear-enron-GM1-ALL-ALL-50

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.6146	0.7024	0.4155	0.0921	0.4492	0.9437	0.0000	0.2588
	1	0.6101	0.7011	0.3880	0.1031	0.4407	0.9453	0.0000	0.2633
	2	0.6127	0.6858	0.3995	0.0978	0.4462	0.9511	0.0000	0.2584
	4	0.6132	0.6814	0.4006	0.0969	0.4417	0.9402	0.0000	0.2609
	8	0.6085	0.6836	0.4074	0.0921	0.4432	0.9392	0.0000	0.2574
	16	0.6137	0.6716	0.4030	0.0948	0.4403	0.9413	0.0000	0.2595

Table A.5: liblinear-enron-GM1-ALL-ALL-75

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.6060	0.6074	0.6033	0.0020	0.4000	0.9316	0.0000	0.2610
	1	0.5951	0.6155	0.5849	0.0144	0.3968	0.9402	0.0000	0.2678
	2	0.5982	0.6049	0.5949	0.0047	0.3958	0.9389	0.0000	0.2676
	4	0.6083	0.6093	0.6065	0.0013	0.4037	0.9488	0.0000	0.2640
	8	0.5990	0.6008	0.5982	0.0012	0.4023	0.9451	0.0000	0.2639
	16	0.5987	0.6011	0.5975	0.0017	0.3991	0.9489	0.0000	0.2664

Table A.6: liblinear-enron-GM1-ALL-ALL-150

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.8607	0.9753	0.5185	0.0980	0.7309	1.0000	0.0000	0.2402
	1	0.8193	0.9544	0.4444	0.1034	0.6761	0.9781	0.0000	0.2389
	2	0.8192	0.9448	0.4444	0.1004	0.6782	0.9778	0.0000	0.2400
	4	0.8187	0.9560	0.4444	0.1014	0.6747	0.9834	0.0000	0.2412
	8	0.8199	0.9547	0.4444	0.1024	0.6747	0.9817	0.0000	0.2419
	16	0.8154	0.9606	0.4444	0.1037	0.6782	0.9881	0.0000	0.2379

Table A.7: liblinear-enron-GM2-ALL-ALL-5

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.8150	0.9369	0.5000	0.1044	0.6869	0.9811	0.0000	0.2443
	1	0.7551	0.9093	0.3936	0.1114	0.5942	0.9711	0.0000	0.2510
	2	0.7578	0.9255	0.3936	0.1129	0.6001	0.9711	0.0000	0.2510
	4	0.7502	0.8969	0.3936	0.1126	0.5998	0.9675	0.0000	0.2480
	8	0.7581	0.8739	0.3936	0.1122	0.6003	0.9678	0.0000	0.2488
	16	0.7528	0.9065	0.3936	0.1138	0.5986	0.9728	0.0000	0.2510

Table A.8: liblinear-enron-GM2-ALL-ALL-10

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.7696	0.8989	0.4824	0.1111	0.6317	0.9814	0.0000	0.2630
	1	0.6790	0.8075	0.4512	0.1045	0.5171	0.9632	0.0000	0.2591
	2	0.6822	0.8065	0.4562	0.1023	0.5212	0.9612	0.0000	0.2558
	4	0.6810	0.7994	0.4465	0.1055	0.5174	0.9674	0.0000	0.2565
	8	0.6768	0.8331	0.4486	0.1040	0.5196	0.9655	0.0000	0.2556
	16	0.6760	0.8380	0.4470	0.1099	0.5162	0.9628	0.0000	0.2551

Table A.9: liblinear-enron-GM2-ALL-ALL-25

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.7402	0.8240	0.5252	0.0987	0.6002	0.9780	0.0000	0.2678
	1	0.6329	0.7216	0.4211	0.0925	0.4682	0.9505	0.0000	0.2616
	2	0.6341	0.7156	0.4119	0.0963	0.4709	0.9504	0.0000	0.2581
	4	0.6319	0.7174	0.4211	0.0913	0.4687	0.9540	0.0000	0.2615
	8	0.6326	0.7296	0.4092	0.0983	0.4686	0.9402	0.0000	0.2603

Table A.10: liblinear-enron-GM2-ALL-ALL-50

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.7330	0.7969	0.5437	0.0867	0.5832	0.9786	0.0000	0.2721
	1	0.6120	0.6959	0.3872	0.1035	0.4454	0.9564	0.0000	0.2650
	2	0.5987	0.6677	0.3874	0.0974	0.4385	0.9523	0.0000	0.2653
	4	0.6057	0.6913	0.3950	0.0966	0.4463	0.9492	0.0000	0.2637
	8	0.6034	0.6681	0.3752	0.1034	0.4375	0.9490	0.0000	0.2656

Table A.11: liblinear-enron-GM2-ALL-ALL-75

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.7447	0.7456	0.7429	0.0013	0.5516	0.9737	0.0000	0.2791
	1	0.5978	0.6047	0.5841	0.0097	0.3979	0.9387	0.0000	0.2697
	2	0.6115	0.6134	0.6105	0.0014	0.4039	0.9311	0.0000	0.2663
	4	0.6068	0.6073	0.6057	0.0008	0.4012	0.9391	0.0000	0.2712

Table A.12: liblinear-enron-GM2-ALL-ALL-150

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.6881	0.9636	0.3017	0.1576	0.5062	1.0000	0.0000	0.3012
	1	0.8117	0.9685	0.4000	0.1167	0.6773	0.9869	0.0000	0.2407
	2	0.8118	0.9550	0.4000	0.1133	0.6725	0.9836	0.0000	0.2423
	4	0.8130	0.9455	0.4000	0.1142	0.6772	0.9821	0.0000	0.2398
	8	0.8070	0.9513	0.4000	0.1152	0.6749	0.9824	0.0000	0.2367
	16	0.8112	0.9676	0.4000	0.1170	0.6732	0.9874	0.0000	0.2405

Table A.13: liblinear-enron-GM5-ALL-ALL-5

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.6297	0.8560	0.2548	0.1432	0.4605	0.9870	0.0000	0.2997
	1	0.7519	0.9022	0.3908	0.1141	0.5979	0.9782	0.0000	0.2478
	2	0.7440	0.9221	0.3908	0.1128	0.5981	0.9733	0.0000	0.2487
	4	0.7418	0.9256	0.3908	0.1161	0.5992	0.9729	0.0000	0.2479
	8	0.7477	0.9272	0.3908	0.1177	0.5994	0.9764	0.0000	0.2458
	16	0.7529	0.9191	0.3908	0.1177	0.6051	0.9770	0.0000	0.2478

Table A.14: liblinear-enron-GM5-ALL-ALL-10

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.5499	0.7076	0.3305	0.1318	0.4372	1.0000	0.0000	0.3073
	1	0.6759	0.7867	0.4371	0.1075	0.5242	0.9554	0.0000	0.2557
	2	0.6728	0.7759	0.4371	0.0982	0.5252	0.9599	0.0000	0.2552
	4	0.6721	0.8209	0.4371	0.1072	0.5252	0.9629	0.0000	0.2558

Table A.15: liblinear-enron-GM5-ALL-ALL-25

GM5									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.5323	0.6564	0.3088	0.1049	0.4262	0.9870	0.0000	0.3097
	1	0.6259	0.7342	0.4304	0.0929	0.4757	0.9572	0.0000	0.2655
	2	0.6352	0.7022	0.4442	0.0832	0.4818	0.9610	0.0000	0.2656

Table A.16: liblinear-enron-GM5-ALL-ALL-50

GM5									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.5211	0.6206	0.3240	0.0953	0.4148	0.9870	0.0000	0.3171
	1	0.6141	0.7194	0.4211	0.0949	0.4514	0.9513	0.0000	0.2700
	2	0.6104	0.6739	0.4230	0.0850	0.4515	0.9494	0.0000	0.2663

Table A.17: liblinear-enron-GM5-ALL-ALL-75

GM5									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.5458	0.5478	0.5418	0.0028	0.4034	0.9870	0.0000	0.3173
	1	0.5947	0.6091	0.5875	0.0101	0.4076	0.9502	0.0000	0.2668

Table A.18: liblinear-enron-GM5-ALL-ALL-150

GB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.8529	0.9835	0.5185	0.1014	0.7203	1.0000	0.0000	0.2469
	1	0.8494	0.9673	0.5185	0.1016	0.7172	0.9854	0.0000	0.2459
	2	0.8476	0.9805	0.5185	0.1040	0.7152	0.9890	0.0000	0.2470
	4	0.8579	0.9762	0.5185	0.1007	0.7174	0.9844	0.0000	0.2516
	8	0.8536	0.9786	0.5185	0.1003	0.7152	0.9921	0.0000	0.2501
	16	0.8523	0.9756	0.5185	0.1028	0.7136	0.9886	0.0000	0.2520

Table A.19: liblinear-enron-GB3-ALL-ALL-5

GB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.8124	0.9538	0.4787	0.1149	0.6699	1.0000	0.0000	0.2599
	1	0.8127	0.9341	0.4894	0.1084	0.6712	1.0000	0.0000	0.2545
	2	0.8128	0.9297	0.4894	0.1074	0.6753	0.9870	0.0000	0.2509
	4	0.8096	0.9426	0.4894	0.1079	0.6723	1.0000	0.0000	0.2548
	8	0.8134	0.9512	0.4894	0.1100	0.6725	0.9870	0.0000	0.2545
	16	0.8129	0.9288	0.4894	0.1081	0.6717	0.9870	0.0000	0.2544

Table A.20: liblinear-enron-GB3-ALL-ALL-10

GB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.7680	0.8882	0.5215	0.1068	0.6218	0.9797	0.0000	0.2675
	1	0.7652	0.8744	0.5158	0.1136	0.6188	0.9816	0.0000	0.2657
	2	0.7684	0.8788	0.5130	0.1119	0.6208	0.9772	0.0000	0.2646
	4	0.7668	0.9056	0.5144	0.1141	0.6194	0.9802	0.0000	0.2653
	8	0.7621	0.8812	0.5144	0.1078	0.6166	0.9776	0.0000	0.2645

Table A.21: liblinear-enron-GB3-ALL-ALL-25

GB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.7409	0.8465	0.4980	0.1063	0.5914	1.0000	0.0000	0.2725
	1	0.7372	0.8204	0.4731	0.1083	0.5865	0.9753	0.0000	0.2732
	2	0.7375	0.8100	0.4765	0.1075	0.5888	1.0000	0.0000	0.2717
	4	0.7361	0.8628	0.4735	0.1118	0.5889	1.0000	0.0000	0.2719

Table A.22: liblinear-enron-GB3-ALL-ALL-50

GB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.7300	0.7955	0.5220	0.0947	0.5710	0.9870	0.0000	0.2783
	1	0.7336	0.8161	0.5273	0.0952	0.5773	0.9763	0.0000	0.2722
	2	0.7324	0.7886	0.5251	0.0932	0.5718	0.9764	0.0000	0.2780
	4	0.7317	0.7808	0.5237	0.0931	0.5734	0.9742	0.0000	0.2744

Table A.23: liblinear-enron-GB3-ALL-ALL-75

GB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.7450	0.7472	0.7440	0.0015	0.5374	0.9711	0.0000	0.2868
	1	0.7435	0.7453	0.7426	0.0013	0.5376	0.9867	0.0000	0.2885
	2	0.7422	0.7432	0.7417	0.0007	0.5401	0.9867	0.0000	0.2836

Table A.24: liblinear-enron-GB3-ALL-ALL-150

OSB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.8690	0.9732	0.5185	0.0928	0.7386	1.0000	0.0000	0.2435
	1	0.8667	0.9741	0.5185	0.0964	0.7375	0.9921	0.0000	0.2396
	2	0.8645	0.9765	0.5185	0.0991	0.7369	0.9923	0.0000	0.2424
	4	0.8687	0.9762	0.5185	0.0958	0.7367	0.9884	0.0000	0.2416
	8	0.8636	0.9740	0.5185	0.0984	0.7346	0.9877	0.0000	0.2438
	16	0.8649	0.9848	0.5185	0.0978	0.7370	0.9924	0.0000	0.2410

Table A.25: liblinear-enron-OSB3-ALL-ALL-5

OSB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.8250	0.9469	0.5106	0.1028	0.6886	0.9867	0.0000	0.2502
	1	0.8296	0.9516	0.5319	0.1003	0.6937	0.9888	0.0000	0.2476
	2	0.8280	0.9432	0.5319	0.1014	0.6923	1.0000	0.0000	0.2475
	4	0.8266	0.9446	0.5319	0.1007	0.6912	0.9870	0.0000	0.2470
	8	0.8282	0.9482	0.5319	0.1010	0.6920	0.9870	0.0000	0.2471

Table A.26: liblinear-enron-OSB3-ALL-ALL-10

OSB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.7826	0.8954	0.5385	0.1038	0.6374	0.9815	0.0000	0.2599
	1	0.7822	0.8850	0.5350	0.1000	0.6388	0.9867	0.0000	0.2601
	2	0.7848	0.8775	0.5350	0.1008	0.6399	1.0000	0.0000	0.2595

Table A.27: liblinear-enron-OSB3-ALL-ALL-25

OSB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.7567	0.8569	0.5160	0.1016	0.6056	0.9793	0.0000	0.2645
	1	0.7542	0.8343	0.5126	0.1003	0.6027	0.9771	0.0000	0.2659

Table A.28: liblinear-enron-OSB3-ALL-ALL-50

OSB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.7470	0.7931	0.5547	0.0862	0.5858	0.9786	0.0000	0.2703
	1	0.7456	0.8011	0.5458	0.0900	0.5899	0.9758	0.0000	0.2674

Table A.29: liblinear-enron-OSB3-ALL-ALL-75

OSB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.7546	0.7553	0.7543	0.0005	0.5555	0.9754	0.0000	0.2779

Table A.30: liblinear-enron-OSB3-ALL-ALL-150

APPENDIX B:

LibLinear Results for the Twitter Short Message Corpus

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.6212	0.8089	0.4737	0.0739	0.6023	0.9696	0.1791	0.1416
	1	0.6228	0.8211	0.4713	0.0778	0.6034	0.9597	0.1429	0.1445
	2	0.6147	0.8966	0.4218	0.0888	0.5948	0.9697	0.0000	0.1514
	4	0.6172	0.8546	0.3846	0.0850	0.5992	0.9811	0.1200	0.1450
	8	0.6273	0.9026	0.4661	0.0813	0.6087	0.9735	0.1404	0.1419
	16	0.6181	0.8324	0.4458	0.0816	0.6013	0.9600	0.1515	0.1386

Table B.1: liblinear-twitter-GM1-ALL-ALL-5

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.4762	0.6234	0.3448	0.0725	0.4537	0.9556	0.0385	0.1607
	1	0.4813	0.6389	0.3627	0.0662	0.4605	0.9482	0.0755	0.1592
	2	0.4845	0.6567	0.3358	0.0699	0.4617	0.9699	0.0702	0.1615
	4	0.4841	0.6900	0.3184	0.0750	0.4628	0.9517	0.0299	0.1639
	8	0.4816	0.7194	0.3080	0.0784	0.4576	0.9621	0.0000	0.1637
	16	0.4800	0.6362	0.2846	0.0723	0.4567	0.9474	0.0370	0.1613

Table B.2: liblinear-twitter-GM1-ALL-ALL-10

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.3461	0.4816	0.2735	0.0562	0.3197	0.9344	0.0000	0.1697
	1	0.3408	0.4390	0.2408	0.0596	0.3160	0.9221	0.0000	0.1740
	2	0.3465	0.4309	0.2714	0.0430	0.3225	0.9225	0.0000	0.1717
	4	0.3510	0.4402	0.2811	0.0476	0.3264	0.9358	0.0000	0.1724
	8	0.3419	0.4296	0.2591	0.0483	0.3189	0.9231	0.0000	0.1707
	16	0.3411	0.4296	0.2651	0.0417	0.3133	0.9011	0.0000	0.1705

Table B.3: liblinear-twitter-GM1-ALL-ALL-25

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.2693	0.3371	0.2190	0.0369	0.2496	0.8798	0.0000	0.1754
	1	0.2704	0.3173	0.2219	0.0365	0.2483	0.9153	0.0000	0.1747
	2	0.2705	0.3338	0.2180	0.0415	0.2419	0.8922	0.0000	0.1753
	4	0.2710	0.3272	0.2032	0.0457	0.2464	0.8889	0.0000	0.1716
	8	0.2712	0.3171	0.2274	0.0281	0.2431	0.9119	0.0000	0.1727
	16	0.2710	0.3326	0.2344	0.0308	0.2458	0.9035	0.0000	0.1713

Table B.4: liblinear-twitter-GM1-ALL-ALL-50

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.2273	0.2738	0.1810	0.0371	0.2100	0.8687	0.0000	0.1713
	1	0.2293	0.2626	0.1768	0.0320	0.2092	0.9157	0.0000	0.1718
	2	0.2318	0.2730	0.1818	0.0364	0.2127	0.8750	0.0000	0.1729
	4	0.2310	0.2776	0.1874	0.0313	0.2101	0.8971	0.0000	0.1687
	8	0.2354	0.2910	0.1743	0.0406	0.2097	0.8873	0.0000	0.1720
	16	0.2368	0.2780	0.1910	0.0361	0.2091	0.9037	0.0000	0.1740

Table B.5: liblinear-twitter-GM1-ALL-ALL-75

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.1851	0.1875	0.1802	0.0034	0.1629	0.8582	0.0000	0.1623
	1	0.1888	0.1932	0.1802	0.0061	0.1642	0.8212	0.0000	0.1636
	2	0.1829	0.1833	0.1821	0.0006	0.1595	0.7807	0.0000	0.1575
	4	0.1921	0.1943	0.1910	0.0016	0.1665	0.8792	0.0000	0.1594
	8	0.1893	0.1913	0.1884	0.0014	0.1640	0.8139	0.0000	0.1650
	16	0.1877	0.1883	0.1865	0.0008	0.1644	0.8143	0.0000	0.1614

Table B.6: liblinear-twitter-GM1-ALL-ALL-150

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.4844	0.7282	0.2664	0.0887	0.4501	0.9272	0.0000	0.1676
	1	0.6241	0.8454	0.4664	0.0780	0.6029	0.9886	0.1159	0.1482
	2	0.6221	0.8232	0.3934	0.0867	0.6054	0.9697	0.1071	0.1423
	4	0.6253	0.8210	0.4245	0.0791	0.6077	0.9545	0.1639	0.1405
	8	0.6282	0.8489	0.4773	0.0734	0.6130	0.9773	0.1818	0.1373
	16	0.6258	0.8544	0.4094	0.0877	0.6119	0.9603	0.2157	0.1348

Table B.7: liblinear-twitter-GM2-ALL-ALL-5

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.3700	0.5725	0.1985	0.0775	0.3455	0.9150	0.0000	0.1686
	1	0.4904	0.6219	0.3429	0.0665	0.4657	0.9575	0.0000	0.1636
	2	0.4903	0.6491	0.3560	0.0628	0.4689	0.9549	0.0879	0.1585
	4	0.4962	0.6924	0.3379	0.0711	0.4711	0.9771	0.0000	0.1639
	8	0.4842	0.6693	0.3593	0.0623	0.4622	0.9524	0.0857	0.1603
	16	0.4891	0.6961	0.3142	0.0737	0.4684	0.9421	0.0000	0.1581

Table B.8: liblinear-twitter-GM2-ALL-ALL-10

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.2641	0.3285	0.1882	0.0346	0.2437	0.8473	0.0000	0.1734
	1	0.3468	0.4945	0.2702	0.0518	0.3226	0.9299	0.0000	0.1737
	2	0.3464	0.4433	0.2642	0.0508	0.3219	0.9542	0.0000	0.1678
	4	0.3526	0.4450	0.2665	0.0470	0.3304	0.9438	0.0000	0.1692
	8	0.3446	0.4469	0.2535	0.0541	0.3202	0.9136	0.0000	0.1666
	16	0.3437	0.4682	0.2419	0.0668	0.3217	0.9213	0.0000	0.1736

Table B.9: liblinear-twitter-GM2-ALL-ALL-25

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.2097	0.2745	0.1587	0.0304	0.2006	0.8333	0.0000	0.1732
	1	0.2679	0.3381	0.2275	0.0404	0.2453	0.8750	0.0000	0.1712
	2	0.2707	0.3221	0.2116	0.0373	0.2470	0.8777	0.0000	0.1796
	4	0.2749	0.3236	0.2372	0.0293	0.2464	0.8760	0.0000	0.1742
	8	0.2773	0.3297	0.2427	0.0265	0.2520	0.8686	0.0000	0.1743

Table B.10: liblinear-twitter-GM2-ALL-ALL-50

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.1800	0.2186	0.1277	0.0302	0.1729	0.7926	0.0000	0.1664
	1	0.2350	0.2861	0.1960	0.0331	0.2147	0.8914	0.0000	0.1715
	2	0.2354	0.2697	0.1867	0.0293	0.2130	0.8397	0.0000	0.1710
	4	0.2363	0.2778	0.1841	0.0335	0.2111	0.8615	0.0000	0.1697
	8	0.2354	0.2672	0.1843	0.0310	0.2147	0.8600	0.0000	0.1747

Table B.11: liblinear-twitter-GM2-ALL-ALL-75

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.1525	0.1554	0.1466	0.0042	0.1439	0.8092	0.0000	0.1605
	1	0.1889	0.1893	0.1882	0.0006	0.1659	0.7742	0.0000	0.1627
	2	0.1844	0.1874	0.1830	0.0021	0.1603	0.8385	0.0000	0.1674
	4	0.1862	0.1888	0.1809	0.0037	0.1633	0.7458	0.0000	0.1626

Table B.12: liblinear-twitter-GM2-ALL-ALL-150

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.2764	0.5119	0.1687	0.0560	0.1995	0.6715	0.0000	0.1509
	1	0.5868	0.8362	0.4040	0.0830	0.5657	0.9498	0.1667	0.1468
	2	0.5802	0.7639	0.3689	0.0835	0.5594	0.9457	0.0845	0.1488
	4	0.5767	0.7832	0.3838	0.0811	0.5582	0.9147	0.1967	0.1434
	8	0.5815	0.7827	0.4162	0.0760	0.5619	0.9506	0.1818	0.1439
	16	0.5760	0.8039	0.4084	0.0872	0.5603	0.9278	0.0625	0.1458

Table B.13: liblinear-twitter-GM5-ALL-ALL-5

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.1718	0.2811	0.0961	0.0371	0.1238	0.5625	0.0000	0.1172
	1	0.4383	0.5825	0.3247	0.0648	0.4150	0.9237	0.0519	0.1609
	2	0.4382	0.5657	0.3108	0.0643	0.4182	0.9302	0.0000	0.1577
	4	0.4412	0.5758	0.3059	0.0584	0.4193	0.9272	0.0000	0.1575
	8	0.4398	0.6007	0.3375	0.0570	0.4185	0.9219	0.0385	0.1540
	16	0.4415	0.6258	0.2951	0.0752	0.4194	0.9213	0.0328	0.1616

Table B.14: liblinear-twitter-GM5-ALL-ALL-10

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.1060	0.1677	0.0717	0.0254	0.0886	0.6154	0.0000	0.1141
	1	0.3011	0.3718	0.2378	0.0356	0.2784	0.9105	0.0000	0.1619
	2	0.3050	0.3874	0.1840	0.0497	0.2840	0.8973	0.0000	0.1648
	4	0.2989	0.3749	0.2324	0.0406	0.2760	0.8627	0.0000	0.1614

Table B.15: liblinear-twitter-GM5-ALL-ALL-25

GM5									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.0805	0.1060	0.0666	0.0149	0.0792	0.5373	0.0000	0.1124
	1	0.2245	0.2574	0.1834	0.0256	0.2062	0.8759	0.0000	0.1529
	2	0.2236	0.3069	0.1884	0.0343	0.2059	0.8803	0.0000	0.1551

Table B.16: liblinear-twitter-GM5-ALL-ALL-50

GM5									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.0643	0.0792	0.0421	0.0123	0.0658	0.5392	0.0000	0.1018
	1	0.1902	0.2133	0.1496	0.0205	0.1724	0.8669	0.0000	0.1514
	2	0.1886	0.2180	0.1673	0.0170	0.1685	0.8211	0.0000	0.1478

Table B.17: liblinear-twitter-GM5-ALL-ALL-75

GM5									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.0636	0.0667	0.0573	0.0044	0.0707	0.5443	0.0000	0.1076
	1	0.1400	0.1402	0.1398	0.0002	0.1349	0.7500	0.0000	0.1406

Table B.18: liblinear-twitter-GM5-ALL-ALL-150

GB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.5405	0.8313	0.3737	0.0845	0.5059	0.9360	0.0000	0.1665
	1	0.5312	0.7360	0.3734	0.0752	0.4996	0.9308	0.0000	0.1684
	2	0.5447	0.7269	0.3850	0.0702	0.5125	0.9375	0.0000	0.1630
	4	0.5399	0.7538	0.3571	0.0834	0.5093	0.9354	0.0000	0.1684
	8	0.5404	0.8297	0.3908	0.0842	0.5085	0.9290	0.0000	0.1665
	16	0.5386	0.7564	0.3780	0.0768	0.5020	0.9416	0.0000	0.1740

Table B.19: liblinear-twitter-GB3-ALL-ALL-5

GB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.4231	0.5716	0.3021	0.0666	0.3913	0.9302	0.0000	0.1732
	1	0.4207	0.5795	0.2998	0.0632	0.3868	0.8806	0.0000	0.1734
	2	0.4221	0.6907	0.3259	0.0717	0.3938	0.9049	0.0000	0.1711
	4	0.4226	0.5960	0.3114	0.0682	0.3899	0.9231	0.0000	0.1757
	8	0.4246	0.5868	0.3045	0.0706	0.3961	0.9266	0.0000	0.1732
	16	0.4238	0.5633	0.3144	0.0664	0.3930	0.9183	0.0000	0.1723

Table B.20: liblinear-twitter-GB3-ALL-ALL-10

GB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.3123	0.4116	0.2218	0.0525	0.2865	0.8750	0.0000	0.1770
	1	0.3087	0.4029	0.2379	0.0469	0.2837	0.9147	0.0000	0.1726
	2	0.3134	0.4094	0.2569	0.0423	0.2829	0.8949	0.0000	0.1782
	4	0.3132	0.4082	0.2461	0.0503	0.2831	0.8973	0.0000	0.1730
	8	0.3149	0.4164	0.2594	0.0455	0.2912	0.9286	0.0000	0.1746

Table B.21: liblinear-twitter-GB3-ALL-ALL-25

GB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.2467	0.2968	0.1960	0.0322	0.2240	0.8992	0.0000	0.1676
	1	0.2465	0.3082	0.1949	0.0353	0.2250	0.8864	0.0000	0.1729
	2	0.2465	0.3034	0.1923	0.0349	0.2243	0.9008	0.0000	0.1697
	4	0.2559	0.3163	0.2019	0.0353	0.2333	0.8978	0.0000	0.1695

Table B.22: liblinear-twitter-GB3-ALL-ALL-50

GB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.2132	0.2497	0.1842	0.0224	0.1963	0.8530	0.0000	0.1675
	1	0.2155	0.2477	0.1803	0.0310	0.1916	0.8803	0.0000	0.1659
	2	0.2173	0.2448	0.1736	0.0278	0.1971	0.8989	0.0000	0.1714
	4	0.2197	0.2648	0.1812	0.0304	0.1954	0.8846	0.0000	0.1689

Table B.23: liblinear-twitter-GB3-ALL-ALL-75

GB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.1739	0.1825	0.1696	0.0061	0.1514	0.8357	0.0000	0.1507
	1	0.1802	0.1813	0.1796	0.0008	0.1569	0.8192	0.0000	0.1544
	2	0.1750	0.1758	0.1746	0.0006	0.1555	0.8182	0.0000	0.1565

Table B.24: liblinear-twitter-GB3-ALL-ALL-150

OSB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.5430	0.7559	0.3680	0.0818	0.5144	0.9513	0.0000	0.1641
	1	0.5391	0.7747	0.4000	0.0729	0.5062	0.9362	0.0000	0.1647
	2	0.5427	0.7651	0.3731	0.0790	0.5084	0.9425	0.0000	0.1687
	4	0.5391	0.7747	0.3934	0.0793	0.5085	0.9434	0.0000	0.1673
	8	0.5427	0.7747	0.4000	0.0825	0.5083	0.9457	0.0000	0.1719
	16	0.5405	0.7773	0.3704	0.0788	0.5090	0.9333	0.0000	0.1653

Table B.25: liblinear-twitter-OSB3-ALL-ALL-5

OSB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.4271	0.5520	0.3216	0.0587	0.3987	0.9261	0.0000	0.1669
	1	0.4288	0.5847	0.3219	0.0646	0.3973	0.9453	0.0000	0.1774
	2	0.4255	0.5802	0.3280	0.0579	0.3936	0.9125	0.0000	0.1768
	4	0.4250	0.6093	0.3043	0.0697	0.3931	0.9375	0.0000	0.1772
	8	0.4283	0.6031	0.3042	0.0676	0.3972	0.9358	0.0000	0.1799

Table B.26: liblinear-twitter-OSB3-ALL-ALL-10

OSB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.3084	0.4086	0.2331	0.0532	0.2849	0.8731	0.0000	0.1766
	1	0.3145	0.4382	0.2234	0.0534	0.2872	0.8945	0.0000	0.1789
	2	0.3062	0.4078	0.2144	0.0495	0.2797	0.9112	0.0000	0.1758

Table B.27: liblinear-twitter-OSB3-ALL-ALL-25

OSB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.2520	0.2913	0.2023	0.0296	0.2293	0.8686	0.0000	0.1728
	1	0.2518	0.3164	0.2046	0.0383	0.2281	0.8897	0.0000	0.1749

Table B.28: liblinear-twitter-OSB3-ALL-ALL-50

OSB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.2211	0.2493	0.1815	0.0254	0.2009	0.8839	0.0000	0.1709
	1	0.2255	0.2722	0.1856	0.0336	0.2001	0.8692	0.0000	0.1693

Table B.29: liblinear-twitter-OSB3-ALL-ALL-75

OSB3									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.1750	0.1839	0.1705	0.0063	0.1580	0.8239	0.0000	0.1531

Table B.30: liblinear-twitter-OSB3-ALL-ALL-150

APPENDIX C:

Naive Bayes Results for the ENRON Email Corpus

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.7215	0.9114	0.4815	0.0960	0.4350	0.9730	0.0000	0.3637
	1	0.6441	0.8864	0.2937	0.1462	0.5404	0.9453	0.0000	0.2494
	2	0.6505	0.8877	0.2256	0.1460	0.5510	0.9467	0.0000	0.2474
	4	0.6610	0.8724	0.2898	0.1378	0.5526	0.9483	0.0000	0.2501
	8	0.6534	0.8864	0.2950	0.1387	0.5461	0.9494	0.0000	0.2482
	16	0.6663	0.8698	0.2551	0.1438	0.5567	0.9513	0.0000	0.2472

Table C.1: nb-enron-GM1-ALL-ALL-5

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.5768	0.7663	0.3311	0.1086	0.3121	0.9164	0.0000	0.3137
	1	0.5189	0.7117	0.2923	0.1220	0.4421	0.9655	0.0000	0.2343
	2	0.5215	0.7192	0.2904	0.1215	0.4446	0.9157	0.0000	0.2344
	4	0.5406	0.7545	0.2715	0.1269	0.4554	0.9500	0.0000	0.2372
	8	0.5349	0.7164	0.2647	0.1192	0.4534	0.9157	0.0000	0.2351
	16	0.5377	0.7174	0.2763	0.1209	0.4537	0.9500	0.0000	0.2354

Table C.2: nb-enron-GM1-ALL-ALL-10

GM1									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.4083	0.5192	0.2996	0.0581	0.1852	0.8796	0.0000	0.2424
	1	0.3956	0.5915	0.2745	0.0983	0.3457	0.9870	0.0000	0.2139
	2	0.4037	0.5964	0.2822	0.0958	0.3488	0.9870	0.0000	0.2137
	4	0.4111	0.5966	0.2402	0.1037	0.3583	0.9870	0.0000	0.2154
	8	0.4127	0.5982	0.2544	0.0957	0.3586	0.9870	0.0000	0.2151
	16	0.4166	0.5986	0.2909	0.0903	0.3600	0.9870	0.0000	0.2143

Table C.3: nb-enron-GM1-ALL-ALL-25

GM1									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.3126	0.4130	0.2686	0.0462	0.1093	0.8718	0.0000	0.1906
	1	0.3153	0.4779	0.2307	0.0905	0.2918	0.9157	0.0000	0.1973
	2	0.3191	0.4838	0.2549	0.0879	0.2950	0.9157	0.0000	0.1989
	4	0.3320	0.4842	0.2526	0.0846	0.3011	0.9157	0.0000	0.1974
	8	0.3296	0.4864	0.2641	0.0844	0.3030	0.9157	0.0000	0.1999
	16	0.3391	0.4875	0.2587	0.0825	0.3052	0.9157	0.0000	0.2014

Table C.4: nb-enron-GM1-ALL-ALL-50

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.2912	0.3441	0.2603	0.0293	0.0791	0.8705	0.0000	0.1658
	1	0.2627	0.4048	0.2087	0.0663	0.2566	0.8085	0.0000	0.1816
	2	0.2800	0.4078	0.2011	0.0679	0.2625	0.8172	0.0000	0.1861
	4	0.2761	0.4106	0.2256	0.0626	0.2641	0.8000	0.0000	0.1848
	8	0.2833	0.4115	0.2237	0.0632	0.2677	0.8261	0.0000	0.1856
	16	0.2884	0.4136	0.2282	0.0599	0.2699	0.7917	0.0000	0.1887

Table C.5: nb-enron-GM1-ALL-ALL-75

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.2451	0.2451	0.2450	0.0000	0.0488	0.8674	0.0000	0.1402
	1	0.1840	0.1841	0.1839	0.0001	0.1938	0.6728	0.0000	0.1576
	2	0.1898	0.1901	0.1893	0.0003	0.1971	0.6773	0.0000	0.1591
	4	0.1955	0.1956	0.1955	0.0001	0.2016	0.6844	0.0000	0.1604
	8	0.1990	0.1991	0.1989	0.0001	0.2034	0.6986	0.0000	0.1616
	16	0.2024	0.2028	0.2018	0.0004	0.2055	0.6926	0.0000	0.1627

Table C.6: nb-enron-GM1-ALL-ALL-150

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.8061	0.9337	0.5185	0.0740	0.5732	0.9781	0.0000	0.3272
	1	0.6536	0.8763	0.2766	0.1482	0.5529	0.9529	0.0000	0.2414
	2	0.7111	0.9132	0.3035	0.1071	0.5998	1.0000	0.0000	0.2359
	4	0.7320	0.8899	0.4797	0.0958	0.6136	0.9656	0.0000	0.2288
	8	0.7961	0.9224	0.5879	0.0753	0.6670	0.9755	0.0000	0.2165
	16	0.8158	0.9489	0.5926	0.0732	0.6752	0.9759	0.0000	0.2286

Table C.7: nb-enron-GM2-ALL-ALL-5

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.7209	0.9024	0.5381	0.0843	0.4862	0.9710	0.0000	0.3227
	1	0.5399	0.7902	0.2541	0.1209	0.4571	0.8932	0.0000	0.2309
	2	0.5847	0.7330	0.3271	0.0972	0.4919	0.9655	0.0000	0.2301
	4	0.6218	0.8022	0.4823	0.0733	0.5176	0.9241	0.0000	0.2273
	8	0.7130	0.8440	0.5489	0.0735	0.5794	0.9410	0.0000	0.2168
	16	0.7401	0.8961	0.5735	0.0780	0.5951	0.9759	0.0000	0.2308

Table C.8: nb-enron-GM2-ALL-ALL-10

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.6083	0.7145	0.4523	0.0791	0.3700	0.9737	0.0000	0.2992
	1	0.4166	0.5881	0.2742	0.0901	0.3675	0.8975	0.0000	0.2180
	2	0.4604	0.6078	0.3110	0.0756	0.3983	0.9231	0.0000	0.2158
	4	0.5015	0.5873	0.4101	0.0446	0.4157	0.9188	0.0000	0.2200
	8	0.6042	0.7139	0.5254	0.0555	0.4851	0.9257	0.0000	0.2108
	16	0.6469	0.7904	0.5391	0.0804	0.5119	0.9867	0.0000	0.2294

Table C.9: nb-enron-GM2-ALL-ALL-25

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.5414	0.5970	0.4515	0.0438	0.3014	0.9296	0.0000	0.2763
	1	0.3448	0.4884	0.2742	0.0729	0.3118	0.8958	0.0000	0.2072
	2	0.3831	0.5023	0.3151	0.0632	0.3371	0.8347	0.0000	0.2062
	4	0.4259	0.4894	0.3918	0.0335	0.3585	0.8974	0.0000	0.2119
	8	0.5386	0.5911	0.4971	0.0315	0.4249	0.8941	0.0000	0.2059
	16	0.5891	0.6972	0.4888	0.0593	0.4577	0.9589	0.0000	0.2284

Table C.10: nb-enron-GM2-ALL-ALL-50

GM2									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.5056	0.5296	0.4925	0.0127	0.2486	0.8921	0.0000	0.2603
	1	0.2896	0.4085	0.2295	0.0576	0.2701	0.8282	0.0000	0.1918
	2	0.3286	0.4265	0.2711	0.0521	0.3018	0.8235	0.0000	0.1963
	4	0.3762	0.4361	0.3264	0.0411	0.3246	0.8706	0.0000	0.2057
	8	0.5018	0.5650	0.4625	0.0392	0.3901	0.8737	0.0000	0.2020
	16	0.5547	0.6703	0.4654	0.0744	0.4239	0.9144	0.0000	0.2307

Table C.11: nb-enron-GM2-ALL-ALL-75

GM2									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.4536	0.4537	0.4535	0.0001	0.1706	0.8573	0.0000	0.2302
	1	0.2164	0.2164	0.2163	0.0000	0.2159	0.6874	0.0000	0.1776
	2	0.2598	0.2601	0.2593	0.0004	0.2403	0.7682	0.0000	0.1823
	4	0.3096	0.3097	0.3095	0.0001	0.2659	0.8385	0.0000	0.1969
	8	0.4547	0.4552	0.4539	0.0006	0.3333	0.8334	0.0000	0.2012
	16	0.5061	0.5063	0.5058	0.0002	0.3734	0.8657	0.0000	0.2351

Table C.12: nb-enron-GM2-ALL-ALL-150

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.7379	0.9618	0.4180	0.1274	0.5485	0.9870	0.0000	0.2951
	1	0.7817	0.9380	0.5353	0.0824	0.6598	0.9693	0.0000	0.2188
	2	0.8104	0.9554	0.6325	0.0755	0.6798	1.0000	0.0000	0.2241
	4	0.8206	0.9436	0.6265	0.0684	0.6644	0.9698	0.0000	0.2503
	8	0.8064	0.9372	0.6265	0.0717	0.6376	0.9718	0.0000	0.2640
	16	0.7980	0.9380	0.6325	0.0661	0.6032	0.9676	0.0000	0.2833

Table C.13: nb-enron-GM5-ALL-ALL-5

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.6803	0.9091	0.3708	0.1247	0.4987	0.9870	0.0000	0.2958
	1	0.6890	0.8903	0.5165	0.0795	0.5668	0.9505	0.0000	0.2148
	2	0.7274	0.8888	0.5714	0.0818	0.5972	0.9466	0.0000	0.2218
	4	0.7367	0.8857	0.5526	0.0816	0.5871	0.9444	0.0000	0.2447
	8	0.7169	0.8473	0.5485	0.0822	0.5357	0.9737	0.0000	0.2631
	16	0.6991	0.8389	0.4791	0.0845	0.5001	0.9867	0.0000	0.2822

Table C.14: nb-enron-GM5-ALL-ALL-10

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.6081	0.7309	0.4074	0.1104	0.4596	0.9744	0.0000	0.2962
	1	0.5847	0.7185	0.5079	0.0608	0.4678	0.9268	0.0000	0.2132
	2	0.6358	0.7188	0.5047	0.0590	0.5079	0.9620	0.0000	0.2145
	4	0.6445	0.7459	0.4969	0.0651	0.4997	0.9444	0.0000	0.2432
	8	0.5994	0.7127	0.5000	0.0450	0.4316	0.9867	0.0000	0.2539
	16	0.5644	0.6254	0.4921	0.0331	0.3775	0.9730	0.0000	0.2620

Table C.15: nb-enron-GM5-ALL-ALL-25

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.5742	0.6977	0.3783	0.0964	0.4284	0.9600	0.0000	0.3010
	1	0.5103	0.5454	0.4597	0.0311	0.4061	0.9136	0.0000	0.2113
	2	0.5726	0.6422	0.4907	0.0445	0.4482	0.9067	0.0000	0.2148
	4	0.5775	0.6355	0.4732	0.0590	0.4415	0.8986	0.0000	0.2432
	8	0.5142	0.5991	0.3952	0.0546	0.3477	0.9045	0.0000	0.2448
	16	0.4650	0.5206	0.3570	0.0466	0.2839	0.9072	0.0000	0.2414

Table C.16: nb-enron-GM5-ALL-ALL-50

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.5646	0.6346	0.3780	0.0866	0.4135	0.9444	0.0000	0.3021
	1	0.4722	0.5150	0.4403	0.0244	0.3675	0.8622	0.0000	0.2053
	2	0.5391	0.5894	0.4776	0.0370	0.4175	0.8857	0.0000	0.2106
	4	0.5539	0.5833	0.4791	0.0360	0.4111	0.8831	0.0000	0.2429
	8	0.4791	0.5279	0.4349	0.0306	0.3050	0.9046	0.0000	0.2378
	16	0.4316	0.4690	0.3988	0.0246	0.2359	0.8950	0.0000	0.2281

Table C.17: nb-enron-GM5-ALL-ALL-75

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.5659	0.5661	0.5657	0.0002	0.3826	0.9085	0.0000	0.3068
	1	0.4139	0.4141	0.4137	0.0002	0.3098	0.8095	0.0000	0.1997
	2	0.4941	0.4945	0.4938	0.0003	0.3648	0.8586	0.0000	0.2071
	4	0.5126	0.5127	0.5125	0.0001	0.3545	0.8444	0.0000	0.2491
	8	0.4287	0.4287	0.4285	0.0001	0.2321	0.8650	0.0000	0.2195
	16	0.2613	0.3703	0.0433	0.1542	0.1063	0.8920	0.0000	0.1732

Table C.18: nb-enron-GM5-ALL-ALL-150

GB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.7882	0.9709	0.5772	0.0823	0.5680	0.9852	0.0000	0.3232
	1	0.8167	0.9561	0.4360	0.1118	0.6987	0.9776	0.0000	0.2271
	2	0.8314	0.9669	0.4790	0.1051	0.7097	0.9833	0.0000	0.2332
	4	0.8629	0.9522	0.5556	0.0727	0.7273	0.9823	0.0000	0.2303
	8	0.8601	0.9782	0.5556	0.0716	0.7232	0.9889	0.0000	0.2342
	16	0.8589	0.9674	0.5556	0.0755	0.7174	1.0000	0.0000	0.2428

Table C.19: nb-enron-GB3-ALL-ALL-5

GB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.7057	0.8951	0.5319	0.0855	0.4602	0.9610	0.0000	0.3217
	1	0.7586	0.8962	0.5359	0.1064	0.6283	0.9579	0.0000	0.2354
	2	0.7729	0.9138	0.5161	0.1115	0.6415	0.9724	0.0000	0.2406
	4	0.8070	0.9251	0.5532	0.0816	0.6616	0.9688	0.0000	0.2407
	8	0.8074	0.9456	0.5638	0.0816	0.6570	1.0000	0.0000	0.2453
	16	0.8091	0.9198	0.5426	0.0873	0.6539	0.9744	0.0000	0.2535

Table C.20: nb-enron-GB3-ALL-ALL-10

GB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.5999	0.7052	0.4270	0.0712	0.3626	0.9600	0.0000	0.2942
	1	0.6887	0.8258	0.5542	0.0827	0.5541	0.9561	0.0000	0.2343
	2	0.7102	0.8493	0.5610	0.0850	0.5667	0.9620	0.0000	0.2413
	4	0.7520	0.8607	0.5501	0.0854	0.5903	0.9620	0.0000	0.2444
	8	0.7436	0.8614	0.5528	0.0834	0.5875	0.9690	0.0000	0.2452
	16	0.7557	0.8677	0.5556	0.0898	0.5906	0.9620	0.0000	0.2545

Table C.21: nb-enron-GB3-ALL-ALL-25

GB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.5059	0.5463	0.4256	0.0386	0.2735	0.9444	0.0000	0.2672
	1	0.6391	0.7451	0.5289	0.0627	0.5008	0.9394	0.0000	0.2375
	2	0.6740	0.7769	0.5262	0.0732	0.5194	0.9620	0.0000	0.2443
	4	0.7097	0.8163	0.5340	0.0834	0.5407	0.9539	0.0000	0.2486
	8	0.7083	0.7993	0.5255	0.0840	0.5406	0.9650	0.0000	0.2482
	16	0.7185	0.8277	0.5201	0.0886	0.5469	0.9744	0.0000	0.2574

Table C.22: nb-enron-GB3-ALL-ALL-50

GB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.4721	0.4962	0.4403	0.0198	0.2291	0.8811	0.0000	0.2484
	1	0.6188	0.7176	0.5323	0.0608	0.4748	0.9209	0.0000	0.2367
	2	0.6573	0.7352	0.5324	0.0684	0.4933	0.9308	0.0000	0.2453
	4	0.6932	0.7345	0.5359	0.0707	0.5118	0.9385	0.0000	0.2529
	8	0.6952	0.7491	0.5359	0.0725	0.5148	0.9615	0.0000	0.2520
	16	0.7075	0.7559	0.5311	0.0793	0.5192	0.9500	0.0000	0.2610

Table C.23: nb-enron-GB3-ALL-ALL-75

GB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.4282	0.4284	0.4279	0.0002	0.1611	0.8550	0.0000	0.2175
	1	0.5976	0.5978	0.5971	0.0004	0.4265	0.8973	0.0000	0.2451
	2	0.6499	0.6499	0.6499	0.0000	0.4496	0.9190	0.0000	0.2533
	4	0.6860	0.6862	0.6859	0.0001	0.4648	0.9348	0.0000	0.2606
	8	0.6889	0.6891	0.6885	0.0003	0.4701	0.9593	0.0000	0.2600
	16	0.7056	0.7059	0.7052	0.0003	0.4750	0.9287	0.0000	0.2688

Table C.24: nb-enron-GB3-ALL-ALL-150

OSB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.8527	0.9592	0.5185	0.0752	0.6957	1.0000	0.0000	0.2611
	1	0.8648	0.9574	0.5556	0.0741	0.7266	1.0000	0.0000	0.2416
	2	0.8642	0.9575	0.5556	0.0736	0.7269	0.9870	0.0000	0.2424
	4	0.8678	0.9587	0.5556	0.0712	0.7238	0.9870	0.0000	0.2446
	8	0.8638	0.9714	0.5556	0.0728	0.7260	1.0000	0.0000	0.2407
	16	0.8653	0.9823	0.5556	0.0732	0.7261	1.0000	0.0000	0.2417

Table C.25: nb-enron-OSB3-ALL-ALL-5

OSB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.7967	0.9336	0.5532	0.0802	0.6298	1.0000	0.0000	0.2738
	1	0.8161	0.9317	0.5213	0.0818	0.6584	0.9744	0.0000	0.2605
	2	0.8180	0.9272	0.5213	0.0844	0.6596	0.9731	0.0000	0.2606
	4	0.8177	0.9307	0.5213	0.0832	0.6618	0.9685	0.0000	0.2586
	8	0.8195	0.9332	0.5213	0.0841	0.6623	0.9744	0.0000	0.2606
	16	0.8186	0.9318	0.5213	0.0830	0.6590	0.9870	0.0000	0.2615

Table C.26: nb-enron-OSB3-ALL-ALL-10

OSB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.7263	0.8437	0.5711	0.0810	0.5621	1.0000	0.0000	0.2761
	1	0.7586	0.8489	0.5514	0.0850	0.5931	0.9870	0.0000	0.2674
	2	0.7635	0.8600	0.5514	0.0856	0.5964	0.9744	0.0000	0.2664
	4	0.7621	0.8551	0.5514	0.0858	0.5947	0.9744	0.0000	0.2644
	8	0.7613	0.8618	0.5556	0.0853	0.5951	0.9744	0.0000	0.2659
	16	0.7626	0.8627	0.5556	0.0857	0.5960	0.9744	0.0000	0.2681

Table C.27: nb-enron-OSB3-ALL-ALL-25

OSB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.6818	0.7570	0.5190	0.0722	0.5105	1.0000	0.0000	0.2815
	1	0.4880	0.6819	0.3615	0.1021	0.3943	0.9744	0.0000	0.2598
	2	0.4123	0.5087	0.3526	0.0473	0.3243	0.9730	0.0000	0.2273
	4	0.7216	0.7899	0.5197	0.0866	0.5483	0.9744	0.0000	0.2701

Table C.28: nb-enron-OSB3-ALL-ALL-50

OSB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.6713	0.7004	0.5504	0.0542	0.4870	1.0000	0.0000	0.2883
	1	0.7074	0.7478	0.5376	0.0762	0.5221	0.9287	0.0000	0.2748
	2	0.7112	0.7531	0.5390	0.0771	0.5218	0.9341	0.0000	0.2757
	4	0.7089	0.7621	0.5393	0.0773	0.5199	0.9352	0.0000	0.2757
	8	0.7079	0.7860	0.5389	0.0829	0.5230	0.9290	0.0000	0.2750
	16	0.7149	0.7604	0.5391	0.0789	0.5243	0.9315	0.0000	0.2760

Table C.29: nb-enron-OSB3-ALL-ALL-75

OSB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.6572	0.6574	0.6571	0.0002	0.4441	0.9867	0.0000	0.3023
	1	0.7041	0.7042	0.7040	0.0001	0.4789	0.9127	0.0000	0.2855
	2	0.7091	0.7092	0.7089	0.0001	0.4787	0.9146	0.0000	0.2875
	4	0.7068	0.7071	0.7066	0.0003	0.4769	0.9189	0.0000	0.2874
	8	0.7101	0.7101	0.7100	0.0001	0.4778	0.9151	0.0000	0.2878
	16	0.7115	0.7120	0.7112	0.0003	0.4790	0.9187	0.0000	0.2885

Table C.30: nb-enron-OSB3-ALL-ALL-150

APPENDIX D:

Naive Bayes Results for the Twitter Short Message Corpus

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.6264	0.7714	0.4580	0.0794	0.5886	0.9618	0.0000	0.1854
	1	0.4974	0.7500	0.1965	0.1176	0.4734	0.9421	0.0000	0.1630
	2	0.5130	0.8101	0.2785	0.1138	0.4936	0.9463	0.0615	0.1538
	4	0.5132	0.7749	0.2637	0.1029	0.4914	0.9518	0.1190	0.1537
	8	0.5238	0.7913	0.2861	0.1088	0.5019	0.9562	0.1311	0.1531
	16	0.5102	0.7778	0.2885	0.1105	0.4904	0.9501	0.1649	0.1509

Table D.1: nb-twitter-GM1-ALL-ALL-5

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.4869	0.6411	0.2738	0.0831	0.4345	0.9282	0.0000	0.2191
	1	0.3490	0.5598	0.1297	0.1163	0.3227	0.9152	0.0000	0.1697
	2	0.3671	0.6005	0.1623	0.1142	0.3407	0.9209	0.0000	0.1662
	4	0.3693	0.5990	0.1997	0.1045	0.3437	0.9151	0.0274	0.1600
	8	0.3755	0.5902	0.1692	0.1023	0.3498	0.9002	0.0000	0.1644
	16	0.3642	0.5588	0.1639	0.1141	0.3398	0.8667	0.0000	0.1616

Table D.2: nb-twitter-GM1-ALL-ALL-10

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.3357	0.4389	0.2200	0.0642	0.2848	0.8560	0.0000	0.2063
	1	0.2260	0.3653	0.0731	0.0991	0.2007	0.8185	0.0000	0.1561
	2	0.2299	0.3574	0.0817	0.0963	0.2042	0.8385	0.0000	0.1556
	4	0.2332	0.3539	0.0956	0.0918	0.2088	0.8615	0.0000	0.1559
	8	0.2398	0.3882	0.0848	0.0934	0.2132	0.8615	0.0000	0.1571
	16	0.2304	0.3517	0.0733	0.0965	0.2023	0.8803	0.0000	0.1535

Table D.3: nb-twitter-GM1-ALL-ALL-25

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.2326	0.3191	0.1395	0.0509	0.1920	0.8426	0.0000	0.1850
	1	0.1595	0.2449	0.0387	0.0799	0.1323	0.8116	0.0000	0.1393
	2	0.1631	0.2501	0.0460	0.0790	0.1366	0.8615	0.0000	0.1368
	4	0.1653	0.2507	0.0556	0.0779	0.1404	0.8000	0.0000	0.1355
	8	0.1671	0.2522	0.0504	0.0757	0.1418	0.8750	0.0000	0.1409
	16	0.1638	0.2436	0.0486	0.0807	0.1387	0.8485	0.0000	0.1426

Table D.4: nb-twitter-GM1-ALL-ALL-50

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.1820	0.2356	0.1399	0.0310	0.1439	0.7876	0.0000	0.1695
	1	0.1328	0.2014	0.0254	0.0707	0.1070	0.7324	0.0000	0.1289
	2	0.1364	0.2167	0.0303	0.0723	0.1115	0.8000	0.0000	0.1310
	4	0.1370	0.2184	0.0400	0.0691	0.1132	0.7941	0.0000	0.1283
	8	0.1390	0.2275	0.0404	0.0698	0.1156	0.7617	0.0000	0.1309
	16	0.1360	0.2114	0.0315	0.0731	0.1109	0.7680	0.0000	0.1268

Table D.5: nb-twitter-GM1-ALL-ALL-75

GM1									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.1252	0.1254	0.1247	0.0003	0.0855	0.7565	0.0000	0.1448
	1	0.0982	0.1353	0.0239	0.0525	0.0745	0.7500	0.0000	0.1112
	2	0.0979	0.1344	0.0248	0.0517	0.0738	0.7027	0.0000	0.1102
	4	0.0975	0.1351	0.0231	0.0526	0.0760	0.7324	0.0000	0.1091
	8	0.0986	0.1350	0.0274	0.0504	0.0754	0.7123	0.0000	0.1101
	16	0.0983	0.1386	0.0200	0.0554	0.0758	0.6923	0.0000	0.1095

Table D.6: nb-twitter-GM1-ALL-ALL-150

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.5711	0.7890	0.3875	0.0853	0.5299	0.9486	0.0000	0.1822
	1	0.5253	0.7643	0.2871	0.1167	0.5135	0.9250	0.1667	0.1530
	2	0.5301	0.7467	0.3114	0.1090	0.5175	0.9328	0.1284	0.1495
	4	0.5401	0.7926	0.3519	0.0979	0.5259	0.9237	0.1522	0.1468
	8	0.5459	0.7992	0.2906	0.1085	0.5313	0.9457	0.1944	0.1512
	16	0.5409	0.8437	0.2975	0.1141	0.5249	0.9560	0.1481	0.1537

Table D.7: nb-twitter-GM2-ALL-ALL-5

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.4439	0.6304	0.2809	0.0749	0.4032	0.8824	0.0000	0.1885
	1	0.3847	0.5960	0.1816	0.1107	0.3716	0.8974	0.0377	0.1667
	2	0.3914	0.5446	0.1842	0.1064	0.3781	0.8988	0.0519	0.1705
	4	0.4018	0.6610	0.2146	0.1041	0.3879	0.8947	0.0588	0.1657
	8	0.4046	0.6051	0.1764	0.1088	0.3866	0.9231	0.0250	0.1688
	16	0.4031	0.6179	0.1855	0.1147	0.3832	0.9170	0.0357	0.1759

Table D.8: nb-twitter-GM2-ALL-ALL-10

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.3215	0.3855	0.2617	0.0382	0.2821	0.8462	0.0000	0.1846
	1	0.2508	0.4249	0.0872	0.1062	0.2406	0.8755	0.0000	0.1721
	2	0.2510	0.3846	0.0963	0.1036	0.2406	0.8745	0.0000	0.1694
	4	0.2686	0.4173	0.1121	0.0960	0.2559	0.8364	0.0000	0.1681
	8	0.2768	0.4602	0.1198	0.1051	0.2597	0.8681	0.0000	0.1714
	16	0.2703	0.4437	0.1105	0.1007	0.2545	0.8619	0.0000	0.1747

Table D.9: nb-twitter-GM2-ALL-ALL-25

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.2509	0.2992	0.2038	0.0282	0.2175	0.8438	0.0000	0.1705
	1	0.1854	0.3044	0.0507	0.0938	0.1758	0.8288	0.0000	0.1584
	2	0.1843	0.2660	0.0413	0.0909	0.1743	0.8300	0.0000	0.1629
	4	0.1980	0.3055	0.0578	0.0901	0.1844	0.8037	0.0000	0.1614
	8	0.2058	0.2880	0.0771	0.0883	0.1919	0.8362	0.0000	0.1619
	16	0.2023	0.3031	0.0786	0.0892	0.1891	0.8438	0.0000	0.1662

Table D.10: nb-twitter-GM2-ALL-ALL-50

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.2162	0.2621	0.1630	0.0338	0.1846	0.7879	0.0000	0.1622
	1	0.1518	0.2358	0.0368	0.0823	0.1431	0.8036	0.0000	0.1514
	2	0.1535	0.2255	0.0328	0.0831	0.1448	0.8293	0.0000	0.1501
	4	0.1666	0.2477	0.0477	0.0835	0.1550	0.8073	0.0000	0.1516
	8	0.1770	0.2535	0.0578	0.0825	0.1648	0.8106	0.0000	0.1596
	16	0.1700	0.2579	0.0573	0.0808	0.1573	0.8571	0.0000	0.1580

Table D.11: nb-twitter-GM2-ALL-ALL-75

GM2									
Group Size	Web1T %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.1709	0.1719	0.1690	0.0013	0.1379	0.7619	0.0000	0.1484
	1	0.1155	0.1655	0.0190	0.0683	0.1074	0.7593	0.0000	0.1354
	2	0.1173	0.1659	0.0206	0.0684	0.1104	0.7967	0.0000	0.1397
	4	0.1282	0.1789	0.0276	0.0712	0.1169	0.7477	0.0000	0.1385
	8	0.1331	0.1819	0.0363	0.0684	0.1236	0.7414	0.0000	0.1437
	16	0.1290	0.1760	0.0357	0.0660	0.1169	0.7519	0.0000	0.1425

Table D.12: nb-twitter-GM2-ALL-ALL-150

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.3453	0.5293	0.2431	0.0531	0.2306	0.7931	0.0000	0.1930
	1	0.5530	0.7495	0.4066	0.0794	0.5324	0.9106	0.1096	0.1415
	2	0.5523	0.7220	0.4000	0.0789	0.5279	0.9231	0.1212	0.1530
	4	0.5516	0.7077	0.3814	0.0714	0.5223	0.9052	0.0426	0.1564
	8	0.5550	0.7094	0.3968	0.0687	0.5262	0.9254	0.0779	0.1559
	16	0.5579	0.7680	0.4106	0.0777	0.5299	0.9245	0.0571	0.1643

Table D.13: nb-twitter-GM5-ALL-ALL-5

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.2408	0.3357	0.1748	0.0354	0.1711	0.8136	0.0000	0.1595
	1	0.4222	0.5466	0.3065	0.0630	0.3994	0.8571	0.0556	0.1545
	2	0.4187	0.5806	0.3035	0.0642	0.3954	0.8889	0.0267	0.1652
	4	0.4191	0.5954	0.3069	0.0590	0.3913	0.8618	0.0286	0.1711
	8	0.4209	0.5239	0.3269	0.0506	0.3953	0.8750	0.0303	0.1673
	16	0.4319	0.5606	0.3228	0.0590	0.4062	0.8932	0.0267	0.1710

Table D.14: nb-twitter-GM5-ALL-ALL-10

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.1543	0.2141	0.1224	0.0232	0.1288	0.7931	0.0000	0.1443
	1	0.2990	0.3613	0.2514	0.0302	0.2770	0.8190	0.0000	0.1613
	2	0.2923	0.3493	0.2405	0.0324	0.2728	0.8710	0.0000	0.1661
	4	0.2935	0.3300	0.2133	0.0306	0.2689	0.8750	0.0000	0.1720
	8	0.2929	0.3552	0.2278	0.0293	0.2722	0.8438	0.0000	0.1707
	16	0.2973	0.3765	0.2032	0.0395	0.2768	0.8615	0.0000	0.1740

Table D.15: nb-twitter-GM5-ALL-ALL-25

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.1226	0.1558	0.0999	0.0157	0.1079	0.7719	0.0000	0.1390
	1	0.2277	0.2534	0.1808	0.0276	0.2096	0.7961	0.0000	0.1528
	2	0.2252	0.2637	0.1996	0.0205	0.2084	0.8000	0.0000	0.1630
	4	0.2216	0.2441	0.1770	0.0182	0.2031	0.8254	0.0000	0.1658
	8	0.2217	0.2573	0.1871	0.0212	0.2033	0.8224	0.0000	0.1637
	16	0.2245	0.2608	0.1540	0.0308	0.2059	0.8710	0.0000	0.1644

Table D.16: nb-twitter-GM5-ALL-ALL-50

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.0977	0.1069	0.0836	0.0086	0.0908	0.7719	0.0000	0.1280
	1	0.1960	0.2111	0.1780	0.0121	0.1782	0.6739	0.0000	0.1457
	2	0.1952	0.2113	0.1803	0.0122	0.1767	0.8710	0.0000	0.1520
	4	0.1878	0.1984	0.1777	0.0069	0.1725	0.7937	0.0000	0.1565
	8	0.1902	0.1945	0.1861	0.0029	0.1729	0.8065	0.0000	0.1565
	16	0.1908	0.2060	0.1689	0.0135	0.1741	0.7937	0.0000	0.1585

Table D.17: nb-twitter-GM5-ALL-ALL-75

GM5									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.0787	0.0792	0.0784	0.0004	0.0754	0.6429	0.0000	0.1186
	1	0.1535	0.1542	0.1531	0.0005	0.1370	0.6392	0.0000	0.1359
	2	0.1524	0.1531	0.1520	0.0005	0.1360	0.7879	0.0000	0.1427
	4	0.1404	0.1414	0.1399	0.0007	0.1276	0.7500	0.0000	0.1459
	8	0.1401	0.1404	0.1399	0.0002	0.1267	0.7463	0.0000	0.1443
	16	0.1424	0.1430	0.1420	0.0005	0.1294	0.7813	0.0000	0.1465

Table D.18: nb-twitter-GM5-ALL-ALL-150

GB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.6179	0.8021	0.4745	0.0729	0.5813	0.9284	0.0392	0.1654
	1	0.6109	0.8125	0.4585	0.0734	0.5959	0.9480	0.2000	0.1296
	2	0.6160	0.7823	0.4606	0.0699	0.5986	0.9347	0.2340	0.1291
	4	0.6199	0.8546	0.4694	0.0819	0.6043	0.9613	0.2444	0.1330
	8	0.6187	0.8474	0.4669	0.0770	0.6040	0.9409	0.2222	0.1266
	16	0.6265	0.8216	0.4648	0.0773	0.6098	0.9512	0.2154	0.1322

Table D.19: nb-twitter-GB3-ALL-ALL-5

GB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.4948	0.6108	0.3477	0.0607	0.4543	0.9091	0.0000	0.1799
	1	0.4975	0.6356	0.3297	0.0644	0.4760	0.9002	0.1190	0.1515
	2	0.5015	0.7366	0.3748	0.0712	0.4809	0.9289	0.1075	0.1444
	4	0.5011	0.6671	0.3665	0.0723	0.4801	0.9102	0.0741	0.1521
	8	0.4999	0.6359	0.3732	0.0716	0.4801	0.9197	0.0952	0.1489
	16	0.5041	0.6385	0.3876	0.0636	0.4838	0.8986	0.0909	0.1465

Table D.20: nb-twitter-GB3-ALL-ALL-10

GB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.3584	0.4401	0.2988	0.0397	0.3164	0.8696	0.0000	0.1861
	1	0.3724	0.4429	0.3147	0.0367	0.3490	0.8824	0.0202	0.1557
	2	0.3760	0.4394	0.3271	0.0352	0.3530	0.8155	0.0227	0.1507
	4	0.3773	0.4834	0.3207	0.0466	0.3539	0.8504	0.0227	0.1554
	8	0.3733	0.4633	0.3186	0.0447	0.3528	0.8355	0.0244	0.1524
	16	0.3838	0.4431	0.2890	0.0417	0.3600	0.8649	0.0270	0.1619

Table D.21: nb-twitter-GB3-ALL-ALL-25

GB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.2839	0.3292	0.2411	0.0265	0.2457	0.8955	0.0000	0.1769
	1	0.2984	0.3356	0.2686	0.0234	0.2746	0.8219	0.0000	0.1569
	2	0.3019	0.3366	0.2770	0.0222	0.2778	0.7529	0.0000	0.1500
	4	0.3044	0.3376	0.2728	0.0237	0.2803	0.7895	0.0000	0.1540
	8	0.3038	0.3409	0.2618	0.0312	0.2805	0.8067	0.0000	0.1536
	16	0.3100	0.3411	0.2813	0.0236	0.2858	0.8696	0.0000	0.1595

Table D.22: nb-twitter-GB3-ALL-ALL-50

GB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.2484	0.2862	0.2169	0.0247	0.2120	0.8615	0.0000	0.1667
	1	0.2648	0.3021	0.2254	0.0309	0.2414	0.8000	0.0000	0.1551
	2	0.2668	0.3023	0.2297	0.0295	0.2423	0.7333	0.0000	0.1481
	4	0.2667	0.3128	0.2263	0.0300	0.2433	0.7368	0.0000	0.1541
	8	0.2657	0.2990	0.2368	0.0235	0.2434	0.7478	0.0171	0.1481
	16	0.2748	0.3096	0.2389	0.0259	0.2512	0.8116	0.0000	0.1578

Table D.23: nb-twitter-GB3-ALL-ALL-75

GB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.1988	0.1995	0.1973	0.0011	0.1613	0.7879	0.0000	0.1550
	1	0.2152	0.2154	0.2148	0.0003	0.1910	0.7105	0.0000	0.1454
	2	0.2190	0.2191	0.2186	0.0002	0.1945	0.6458	0.0000	0.1397
	4	0.2197	0.2200	0.2190	0.0005	0.1954	0.6914	0.0000	0.1450
	8	0.2180	0.2187	0.2176	0.0006	0.1942	0.7000	0.0000	0.1418
	16	0.2221	0.2233	0.2216	0.0008	0.1976	0.7297	0.0000	0.1476

Table D.24: nb-twitter-GB3-ALL-ALL-150

OSB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	0.6475	0.8164	0.4983	0.0673	0.6308	0.9254	0.1481	0.1296
	1	0.5628	0.8293	0.3913	0.0878	0.5296	0.9419	0.0597	0.1640
	2	0.5687	0.7734	0.3836	0.0833	0.5328	0.9243	0.0597	0.1675
	4	0.5627	0.7768	0.3836	0.0856	0.5292	0.9419	0.0597	0.1656
	8	0.5626	0.7790	0.3429	0.0915	0.5272	0.9419	0.0597	0.1677
	16	0.5587	0.7479	0.3857	0.0802	0.5251	0.9458	0.0351	0.1636

Table D.25: nb-twitter-OSB3-ALL-ALL-5

OSB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	0.5271	0.6410	0.4333	0.0545	0.5077	0.9069	0.0988	0.1454
	1	0.4387	0.6071	0.3160	0.0682	0.3977	0.9122	0.0000	0.1724
	2	0.4420	0.5840	0.2883	0.0688	0.4002	0.9098	0.0000	0.1752
	4	0.4403	0.6238	0.2876	0.0767	0.3971	0.9228	0.0000	0.1777
	8	0.4410	0.5966	0.2853	0.0690	0.3983	0.9228	0.0000	0.1771
	16	0.4425	0.5954	0.3245	0.0614	0.3991	0.9265	0.0000	0.1757

Table D.26: nb-twitter-OSB3-ALL-ALL-10

OSB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	0.3979	0.4848	0.3207	0.0464	0.3752	0.8824	0.0000	0.1648
	1	0.3206	0.4237	0.2419	0.0407	0.2744	0.8341	0.0000	0.1689
	2	0.3223	0.3951	0.2704	0.0365	0.2776	0.8386	0.0000	0.1695
	4	0.3228	0.3814	0.2773	0.0359	0.2759	0.8571	0.0000	0.1679
	8	0.3249	0.3937	0.2570	0.0369	0.2814	0.8389	0.0000	0.1682
	16	0.3229	0.4016	0.2749	0.0351	0.2785	0.8629	0.0000	0.1698

Table D.27: nb-twitter-OSB3-ALL-ALL-25

OSB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	0.3233	0.3739	0.2838	0.0259	0.3004	0.7895	0.0000	0.1641
	1	0.2535	0.2797	0.2254	0.0177	0.2115	0.7556	0.0000	0.1573
	2	0.2538	0.2810	0.2332	0.0177	0.2114	0.7712	0.0000	0.1569
	4	0.2548	0.2819	0.2296	0.0181	0.2126	0.7511	0.0000	0.1594
	8	0.2561	0.2831	0.2305	0.0200	0.2144	0.7585	0.0000	0.1587
	16	0.2564	0.2913	0.2300	0.0216	0.2136	0.7609	0.0000	0.1594

Table D.28: nb-twitter-OSB3-ALL-ALL-50

OSB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	0.2861	0.3048	0.2582	0.0180	0.2634	0.7945	0.0000	0.1605
	1	0.2212	0.2444	0.1972	0.0198	0.1818	0.7364	0.0000	0.1513
	2	0.2242	0.2654	0.1806	0.0267	0.1840	0.8051	0.0000	0.1513
	4	0.2237	0.2615	0.1851	0.0269	0.1851	0.7229	0.0000	0.1512
	8	0.2219	0.2611	0.1870	0.0237	0.1831	0.7077	0.0000	0.1500
	16	0.2228	0.2482	0.1973	0.0209	0.1838	0.7360	0.0000	0.1515

Table D.29: nb-twitter-OSB3-ALL-ALL-75

OSB3									
Group Size	WebIT %	Accuracy				F-Score			
		AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	0.2332	0.2337	0.2320	0.0008	0.2104	0.7778	0.0000	0.1561
	1	0.1775	0.1776	0.1773	0.0001	0.1402	0.6337	0.0000	0.1314
	2	0.1791	0.1792	0.1790	0.0001	0.1422	0.6250	0.0000	0.1322
	4	0.1786	0.1788	0.1784	0.0002	0.1412	0.6244	0.0000	0.1329
	8	0.1795	0.1810	0.1787	0.0011	0.1422	0.6570	0.0000	0.1328
	16	0.1789	0.1797	0.1785	0.0006	0.1411	0.6540	0.0000	0.1329

Table D.30: nb-twitter-OSB3-ALL-ALL-150

APPENDIX E:

Grouped Results LibLinear Results for the ENRON Email Corpus

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.8581	0.9505	0.6630	0.0607	0.6718	0.9795	0.0000	0.2650
		SAL	0.8767	0.9531	0.7526	0.0517	0.6663	0.9842	0.0000	0.2625
		STL	0.7460	0.9246	0.4815	0.1113	0.7211	0.9653	0.0000	0.1841
	1	RAN	0.8475	0.9362	0.6603	0.0762	0.6682	0.9737	0.0000	0.2516
		SAL	0.8797	0.9578	0.7977	0.0363	0.6682	0.9826	0.0000	0.2670
		STL	0.7426	0.9332	0.4444	0.1129	0.7215	0.9712	0.0000	0.1845
	2	RAN	0.8400	0.9275	0.5742	0.0747	0.6716	0.9672	0.0000	0.2570
		SAL	0.8810	0.9570	0.8049	0.0337	0.6701	0.9819	0.0000	0.2621
		STL	0.7437	0.9291	0.4444	0.1080	0.7226	0.9692	0.0000	0.1817
	4	RAN	0.8639	0.9590	0.7444	0.0553	0.6833	0.9799	0.0000	0.2500
		SAL	0.8800	0.9582	0.7877	0.0365	0.6766	0.9821	0.0000	0.2535
		STL	0.7455	0.9314	0.4444	0.1089	0.7250	0.9676	0.0000	0.1807
	8	RAN	0.8656	0.9485	0.7321	0.0656	0.6705	0.9760	0.0000	0.2671
		SAL	0.8810	0.9570	0.7848	0.0347	0.6720	0.9819	0.0000	0.2592
		STL	0.7427	0.9237	0.4444	0.1087	0.7208	0.9651	0.0000	0.1829
	16	RAN	0.8550	0.9555	0.6913	0.0616	0.6795	0.9744	0.0000	0.2492
		SAL	0.8789	0.9732	0.7844	0.0369	0.6731	0.9878	0.0000	0.2536
		STL	0.7379	0.9269	0.4444	0.1127	0.7178	0.9668	0.0000	0.1827

Table E.1: grouped-liblinear-enron-GM1-ALL-ALL-5

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.8024	0.9312	0.6768	0.0655	0.5981	0.9778	0.0000	0.2636
		SAL	0.8227	0.9043	0.7375	0.0531	0.6038	0.9660	0.0000	0.2671
		STL	0.6582	0.8234	0.3776	0.1228	0.6346	0.9618	0.0000	0.2012
	1	RAN	0.8123	0.8862	0.7168	0.0572	0.6040	0.9699	0.0000	0.2686
		SAL	0.8209	0.8890	0.7641	0.0360	0.5922	0.9620	0.0000	0.2714
		STL	0.6499	0.8117	0.3878	0.1172	0.6282	0.9397	0.0000	0.1990
	2	RAN	0.7988	0.9068	0.6456	0.0668	0.5900	0.9660	0.0000	0.2655
		SAL	0.8246	0.8905	0.7788	0.0331	0.6025	0.9633	0.0000	0.2633
		STL	0.6547	0.8168	0.4388	0.1124	0.6353	0.9488	0.0000	0.1932
	4	RAN	0.8083	0.9086	0.6986	0.0481	0.6013	0.9692	0.0000	0.2674
		SAL	0.8221	0.8922	0.7372	0.0367	0.5968	0.9652	0.0000	0.2651
		STL	0.6502	0.8177	0.4388	0.1127	0.6299	0.9428	0.0000	0.1943
	8	RAN	0.8027	0.8736	0.6660	0.0616	0.6055	0.9678	0.0000	0.2555
		SAL	0.8182	0.9025	0.7224	0.0426	0.5966	0.9684	0.0000	0.2683
		STL	0.6525	0.8144	0.4388	0.1125	0.6319	0.9511	0.0000	0.1923
	16	RAN	0.8160	0.9187	0.7108	0.0618	0.6036	0.9698	0.0000	0.2591
		SAL	0.8231	0.9158	0.7345	0.0406	0.6039	0.9691	0.0000	0.2614
		STL	0.6473	0.8219	0.3878	0.1176	0.6273	0.9485	0.0000	0.2013

Table E.2: grouped-liblinear-enron-GM1-ALL-ALL-10

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.7373	0.8073	0.6803	0.0411	0.5176	0.9640	0.0000	0.2682
		SAL	0.7414	0.7815	0.7195	0.0219	0.5144	0.9546	0.0000	0.2664
		STL	0.5747	0.7400	0.4430	0.1079	0.5435	0.9337	0.0000	0.2273
	1	RAN	0.7300	0.8064	0.6522	0.0486	0.5081	0.9572	0.0000	0.2699
		SAL	0.7511	0.7905	0.7100	0.0280	0.5241	0.9551	0.0000	0.2654
		STL	0.5730	0.7486	0.4574	0.1109	0.5376	0.9347	0.0000	0.2323
	2	RAN	0.7442	0.8364	0.6904	0.0527	0.5211	0.9606	0.0000	0.2637
		SAL	0.7450	0.7880	0.7076	0.0280	0.5141	0.9645	0.0000	0.2666
		STL	0.5728	0.7472	0.4500	0.1120	0.5415	0.9427	0.0000	0.2285
	4	RAN	0.7306	0.7668	0.6556	0.0452	0.5175	0.9558	0.0000	0.2668
		SAL	0.7454	0.7836	0.7137	0.0219	0.5147	0.9496	0.0000	0.2689
		STL	0.5696	0.7409	0.4483	0.1095	0.5390	0.9388	0.0000	0.2277
	8	RAN	0.7383	0.8013	0.6680	0.0407	0.5254	0.9566	0.0000	0.2590
		SAL	0.7476	0.7933	0.7244	0.0245	0.5183	0.9565	0.0000	0.2656
		STL	0.5727	0.7454	0.4599	0.1051	0.5437	0.9441	0.0000	0.2264
	16	RAN	0.7364	0.7925	0.6755	0.0386	0.5113	0.9525	0.0000	0.2764
		SAL	0.7455	0.7776	0.7148	0.0232	0.5132	0.9568	0.0000	0.2719
		STL	0.5764	0.7487	0.4483	0.1090	0.5424	0.9388	0.0000	0.2344

Table E.3: grouped-liblinear-enron-GM1-ALL-ALL-25

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.6872	0.7476	0.6382	0.0454	0.4701	0.9509	0.0000	0.2677
		SAL	0.6889	0.7028	0.6648	0.0171	0.4733	0.9426	0.0000	0.2611
		STL	0.5472	0.6660	0.4341	0.0948	0.4966	0.9455	0.0000	0.2368
	1	RAN	0.6765	0.7280	0.5821	0.0669	0.4680	0.9486	0.0000	0.2701
		SAL	0.6918	0.7114	0.6621	0.0214	0.4689	0.9561	0.0000	0.2625
		STL	0.5408	0.6699	0.4234	0.1010	0.4870	0.9423	0.0000	0.2372
	2	RAN	0.6981	0.7214	0.6835	0.0167	0.4779	0.9475	0.0000	0.2691
		SAL	0.6834	0.6975	0.6662	0.0130	0.4600	0.9426	0.0000	0.2633
		STL	0.5443	0.6732	0.4287	0.1003	0.4912	0.9330	0.0000	0.2388
	4	RAN	0.6734	0.7052	0.6472	0.0240	0.4622	0.9395	0.0000	0.2671
		SAL	0.6928	0.7026	0.6810	0.0089	0.4727	0.9532	0.0000	0.2677
		STL	0.5407	0.6664	0.4327	0.0962	0.4904	0.9396	0.0000	0.2365
	8	RAN	0.6889	0.7127	0.6465	0.0301	0.4727	0.9511	0.0000	0.2694
		SAL	0.6921	0.7013	0.6753	0.0119	0.4700	0.9559	0.0000	0.2724
		STL	0.5447	0.6779	0.4376	0.0998	0.4911	0.9341	0.0000	0.2389
	16	RAN	0.6861	0.7524	0.6315	0.0500	0.4633	0.9416	0.0000	0.2699
		SAL	0.6920	0.7105	0.6715	0.0160	0.4732	0.9504	0.0000	0.2648
		STL	0.5530	0.6826	0.4406	0.0996	0.4948	0.9381	0.0000	0.2358

Table E.4: grouped-liblinear-enron-GM1-ALL-ALL-50

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.6490	0.6499	0.6482	0.0009	0.4426	0.9437	0.0000	0.2615
		SAL	0.6631	0.7024	0.6239	0.0393	0.4462	0.9388	0.0000	0.2682
		STL	0.5316	0.6478	0.4155	0.1162	0.4589	0.9217	0.0000	0.2459
	1	RAN	0.6585	0.6724	0.6446	0.0139	0.4423	0.9365	0.0000	0.2678
		SAL	0.6565	0.7011	0.6118	0.0447	0.4354	0.9394	0.0000	0.2714
		STL	0.5155	0.6430	0.3880	0.1275	0.4445	0.9453	0.0000	0.2500
	2	RAN	0.6511	0.6786	0.6237	0.0275	0.4416	0.9511	0.0000	0.2647
		SAL	0.6618	0.6858	0.6378	0.0240	0.4435	0.9286	0.0000	0.2644
		STL	0.5253	0.6511	0.3995	0.1258	0.4534	0.9104	0.0000	0.2454
	4	RAN	0.6570	0.6793	0.6347	0.0223	0.4415	0.9402	0.0000	0.2681
		SAL	0.6581	0.6814	0.6347	0.0234	0.4337	0.9281	0.0000	0.2662
		STL	0.5245	0.6484	0.4006	0.1239	0.4501	0.9380	0.0000	0.2476
	8	RAN	0.6445	0.6632	0.6259	0.0186	0.4324	0.9392	0.0000	0.2626
		SAL	0.6585	0.6836	0.6334	0.0251	0.4495	0.9275	0.0000	0.2627
		STL	0.5226	0.6378	0.4074	0.1152	0.4479	0.9339	0.0000	0.2462
	16	RAN	0.6553	0.6716	0.6391	0.0163	0.4339	0.9413	0.0000	0.2676
		SAL	0.6593	0.6655	0.6531	0.0062	0.4362	0.9401	0.0000	0.2647
		STL	0.5264	0.6497	0.4030	0.1233	0.4507	0.9156	0.0000	0.2452

Table E.5: grouped-liblinear-enron-GM1-ALL-ALL-75

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.6033	0.6033	0.6033	0.0000	0.3951	0.9144	0.0000	0.2613
		SAL	0.6074	0.6074	0.6074	0.0000	0.4025	0.9316	0.0000	0.2607
		STL	0.6074	0.6074	0.6074	0.0000	0.4025	0.9316	0.0000	0.2607
	1	RAN	0.6155	0.6155	0.6155	0.0000	0.4059	0.9176	0.0000	0.2649
		SAL	0.5849	0.5849	0.5849	0.0000	0.3923	0.9402	0.0000	0.2691
		STL	0.5849	0.5849	0.5849	0.0000	0.3923	0.9402	0.0000	0.2691
	2	RAN	0.6049	0.6049	0.6049	0.0000	0.3968	0.9342	0.0000	0.2654
		SAL	0.5949	0.5949	0.5949	0.0000	0.3954	0.9389	0.0000	0.2686
		STL	0.5949	0.5949	0.5949	0.0000	0.3954	0.9389	0.0000	0.2686
	4	RAN	0.6065	0.6065	0.6065	0.0000	0.4026	0.9132	0.0000	0.2608
		SAL	0.6093	0.6093	0.6093	0.0000	0.4042	0.9488	0.0000	0.2656
		STL	0.6093	0.6093	0.6093	0.0000	0.4042	0.9488	0.0000	0.2656
	8	RAN	0.6008	0.6008	0.6008	0.0000	0.4015	0.9394	0.0000	0.2651
		SAL	0.5982	0.5982	0.5982	0.0000	0.4028	0.9451	0.0000	0.2632
		STL	0.5982	0.5982	0.5982	0.0000	0.4028	0.9451	0.0000	0.2632
	16	RAN	0.6011	0.6011	0.6011	0.0000	0.4038	0.9274	0.0000	0.2614
		SAL	0.5975	0.5975	0.5975	0.0000	0.3968	0.9489	0.0000	0.2689
		STL	0.5975	0.5975	0.5975	0.0000	0.3968	0.9489	0.0000	0.2689

Table E.6: grouped-liblinear-enron-GM1-ALL-ALL-150

GM2										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.8948	0.9753	0.7918	0.0485	0.7299	1.0000	0.0000	0.2440
		SAL	0.9091	0.9599	0.8276	0.0336	0.7160	0.9901	0.0000	0.2660
		STL	0.7782	0.9509	0.5185	0.1226	0.7467	0.9847	0.0000	0.2057
	1	RAN	0.8538	0.9413	0.6271	0.0733	0.6626	0.9781	0.0000	0.2548
		SAL	0.8745	0.9544	0.7669	0.0413	0.6615	0.9780	0.0000	0.2644
		STL	0.7294	0.9356	0.4444	0.1127	0.7042	0.9676	0.0000	0.1876
	2	RAN	0.8520	0.9448	0.7456	0.0570	0.6654	0.9771	0.0000	0.2605
		SAL	0.8758	0.9369	0.7792	0.0411	0.6651	0.9778	0.0000	0.2601
		STL	0.7300	0.9133	0.4444	0.1143	0.7041	0.9658	0.0000	0.1903
	4	RAN	0.8487	0.9560	0.7092	0.0660	0.6539	0.9834	0.0000	0.2618
		SAL	0.8775	0.9366	0.7835	0.0366	0.6662	0.9789	0.0000	0.2620
		STL	0.7298	0.9381	0.4444	0.1136	0.7041	0.9672	0.0000	0.1896
	8	RAN	0.8532	0.9547	0.7217	0.0652	0.6544	0.9817	0.0000	0.2670
		SAL	0.8783	0.9366	0.7688	0.0411	0.6671	0.9781	0.0000	0.2608
		STL	0.7281	0.9262	0.4444	0.1120	0.7028	0.9609	0.0000	0.1869
	16	RAN	0.8440	0.9606	0.6183	0.0813	0.6695	0.9881	0.0000	0.2538
		SAL	0.8733	0.9428	0.7773	0.0434	0.6605	0.9789	0.0000	0.2653
		STL	0.7291	0.9077	0.4444	0.1101	0.7047	0.9680	0.0000	0.1842

Table E.7: grouped-liblinear-enron-GM2-ALL-ALL-5

GM2										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.8552	0.9369	0.7431	0.0453	0.6870	0.9789	0.0000	0.2520
		SAL	0.8708	0.9297	0.8023	0.0350	0.6791	0.9811	0.0000	0.2612
		STL	0.7188	0.9258	0.5000	0.1243	0.6945	0.9802	0.0000	0.2174
	1	RAN	0.8038	0.9093	0.6536	0.0624	0.5769	0.9711	0.0000	0.2683
		SAL	0.8177	0.8707	0.7580	0.0376	0.5879	0.9616	0.0000	0.2696
		STL	0.6438	0.8086	0.3936	0.1151	0.6178	0.9592	0.0000	0.2084
	2	RAN	0.8181	0.9255	0.7252	0.0584	0.5925	0.9711	0.0000	0.2721
		SAL	0.8107	0.8651	0.7298	0.0394	0.5878	0.9641	0.0000	0.2621
		STL	0.6447	0.8129	0.3936	0.1184	0.6199	0.9537	0.0000	0.2138
	4	RAN	0.7917	0.8918	0.6272	0.0747	0.5913	0.9675	0.0000	0.2618
		SAL	0.8148	0.8969	0.7263	0.0476	0.5891	0.9622	0.0000	0.2704
		STL	0.6440	0.8130	0.3936	0.1141	0.6191	0.9535	0.0000	0.2057
	8	RAN	0.8112	0.8739	0.6976	0.0508	0.5855	0.9634	0.0000	0.2628
		SAL	0.8194	0.8722	0.7347	0.0398	0.5958	0.9678	0.0000	0.2667
		STL	0.6437	0.8110	0.3936	0.1181	0.6195	0.9561	0.0000	0.2120
	16	RAN	0.8008	0.9065	0.6550	0.0763	0.5866	0.9728	0.0000	0.2670
		SAL	0.8128	0.8887	0.6917	0.0460	0.5886	0.9615	0.0000	0.2704
		STL	0.6448	0.8073	0.3936	0.1155	0.6205	0.9596	0.0000	0.2093

Table E.8: grouped-liblinear-enron-GM2-ALL-ALL-10

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.8191	0.8989	0.7154	0.0639	0.6266	0.9810	0.0000	0.2710
		SAL	0.8224	0.8598	0.7468	0.0363	0.6270	0.9814	0.0000	0.2725
		STL	0.6674	0.8551	0.4824	0.1262	0.6416	0.9748	0.0000	0.2442
	1	RAN	0.7356	0.7693	0.6908	0.0296	0.5124	0.9610	0.0000	0.2729
		SAL	0.7309	0.8075	0.6765	0.0392	0.5039	0.9632	0.0000	0.2700
		STL	0.5704	0.7427	0.4512	0.1123	0.5351	0.9518	0.0000	0.2313
	2	RAN	0.7394	0.8065	0.6931	0.0411	0.5174	0.9526	0.0000	0.2680
		SAL	0.7353	0.8036	0.6822	0.0411	0.5119	0.9612	0.0000	0.2695
		STL	0.5718	0.7216	0.4562	0.0986	0.5343	0.9441	0.0000	0.2270
	4	RAN	0.7403	0.7758	0.6806	0.0344	0.5097	0.9512	0.0000	0.2696
		SAL	0.7324	0.7994	0.7053	0.0327	0.5094	0.9674	0.0000	0.2643
		STL	0.5701	0.7473	0.4465	0.1126	0.5329	0.9510	0.0000	0.2334
	8	RAN	0.7192	0.8331	0.6238	0.0661	0.5093	0.9655	0.0000	0.2689
		SAL	0.7362	0.8000	0.6915	0.0359	0.5106	0.9562	0.0000	0.2677
		STL	0.5751	0.7448	0.4486	0.1055	0.5390	0.9492	0.0000	0.2269
	16	RAN	0.7317	0.8142	0.6307	0.0670	0.5174	0.9613	0.0000	0.2645
		SAL	0.7302	0.8380	0.6722	0.0531	0.5027	0.9628	0.0000	0.2685
		STL	0.5661	0.7312	0.4470	0.1040	0.5286	0.9518	0.0000	0.2300

Table E.9: grouped-liblinear-enron-GM2-ALL-ALL-25

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.7702	0.8240	0.6807	0.0637	0.5973	0.9747	0.0000	0.2689
		SAL	0.7940	0.8240	0.7423	0.0367	0.5922	0.9780	0.0000	0.2791
		STL	0.6564	0.8029	0.5252	0.1139	0.6109	0.9731	0.0000	0.2545
	1	RAN	0.6743	0.7015	0.6543	0.0199	0.4607	0.9505	0.0000	0.2681
		SAL	0.6892	0.7216	0.6673	0.0234	0.4598	0.9480	0.0000	0.2718
		STL	0.5354	0.6679	0.4211	0.1016	0.4843	0.9348	0.0000	0.2432
	2	RAN	0.6817	0.7054	0.6572	0.0197	0.4625	0.9318	0.0000	0.2650
		SAL	0.6890	0.7156	0.6716	0.0191	0.4677	0.9504	0.0000	0.2658
		STL	0.5317	0.6701	0.4119	0.1062	0.4826	0.9357	0.0000	0.2425
	4	RAN	0.6806	0.7174	0.6552	0.0266	0.4638	0.9460	0.0000	0.2712
		SAL	0.6808	0.7030	0.6581	0.0183	0.4587	0.9540	0.0000	0.2726
		STL	0.5343	0.6607	0.4211	0.0983	0.4837	0.9347	0.0000	0.2387
	8	RAN	0.6771	0.7296	0.6471	0.0372	0.4545	0.9333	0.0000	0.2730
		SAL	0.6883	0.7290	0.6577	0.0300	0.4729	0.9402	0.0000	0.2669
		STL	0.5325	0.6714	0.4092	0.1076	0.4786	0.9327	0.0000	0.2393

Table E.10: grouped-liblinear-enron-GM2-ALL-ALL-50

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.7667	0.7969	0.7365	0.0302	0.5812	0.9747	0.0000	0.2717
		SAL	0.7747	0.7839	0.7656	0.0092	0.5797	0.9786	0.0000	0.2763
		STL	0.6576	0.7716	0.5437	0.1139	0.5887	0.9737	0.0000	0.2682
	1	RAN	0.6565	0.6959	0.6171	0.0394	0.4408	0.9313	0.0000	0.2716
		SAL	0.6640	0.6751	0.6528	0.0112	0.4415	0.9564	0.0000	0.2767
		STL	0.5156	0.6440	0.3872	0.1284	0.4539	0.9444	0.0000	0.2453
	2	RAN	0.6439	0.6625	0.6253	0.0186	0.4317	0.9523	0.0000	0.2687
		SAL	0.6329	0.6677	0.5980	0.0349	0.4301	0.9428	0.0000	0.2722
		STL	0.5194	0.6514	0.3874	0.1320	0.4538	0.9377	0.0000	0.2538
	4	RAN	0.6397	0.6441	0.6352	0.0045	0.4354	0.9450	0.0000	0.2725
		SAL	0.6565	0.6913	0.6216	0.0349	0.4427	0.9492	0.0000	0.2666
		STL	0.5209	0.6467	0.3950	0.1259	0.4609	0.9304	0.0000	0.2508
	8	RAN	0.6570	0.6647	0.6492	0.0077	0.4352	0.9490	0.0000	0.2731
		SAL	0.6420	0.6681	0.6158	0.0262	0.4304	0.9344	0.0000	0.2696
		STL	0.5112	0.6471	0.3752	0.1359	0.4470	0.9428	0.0000	0.2535

Table E.11: grouped-liblinear-enron-GM2-ALL-ALL-75

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.7429	0.7429	0.7429	0.0000	0.5493	0.9731	0.0000	0.2777
		SAL	0.7456	0.7456	0.7456	0.0000	0.5528	0.9737	0.0000	0.2798
		STL	0.7456	0.7456	0.7456	0.0000	0.5528	0.9737	0.0000	0.2798
	1	RAN	0.5841	0.5841	0.5841	0.0000	0.3870	0.9285	0.0000	0.2690
		SAL	0.6047	0.6047	0.6047	0.0000	0.4034	0.9387	0.0000	0.2698
		STL	0.6047	0.6047	0.6047	0.0000	0.4034	0.9387	0.0000	0.2698
	2	RAN	0.6134	0.6134	0.6134	0.0000	0.4057	0.9311	0.0000	0.2653
		SAL	0.6105	0.6105	0.6105	0.0000	0.4030	0.9283	0.0000	0.2668
		STL	0.6105	0.6105	0.6105	0.0000	0.4030	0.9283	0.0000	0.2668
	4	RAN	0.6057	0.6057	0.6057	0.0000	0.4016	0.9327	0.0000	0.2717
		SAL	0.6073	0.6073	0.6073	0.0000	0.4010	0.9391	0.0000	0.2709
		STL	0.6073	0.6073	0.6073	0.0000	0.4010	0.9391	0.0000	0.2709

Table E.12: grouped-liblinear-enron-GM2-ALL-ALL-150

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.7207	0.9636	0.4010	0.1429	0.5052	1.0000	0.0000	0.3099
		SAL	0.7744	0.9271	0.5114	0.1158	0.5026	1.0000	0.0000	0.3307
		STL	0.5692	0.8742	0.3017	0.1344	0.5108	1.0000	0.0000	0.2582
	1	RAN	0.8487	0.9685	0.7000	0.0784	0.6751	0.9869	0.0000	0.2565
		SAL	0.8705	0.9378	0.7535	0.0455	0.6656	0.9824	0.0000	0.2587
		STL	0.7160	0.9274	0.4000	0.1367	0.6913	0.9590	0.0000	0.2018
	2	RAN	0.8515	0.9550	0.5736	0.0716	0.6635	0.9836	0.0000	0.2600
		SAL	0.8636	0.9498	0.7201	0.0609	0.6591	0.9824	0.0000	0.2612
		STL	0.7201	0.9287	0.4000	0.1304	0.6949	0.9613	0.0000	0.1986
	4	RAN	0.8531	0.9421	0.6677	0.0616	0.6730	0.9714	0.0000	0.2549
		SAL	0.8696	0.9455	0.7224	0.0535	0.6671	0.9821	0.0000	0.2582
		STL	0.7163	0.9264	0.4000	0.1352	0.6915	0.9666	0.0000	0.2014
	8	RAN	0.8383	0.9513	0.6020	0.0744	0.6728	0.9700	0.0000	0.2452
		SAL	0.8705	0.9470	0.7557	0.0454	0.6656	0.9824	0.0000	0.2597
		STL	0.7122	0.9284	0.4000	0.1349	0.6864	0.9639	0.0000	0.2006
	16	RAN	0.8522	0.9676	0.6954	0.0732	0.6686	0.9874	0.0000	0.2547
		SAL	0.8676	0.9463	0.7557	0.0519	0.6630	0.9824	0.0000	0.2603
		STL	0.7138	0.9276	0.4000	0.1365	0.6881	0.9630	0.0000	0.2014

Table E.13: grouped-liblinear-enron-GM5-ALL-ALL-5

GM5										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.6930	0.8560	0.4644	0.0931	0.4657	0.9867	0.0000	0.3066
		SAL	0.7104	0.8020	0.5628	0.0630	0.4652	0.9870	0.0000	0.3143
		STL	0.4857	0.7801	0.2548	0.1328	0.4507	0.9870	0.0000	0.2766
	1	RAN	0.8095	0.9022	0.7286	0.0564	0.5826	0.9782	0.0000	0.2630
		SAL	0.8057	0.8903	0.6153	0.0603	0.5886	0.9727	0.0000	0.2639
		STL	0.6406	0.8044	0.3908	0.1168	0.6225	0.9604	0.0000	0.2110
	2	RAN	0.7999	0.9145	0.7189	0.0572	0.5902	0.9684	0.0000	0.2723
		SAL	0.7957	0.9221	0.6462	0.0685	0.5860	0.9733	0.0000	0.2568
		STL	0.6365	0.7796	0.3908	0.1135	0.6181	0.9529	0.0000	0.2119
	4	RAN	0.7865	0.9187	0.5834	0.0723	0.5908	0.9714	0.0000	0.2641
		SAL	0.7985	0.9256	0.5951	0.0810	0.5848	0.9729	0.0000	0.2634
		STL	0.6405	0.7866	0.3908	0.1150	0.6220	0.9551	0.0000	0.2108
	8	RAN	0.8017	0.9272	0.6714	0.0691	0.5895	0.9764	0.0000	0.2584
		SAL	0.8020	0.9232	0.5924	0.0707	0.5874	0.9736	0.0000	0.2637
		STL	0.6394	0.8052	0.3908	0.1191	0.6214	0.9565	0.0000	0.2104
	16	RAN	0.8086	0.9142	0.6593	0.0748	0.6006	0.9770	0.0000	0.2613
		SAL	0.8080	0.9191	0.6835	0.0576	0.5901	0.9734	0.0000	0.2652
		STL	0.6422	0.8006	0.3908	0.1194	0.6246	0.9573	0.0000	0.2122

Table E.14: grouped-liblinear-enron-GM5-ALL-ALL-10

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.5816	0.7076	0.4018	0.1110	0.4370	1.0000	0.0000	0.3091
		SAL	0.6305	0.6898	0.5050	0.0599	0.4377	0.9744	0.0000	0.3124
		STL	0.4377	0.6993	0.3305	0.1268	0.4368	0.9870	0.0000	0.3003
	1	RAN	0.7379	0.7867	0.6328	0.0574	0.5186	0.9523	0.0000	0.2697
		SAL	0.7247	0.7775	0.6392	0.0455	0.5128	0.9554	0.0000	0.2673
		STL	0.5652	0.7111	0.4371	0.1041	0.5413	0.9412	0.0000	0.2270
	2	RAN	0.7282	0.7445	0.7007	0.0137	0.5224	0.9551	0.0000	0.2684
		SAL	0.7287	0.7759	0.6819	0.0279	0.5155	0.9599	0.0000	0.2666
		STL	0.5616	0.7027	0.4371	0.0970	0.5378	0.9395	0.0000	0.2282
	4	RAN	0.7235	0.8209	0.6430	0.0658	0.5187	0.9488	0.0000	0.2720
		SAL	0.7320	0.7808	0.6872	0.0288	0.5180	0.9629	0.0000	0.2654
		STL	0.5607	0.7156	0.4371	0.1032	0.5388	0.9390	0.0000	0.2273

Table E.15: grouped-liblinear-enron-GM5-ALL-ALL-25

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.5793	0.6564	0.4924	0.0673	0.4272	0.9870	0.0000	0.3154
		SAL	0.5812	0.6174	0.5616	0.0256	0.4256	0.9870	0.0000	0.3083
		STL	0.4365	0.5943	0.3088	0.1185	0.4259	0.9870	0.0000	0.3052
	1	RAN	0.6659	0.7342	0.5793	0.0646	0.4697	0.9572	0.0000	0.2773
		SAL	0.6784	0.7134	0.6323	0.0340	0.4698	0.9571	0.0000	0.2709
		STL	0.5333	0.6441	0.4304	0.0874	0.4877	0.9281	0.0000	0.2470
	2	RAN	0.6780	0.7022	0.6515	0.0208	0.4747	0.9584	0.0000	0.2702
		SAL	0.6825	0.7004	0.6661	0.0140	0.4729	0.9610	0.0000	0.2749
		STL	0.5452	0.6611	0.4442	0.0892	0.4976	0.9399	0.0000	0.2503

Table E.16: grouped-liblinear-enron-GM5-ALL-ALL-50

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.5703	0.6206	0.5199	0.0503	0.4193	0.9870	0.0000	0.3119
		SAL	0.5454	0.5772	0.5136	0.0318	0.4086	0.9870	0.0000	0.3215
		STL	0.4475	0.5710	0.3240	0.1235	0.4164	0.9744	0.0000	0.3177
	1	RAN	0.6525	0.7194	0.5856	0.0669	0.4427	0.9513	0.0000	0.2758
		SAL	0.6549	0.6679	0.6419	0.0130	0.4445	0.9497	0.0000	0.2763
		STL	0.5350	0.6489	0.4211	0.1139	0.4672	0.9421	0.0000	0.2567
	2	RAN	0.6511	0.6739	0.6283	0.0228	0.4460	0.9437	0.0000	0.2699
		SAL	0.6461	0.6551	0.6371	0.0090	0.4410	0.9494	0.0000	0.2737
		STL	0.5341	0.6451	0.4230	0.1111	0.4674	0.9380	0.0000	0.2542

Table E.17: grouped-liblinear-enron-GM5-ALL-ALL-75

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.5418	0.5418	0.5418	0.0000	0.4035	0.9737	0.0000	0.3182
		SAL	0.5478	0.5478	0.5478	0.0000	0.4034	0.9870	0.0000	0.3169
		STL	0.5478	0.5478	0.5478	0.0000	0.4034	0.9870	0.0000	0.3169
	1	RAN	0.6091	0.6091	0.6091	0.0000	0.4141	0.9493	0.0000	0.2691
		SAL	0.5875	0.5875	0.5875	0.0000	0.4043	0.9502	0.0000	0.2656
		STL	0.5875	0.5875	0.5875	0.0000	0.4043	0.9502	0.0000	0.2656

Table E.18: grouped-liblinear-enron-GM5-ALL-ALL-150

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.8782	0.9835	0.6177	0.0747	0.7112	1.0000	0.0000	0.2621
		SAL	0.9047	0.9706	0.7487	0.0431	0.7088	1.0000	0.0000	0.2663
		STL	0.7758	0.9533	0.5185	0.1190	0.7410	0.9839	0.0000	0.2063
	1	RAN	0.8781	0.9673	0.7660	0.0609	0.7147	0.9822	0.0000	0.2540
		SAL	0.9020	0.9662	0.7589	0.0466	0.7005	0.9854	0.0000	0.2721
		STL	0.7682	0.9664	0.5185	0.1219	0.7364	0.9837	0.0000	0.2054
	2	RAN	0.8740	0.9805	0.6998	0.0747	0.7114	0.9890	0.0000	0.2549
		SAL	0.9014	0.9658	0.7589	0.0460	0.6988	0.9840	0.0000	0.2736
		STL	0.7675	0.9632	0.5185	0.1215	0.7354	0.9834	0.0000	0.2061
	4	RAN	0.9046	0.9762	0.8386	0.0344	0.7172	0.9821	0.0000	0.2684
		SAL	0.9016	0.9666	0.7585	0.0461	0.6994	0.9843	0.0000	0.2733
		STL	0.7676	0.9663	0.5185	0.1220	0.7355	0.9844	0.0000	0.2062
	8	RAN	0.8921	0.9786	0.8128	0.0426	0.7116	0.9921	0.0000	0.2628
		SAL	0.9025	0.9666	0.7581	0.0466	0.6999	0.9881	0.0000	0.2751
		STL	0.7661	0.9641	0.5185	0.1210	0.7341	0.9826	0.0000	0.2057
	16	RAN	0.8881	0.9756	0.7216	0.0591	0.7070	0.9884	0.0000	0.2677
		SAL	0.9025	0.9666	0.7605	0.0466	0.6996	0.9886	0.0000	0.2750
		STL	0.7663	0.9643	0.5185	0.1218	0.7343	0.9821	0.0000	0.2063

Table E.19: grouped-liblinear-enron-GB3-ALL-ALL-5

GB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.8618	0.9407	0.7427	0.0577	0.6638	1.0000	0.0000	0.2742
		SAL	0.8626	0.9538	0.7131	0.0564	0.6593	1.0000	0.0000	0.2753
		STL	0.7128	0.9326	0.4787	0.1349	0.6867	0.9816	0.0000	0.2261
	1	RAN	0.8550	0.9341	0.7705	0.0454	0.6599	0.9818	0.0000	0.2701
		SAL	0.8680	0.9242	0.6904	0.0569	0.6658	1.0000	0.0000	0.2701
		STL	0.7151	0.9302	0.4894	0.1248	0.6880	0.9806	0.0000	0.2189
	2	RAN	0.8550	0.9265	0.7683	0.0454	0.6737	0.9819	0.0000	0.2588
		SAL	0.8657	0.9221	0.6941	0.0562	0.6610	0.9870	0.0000	0.2715
		STL	0.7176	0.9297	0.4894	0.1254	0.6912	0.9796	0.0000	0.2185
	4	RAN	0.8471	0.9426	0.7322	0.0584	0.6681	0.9870	0.0000	0.2658
		SAL	0.8640	0.9204	0.7026	0.0546	0.6572	1.0000	0.0000	0.2751
		STL	0.7177	0.9300	0.4894	0.1253	0.6915	0.9806	0.0000	0.2187
	8	RAN	0.8560	0.9512	0.7510	0.0590	0.6667	0.9808	0.0000	0.2654
		SAL	0.8664	0.9185	0.6894	0.0577	0.6595	0.9870	0.0000	0.2748
		STL	0.7177	0.9292	0.4894	0.1253	0.6912	0.9799	0.0000	0.2187
	16	RAN	0.8525	0.9215	0.7137	0.0541	0.6616	0.9831	0.0000	0.2682
		SAL	0.8690	0.9264	0.7208	0.0513	0.6629	0.9870	0.0000	0.2722
		STL	0.7170	0.9288	0.4894	0.1248	0.6906	0.9801	0.0000	0.2184

Table E.20: grouped-liblinear-enron-GB3-ALL-ALL-10

GB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.8190	0.8758	0.7683	0.0365	0.6151	0.9797	0.0000	0.2800
		SAL	0.8195	0.8882	0.7559	0.0473	0.6142	0.9774	0.0000	0.2768
		STL	0.6657	0.8529	0.5215	0.1221	0.6361	0.9700	0.0000	0.2437
	1	RAN	0.8158	0.8744	0.6640	0.0708	0.6150	0.9812	0.0000	0.2762
		SAL	0.8235	0.8733	0.7936	0.0248	0.6158	0.9816	0.0000	0.2720
		STL	0.6562	0.8501	0.5158	0.1235	0.6255	0.9717	0.0000	0.2480
	2	RAN	0.8268	0.8600	0.7862	0.0291	0.6207	0.9765	0.0000	0.2693
		SAL	0.8258	0.8788	0.8011	0.0253	0.6174	0.9772	0.0000	0.2709
		STL	0.6527	0.8497	0.5130	0.1264	0.6242	0.9721	0.0000	0.2533
	4	RAN	0.8230	0.9056	0.7260	0.0568	0.6185	0.9802	0.0000	0.2705
		SAL	0.8238	0.8793	0.7973	0.0262	0.6152	0.9771	0.0000	0.2723
		STL	0.6534	0.8498	0.5144	0.1258	0.6243	0.9721	0.0000	0.2526
	8	RAN	0.8088	0.8812	0.7701	0.0363	0.6109	0.9750	0.0000	0.2702
		SAL	0.8230	0.8563	0.7995	0.0177	0.6137	0.9776	0.0000	0.2718
		STL	0.6546	0.8535	0.5144	0.1255	0.6251	0.9720	0.0000	0.2507

Table E.21: grouped-liblinear-enron-GB3-ALL-ALL-25

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.7902	0.8149	0.7445	0.0323	0.5839	1.0000	0.0000	0.2793
		SAL	0.7905	0.8465	0.7234	0.0509	0.5898	0.9761	0.0000	0.2784
		STL	0.6421	0.8024	0.4980	0.1248	0.6004	0.9754	0.0000	0.2590
	1	RAN	0.7853	0.8094	0.7482	0.0266	0.5776	0.9753	0.0000	0.2820
		SAL	0.7918	0.8204	0.7663	0.0222	0.5864	0.9709	0.0000	0.2792
		STL	0.6344	0.8026	0.4731	0.1346	0.5955	0.9727	0.0000	0.2576
	2	RAN	0.7908	0.8058	0.7743	0.0129	0.5867	0.9753	0.0000	0.2803
		SAL	0.7891	0.8100	0.7663	0.0179	0.5836	1.0000	0.0000	0.2756
		STL	0.6326	0.8017	0.4765	0.1331	0.5960	0.9747	0.0000	0.2584
	4	RAN	0.7895	0.8628	0.7357	0.0537	0.5897	0.9759	0.0000	0.2759
		SAL	0.7884	0.8137	0.7670	0.0193	0.5833	1.0000	0.0000	0.2790
		STL	0.6305	0.7973	0.4735	0.1324	0.5938	0.9725	0.0000	0.2604

Table E.22: grouped-liblinear-enron-GB3-ALL-ALL-50

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.7731	0.7764	0.7698	0.0033	0.5722	0.9870	0.0000	0.2775
		SAL	0.7662	0.7955	0.7368	0.0294	0.5603	0.9758	0.0000	0.2858
		STL	0.6507	0.7794	0.5220	0.1287	0.5805	0.9744	0.0000	0.2711
	1	RAN	0.7762	0.8161	0.7364	0.0399	0.5810	0.9712	0.0000	0.2717
		SAL	0.7740	0.7836	0.7644	0.0096	0.5735	0.9763	0.0000	0.2786
		STL	0.6506	0.7739	0.5273	0.1233	0.5774	0.9718	0.0000	0.2662
	2	RAN	0.7734	0.7886	0.7583	0.0152	0.5686	0.9726	0.0000	0.2874
		SAL	0.7756	0.7820	0.7692	0.0064	0.5733	0.9764	0.0000	0.2804
		STL	0.6482	0.7712	0.5251	0.1230	0.5736	0.9719	0.0000	0.2658
	4	RAN	0.7715	0.7715	0.7715	0.0000	0.5690	0.9714	0.0000	0.2787
		SAL	0.7756	0.7808	0.7704	0.0052	0.5748	0.9742	0.0000	0.2780
		STL	0.6480	0.7723	0.5237	0.1243	0.5763	0.9713	0.0000	0.2661

Table E.23: grouped-liblinear-enron-GB3-ALL-ALL-75

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.7472	0.7472	0.7472	0.0000	0.5470	0.9701	0.0000	0.2839
		SAL	0.7440	0.7440	0.7440	0.0000	0.5326	0.9711	0.0000	0.2882
		STL	0.7440	0.7440	0.7440	0.0000	0.5326	0.9711	0.0000	0.2882
	1	RAN	0.7453	0.7453	0.7453	0.0000	0.5413	0.9700	0.0000	0.2850
		SAL	0.7426	0.7426	0.7426	0.0000	0.5358	0.9867	0.0000	0.2903
		STL	0.7426	0.7426	0.7426	0.0000	0.5358	0.9867	0.0000	0.2903
	2	RAN	0.7432	0.7432	0.7432	0.0000	0.5451	0.9666	0.0000	0.2813
		SAL	0.7417	0.7417	0.7417	0.0000	0.5376	0.9867	0.0000	0.2848
		STL	0.7417	0.7417	0.7417	0.0000	0.5376	0.9867	0.0000	0.2848

Table E.24: grouped-liblinear-enron-GB3-ALL-ALL-150

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.8946	0.9696	0.6599	0.0718	0.7269	1.0000	0.0000	0.2605
		SAL	0.9147	0.9732	0.7892	0.0337	0.7246	0.9903	0.0000	0.2633
		STL	0.7979	0.9579	0.5185	0.1085	0.7643	0.9841	0.0000	0.1994
	1	RAN	0.8970	0.9619	0.6565	0.0575	0.7324	0.9869	0.0000	0.2481
		SAL	0.9147	0.9673	0.7777	0.0410	0.7227	0.9921	0.0000	0.2643
		STL	0.7885	0.9741	0.5185	0.1165	0.7573	0.9853	0.0000	0.2004
	2	RAN	0.8904	0.9765	0.6446	0.0710	0.7325	0.9923	0.0000	0.2548
		SAL	0.9142	0.9673	0.7812	0.0387	0.7203	0.9877	0.0000	0.2642
		STL	0.7891	0.9740	0.5185	0.1187	0.7579	0.9851	0.0000	0.2020
	4	RAN	0.9027	0.9762	0.7346	0.0487	0.7313	0.9884	0.0000	0.2534
		SAL	0.9142	0.9677	0.7777	0.0392	0.7208	0.9877	0.0000	0.2634
		STL	0.7893	0.9738	0.5185	0.1187	0.7582	0.9856	0.0000	0.2019
	8	RAN	0.8876	0.9706	0.7021	0.0675	0.7249	0.9840	0.0000	0.2584
		SAL	0.9144	0.9673	0.7777	0.0396	0.7207	0.9877	0.0000	0.2642
		STL	0.7889	0.9740	0.5185	0.1191	0.7581	0.9853	0.0000	0.2020
	16	RAN	0.8916	0.9848	0.7284	0.0649	0.7327	0.9924	0.0000	0.2513
		SAL	0.9143	0.9677	0.7777	0.0392	0.7206	0.9877	0.0000	0.2640
		STL	0.7889	0.9744	0.5185	0.1185	0.7578	0.9853	0.0000	0.2017

Table E.25: grouped-liblinear-enron-OSB3-ALL-ALL-5

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.8643	0.9469	0.7573	0.0505	0.6814	0.9867	0.0000	0.2595
		SAL	0.8758	0.9462	0.7660	0.0419	0.6788	0.9867	0.0000	0.2647
		STL	0.7349	0.9353	0.5106	0.1231	0.7054	0.9841	0.0000	0.2236
	1	RAN	0.8669	0.9516	0.7406	0.0518	0.6841	0.9849	0.0000	0.2616
		SAL	0.8813	0.9316	0.7407	0.0470	0.6847	0.9888	0.0000	0.2642
		STL	0.7405	0.9363	0.5319	0.1154	0.7122	0.9844	0.0000	0.2126
	2	RAN	0.8638	0.9432	0.7652	0.0573	0.6847	1.0000	0.0000	0.2616
		SAL	0.8801	0.9319	0.7410	0.0459	0.6804	0.9870	0.0000	0.2642
		STL	0.7401	0.9368	0.5319	0.1174	0.7120	0.9817	0.0000	0.2119
	4	RAN	0.8600	0.9446	0.7783	0.0549	0.6809	0.9854	0.0000	0.2616
		SAL	0.8804	0.9319	0.7448	0.0450	0.6814	0.9870	0.0000	0.2628
		STL	0.7393	0.9369	0.5319	0.1172	0.7114	0.9812	0.0000	0.2121
	8	RAN	0.8652	0.9482	0.7428	0.0554	0.6859	0.9851	0.0000	0.2573
		SAL	0.8793	0.9317	0.7381	0.0450	0.6782	0.9870	0.0000	0.2670
		STL	0.7401	0.9372	0.5319	0.1174	0.7119	0.9817	0.0000	0.2121

Table E.26: grouped-liblinear-enron-OSB3-ALL-ALL-10

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.8300	0.8954	0.7736	0.0457	0.6303	0.9815	0.0000	0.2729
		SAL	0.8320	0.8928	0.7447	0.0480	0.6334	0.9810	0.0000	0.2650
		STL	0.6858	0.8664	0.5385	0.1179	0.6486	0.9771	0.0000	0.2403
	1	RAN	0.8262	0.8850	0.7908	0.0382	0.6321	0.9867	0.0000	0.2703
		SAL	0.8379	0.8634	0.8210	0.0132	0.6345	0.9801	0.0000	0.2718
		STL	0.6823	0.8636	0.5350	0.1156	0.6498	0.9752	0.0000	0.2362
	2	RAN	0.8349	0.8516	0.8018	0.0171	0.6336	1.0000	0.0000	0.2708
		SAL	0.8388	0.8775	0.8140	0.0207	0.6377	0.9787	0.0000	0.2689
		STL	0.6806	0.8630	0.5350	0.1162	0.6485	0.9769	0.0000	0.2372

Table E.27: grouped-liblinear-enron-OSB3-ALL-ALL-25

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.8012	0.8280	0.7684	0.0247	0.5999	0.9727	0.0000	0.2719
		SAL	0.8063	0.8569	0.7447	0.0465	0.6051	0.9793	0.0000	0.2726
		STL	0.6625	0.8147	0.5160	0.1220	0.6119	0.9785	0.0000	0.2481
	1	RAN	0.8024	0.8343	0.7672	0.0275	0.5976	0.9717	0.0000	0.2769
		SAL	0.8025	0.8219	0.7801	0.0172	0.6010	0.9764	0.0000	0.2706
		STL	0.6575	0.8132	0.5126	0.1230	0.6096	0.9771	0.0000	0.2493

Table E.28: grouped-liblinear-enron-OSB3-ALL-ALL-50

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.7842	0.7888	0.7796	0.0046	0.5802	0.9741	0.0000	0.2784
		SAL	0.7852	0.7931	0.7774	0.0079	0.5874	0.9786	0.0000	0.2708
		STL	0.6715	0.7884	0.5547	0.1169	0.5898	0.9766	0.0000	0.2615
	1	RAN	0.7832	0.8011	0.7653	0.0179	0.5876	0.9705	0.0000	0.2710
		SAL	0.7859	0.7894	0.7823	0.0035	0.5870	0.9751	0.0000	0.2726
		STL	0.6678	0.7898	0.5458	0.1220	0.5950	0.9758	0.0000	0.2582

Table E.29: grouped-liblinear-enron-OSB3-ALL-ALL-75

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.7553	0.7553	0.7553	0.0000	0.5537	0.9754	0.0000	0.2782
		SAL	0.7543	0.7543	0.7543	0.0000	0.5563	0.9716	0.0000	0.2778
		STL	0.7543	0.7543	0.7543	0.0000	0.5563	0.9716	0.0000	0.2778

Table E.30: grouped-liblinear-enron-OSB3-ALL-ALL-150

APPENDIX F:

Grouped LibLinear Results for the Twitter Short Message Corpus

GM1										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.6283	0.8081	0.4918	0.0706	0.6077	0.9696	0.1892	0.1404
		SAL	0.6321	0.7631	0.5068	0.0720	0.6100	0.9363	0.2195	0.1374
		STL	0.6032	0.8089	0.4737	0.0758	0.5893	0.9391	0.1791	0.1458
	1	RAN	0.6333	0.8037	0.5031	0.0723	0.6074	0.9588	0.1449	0.1479
		SAL	0.6259	0.8211	0.5083	0.0802	0.6013	0.9597	0.1429	0.1523
		STL	0.6093	0.8117	0.4713	0.0787	0.6015	0.9347	0.1690	0.1326
	2	RAN	0.6223	0.8966	0.4754	0.0969	0.6070	0.9602	0.2000	0.1431
		SAL	0.6025	0.8093	0.4441	0.0877	0.5720	0.9697	0.1509	0.1636
		STL	0.6195	0.8049	0.4218	0.0796	0.6055	0.9328	0.0000	0.1442
	4	RAN	0.6126	0.7957	0.3846	0.0918	0.5914	0.9811	0.1200	0.1514
		SAL	0.6266	0.8546	0.4823	0.0837	0.6041	0.9560	0.1695	0.1486
		STL	0.6123	0.8062	0.4659	0.0781	0.6021	0.9347	0.1972	0.1342
	8	RAN	0.6356	0.8084	0.4848	0.0714	0.6088	0.9718	0.1613	0.1491
		SAL	0.6321	0.9026	0.4828	0.0909	0.6121	0.9735	0.1404	0.1448
		STL	0.6143	0.8117	0.4661	0.0789	0.6052	0.9347	0.1972	0.1310
	16	RAN	0.6179	0.8112	0.4645	0.0902	0.5989	0.9470	0.1818	0.1455
		SAL	0.6219	0.8324	0.4563	0.0781	0.6022	0.9600	0.2182	0.1413
		STL	0.6145	0.8062	0.4458	0.0756	0.6028	0.9347	0.1515	0.1283

Table F.1: grouped-liblinear-twitter-GM1-ALL-ALL-5

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.4768	0.6234	0.3448	0.0817	0.4500	0.9556	0.0702	0.1651
		SAL	0.4978	0.5788	0.3952	0.0572	0.4670	0.9527	0.0385	0.1615
		STL	0.4540	0.6063	0.3578	0.0697	0.4443	0.9389	0.1250	0.1545
	1	RAN	0.4943	0.5836	0.3936	0.0629	0.4682	0.9482	0.0755	0.1626
		SAL	0.4773	0.6389	0.3627	0.0640	0.4545	0.9405	0.0923	0.1607
		STL	0.4724	0.6329	0.3766	0.0695	0.4587	0.9384	0.0889	0.1539
	2	RAN	0.4914	0.5881	0.3884	0.0627	0.4631	0.9513	0.0833	0.1706
		SAL	0.4859	0.6567	0.3888	0.0779	0.4582	0.9699	0.0702	0.1608
		STL	0.4761	0.6321	0.3358	0.0673	0.4638	0.9381	0.1446	0.1524
	4	RAN	0.4947	0.6310	0.3849	0.0544	0.4729	0.9517	0.1250	0.1570
		SAL	0.4853	0.6900	0.3778	0.0916	0.4542	0.9487	0.0714	0.1781
		STL	0.4722	0.6362	0.3184	0.0728	0.4613	0.9402	0.0299	0.1551
	8	RAN	0.4946	0.6282	0.3895	0.0632	0.4639	0.9472	0.0000	0.1622
		SAL	0.4787	0.7194	0.3994	0.0862	0.4495	0.9621	0.1034	0.1636
		STL	0.4714	0.6362	0.3080	0.0821	0.4593	0.9402	0.0400	0.1648
	16	RAN	0.4904	0.6124	0.3844	0.0675	0.4600	0.9363	0.0769	0.1604
		SAL	0.4817	0.5909	0.3985	0.0591	0.4534	0.9474	0.0370	0.1659
		STL	0.4679	0.6362	0.2846	0.0859	0.4568	0.9402	0.1026	0.1576

Table F.2: grouped-liblinear-twitter-GM1-ALL-ALL-10

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.3441	0.4816	0.2912	0.0644	0.3144	0.9344	0.0000	0.1658
		SAL	0.3544	0.4245	0.2735	0.0484	0.3248	0.8820	0.0000	0.1725
		STL	0.3399	0.4550	0.2916	0.0538	0.3199	0.8806	0.0000	0.1707
	1	RAN	0.3377	0.4119	0.2408	0.0661	0.3121	0.9167	0.0000	0.1736
		SAL	0.3531	0.4352	0.3091	0.0518	0.3188	0.9221	0.0000	0.1782
		STL	0.3318	0.4390	0.2660	0.0582	0.3170	0.9052	0.0000	0.1699
	2	RAN	0.3535	0.4084	0.3176	0.0279	0.3207	0.8960	0.0377	0.1672
		SAL	0.3477	0.4309	0.2878	0.0500	0.3197	0.9225	0.0000	0.1779
		STL	0.3382	0.4245	0.2714	0.0463	0.3271	0.8969	0.0000	0.1696
	4	RAN	0.3566	0.4015	0.3092	0.0320	0.3249	0.9119	0.0000	0.1747
		SAL	0.3486	0.4402	0.2859	0.0583	0.3213	0.9358	0.0000	0.1729
		STL	0.3478	0.4372	0.2811	0.0482	0.3331	0.8851	0.0000	0.1694
	8	RAN	0.3442	0.4118	0.3082	0.0327	0.3166	0.9051	0.0000	0.1671
		SAL	0.3520	0.4186	0.2944	0.0498	0.3267	0.9231	0.0000	0.1788
		STL	0.3294	0.4296	0.2591	0.0566	0.3135	0.8851	0.0000	0.1656
	16	RAN	0.3482	0.3976	0.3137	0.0335	0.3136	0.9011	0.0000	0.1701
		SAL	0.3375	0.4094	0.2879	0.0373	0.3074	0.8981	0.0000	0.1742
		STL	0.3376	0.4296	0.2651	0.0514	0.3188	0.8851	0.0000	0.1670

Table F.3: grouped-liblinear-twitter-GM1-ALL-ALL-25

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.2776	0.3371	0.2451	0.0421	0.2566	0.8780	0.0000	0.1768
		SAL	0.2659	0.2759	0.2510	0.0107	0.2405	0.8759	0.0000	0.1688
		STL	0.2645	0.3273	0.2190	0.0459	0.2518	0.8798	0.0000	0.1799
	1	RAN	0.2736	0.3120	0.2219	0.0380	0.2521	0.9153	0.0000	0.1736
		SAL	0.2769	0.3173	0.2438	0.0305	0.2506	0.8788	0.0000	0.1745
		STL	0.2606	0.3142	0.2249	0.0386	0.2421	0.8647	0.0000	0.1758
	2	RAN	0.2741	0.3248	0.2180	0.0438	0.2398	0.8905	0.0000	0.1723
		SAL	0.2644	0.3100	0.2250	0.0350	0.2351	0.8922	0.0000	0.1718
		STL	0.2731	0.3338	0.2284	0.0445	0.2510	0.8838	0.0000	0.1814
	4	RAN	0.2826	0.3236	0.2287	0.0398	0.2524	0.8766	0.0000	0.1675
		SAL	0.2717	0.3272	0.2032	0.0515	0.2452	0.8889	0.0000	0.1676
		STL	0.2586	0.3155	0.2162	0.0418	0.2416	0.8880	0.0000	0.1793
	8	RAN	0.2773	0.2996	0.2637	0.0159	0.2504	0.9119	0.0000	0.1770
		SAL	0.2742	0.2924	0.2446	0.0211	0.2381	0.8449	0.0000	0.1686
		STL	0.2623	0.3171	0.2274	0.0393	0.2409	0.9010	0.0000	0.1722
	16	RAN	0.2759	0.2963	0.2501	0.0192	0.2525	0.9035	0.0000	0.1689
		SAL	0.2698	0.2920	0.2504	0.0171	0.2370	0.8832	0.0000	0.1713
		STL	0.2672	0.3326	0.2344	0.0463	0.2480	0.8906	0.0000	0.1733

Table F.4: grouped-liblinear-twitter-GM1-ALL-ALL-50

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.2396	0.2738	0.2054	0.0342	0.2200	0.8390	0.0000	0.1619
		SAL	0.2165	0.2521	0.1810	0.0356	0.1989	0.8321	0.0000	0.1745
		STL	0.2257	0.2633	0.1881	0.0376	0.2112	0.8687	0.0000	0.1765
	1	RAN	0.2337	0.2554	0.2120	0.0217	0.2063	0.8630	0.0000	0.1679
		SAL	0.2347	0.2595	0.2098	0.0249	0.2140	0.9157	0.0000	0.1727
		STL	0.2197	0.2626	0.1768	0.0429	0.2074	0.8435	0.0000	0.1746
	2	RAN	0.2313	0.2641	0.1986	0.0327	0.2093	0.8722	0.0000	0.1780
		SAL	0.2367	0.2648	0.2086	0.0281	0.2173	0.8417	0.0000	0.1683
		STL	0.2274	0.2730	0.1818	0.0456	0.2114	0.8750	0.0000	0.1723
	4	RAN	0.2299	0.2328	0.2271	0.0028	0.2063	0.8971	0.0000	0.1665
		SAL	0.2391	0.2776	0.2006	0.0385	0.2150	0.8387	0.0000	0.1719
		STL	0.2240	0.2605	0.1874	0.0365	0.2091	0.8343	0.0000	0.1674
	8	RAN	0.2451	0.2487	0.2416	0.0035	0.2157	0.8873	0.0000	0.1741
		SAL	0.2413	0.2910	0.1915	0.0498	0.2100	0.8429	0.0000	0.1686
		STL	0.2199	0.2654	0.1743	0.0456	0.2033	0.8116	0.0000	0.1729
	16	RAN	0.2372	0.2745	0.2000	0.0372	0.2064	0.9037	0.0000	0.1756
		SAL	0.2387	0.2639	0.2136	0.0252	0.2094	0.9034	0.0000	0.1691
		STL	0.2345	0.2780	0.1910	0.0435	0.2114	0.8621	0.0000	0.1771

Table F.5: grouped-liblinear-twitter-GM1-ALL-ALL-75

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.1802	0.1802	0.1802	0.0000	0.1609	0.8582	0.0000	0.1599
		SAL	0.1875	0.1875	0.1875	0.0000	0.1640	0.8127	0.0000	0.1634
		STL	0.1875	0.1875	0.1875	0.0000	0.1640	0.8127	0.0000	0.1634
	1	RAN	0.1802	0.1802	0.1802	0.0000	0.1554	0.8071	0.0000	0.1605
		SAL	0.1932	0.1932	0.1932	0.0000	0.1687	0.8212	0.0000	0.1650
		STL	0.1932	0.1932	0.1932	0.0000	0.1687	0.8212	0.0000	0.1650
	2	RAN	0.1821	0.1821	0.1821	0.0000	0.1617	0.7698	0.0000	0.1628
		SAL	0.1833	0.1833	0.1833	0.0000	0.1585	0.7807	0.0000	0.1548
		STL	0.1833	0.1833	0.1833	0.0000	0.1585	0.7807	0.0000	0.1548
	4	RAN	0.1943	0.1943	0.1943	0.0000	0.1702	0.8792	0.0000	0.1668
		SAL	0.1910	0.1910	0.1910	0.0000	0.1647	0.7697	0.0000	0.1556
		STL	0.1910	0.1910	0.1910	0.0000	0.1647	0.7697	0.0000	0.1556
	8	RAN	0.1913	0.1913	0.1913	0.0000	0.1649	0.8139	0.0000	0.1687
		SAL	0.1884	0.1884	0.1884	0.0000	0.1636	0.7644	0.0000	0.1631
		STL	0.1884	0.1884	0.1884	0.0000	0.1636	0.7644	0.0000	0.1631
	16	RAN	0.1865	0.1865	0.1865	0.0000	0.1592	0.8143	0.0000	0.1666
		SAL	0.1883	0.1883	0.1883	0.0000	0.1671	0.7732	0.0000	0.1588
		STL	0.1883	0.1883	0.1883	0.0000	0.1671	0.7732	0.0000	0.1588

Table F.6: grouped-liblinear-twitter-GM1-ALL-ALL-150

GM2										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.4955	0.7162	0.3041	0.0815	0.4553	0.9272	0.0000	0.1764
		SAL	0.4834	0.7282	0.2664	0.1007	0.4476	0.9272	0.0000	0.1688
		STL	0.4744	0.6572	0.3283	0.0813	0.4474	0.8897	0.0000	0.1570
	1	RAN	0.6339	0.8454	0.4772	0.0813	0.6069	0.9886	0.1159	0.1596
		SAL	0.6252	0.7790	0.4664	0.0795	0.6051	0.9771	0.1739	0.1438
		STL	0.6133	0.7656	0.4881	0.0714	0.5967	0.9202	0.1250	0.1404
	2	RAN	0.6219	0.8172	0.4335	0.0934	0.6025	0.9697	0.1071	0.1478
		SAL	0.6324	0.7629	0.3934	0.0813	0.6130	0.9524	0.2143	0.1385
		STL	0.6120	0.8232	0.4517	0.0838	0.6006	0.9202	0.2716	0.1400
	4	RAN	0.6420	0.8157	0.5014	0.0783	0.6202	0.9545	0.2258	0.1400
		SAL	0.6196	0.8210	0.4820	0.0810	0.5996	0.9488	0.1951	0.1453
		STL	0.6144	0.7669	0.4245	0.0751	0.6035	0.9202	0.1639	0.1351
	8	RAN	0.6415	0.7996	0.5168	0.0782	0.6205	0.9732	0.2326	0.1453
		SAL	0.6309	0.8489	0.4951	0.0678	0.6136	0.9773	0.1818	0.1390
		STL	0.6123	0.7669	0.4773	0.0707	0.6048	0.9202	0.2667	0.1265
	16	RAN	0.6358	0.8544	0.4986	0.0831	0.6204	0.9603	0.2985	0.1281
		SAL	0.6272	0.8015	0.4094	0.1010	0.6102	0.9579	0.2157	0.1468
		STL	0.6144	0.7870	0.5018	0.0758	0.6051	0.9202	0.2368	0.1282

Table F.7: grouped-liblinear-twitter-GM2-ALL-ALL-5

GM2										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.3685	0.5557	0.1985	0.0875	0.3390	0.9150	0.0000	0.1702
		SAL	0.3721	0.5725	0.2590	0.0864	0.3469	0.8176	0.0000	0.1686
		STL	0.3695	0.4854	0.2646	0.0539	0.3506	0.8539	0.0000	0.1669
	1	RAN	0.5044	0.6219	0.3851	0.0668	0.4737	0.9575	0.0357	0.1671
		SAL	0.4832	0.5897	0.3429	0.0674	0.4514	0.9531	0.0000	0.1722
		STL	0.4836	0.6154	0.3430	0.0631	0.4721	0.8945	0.1667	0.1498
	2	RAN	0.4934	0.5992	0.3683	0.0549	0.4690	0.9509	0.0923	0.1542
		SAL	0.5073	0.6491	0.4107	0.0599	0.4802	0.9549	0.0923	0.1667
		STL	0.4700	0.6213	0.3560	0.0672	0.4575	0.8963	0.0879	0.1536
	4	RAN	0.4989	0.6303	0.3851	0.0732	0.4696	0.9771	0.0303	0.1692
		SAL	0.5058	0.6924	0.4116	0.0731	0.4763	0.9363	0.0000	0.1648
		STL	0.4840	0.6013	0.3379	0.0650	0.4676	0.8928	0.0714	0.1573
	8	RAN	0.4895	0.6693	0.3939	0.0782	0.4646	0.9524	0.1463	0.1658
		SAL	0.4870	0.5608	0.4050	0.0400	0.4583	0.9502	0.1042	0.1627
		STL	0.4762	0.6163	0.3593	0.0619	0.4638	0.8980	0.0857	0.1519
	16	RAN	0.4965	0.6961	0.3142	0.0889	0.4709	0.9421	0.0000	0.1724
		SAL	0.4962	0.6383	0.3804	0.0677	0.4714	0.9358	0.1111	0.1564
		STL	0.4746	0.6163	0.3733	0.0591	0.4628	0.8980	0.1379	0.1440

Table F.8: grouped-liblinear-twitter-GM2-ALL-ALL-10

GM2										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.2618	0.3285	0.2022	0.0403	0.2437	0.8399	0.0000	0.1704
		SAL	0.2694	0.3163	0.2364	0.0237	0.2376	0.7742	0.0000	0.1790
		STL	0.2613	0.3004	0.1882	0.0369	0.2498	0.8473	0.0000	0.1706
	1	RAN	0.3556	0.3991	0.3017	0.0342	0.3266	0.9299	0.0000	0.1729
		SAL	0.3512	0.4945	0.2926	0.0698	0.3227	0.9037	0.0000	0.1790
		STL	0.3338	0.4079	0.2702	0.0418	0.3186	0.8871	0.0000	0.1689
	2	RAN	0.3525	0.4076	0.2881	0.0379	0.3219	0.8880	0.0000	0.1689
		SAL	0.3555	0.4433	0.2642	0.0587	0.3285	0.9542	0.0000	0.1683
		STL	0.3313	0.4132	0.2655	0.0500	0.3154	0.8618	0.0241	0.1658
	4	RAN	0.3577	0.4149	0.3246	0.0338	0.3291	0.8548	0.0000	0.1675
		SAL	0.3598	0.4450	0.3107	0.0441	0.3372	0.9438	0.0345	0.1718
		STL	0.3403	0.4418	0.2665	0.0576	0.3249	0.8463	0.0000	0.1681
	8	RAN	0.3551	0.4446	0.2818	0.0548	0.3224	0.9011	0.0000	0.1673
		SAL	0.3533	0.4469	0.3027	0.0480	0.3249	0.9136	0.0000	0.1711
		STL	0.3253	0.4172	0.2535	0.0541	0.3132	0.8767	0.0682	0.1608
	16	RAN	0.3463	0.4218	0.2916	0.0476	0.3175	0.9213	0.0000	0.1831
		SAL	0.3572	0.4682	0.2755	0.0805	0.3310	0.8782	0.0313	0.1664
		STL	0.3276	0.4381	0.2419	0.0648	0.3166	0.8436	0.0000	0.1707

Table F.9: grouped-liblinear-twitter-GM2-ALL-ALL-25

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.2089	0.2220	0.1947	0.0112	0.1974	0.8315	0.0000	0.1739
		SAL	0.2107	0.2265	0.1860	0.0177	0.2008	0.8333	0.0000	0.1720
		STL	0.2095	0.2745	0.1587	0.0484	0.2034	0.8333	0.0000	0.1736
	1	RAN	0.2702	0.3381	0.2310	0.0482	0.2478	0.8592	0.0000	0.1705
		SAL	0.2781	0.3185	0.2483	0.0296	0.2458	0.8750	0.0000	0.1685
		STL	0.2555	0.3090	0.2275	0.0378	0.2424	0.8661	0.0000	0.1744
	2	RAN	0.2701	0.2863	0.2559	0.0125	0.2423	0.8521	0.0000	0.1803
		SAL	0.2794	0.3221	0.2116	0.0484	0.2533	0.8777	0.0000	0.1780
		STL	0.2625	0.3178	0.2331	0.0391	0.2454	0.8571	0.0000	0.1802
	4	RAN	0.2742	0.3019	0.2591	0.0196	0.2442	0.8473	0.0000	0.1724
		SAL	0.2842	0.3006	0.2567	0.0195	0.2510	0.8760	0.0000	0.1741
		STL	0.2662	0.3236	0.2372	0.0406	0.2441	0.8689	0.0000	0.1759
	8	RAN	0.2773	0.3057	0.2445	0.0252	0.2490	0.8218	0.0000	0.1678
		SAL	0.2780	0.2855	0.2718	0.0057	0.2494	0.8686	0.0000	0.1742
		STL	0.2767	0.3297	0.2427	0.0380	0.2578	0.8571	0.0000	0.1806

Table F.10: grouped-liblinear-twitter-GM2-ALL-ALL-50

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.1731	0.2186	0.1277	0.0455	0.1724	0.7893	0.0000	0.1690
		SAL	0.1869	0.1948	0.1789	0.0079	0.1742	0.7926	0.0000	0.1712
		STL	0.1801	0.2027	0.1576	0.0225	0.1721	0.7589	0.0000	0.1587
	1	RAN	0.2398	0.2568	0.2227	0.0170	0.2098	0.8914	0.0000	0.1693
		SAL	0.2410	0.2861	0.1960	0.0451	0.2205	0.8647	0.0000	0.1747
		STL	0.2242	0.2523	0.1960	0.0282	0.2137	0.8402	0.0000	0.1703
	2	RAN	0.2430	0.2518	0.2341	0.0088	0.2147	0.8397	0.0000	0.1748
		SAL	0.2395	0.2697	0.2093	0.0302	0.2119	0.8027	0.0000	0.1694
		STL	0.2238	0.2609	0.1867	0.0371	0.2124	0.8353	0.0000	0.1688
	4	RAN	0.2424	0.2688	0.2160	0.0264	0.2097	0.8372	0.0000	0.1712
		SAL	0.2356	0.2556	0.2156	0.0200	0.2082	0.8615	0.0000	0.1710
		STL	0.2309	0.2778	0.1841	0.0469	0.2155	0.8291	0.0000	0.1666
	8	RAN	0.2359	0.2575	0.2143	0.0216	0.2135	0.8259	0.0000	0.1699
		SAL	0.2445	0.2672	0.2219	0.0227	0.2155	0.8600	0.0000	0.1805
		STL	0.2257	0.2672	0.1843	0.0415	0.2150	0.8160	0.0000	0.1737

Table F.11: grouped-liblinear-twitter-GM2-ALL-ALL-75

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.1466	0.1466	0.1466	0.0000	0.1383	0.7754	0.0000	0.1565
		SAL	0.1554	0.1554	0.1554	0.0000	0.1466	0.8092	0.0000	0.1624
		STL	0.1554	0.1554	0.1554	0.0000	0.1466	0.8092	0.0000	0.1624
	1	RAN	0.1882	0.1882	0.1882	0.0000	0.1610	0.7742	0.0000	0.1642
		SAL	0.1893	0.1893	0.1893	0.0000	0.1683	0.7241	0.0000	0.1618
		STL	0.1893	0.1893	0.1893	0.0000	0.1683	0.7241	0.0000	0.1618
	2	RAN	0.1874	0.1874	0.1874	0.0000	0.1584	0.8385	0.0000	0.1714
		SAL	0.1830	0.1830	0.1830	0.0000	0.1612	0.7421	0.0000	0.1653
		STL	0.1830	0.1830	0.1830	0.0000	0.1612	0.7421	0.0000	0.1653
	4	RAN	0.1809	0.1809	0.1809	0.0000	0.1573	0.7458	0.0000	0.1599
		SAL	0.1888	0.1888	0.1888	0.0000	0.1662	0.7143	0.0000	0.1638
		STL	0.1888	0.1888	0.1888	0.0000	0.1662	0.7143	0.0000	0.1638

Table F.12: grouped-liblinear-twitter-GM2-ALL-ALL-150

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.2775	0.4753	0.1687	0.0584	0.1980	0.6443	0.0000	0.1541
		SAL	0.2754	0.5119	0.1805	0.0606	0.1990	0.6715	0.0000	0.1498
		STL	0.2763	0.4075	0.2085	0.0483	0.2016	0.5846	0.0000	0.1488
	1	RAN	0.5972	0.8029	0.4040	0.0855	0.5712	0.9498	0.1887	0.1491
		SAL	0.5876	0.8362	0.4503	0.0896	0.5650	0.9494	0.1667	0.1503
		STL	0.5756	0.7406	0.4249	0.0715	0.5609	0.9286	0.2373	0.1405
	2	RAN	0.5836	0.7339	0.4037	0.0852	0.5587	0.9237	0.0845	0.1523
		SAL	0.5885	0.7639	0.3689	0.0879	0.5700	0.9457	0.1017	0.1449
		STL	0.5686	0.7365	0.4480	0.0755	0.5496	0.9105	0.2000	0.1483
	4	SAL	0.5900	0.7832	0.4274	0.0883	0.5684	0.9064	0.1967	0.1439
		STL	0.5635	0.7406	0.3838	0.0707	0.5481	0.9147	0.1972	0.1421
		RAN	0.5905	0.7827	0.4317	0.0894	0.5716	0.9389	0.2295	0.1456
	8	SAL	0.5784	0.7253	0.4162	0.0701	0.5546	0.9506	0.1818	0.1419
		STL	0.5757	0.7365	0.4249	0.0657	0.5596	0.9105	0.2059	0.1438
		RAN	0.5819	0.8039	0.4245	0.0911	0.5643	0.9278	0.1231	0.1463
	16	SAL	0.5800	0.7916	0.4084	0.0966	0.5632	0.9104	0.1765	0.1517
		STL	0.5661	0.7365	0.4176	0.0710	0.5534	0.9105	0.0625	0.1389

Table F.13: grouped-liblinear-twitter-GM5-ALL-ALL-5

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.1740	0.2808	0.1212	0.0355	0.1302	0.5538	0.0000	0.1202
		SAL	0.1727	0.2811	0.0961	0.0439	0.1221	0.5294	0.0000	0.1157
		STL	0.1688	0.2530	0.1313	0.0304	0.1192	0.5625	0.0000	0.1155
	1	RAN	0.4394	0.5487	0.3428	0.0598	0.4153	0.8931	0.0519	0.1602
		SAL	0.4520	0.5825	0.3247	0.0719	0.4245	0.9237	0.0741	0.1673
		STL	0.4234	0.5439	0.3402	0.0588	0.4053	0.8485	0.0597	0.1544
	2	RAN	0.4501	0.5657	0.3178	0.0665	0.4290	0.9272	0.0000	0.1542
		SAL	0.4401	0.5567	0.3453	0.0618	0.4169	0.9302	0.0519	0.1657
		STL	0.4244	0.5439	0.3108	0.0618	0.4088	0.8640	0.0345	0.1521
	4	RAN	0.4540	0.5758	0.3693	0.0569	0.4296	0.9272	0.0000	0.1579
		SAL	0.4499	0.5550	0.3482	0.0490	0.4219	0.8923	0.0000	0.1614
		STL	0.4198	0.5439	0.3059	0.0623	0.4063	0.8500	0.0328	0.1522
	8	RAN	0.4431	0.6007	0.3683	0.0619	0.4227	0.9219	0.1067	0.1521
		SAL	0.4519	0.5438	0.3591	0.0466	0.4204	0.9134	0.0741	0.1611
		STL	0.4246	0.5439	0.3375	0.0579	0.4122	0.8485	0.0385	0.1483
	16	RAN	0.4564	0.5563	0.3924	0.0554	0.4276	0.9213	0.0370	0.1635
		SAL	0.4538	0.6258	0.3294	0.0925	0.4311	0.9160	0.0779	0.1685
		STL	0.4142	0.5366	0.2951	0.0649	0.3996	0.8321	0.0328	0.1502

Table F.14: grouped-liblinear-twitter-GM5-ALL-ALL-10

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.1053	0.1493	0.0851	0.0211	0.0916	0.6154	0.0000	0.1161
		SAL	0.1088	0.1677	0.0717	0.0319	0.0881	0.5075	0.0000	0.1101
		STL	0.1039	0.1480	0.0816	0.0217	0.0861	0.5758	0.0000	0.1157
	1	RAN	0.2969	0.3466	0.2487	0.0297	0.2722	0.8872	0.0000	0.1590
		SAL	0.3133	0.3718	0.2607	0.0398	0.2856	0.9105	0.0000	0.1670
		STL	0.2932	0.3498	0.2378	0.0332	0.2773	0.8346	0.0000	0.1593
	2	RAN	0.3113	0.3874	0.2285	0.0510	0.2880	0.8913	0.0000	0.1678
		SAL	0.3080	0.3700	0.2576	0.0447	0.2838	0.8973	0.0000	0.1609
		STL	0.2958	0.3352	0.1840	0.0518	0.2801	0.8197	0.0196	0.1655
	4	RAN	0.3019	0.3746	0.2493	0.0436	0.2771	0.8613	0.0000	0.1570
		SAL	0.3050	0.3749	0.2491	0.0413	0.2808	0.8627	0.0000	0.1655
		STL	0.2897	0.3382	0.2324	0.0348	0.2701	0.8217	0.0000	0.1613

Table F.15: grouped-liblinear-twitter-GM5-ALL-ALL-25

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.0827	0.1043	0.0668	0.0158	0.0793	0.5205	0.0000	0.1092
		SAL	0.0809	0.1060	0.0666	0.0178	0.0835	0.5333	0.0000	0.1187
		STL	0.0780	0.0908	0.0678	0.0096	0.0749	0.5373	0.0000	0.1089
	1	RAN	0.2249	0.2511	0.1950	0.0231	0.2079	0.8759	0.0000	0.1559
		SAL	0.2266	0.2574	0.1834	0.0315	0.2066	0.8636	0.0000	0.1527
		STL	0.2220	0.2457	0.1952	0.0207	0.2042	0.7729	0.0000	0.1499
	2	RAN	0.2190	0.2327	0.2035	0.0120	0.2011	0.8803	0.0000	0.1486
		SAL	0.2329	0.3069	0.1935	0.0524	0.2146	0.8519	0.0000	0.1633
		STL	0.2190	0.2430	0.1884	0.0228	0.2020	0.7846	0.0000	0.1528

Table F.16: grouped-liblinear-twitter-GM5-ALL-ALL-50

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.0633	0.0681	0.0585	0.0048	0.0625	0.4571	0.0000	0.0971
		SAL	0.0607	0.0792	0.0421	0.0186	0.0624	0.4595	0.0000	0.0943
		STL	0.0690	0.0764	0.0617	0.0073	0.0725	0.5392	0.0000	0.1127
	1	RAN	0.1991	0.2074	0.1907	0.0084	0.1790	0.8326	0.0000	0.1519
		SAL	0.1901	0.1943	0.1859	0.0042	0.1714	0.8669	0.0000	0.1535
		STL	0.1815	0.2133	0.1496	0.0318	0.1668	0.7969	0.0000	0.1486
	2	RAN	0.1944	0.2180	0.1708	0.0236	0.1707	0.8211	0.0000	0.1469
		SAL	0.1925	0.1979	0.1870	0.0054	0.1668	0.8201	0.0000	0.1520
		STL	0.1789	0.1904	0.1673	0.0115	0.1680	0.7333	0.0000	0.1446

Table F.17: grouped-liblinear-twitter-GM5-ALL-ALL-75

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.0573	0.0573	0.0573	0.0000	0.0623	0.5363	0.0000	0.1016
		SAL	0.0667	0.0667	0.0667	0.0000	0.0749	0.5443	0.0000	0.1102
		STL	0.0667	0.0667	0.0667	0.0000	0.0749	0.5443	0.0000	0.1102
	1	RAN	0.1402	0.1402	0.1402	0.0000	0.1270	0.7500	0.0000	0.1360
		SAL	0.1398	0.1398	0.1398	0.0000	0.1388	0.7399	0.0000	0.1426
		STL	0.1398	0.1398	0.1398	0.0000	0.1388	0.7399	0.0000	0.1426

Table F.18: grouped-liblinear-twitter-GM5-ALL-ALL-150

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.5516	0.8313	0.3737	0.0851	0.5171	0.9360	0.0000	0.1613
		SAL	0.5413	0.7271	0.4077	0.0823	0.5003	0.9125	0.0000	0.1754
		STL	0.5286	0.7248	0.3916	0.0846	0.5004	0.9206	0.0656	0.1620
	1	RAN	0.5237	0.7348	0.3734	0.0767	0.4901	0.9308	0.0000	0.1701
		SAL	0.5472	0.7360	0.3782	0.0744	0.5070	0.9213	0.0385	0.1749
		STL	0.5227	0.6789	0.3935	0.0718	0.5016	0.9237	0.0000	0.1594
	2	RAN	0.5529	0.6855	0.3850	0.0687	0.5190	0.9375	0.0800	0.1623
		SAL	0.5518	0.7269	0.4286	0.0748	0.5138	0.8897	0.0435	0.1701
		STL	0.5295	0.6789	0.4142	0.0642	0.5047	0.9231	0.0000	0.1559
	4	RAN	0.5455	0.7530	0.3571	0.0896	0.5146	0.9344	0.0370	0.1655
		SAL	0.5573	0.7538	0.4223	0.0816	0.5217	0.9354	0.0435	0.1705
		STL	0.5167	0.6748	0.3966	0.0730	0.4917	0.9237	0.0000	0.1677
	8	RAN	0.5486	0.8297	0.4236	0.0909	0.5209	0.9290	0.0513	0.1596
		SAL	0.5487	0.7169	0.3908	0.0828	0.5056	0.8930	0.0385	0.1772
		STL	0.5241	0.6789	0.3935	0.0756	0.4989	0.9237	0.0000	0.1616
	16	RAN	0.5473	0.7285	0.3780	0.0773	0.5080	0.9105	0.0000	0.1802
		SAL	0.5471	0.7564	0.4084	0.0801	0.5015	0.9416	0.0000	0.1787
		STL	0.5214	0.6775	0.3966	0.0698	0.4965	0.9237	0.0000	0.1623

Table F.19: grouped-liblinear-twitter-GB3-ALL-ALL-5

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.4323	0.5419	0.3306	0.0708	0.3973	0.8931	0.0000	0.1751
		SAL	0.4251	0.5716	0.3021	0.0693	0.3946	0.9302	0.0000	0.1727
		STL	0.4118	0.5448	0.3267	0.0572	0.3819	0.9015	0.0000	0.1714
	1	RAN	0.4203	0.5008	0.3237	0.0515	0.3793	0.8806	0.0000	0.1743
		SAL	0.4268	0.5795	0.2998	0.0774	0.3916	0.8655	0.0000	0.1846
		STL	0.4150	0.5289	0.3373	0.0573	0.3897	0.8727	0.0308	0.1603
	2	RAN	0.4277	0.6907	0.3418	0.0837	0.3982	0.9049	0.0000	0.1809
		SAL	0.4239	0.5714	0.3259	0.0686	0.3921	0.8947	0.0385	0.1685
		STL	0.4146	0.5289	0.3365	0.0600	0.3910	0.8750	0.0000	0.1634
	4	RAN	0.4325	0.5960	0.3114	0.0791	0.3947	0.9127	0.0000	0.1880
		SAL	0.4286	0.5818	0.3194	0.0625	0.3922	0.9231	0.0000	0.1746
		STL	0.4066	0.5280	0.3317	0.0584	0.3827	0.8750	0.0000	0.1635
	8	RAN	0.4295	0.5868	0.3045	0.0738	0.3980	0.9266	0.0000	0.1783
		SAL	0.4298	0.5508	0.3273	0.0758	0.3988	0.8947	0.0000	0.1798
		STL	0.4145	0.5297	0.3274	0.0600	0.3914	0.8750	0.0000	0.1606
	16	RAN	0.4380	0.5621	0.3144	0.0690	0.4078	0.9183	0.0000	0.1714
		SAL	0.4291	0.5633	0.3351	0.0633	0.3887	0.9147	0.0000	0.1798
		STL	0.4043	0.5297	0.3278	0.0622	0.3826	0.8750	0.0000	0.1642

Table F.20: grouped-liblinear-twitter-GB3-ALL-ALL-10

GB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.3201	0.3997	0.2486	0.0509	0.2917	0.8433	0.0000	0.1746
		SAL	0.3170	0.3983	0.2658	0.0472	0.2898	0.8750	0.0000	0.1755
		STL	0.2998	0.4116	0.2218	0.0567	0.2781	0.8531	0.0000	0.1804
	1	RAN	0.3143	0.3864	0.2626	0.0412	0.2831	0.9147	0.0000	0.1686
		SAL	0.3172	0.3813	0.2666	0.0401	0.2907	0.8923	0.0000	0.1777
		STL	0.2946	0.4029	0.2379	0.0547	0.2772	0.8689	0.0000	0.1712
	2	RAN	0.3193	0.3680	0.2569	0.0437	0.2910	0.8949	0.0000	0.1861
		SAL	0.3118	0.3603	0.2839	0.0301	0.2706	0.8622	0.0000	0.1778
		STL	0.3090	0.4094	0.2572	0.0500	0.2872	0.8647	0.0000	0.1696
	4	RAN	0.3191	0.3886	0.2582	0.0424	0.2805	0.8973	0.0000	0.1748
		SAL	0.3203	0.3957	0.2714	0.0492	0.2893	0.8841	0.0000	0.1716
		STL	0.3002	0.4082	0.2461	0.0557	0.2794	0.8593	0.0000	0.1724
	8	RAN	0.3240	0.3914	0.2693	0.0388	0.3031	0.9286	0.0000	0.1813
		SAL	0.3225	0.3795	0.2862	0.0348	0.2910	0.8806	0.0000	0.1714
		STL	0.2982	0.4164	0.2594	0.0554	0.2794	0.8657	0.0000	0.1702

Table F.21: grouped-liblinear-twitter-GB3-ALL-ALL-25

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.2506	0.2968	0.2038	0.0379	0.2256	0.8992	0.0000	0.1710
		SAL	0.2483	0.2688	0.2372	0.0145	0.2229	0.8540	0.0000	0.1659
		STL	0.2411	0.2883	0.1960	0.0377	0.2235	0.8298	0.0000	0.1658
	1	RAN	0.2412	0.2821	0.2077	0.0309	0.2161	0.8679	0.0000	0.1683
		SAL	0.2572	0.2728	0.2349	0.0161	0.2292	0.8561	0.0000	0.1686
		STL	0.2412	0.3082	0.1949	0.0485	0.2299	0.8864	0.0000	0.1811
	2	RAN	0.2494	0.2622	0.2352	0.0110	0.2229	0.8812	0.0000	0.1712
		SAL	0.2558	0.2942	0.2224	0.0295	0.2295	0.8872	0.0000	0.1661
		STL	0.2344	0.3034	0.1923	0.0492	0.2205	0.9008	0.0000	0.1717
	4	RAN	0.2532	0.2633	0.2403	0.0096	0.2284	0.8978	0.0000	0.1686
		SAL	0.2626	0.2964	0.2126	0.0361	0.2320	0.8699	0.0000	0.1670
		STL	0.2520	0.3163	0.2019	0.0478	0.2396	0.8764	0.0000	0.1725

Table F.22: grouped-liblinear-twitter-GB3-ALL-ALL-50

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.2035	0.2139	0.1931	0.0104	0.1888	0.8496	0.0000	0.1631
		SAL	0.2193	0.2325	0.2060	0.0133	0.1972	0.8530	0.0000	0.1658
		STL	0.2170	0.2497	0.1842	0.0328	0.2029	0.8235	0.0000	0.1732
	1	RAN	0.2184	0.2477	0.1891	0.0293	0.1915	0.8071	0.0000	0.1657
		SAL	0.2143	0.2442	0.1845	0.0299	0.1898	0.8803	0.0000	0.1667
		STL	0.2138	0.2472	0.1803	0.0335	0.1934	0.8561	0.0000	0.1654
	2	RAN	0.2193	0.2448	0.1937	0.0256	0.2010	0.8989	0.0000	0.1717
		SAL	0.2243	0.2421	0.2065	0.0178	0.1980	0.8520	0.0000	0.1678
		STL	0.2085	0.2433	0.1736	0.0348	0.1924	0.8692	0.0000	0.1746
	4	RAN	0.2226	0.2324	0.2128	0.0098	0.1930	0.8846	0.0000	0.1698
		SAL	0.2244	0.2648	0.1840	0.0404	0.1947	0.8722	0.0000	0.1672
		STL	0.2120	0.2428	0.1812	0.0308	0.1985	0.8682	0.0000	0.1696

Table F.23: grouped-liblinear-twitter-GB3-ALL-ALL-75

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.1825	0.1825	0.1825	0.0000	0.1573	0.8100	0.0000	0.1522
		SAL	0.1696	0.1696	0.1696	0.0000	0.1484	0.8357	0.0000	0.1498
		STL	0.1696	0.1696	0.1696	0.0000	0.1484	0.8357	0.0000	0.1498
	1	RAN	0.1813	0.1813	0.1813	0.0000	0.1581	0.8192	0.0000	0.1611
		SAL	0.1796	0.1796	0.1796	0.0000	0.1562	0.8125	0.0000	0.1509
		STL	0.1796	0.1796	0.1796	0.0000	0.1562	0.8125	0.0000	0.1509
	2	RAN	0.1758	0.1758	0.1758	0.0000	0.1528	0.7723	0.0000	0.1577
		SAL	0.1746	0.1746	0.1746	0.0000	0.1568	0.8182	0.0000	0.1558
		STL	0.1746	0.1746	0.1746	0.0000	0.1568	0.8182	0.0000	0.1558

Table F.24: grouped-liblinear-twitter-GB3-ALL-ALL-150

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.5481	0.6885	0.3680	0.0785	0.5141	0.9272	0.0941	0.1632
		SAL	0.5564	0.7559	0.3794	0.0880	0.5289	0.9513	0.0000	0.1634
		STL	0.5245	0.6680	0.3774	0.0752	0.5001	0.9206	0.0299	0.1644
	1	RAN	0.5480	0.7148	0.4186	0.0746	0.5107	0.9362	0.0952	0.1659
		SAL	0.5525	0.7747	0.4000	0.0710	0.5169	0.9290	0.0000	0.1637
		STL	0.5168	0.6748	0.4059	0.0676	0.4911	0.9237	0.0000	0.1633
	2	RAN	0.5426	0.7221	0.3867	0.0812	0.5010	0.9302	0.0400	0.1739
		SAL	0.5623	0.7651	0.3934	0.0786	0.5259	0.9425	0.0000	0.1714
		STL	0.5233	0.6734	0.3731	0.0720	0.4984	0.9194	0.0000	0.1591
	4	RAN	0.5435	0.6757	0.3967	0.0789	0.5120	0.9434	0.0435	0.1691
		SAL	0.5509	0.7747	0.3934	0.0845	0.5152	0.9333	0.0000	0.1704
		STL	0.5230	0.6762	0.4059	0.0712	0.4983	0.9237	0.0000	0.1619
	8	RAN	0.5520	0.7570	0.4263	0.0827	0.5113	0.9457	0.0000	0.1743
		SAL	0.5549	0.7747	0.4000	0.0893	0.5177	0.9425	0.0000	0.1794
		STL	0.5211	0.6775	0.4143	0.0701	0.4961	0.9280	0.0000	0.1609
	16	RAN	0.5459	0.7647	0.3704	0.0862	0.5088	0.9333	0.0000	0.1626
		SAL	0.5557	0.7773	0.4372	0.0780	0.5218	0.9278	0.0000	0.1649
		STL	0.5200	0.6775	0.4022	0.0665	0.4963	0.9280	0.0000	0.1672

Table F.25: grouped-liblinear-twitter-OSB3-ALL-ALL-5

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.4272	0.5191	0.3284	0.0617	0.3974	0.9261	0.0000	0.1711
		SAL	0.4408	0.5520	0.3268	0.0575	0.4043	0.8621	0.0000	0.1739
		STL	0.4135	0.5473	0.3216	0.0532	0.3944	0.8759	0.0426	0.1547
	1	RAN	0.4373	0.5798	0.3328	0.0678	0.4050	0.9453	0.0000	0.1793
		SAL	0.4370	0.5847	0.3219	0.0643	0.4003	0.8832	0.0000	0.1769
		STL	0.4122	0.5331	0.3226	0.0581	0.3864	0.8664	0.0299	0.1756
	2	RAN	0.4246	0.5667	0.3483	0.0546	0.3893	0.9125	0.0000	0.1763
		SAL	0.4369	0.5802	0.3380	0.0629	0.4012	0.8812	0.0000	0.1809
		STL	0.4151	0.5322	0.3280	0.0536	0.3902	0.8633	0.0000	0.1727
	4	RAN	0.4239	0.6093	0.3043	0.0825	0.3891	0.9375	0.0000	0.1804
		SAL	0.4318	0.6031	0.3051	0.0734	0.3947	0.8679	0.0000	0.1812
		STL	0.4193	0.5322	0.3495	0.0479	0.3956	0.8664	0.0392	0.1696
	8	RAN	0.4326	0.5522	0.3042	0.0617	0.3967	0.9358	0.0000	0.1841
		SAL	0.4344	0.6031	0.3219	0.0814	0.4011	0.9057	0.0000	0.1818
		STL	0.4178	0.5322	0.3247	0.0555	0.3939	0.8664	0.0328	0.1734

Table F.26: grouped-liblinear-twitter-OSB3-ALL-ALL-10

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.3047	0.3761	0.2584	0.0478	0.2748	0.8722	0.0000	0.1747
		SAL	0.3148	0.3923	0.2331	0.0595	0.2924	0.8647	0.0000	0.1755
		STL	0.3055	0.4086	0.2393	0.0511	0.2876	0.8731	0.0000	0.1790
	1	RAN	0.3188	0.4382	0.2234	0.0653	0.2824	0.8837	0.0000	0.1826
		SAL	0.3235	0.3714	0.2589	0.0388	0.2919	0.8945	0.0000	0.1816
		STL	0.3012	0.4021	0.2604	0.0501	0.2873	0.8571	0.0000	0.1722
	2	RAN	0.3146	0.3747	0.2557	0.0390	0.2824	0.9112	0.0000	0.1774
		SAL	0.3142	0.3713	0.2617	0.0436	0.2833	0.8741	0.0000	0.1792
		STL	0.2898	0.4078	0.2144	0.0593	0.2733	0.8529	0.0000	0.1705

Table F.27: grouped-liblinear-twitter-OSB3-ALL-ALL-25

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.2524	0.2630	0.2319	0.0145	0.2311	0.8550	0.0000	0.1770
		SAL	0.2589	0.2913	0.2137	0.0329	0.2327	0.8686	0.0000	0.1697
		STL	0.2446	0.2880	0.2023	0.0350	0.2242	0.8456	0.0000	0.1715
	1	RAN	0.2527	0.3057	0.2138	0.0388	0.2268	0.8727	0.0000	0.1742
		SAL	0.2521	0.2849	0.2251	0.0247	0.2250	0.8464	0.0000	0.1739
		STL	0.2505	0.3164	0.2046	0.0478	0.2323	0.8897	0.0000	0.1766

Table F.28: grouped-liblinear-twitter-OSB3-ALL-ALL-50

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.2263	0.2300	0.2227	0.0037	0.2002	0.8374	0.0000	0.1650
		SAL	0.2221	0.2493	0.1949	0.0272	0.1998	0.8839	0.0000	0.1735
		STL	0.2148	0.2482	0.1815	0.0334	0.2028	0.8561	0.0000	0.1740
	1	RAN	0.2217	0.2519	0.1916	0.0302	0.1933	0.8692	0.0000	0.1698
		SAL	0.2370	0.2722	0.2019	0.0351	0.2077	0.7818	0.0000	0.1640
		STL	0.2177	0.2498	0.1856	0.0321	0.1992	0.8303	0.0000	0.1736

Table F.29: grouped-liblinear-twitter-OSB3-ALL-ALL-75

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.1839	0.1839	0.1839	0.0000	0.1609	0.8043	0.0000	0.1509
		SAL	0.1705	0.1705	0.1705	0.0000	0.1566	0.8239	0.0000	0.1542
		STL	0.1705	0.1705	0.1705	0.0000	0.1566	0.8239	0.0000	0.1542

Table F.30: grouped-liblinear-twitter-OSB3-ALL-ALL-150

APPENDIX G:

Grouped Naive Bayes Results for the ENRON Email Corpus

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.7112	0.8965	0.5604	0.0942	0.3205	0.9529	0.0000	0.3517
		SAL	0.6942	0.8457	0.4841	0.0881	0.2498	0.9165	0.0000	0.3264
		STL	0.7591	0.9114	0.4815	0.0937	0.7347	0.9730	0.0000	0.1714
	1	RAN	0.6223	0.8864	0.2937	0.1626	0.4969	0.9407	0.0000	0.2549
		SAL	0.6009	0.8448	0.2985	0.1576	0.4483	0.9110	0.0000	0.2488
		STL	0.7091	0.8601	0.4875	0.0791	0.6762	0.9453	0.0000	0.1760
	2	RAN	0.6337	0.8877	0.2256	0.1662	0.5208	0.9420	0.0000	0.2563
		SAL	0.6075	0.8704	0.2926	0.1574	0.4534	0.9173	0.0000	0.2476
		STL	0.7103	0.8612	0.5096	0.0766	0.6787	0.9467	0.0000	0.1729
	4	RAN	0.6545	0.8717	0.2898	0.1469	0.5182	0.9198	0.0000	0.2631
		SAL	0.6134	0.8724	0.3059	0.1559	0.4570	0.9186	0.0000	0.2476
		STL	0.7150	0.8606	0.5176	0.0764	0.6827	0.9483	0.0000	0.1730
	8	RAN	0.6253	0.8864	0.2950	0.1491	0.4916	0.9398	0.0000	0.2540
		SAL	0.6184	0.8729	0.3070	0.1541	0.4618	0.9235	0.0000	0.2480
		STL	0.7167	0.8622	0.5217	0.0756	0.6850	0.9494	0.0000	0.1714
	16	RAN	0.6658	0.8698	0.2551	0.1582	0.5233	0.9173	0.0000	0.2575
		SAL	0.6172	0.8599	0.2724	0.1629	0.4627	0.9276	0.0000	0.2480
		STL	0.7158	0.8628	0.5256	0.0752	0.6840	0.9513	0.0000	0.1715

Table G.1: grouped-nb-enron-GM1-ALL-ALL-5

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.5658	0.7384	0.3311	0.1193	0.1854	0.8975	0.0000	0.2631
		SAL	0.5240	0.7271	0.3841	0.0955	0.1419	0.9164	0.0000	0.2302
		STL	0.6406	0.7663	0.5204	0.0710	0.6089	0.9144	0.0000	0.1999
	1	RAN	0.4851	0.6974	0.2923	0.1199	0.3867	0.8844	0.0000	0.2229
		SAL	0.4615	0.6259	0.3234	0.0999	0.3605	0.8191	0.0000	0.2192
		STL	0.6101	0.7117	0.3748	0.0867	0.5791	0.9655	0.0000	0.1960
	2	RAN	0.4861	0.7192	0.2904	0.1308	0.3905	0.8919	0.0000	0.2318
		SAL	0.4692	0.5976	0.2952	0.0933	0.3642	0.8037	0.0000	0.2161
		STL	0.6091	0.7137	0.3918	0.0828	0.5793	0.9157	0.0000	0.1920
	4	RAN	0.5304	0.7545	0.2715	0.1535	0.4113	0.8797	0.0000	0.2443
		SAL	0.4767	0.6021	0.3353	0.0915	0.3706	0.8056	0.0000	0.2167
		STL	0.6145	0.7146	0.4003	0.0822	0.5843	0.9500	0.0000	0.1907
	8	RAN	0.5051	0.6994	0.2647	0.1301	0.3973	0.8365	0.0000	0.2348
		SAL	0.4832	0.6110	0.3375	0.0936	0.3763	0.8063	0.0000	0.2187
		STL	0.6166	0.7164	0.4038	0.0820	0.5864	0.9157	0.0000	0.1897
	16	RAN	0.5172	0.6935	0.2763	0.1387	0.3980	0.9015	0.0000	0.2364
		SAL	0.4788	0.6056	0.3219	0.0886	0.3762	0.8341	0.0000	0.2178
		STL	0.6170	0.7174	0.4079	0.0812	0.5869	0.9500	0.0000	0.1899

Table G.2: grouped-nb-enron-GM1-ALL-ALL-10

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.4141	0.5192	0.3471	0.0548	0.1008	0.8796	0.0000	0.1952
		SAL	0.3826	0.4585	0.2996	0.0622	0.0896	0.8666	0.0000	0.1791
		STL	0.4280	0.5172	0.3652	0.0466	0.3652	0.8750	0.0000	0.2397
	1	RAN	0.3598	0.4587	0.2930	0.0601	0.2919	0.8148	0.0000	0.2012
		SAL	0.3306	0.3737	0.2745	0.0367	0.2805	0.8205	0.0000	0.1863
		STL	0.4964	0.5915	0.3156	0.0916	0.4648	0.9870	0.0000	0.2020
	2	RAN	0.3504	0.4163	0.3035	0.0373	0.2879	0.7757	0.0000	0.1908
		SAL	0.3618	0.4662	0.2822	0.0656	0.2896	0.7686	0.0000	0.1969
		STL	0.4989	0.5964	0.3246	0.0906	0.4688	0.9870	0.0000	0.2005
	4	RAN	0.3616	0.4911	0.2402	0.0871	0.3053	0.8243	0.0000	0.2001
		SAL	0.3690	0.4729	0.2850	0.0654	0.2957	0.7718	0.0000	0.1986
		STL	0.5026	0.5966	0.3294	0.0883	0.4739	0.9870	0.0000	0.1990
	8	RAN	0.3580	0.4243	0.2544	0.0568	0.3017	0.8513	0.0000	0.1990
		SAL	0.3758	0.4772	0.3050	0.0630	0.2989	0.7813	0.0000	0.1991
		STL	0.5041	0.5982	0.3330	0.0871	0.4753	0.9870	0.0000	0.1979
	16	RAN	0.3729	0.4546	0.3235	0.0407	0.3039	0.8175	0.0000	0.1978
		SAL	0.3715	0.4700	0.2909	0.0603	0.2998	0.7713	0.0000	0.1978
		STL	0.5055	0.5986	0.3372	0.0857	0.4761	0.9870	0.0000	0.1981

Table G.3: grouped-nb-enron-GM1-ALL-ALL-25

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.3205	0.4130	0.2686	0.0656	0.0672	0.8599	0.0000	0.1603
		SAL	0.3237	0.3750	0.2792	0.0394	0.0685	0.8667	0.0000	0.1647
		STL	0.2936	0.2978	0.2901	0.0032	0.1921	0.8718	0.0000	0.2142
	1	RAN	0.2744	0.3331	0.2307	0.0431	0.2497	0.8040	0.0000	0.1828
		SAL	0.2623	0.2763	0.2495	0.0110	0.2404	0.7367	0.0000	0.1724
		STL	0.4092	0.4779	0.2728	0.0965	0.3853	0.9157	0.0000	0.2012
	2	RAN	0.2681	0.2885	0.2549	0.0146	0.2486	0.7320	0.0000	0.1797
		SAL	0.2749	0.2802	0.2681	0.0051	0.2459	0.7417	0.0000	0.1773
		STL	0.4144	0.4838	0.2781	0.0964	0.3904	0.9157	0.0000	0.2032
	4	RAN	0.2862	0.3415	0.2526	0.0394	0.2552	0.6896	0.0000	0.1749
		SAL	0.2922	0.3067	0.2778	0.0118	0.2533	0.7423	0.0000	0.1804
		STL	0.4176	0.4842	0.2850	0.0937	0.3949	0.9157	0.0000	0.2014
	8	RAN	0.2819	0.3057	0.2641	0.0175	0.2593	0.7625	0.0000	0.1854
		SAL	0.2865	0.2916	0.2824	0.0038	0.2524	0.7513	0.0000	0.1779
		STL	0.4203	0.4864	0.2885	0.0932	0.3973	0.9157	0.0000	0.2013
	16	RAN	0.2952	0.3505	0.2587	0.0398	0.2585	0.7603	0.0000	0.1842
		SAL	0.3001	0.3139	0.2898	0.0101	0.2596	0.7871	0.0000	0.1854
		STL	0.4218	0.4875	0.2919	0.0919	0.3975	0.9157	0.0000	0.2015

Table G.4: grouped-nb-enron-GM1-ALL-ALL-50

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.3069	0.3441	0.2696	0.0373	0.0618	0.8578	0.0000	0.1515
		SAL	0.2796	0.2988	0.2603	0.0193	0.0579	0.8647	0.0000	0.1534
		STL	0.2871	0.3076	0.2667	0.0204	0.1177	0.8705	0.0000	0.1836
	1	RAN	0.2345	0.2603	0.2087	0.0258	0.2265	0.7585	0.0000	0.1717
		SAL	0.2287	0.2468	0.2106	0.0181	0.2236	0.7277	0.0000	0.1686
		STL	0.3250	0.4048	0.2451	0.0798	0.3197	0.8085	0.0000	0.1872
	2	RAN	0.2518	0.3025	0.2011	0.0507	0.2314	0.7606	0.0000	0.1766
		SAL	0.2589	0.2968	0.2210	0.0379	0.2328	0.6919	0.0000	0.1773
		STL	0.3293	0.4078	0.2509	0.0785	0.3235	0.8172	0.0000	0.1888
	4	RAN	0.2410	0.2438	0.2382	0.0028	0.2283	0.7446	0.0000	0.1714
		SAL	0.2535	0.2814	0.2256	0.0279	0.2354	0.7226	0.0000	0.1774
		STL	0.3337	0.4106	0.2569	0.0768	0.3285	0.8000	0.0000	0.1880
	8	RAN	0.2462	0.2688	0.2237	0.0225	0.2343	0.6904	0.0000	0.1723
		SAL	0.2678	0.3051	0.2305	0.0373	0.2393	0.7048	0.0000	0.1788
		STL	0.3359	0.4115	0.2604	0.0755	0.3295	0.8261	0.0000	0.1896
	16	RAN	0.2676	0.2869	0.2483	0.0193	0.2396	0.7419	0.0000	0.1833
		SAL	0.2588	0.2895	0.2282	0.0307	0.2381	0.7295	0.0000	0.1771
		STL	0.3388	0.4136	0.2639	0.0748	0.3319	0.7917	0.0000	0.1901

Table G.5: grouped-nb-enron-GM1-ALL-ALL-75

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.2450	0.2450	0.2450	0.0000	0.0487	0.8668	0.0000	0.1401
		SAL	0.2451	0.2451	0.2451	0.0000	0.0488	0.8674	0.0000	0.1403
		STL	0.2451	0.2451	0.2451	0.0000	0.0488	0.8674	0.0000	0.1403
	1	RAN	0.1839	0.1839	0.1839	0.0000	0.1942	0.6636	0.0000	0.1582
		SAL	0.1841	0.1841	0.1841	0.0000	0.1935	0.6728	0.0000	0.1572
		STL	0.1841	0.1841	0.1841	0.0000	0.1935	0.6728	0.0000	0.1572
	2	RAN	0.1893	0.1893	0.1893	0.0000	0.1965	0.6773	0.0000	0.1592
		SAL	0.1901	0.1901	0.1901	0.0000	0.1974	0.6735	0.0000	0.1591
		STL	0.1901	0.1901	0.1901	0.0000	0.1974	0.6735	0.0000	0.1591
	4	RAN	0.1956	0.1956	0.1956	0.0000	0.2016	0.6844	0.0000	0.1612
		SAL	0.1955	0.1955	0.1955	0.0000	0.2016	0.6801	0.0000	0.1600
		STL	0.1955	0.1955	0.1955	0.0000	0.2016	0.6801	0.0000	0.1600
	8	RAN	0.1989	0.1989	0.1989	0.0000	0.2031	0.6986	0.0000	0.1618
		SAL	0.1991	0.1991	0.1991	0.0000	0.2036	0.6801	0.0000	0.1615
		STL	0.1991	0.1991	0.1991	0.0000	0.2036	0.6801	0.0000	0.1615
	16	RAN	0.2018	0.2018	0.2018	0.0000	0.2052	0.6794	0.0000	0.1622
		SAL	0.2028	0.2028	0.2028	0.0000	0.2056	0.6926	0.0000	0.1630
		STL	0.2028	0.2028	0.2028	0.0000	0.2056	0.6926	0.0000	0.1630

Table G.6: grouped-nb-enron-GM1-ALL-ALL-150

GM2										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.8114	0.9270	0.6573	0.0662	0.4915	0.9781	0.0000	0.3374
		SAL	0.7950	0.9010	0.6311	0.0598	0.4441	0.9555	0.0000	0.3345
		STL	0.8119	0.9337	0.5185	0.0910	0.7841	0.9670	0.0000	0.1661
	1	RAN	0.6333	0.8675	0.2766	0.1733	0.5020	0.9370	0.0000	0.2578
		SAL	0.6308	0.8528	0.2883	0.1638	0.4829	0.9281	0.0000	0.2506
		STL	0.6968	0.8763	0.5445	0.0787	0.6739	0.9529	0.0000	0.1532
	2	RAN	0.7264	0.9132	0.4417	0.1062	0.5780	0.9545	0.0000	0.2582
		SAL	0.6882	0.8550	0.3035	0.1284	0.5210	0.9321	0.0000	0.2516
		STL	0.7186	0.8705	0.6072	0.0766	0.7004	1.0000	0.0000	0.1422
	4	RAN	0.7356	0.8675	0.4845	0.1042	0.5817	0.9253	0.0000	0.2450
		SAL	0.7410	0.8782	0.4797	0.1032	0.5602	0.9559	0.0000	0.2553
		STL	0.7194	0.8899	0.5837	0.0757	0.6987	0.9656	0.0000	0.1439
	8	RAN	0.8166	0.9224	0.6607	0.0680	0.6420	0.9642	0.0000	0.2402
		SAL	0.8242	0.9216	0.5879	0.0723	0.6286	0.9755	0.0000	0.2477
		STL	0.7474	0.8784	0.6321	0.0597	0.7304	0.9630	0.0000	0.1242
	16	RAN	0.8333	0.9489	0.6951	0.0657	0.6524	0.9759	0.0000	0.2473
		SAL	0.8572	0.9347	0.7479	0.0455	0.6354	0.9746	0.0000	0.2634
		STL	0.7571	0.8821	0.5926	0.0649	0.7377	0.9630	0.0000	0.1422

Table G.7: grouped-nb-enron-GM2-ALL-ALL-5

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.7271	0.8713	0.5381	0.0877	0.4106	0.9710	0.0000	0.3276
		SAL	0.6963	0.8205	0.5599	0.0675	0.3439	0.9394	0.0000	0.3055
		STL	0.7393	0.9024	0.5745	0.0901	0.7041	0.9679	0.0000	0.1959
	1	RAN	0.5131	0.7902	0.2541	0.1471	0.4019	0.8853	0.0000	0.2319
		SAL	0.4976	0.6377	0.3167	0.1058	0.3901	0.8932	0.0000	0.2245
		STL	0.6089	0.6987	0.4849	0.0610	0.5794	0.8749	0.0000	0.1824
	2	RAN	0.5793	0.7090	0.3424	0.1013	0.4527	0.8739	0.0000	0.2388
		SAL	0.5539	0.7023	0.3271	0.1131	0.4278	0.8901	0.0000	0.2287
		STL	0.6209	0.7330	0.5128	0.0545	0.5951	0.9655	0.0000	0.1823
	4	RAN	0.6270	0.8022	0.4944	0.0828	0.4931	0.9196	0.0000	0.2395
		SAL	0.6081	0.7190	0.4823	0.0745	0.4607	0.9005	0.0000	0.2312
		STL	0.6302	0.7094	0.5207	0.0585	0.5991	0.9241	0.0000	0.1836
	8	RAN	0.7474	0.8440	0.6015	0.0625	0.5565	0.9400	0.0000	0.2302
		SAL	0.7311	0.8202	0.5846	0.0722	0.5474	0.9410	0.0000	0.2332
		STL	0.6605	0.7617	0.5489	0.0532	0.6345	0.9286	0.0000	0.1705
	16	RAN	0.7656	0.8961	0.5957	0.0807	0.5709	0.9759	0.0000	0.2469
		SAL	0.7818	0.8610	0.6899	0.0460	0.5656	0.9471	0.0000	0.2546
		STL	0.6728	0.7552	0.5735	0.0520	0.6487	0.9500	0.0000	0.1723

Table G.8: grouped-nb-enron-GM2-ALL-ALL-10

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.5975	0.7145	0.4636	0.0953	0.2695	0.9293	0.0000	0.2761
		SAL	0.5942	0.7023	0.4523	0.0743	0.2636	0.9152	0.0000	0.2805
		STL	0.6331	0.7088	0.5554	0.0571	0.5768	0.9737	0.0000	0.2225
	1	RAN	0.3720	0.4786	0.2837	0.0763	0.3161	0.8705	0.0000	0.2091
		SAL	0.3766	0.4937	0.2742	0.0667	0.3146	0.8975	0.0000	0.2092
		STL	0.5011	0.5881	0.4209	0.0580	0.4717	0.8636	0.0000	0.1968
	2	RAN	0.4446	0.5200	0.3110	0.0839	0.3586	0.8620	0.0000	0.2170
		SAL	0.4214	0.4976	0.3305	0.0498	0.3458	0.8644	0.0000	0.2116
		STL	0.5153	0.6078	0.4446	0.0534	0.4907	0.9231	0.0000	0.1869
	4	RAN	0.4960	0.5403	0.4444	0.0348	0.3808	0.8547	0.0000	0.2260
		SAL	0.4878	0.5873	0.4101	0.0570	0.3748	0.9188	0.0000	0.2253
		STL	0.5207	0.5802	0.4948	0.0302	0.4916	0.8941	0.0000	0.1864
	8	RAN	0.6310	0.7008	0.5261	0.0557	0.4663	0.9257	0.0000	0.2214
		SAL	0.6211	0.7139	0.5706	0.0442	0.4560	0.8951	0.0000	0.2196
		STL	0.5605	0.6335	0.5254	0.0355	0.5331	0.9009	0.0000	0.1806
	16	RAN	0.6782	0.7517	0.6019	0.0625	0.4939	0.9191	0.0000	0.2378
		SAL	0.6826	0.7904	0.5595	0.0833	0.4880	0.9275	0.0000	0.2514
		STL	0.5799	0.6454	0.5391	0.0428	0.5538	0.9867	0.0000	0.1885

Table G.9: grouped-nb-enron-GM2-ALL-ALL-25

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.5627	0.5970	0.5242	0.0299	0.2547	0.9063	0.0000	0.2697
		SAL	0.5338	0.5932	0.4515	0.0601	0.2180	0.8959	0.0000	0.2590
		STL	0.5278	0.5459	0.4946	0.0236	0.4315	0.9296	0.0000	0.2511
	1	RAN	0.3025	0.3280	0.2742	0.0220	0.2681	0.7377	0.0000	0.1933
		SAL	0.3090	0.3163	0.3044	0.0052	0.2728	0.8958	0.0000	0.2016
		STL	0.4228	0.4884	0.3114	0.0792	0.3945	0.8132	0.0000	0.2012
	2	RAN	0.3539	0.3809	0.3151	0.0281	0.2984	0.8045	0.0000	0.1988
		SAL	0.3547	0.3661	0.3448	0.0088	0.2971	0.8347	0.0000	0.1989
		STL	0.4408	0.5023	0.3303	0.0783	0.4158	0.8128	0.0000	0.1979
	4	RAN	0.4102	0.4249	0.3939	0.0127	0.3252	0.8479	0.0000	0.2087
		SAL	0.4134	0.4192	0.4044	0.0064	0.3268	0.8974	0.0000	0.2160
		STL	0.4542	0.4894	0.3918	0.0442	0.4233	0.8176	0.0000	0.1953
	8	RAN	0.5480	0.5908	0.5177	0.0311	0.4041	0.8840	0.0000	0.2085
		SAL	0.5554	0.5911	0.5344	0.0253	0.4017	0.8618	0.0000	0.2118
		STL	0.5124	0.5370	0.4971	0.0175	0.4688	0.8941	0.0000	0.1896
	16	RAN	0.6202	0.6477	0.5704	0.0353	0.4438	0.9051	0.0000	0.2349
		SAL	0.6169	0.6972	0.5731	0.0568	0.4410	0.9356	0.0000	0.2435
		STL	0.5301	0.5543	0.4888	0.0294	0.4883	0.9589	0.0000	0.2016

Table G.10: grouped-nb-enron-GM2-ALL-ALL-50

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.5153	0.5296	0.5010	0.0143	0.2140	0.8921	0.0000	0.2510
		SAL	0.5030	0.5128	0.4932	0.0098	0.1989	0.8916	0.0000	0.2485
		STL	0.4987	0.5048	0.4925	0.0062	0.3328	0.8700	0.0000	0.2604
	1	RAN	0.2635	0.2643	0.2626	0.0008	0.2461	0.6999	0.0000	0.1890
		SAL	0.2678	0.3060	0.2295	0.0382	0.2480	0.7862	0.0000	0.1931
		STL	0.3375	0.4085	0.2664	0.0711	0.3161	0.8282	0.0000	0.1847
	2	RAN	0.3145	0.3434	0.2857	0.0289	0.2789	0.7465	0.0000	0.1964
		SAL	0.3092	0.3473	0.2711	0.0381	0.2752	0.8037	0.0000	0.1951
		STL	0.3620	0.4265	0.2974	0.0645	0.3514	0.8235	0.0000	0.1879
	4	RAN	0.3731	0.4061	0.3401	0.0330	0.3039	0.8706	0.0000	0.2099
		SAL	0.3657	0.4049	0.3264	0.0392	0.3012	0.8670	0.0000	0.2100
		STL	0.3900	0.4361	0.3439	0.0461	0.3687	0.8291	0.0000	0.1892
	8	RAN	0.5275	0.5650	0.4901	0.0374	0.3768	0.8579	0.0000	0.2108
		SAL	0.5069	0.5458	0.4681	0.0388	0.3722	0.8737	0.0000	0.2070
		STL	0.4710	0.4795	0.4625	0.0085	0.4212	0.8429	0.0000	0.1836
	16	RAN	0.5897	0.6703	0.5092	0.0806	0.4142	0.9144	0.0000	0.2394
		SAL	0.5758	0.6406	0.5111	0.0647	0.4100	0.8824	0.0000	0.2412
		STL	0.4985	0.5315	0.4654	0.0331	0.4475	0.9143	0.0000	0.2082

Table G.11: grouped-nb-enron-GM2-ALL-ALL-75

GM2										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.4535	0.4535	0.4535	0.0000	0.1703	0.8555	0.0000	0.2304
		SAL	0.4537	0.4537	0.4537	0.0000	0.1708	0.8573	0.0000	0.2301
		STL	0.4537	0.4537	0.4537	0.0000	0.1708	0.8573	0.0000	0.2301
	1	RAN	0.2163	0.2163	0.2163	0.0000	0.2158	0.6874	0.0000	0.1767
		SAL	0.2164	0.2164	0.2164	0.0000	0.2160	0.6834	0.0000	0.1780
		STL	0.2164	0.2164	0.2164	0.0000	0.2160	0.6834	0.0000	0.1780
	2	RAN	0.2593	0.2593	0.2593	0.0000	0.2403	0.7671	0.0000	0.1822
		SAL	0.2601	0.2601	0.2601	0.0000	0.2403	0.7682	0.0000	0.1824
		STL	0.2601	0.2601	0.2601	0.0000	0.2403	0.7682	0.0000	0.1824
	4	RAN	0.3097	0.3097	0.3097	0.0000	0.2657	0.8364	0.0000	0.1964
		SAL	0.3095	0.3095	0.3095	0.0000	0.2660	0.8385	0.0000	0.1972
		STL	0.3095	0.3095	0.3095	0.0000	0.2660	0.8385	0.0000	0.1972
	8	RAN	0.4539	0.4539	0.4539	0.0000	0.3333	0.8287	0.0000	0.2013
		SAL	0.4552	0.4552	0.4552	0.0000	0.3333	0.8334	0.0000	0.2011
		STL	0.4552	0.4552	0.4552	0.0000	0.3333	0.8334	0.0000	0.2011
	16	RAN	0.5058	0.5058	0.5058	0.0000	0.3738	0.8657	0.0000	0.2349
		SAL	0.5063	0.5063	0.5063	0.0000	0.3733	0.8657	0.0000	0.2352
		STL	0.5063	0.5063	0.5063	0.0000	0.3733	0.8657	0.0000	0.2352

Table G.12: grouped-nb-enron-GM2-ALL-ALL-150

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.7692	0.9618	0.6018	0.1082	0.5340	0.9802	0.0000	0.3121
		SAL	0.8106	0.9055	0.6539	0.0704	0.5305	0.9528	0.0000	0.3241
		STL	0.6339	0.8767	0.4180	0.1223	0.5810	0.9870	0.0000	0.2393
	1	RAN	0.7957	0.9380	0.6322	0.0867	0.6377	0.9693	0.0000	0.2332
		SAL	0.8073	0.9197	0.5353	0.0788	0.6169	0.9586	0.0000	0.2497
		STL	0.7421	0.8766	0.6145	0.0651	0.7247	0.9600	0.0000	0.1426
	2	RAN	0.8289	0.9554	0.6859	0.0629	0.6597	0.9806	0.0000	0.2434
		SAL	0.8519	0.9318	0.7022	0.0562	0.6470	1.0000	0.0000	0.2618
		STL	0.7504	0.9077	0.6325	0.0657	0.7327	0.9540	0.0000	0.1362
	4	RAN	0.8427	0.9428	0.6772	0.0533	0.6313	0.9698	0.0000	0.2783
		SAL	0.8553	0.9436	0.7293	0.0428	0.6143	0.9693	0.0000	0.2859
		STL	0.7638	0.9006	0.6265	0.0668	0.7478	0.9500	0.0000	0.1351
	8	RAN	0.8120	0.9372	0.6667	0.0776	0.5955	0.9718	0.0000	0.2812
		SAL	0.8325	0.9241	0.7240	0.0472	0.5585	0.9582	0.0000	0.2960
		STL	0.7747	0.9218	0.6265	0.0740	0.7590	0.9559	0.0000	0.1401
	16	RAN	0.8068	0.9380	0.6991	0.0625	0.5363	0.9676	0.0000	0.3012
		SAL	0.8126	0.9073	0.6810	0.0567	0.5136	0.9494	0.0000	0.3063
		STL	0.7746	0.9065	0.6325	0.0718	0.7596	0.9557	0.0000	0.1391

Table G.13: grouped-nb-enron-GM5-ALL-ALL-5

GM5										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.7371	0.9091	0.5956	0.0726	0.4816	0.9491	0.0000	0.3135
		SAL	0.7413	0.8168	0.6452	0.0565	0.4794	0.9396	0.0000	0.3142
		STL	0.5624	0.8320	0.3708	0.1317	0.5353	0.9870	0.0000	0.2520
	1	RAN	0.7178	0.8903	0.5807	0.0706	0.5411	0.9505	0.0000	0.2318
		SAL	0.7020	0.8310	0.5165	0.0841	0.5309	0.9173	0.0000	0.2269
		STL	0.6472	0.7498	0.5462	0.0643	0.6284	0.9250	0.0000	0.1657
	2	RAN	0.7544	0.8888	0.6724	0.0622	0.5753	0.9466	0.0000	0.2423
		SAL	0.7632	0.8734	0.6045	0.0724	0.5702	0.9409	0.0000	0.2430
		STL	0.6647	0.7891	0.5714	0.0708	0.6460	0.9275	0.0000	0.1618
	4	RAN	0.7575	0.8857	0.6151	0.0698	0.5545	0.9315	0.0000	0.2608
		SAL	0.7746	0.8638	0.6282	0.0632	0.5451	0.9359	0.0000	0.2748
		STL	0.6779	0.7848	0.5526	0.0761	0.6616	0.9444	0.0000	0.1664
	8	RAN	0.7310	0.8473	0.5485	0.0869	0.4717	0.9418	0.0000	0.2702
		SAL	0.7329	0.8184	0.6297	0.0669	0.4656	0.9433	0.0000	0.2772
		STL	0.6869	0.8005	0.5586	0.0830	0.6696	0.9737	0.0000	0.1759
	16	RAN	0.7199	0.8389	0.4791	0.0847	0.4327	0.9548	0.0000	0.2947
		SAL	0.6940	0.8021	0.5511	0.0835	0.3992	0.9386	0.0000	0.2790
		STL	0.6834	0.7931	0.5616	0.0810	0.6685	0.9867	0.0000	0.1765

Table G.14: grouped-nb-enron-GM5-ALL-ALL-10

GM5										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.6434	0.7309	0.5130	0.0775	0.4455	0.9297	0.0000	0.3071
		SAL	0.6732	0.7168	0.5666	0.0525	0.4418	0.9178	0.0000	0.3076
		STL	0.5076	0.7289	0.4074	0.1105	0.4916	0.9744	0.0000	0.2698
	1	RAN	0.6028	0.7185	0.5085	0.0748	0.4394	0.9144	0.0000	0.2220
		SAL	0.5991	0.6973	0.5529	0.0464	0.4385	0.8812	0.0000	0.2177
		STL	0.5522	0.6382	0.5079	0.0417	0.5254	0.9268	0.0000	0.1864
	2	RAN	0.6698	0.6963	0.6157	0.0272	0.4917	0.8946	0.0000	0.2253
		SAL	0.6673	0.7188	0.6446	0.0239	0.4889	0.8985	0.0000	0.2270
		STL	0.5702	0.6659	0.5047	0.0519	0.5431	0.9620	0.0000	0.1840
	4	RAN	0.6709	0.7459	0.5991	0.0609	0.4703	0.9324	0.0000	0.2584
		SAL	0.6765	0.7014	0.6575	0.0159	0.4689	0.8822	0.0000	0.2598
		STL	0.5861	0.6627	0.4969	0.0600	0.5599	0.9444	0.0000	0.1940
	8	RAN	0.6294	0.7127	0.5875	0.0421	0.3859	0.9066	0.0000	0.2616
		SAL	0.5961	0.6366	0.5724	0.0224	0.3662	0.9130	0.0000	0.2548
		STL	0.5726	0.6436	0.5000	0.0465	0.5428	0.9867	0.0000	0.2030
	16	RAN	0.5891	0.6076	0.5691	0.0148	0.3203	0.9140	0.0000	0.2634
		SAL	0.5466	0.5729	0.5154	0.0211	0.2859	0.9126	0.0000	0.2409
		STL	0.5575	0.6254	0.4921	0.0406	0.5264	0.9730	0.0000	0.2115

Table G.15: grouped-nb-enron-GM5-ALL-ALL-25

GM5										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.6165	0.6977	0.5449	0.0628	0.4160	0.9251	0.0000	0.3096
		SAL	0.6224	0.6475	0.5970	0.0206	0.4147	0.9096	0.0000	0.3081
		STL	0.4838	0.6288	0.3783	0.1060	0.4544	0.9600	0.0000	0.2827
	1	RAN	0.5128	0.5454	0.4620	0.0364	0.3799	0.8700	0.0000	0.2134
		SAL	0.5173	0.5303	0.4917	0.0181	0.3783	0.8631	0.0000	0.2125
		STL	0.5007	0.5410	0.4597	0.0332	0.4600	0.9136	0.0000	0.1971
	2	RAN	0.5942	0.6422	0.5384	0.0427	0.4341	0.9067	0.0000	0.2238
		SAL	0.5959	0.6162	0.5765	0.0162	0.4326	0.8889	0.0000	0.2218
		STL	0.5277	0.5604	0.4907	0.0286	0.4779	0.9041	0.0000	0.1944
	4	RAN	0.5791	0.6349	0.4732	0.0749	0.4192	0.8708	0.0000	0.2509
		SAL	0.6179	0.6355	0.6059	0.0127	0.4192	0.8923	0.0000	0.2568
		STL	0.5356	0.5698	0.4859	0.0360	0.4860	0.8986	0.0000	0.2134
	8	RAN	0.5125	0.5991	0.3952	0.0860	0.2985	0.8772	0.0000	0.2387
		SAL	0.5315	0.5655	0.5055	0.0251	0.3084	0.9045	0.0000	0.2436
		STL	0.4985	0.5234	0.4773	0.0190	0.4363	0.8986	0.0000	0.2272
	16	RAN	0.4494	0.5206	0.3570	0.0685	0.2269	0.9072	0.0000	0.2189
		SAL	0.4740	0.5064	0.4419	0.0263	0.2237	0.8982	0.0000	0.2247
		STL	0.4717	0.5027	0.4357	0.0276	0.4012	0.8986	0.0000	0.2360

Table G.16: grouped-nb-enron-GM5-ALL-ALL-50

GM5										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.6083	0.6216	0.5951	0.0132	0.4086	0.9157	0.0000	0.3082
		SAL	0.5978	0.6346	0.5609	0.0368	0.4000	0.9017	0.0000	0.3079
		STL	0.4877	0.5973	0.3780	0.1096	0.4317	0.9444	0.0000	0.2888
	1	RAN	0.4809	0.4897	0.4722	0.0087	0.3491	0.8622	0.0000	0.2108
		SAL	0.4856	0.5150	0.4562	0.0294	0.3503	0.8414	0.0000	0.2088
		STL	0.4500	0.4597	0.4403	0.0097	0.4031	0.8246	0.0000	0.1910
	2	RAN	0.5593	0.5894	0.5291	0.0301	0.4092	0.8707	0.0000	0.2188
		SAL	0.5609	0.5746	0.5471	0.0138	0.4055	0.8847	0.0000	0.2155
		STL	0.4973	0.5170	0.4776	0.0197	0.4377	0.8857	0.0000	0.1953
	4	RAN	0.5787	0.5833	0.5741	0.0046	0.3985	0.8586	0.0000	0.2468
		SAL	0.5722	0.5798	0.5647	0.0076	0.3930	0.8831	0.0000	0.2525
		STL	0.5108	0.5426	0.4791	0.0318	0.4419	0.8720	0.0000	0.2255
	8	RAN	0.4814	0.5279	0.4349	0.0465	0.2771	0.9046	0.0000	0.2352
		SAL	0.4896	0.5072	0.4719	0.0176	0.2744	0.8724	0.0000	0.2384
		STL	0.4664	0.4738	0.4590	0.0074	0.3636	0.8848	0.0000	0.2289
	16	RAN	0.4317	0.4459	0.4176	0.0142	0.1951	0.8947	0.0000	0.2138
		SAL	0.4290	0.4481	0.4100	0.0191	0.1969	0.8697	0.0000	0.2133
		STL	0.4339	0.4690	0.3988	0.0351	0.3157	0.8950	0.0000	0.2352

Table G.17: grouped-nb-enron-GM5-ALL-ALL-75

GM5										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.5661	0.5661	0.5661	0.0000	0.3832	0.9077	0.0000	0.3073
		SAL	0.5657	0.5657	0.5657	0.0000	0.3823	0.9085	0.0000	0.3065
		STL	0.5657	0.5657	0.5657	0.0000	0.3823	0.9085	0.0000	0.3065
	1	RAN	0.4141	0.4141	0.4141	0.0000	0.3101	0.8081	0.0000	0.2001
		SAL	0.4137	0.4137	0.4137	0.0000	0.3097	0.8095	0.0000	0.1995
		STL	0.4137	0.4137	0.4137	0.0000	0.3097	0.8095	0.0000	0.1995
	2	RAN	0.4945	0.4945	0.4945	0.0000	0.3653	0.8565	0.0000	0.2067
		SAL	0.4938	0.4938	0.4938	0.0000	0.3645	0.8586	0.0000	0.2073
		STL	0.4938	0.4938	0.4938	0.0000	0.3645	0.8586	0.0000	0.2073
	4	RAN	0.5127	0.5127	0.5127	0.0000	0.3546	0.8444	0.0000	0.2496
		SAL	0.5125	0.5125	0.5125	0.0000	0.3545	0.8440	0.0000	0.2489
		STL	0.5125	0.5125	0.5125	0.0000	0.3545	0.8440	0.0000	0.2489
	8	RAN	0.4285	0.4285	0.4285	0.0000	0.2320	0.8633	0.0000	0.2195
		SAL	0.4287	0.4287	0.4287	0.0000	0.2322	0.8650	0.0000	0.2195
		STL	0.4287	0.4287	0.4287	0.0000	0.2322	0.8650	0.0000	0.2195
	16	RAN	0.0433	0.0433	0.0433	0.0000	0.0024	0.1148	0.0000	0.0130
		SAL	0.3703	0.3703	0.3703	0.0000	0.1583	0.8920	0.0000	0.1919
		STL	0.3703	0.3703	0.3703	0.0000	0.1583	0.8920	0.0000	0.1919

Table G.18: grouped-nb-enron-GM5-ALL-ALL-150

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.7853	0.9709	0.5772	0.0870	0.5006	0.9852	0.0000	0.3368
		SAL	0.7730	0.9016	0.6315	0.0687	0.4223	0.9392	0.0000	0.3270
		STL	0.8062	0.9319	0.6075	0.0863	0.7812	0.9660	0.0000	0.1475
	1	RAN	0.8290	0.9432	0.5311	0.1033	0.6821	0.9757	0.0000	0.2415
		SAL	0.8449	0.9561	0.4360	0.1173	0.6614	0.9776	0.0000	0.2596
		STL	0.7761	0.9485	0.4815	0.1023	0.7527	0.9776	0.0000	0.1564
	2	RAN	0.8492	0.9669	0.5602	0.1006	0.6945	0.9833	0.0000	0.2540
		SAL	0.8578	0.9550	0.4790	0.1102	0.6722	0.9820	0.0000	0.2637
		STL	0.7874	0.9494	0.5556	0.0891	0.7623	0.9757	0.0000	0.1571
	4	RAN	0.8901	0.9483	0.8122	0.0359	0.7044	0.9757	0.0000	0.2564
		SAL	0.8930	0.9522	0.7851	0.0455	0.6939	0.9823	0.0000	0.2622
		STL	0.8055	0.9459	0.5556	0.0870	0.7835	0.9763	0.0000	0.1410
	8	RAN	0.8854	0.9782	0.8101	0.0419	0.6996	0.9889	0.0000	0.2607
		SAL	0.8904	0.9579	0.7796	0.0422	0.6893	0.9870	0.0000	0.2652
		STL	0.8045	0.9528	0.5556	0.0849	0.7806	0.9771	0.0000	0.1456
	16	RAN	0.8777	0.9674	0.7354	0.0531	0.6874	1.0000	0.0000	0.2686
		SAL	0.8915	0.9528	0.7770	0.0457	0.6786	0.9870	0.0000	0.2758
		STL	0.8075	0.9473	0.5556	0.0903	0.7863	0.9765	0.0000	0.1467

Table G.19: grouped-nb-enron-GB3-ALL-ALL-5

GB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.7209	0.8310	0.5989	0.0743	0.3650	0.9456	0.0000	0.3224
		SAL	0.6704	0.8012	0.5652	0.0738	0.3254	0.9493	0.0000	0.2913
		STL	0.7258	0.8951	0.5319	0.0953	0.6902	0.9610	0.0000	0.2041
	1	RAN	0.7835	0.8924	0.5487	0.1081	0.6067	0.9558	0.0000	0.2524
		SAL	0.7793	0.8962	0.5359	0.1160	0.5999	0.9579	0.0000	0.2547
		STL	0.7129	0.8734	0.5638	0.0755	0.6784	0.9519	0.0000	0.1842
	2	RAN	0.7969	0.9087	0.5466	0.1090	0.6218	0.9724	0.0000	0.2542
		SAL	0.7994	0.8989	0.5161	0.1149	0.6141	0.9637	0.0000	0.2592
		STL	0.7225	0.9138	0.5532	0.0917	0.6887	0.9594	0.0000	0.1963
	4	RAN	0.8314	0.9251	0.7516	0.0528	0.6422	0.9688	0.0000	0.2545
		SAL	0.8502	0.9004	0.7678	0.0372	0.6340	0.9648	0.0000	0.2669
		STL	0.7395	0.9189	0.5532	0.0938	0.7087	0.9663	0.0000	0.1855
	8	RAN	0.8343	0.9456	0.7188	0.0573	0.6320	1.0000	0.0000	0.2648
		SAL	0.8504	0.9029	0.7455	0.0378	0.6338	0.9744	0.0000	0.2681
		STL	0.7374	0.9109	0.5638	0.0883	0.7052	0.9772	0.0000	0.1874
	16	RAN	0.8336	0.9165	0.6203	0.0721	0.6227	0.9632	0.0000	0.2742
		SAL	0.8500	0.8999	0.7729	0.0369	0.6262	0.9744	0.0000	0.2755
		STL	0.7437	0.9198	0.5426	0.0988	0.7127	0.9686	0.0000	0.1909

Table G.20: grouped-nb-enron-GB3-ALL-ALL-10

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.6238	0.7052	0.5110	0.0638	0.2828	0.9304	0.0000	0.2843
		SAL	0.5608	0.6636	0.4270	0.0765	0.2493	0.9253	0.0000	0.2652
		STL	0.6151	0.6894	0.5403	0.0542	0.5556	0.9600	0.0000	0.2281
	1	RAN	0.7123	0.8258	0.6218	0.0757	0.5320	0.9329	0.0000	0.2465
		SAL	0.7184	0.8183	0.5719	0.0860	0.5347	0.9561	0.0000	0.2462
		STL	0.6352	0.6956	0.5542	0.0558	0.5955	0.9383	0.0000	0.2017
	2	RAN	0.7365	0.8493	0.6077	0.0752	0.5446	0.9415	0.0000	0.2548
		SAL	0.7453	0.8321	0.6359	0.0740	0.5483	0.9409	0.0000	0.2533
		STL	0.6487	0.7517	0.5610	0.0697	0.6071	0.9620	0.0000	0.2077
	4	RAN	0.7956	0.8607	0.7353	0.0444	0.5743	0.9528	0.0000	0.2585
		SAL	0.7939	0.8307	0.7504	0.0261	0.5702	0.9514	0.0000	0.2595
		STL	0.6663	0.8136	0.5501	0.0905	0.6264	0.9620	0.0000	0.2075
	8	RAN	0.7805	0.8614	0.7359	0.0430	0.5716	0.9575	0.0000	0.2592
		SAL	0.7891	0.8112	0.7535	0.0199	0.5687	0.9647	0.0000	0.2588
		STL	0.6612	0.8189	0.5528	0.0916	0.6221	0.9690	0.0000	0.2107
	16	RAN	0.7973	0.8677	0.7348	0.0417	0.5712	0.9620	0.0000	0.2693
		SAL	0.8016	0.8327	0.7752	0.0195	0.5698	0.9465	0.0000	0.2712
		STL	0.6681	0.8462	0.5556	0.1027	0.6307	0.9500	0.0000	0.2141

Table G.21: grouped-nb-enron-GB3-ALL-ALL-25

GB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.5052	0.5421	0.4843	0.0262	0.1996	0.8947	0.0000	0.2422
		SAL	0.5059	0.5463	0.4256	0.0567	0.2082	0.8943	0.0000	0.2474
		STL	0.5067	0.5326	0.4752	0.0238	0.4126	0.9444	0.0000	0.2554
	1	RAN	0.6608	0.7451	0.5709	0.0712	0.4806	0.9394	0.0000	0.2483
		SAL	0.6613	0.7140	0.6267	0.0379	0.4868	0.9222	0.0000	0.2433
		STL	0.5952	0.6454	0.5289	0.0489	0.5351	0.9077	0.0000	0.2158
	2	RAN	0.7032	0.7629	0.6679	0.0425	0.5026	0.9152	0.0000	0.2543
		SAL	0.7040	0.7769	0.6296	0.0602	0.5069	0.9456	0.0000	0.2517
		STL	0.6148	0.7059	0.5262	0.0734	0.5487	0.9620	0.0000	0.2229
	4	RAN	0.7465	0.8163	0.6789	0.0561	0.5280	0.9539	0.0000	0.2619
		SAL	0.7485	0.7770	0.7042	0.0317	0.5268	0.9419	0.0000	0.2586
		STL	0.6341	0.7525	0.5340	0.0902	0.5674	0.9467	0.0000	0.2210
	8	RAN	0.7456	0.7993	0.6834	0.0477	0.5262	0.9637	0.0000	0.2594
		SAL	0.7495	0.7739	0.7146	0.0253	0.5304	0.9650	0.0000	0.2577
		STL	0.6298	0.7552	0.5255	0.0950	0.5652	0.9637	0.0000	0.2239
	16	RAN	0.7533	0.8277	0.7077	0.0531	0.5326	0.9410	0.0000	0.2718
		SAL	0.7629	0.7801	0.7349	0.0200	0.5322	0.9392	0.0000	0.2685
		STL	0.6392	0.7742	0.5201	0.1044	0.5761	0.9744	0.0000	0.2270

Table G.22: grouped-nb-enron-GB3-ALL-ALL-50

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.4676	0.4949	0.4403	0.0273	0.1844	0.8811	0.0000	0.2307
		SAL	0.4682	0.4766	0.4598	0.0084	0.1812	0.8809	0.0000	0.2314
		STL	0.4805	0.4962	0.4647	0.0157	0.3218	0.8709	0.0000	0.2559
	1	RAN	0.6370	0.7176	0.5564	0.0806	0.4643	0.9202	0.0000	0.2460
		SAL	0.6396	0.6479	0.6313	0.0083	0.4636	0.9209	0.0000	0.2436
		STL	0.5797	0.6272	0.5323	0.0474	0.4966	0.9021	0.0000	0.2181
	2	RAN	0.6822	0.7352	0.6293	0.0529	0.4818	0.9308	0.0000	0.2558
		SAL	0.6820	0.7254	0.6387	0.0433	0.4829	0.9281	0.0000	0.2524
		STL	0.6076	0.6827	0.5324	0.0752	0.5153	0.9301	0.0000	0.2252
	4	RAN	0.7239	0.7331	0.7147	0.0092	0.5013	0.9378	0.0000	0.2647
		SAL	0.7261	0.7345	0.7178	0.0083	0.5004	0.9382	0.0000	0.2623
		STL	0.6296	0.7232	0.5359	0.0936	0.5338	0.9385	0.0000	0.2288
	8	RAN	0.7270	0.7491	0.7049	0.0221	0.5057	0.9615	0.0000	0.2607
		SAL	0.7284	0.7350	0.7217	0.0067	0.5036	0.9550	0.0000	0.2627
		STL	0.6302	0.7245	0.5359	0.0943	0.5350	0.9597	0.0000	0.2300
	16	RAN	0.7417	0.7559	0.7275	0.0142	0.5076	0.9369	0.0000	0.2714
		SAL	0.7437	0.7479	0.7395	0.0042	0.5091	0.9250	0.0000	0.2735
		STL	0.6370	0.7428	0.5311	0.1059	0.5410	0.9500	0.0000	0.2348

Table G.23: grouped-nb-enron-GB3-ALL-ALL-75

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.4279	0.4279	0.4279	0.0000	0.1609	0.8518	0.0000	0.2174
		SAL	0.4284	0.4284	0.4284	0.0000	0.1612	0.8550	0.0000	0.2176
		STL	0.4284	0.4284	0.4284	0.0000	0.1612	0.8550	0.0000	0.2176
	1	RAN	0.5971	0.5971	0.5971	0.0000	0.4266	0.8973	0.0000	0.2455
		SAL	0.5978	0.5978	0.5978	0.0000	0.4264	0.8962	0.0000	0.2449
		STL	0.5978	0.5978	0.5978	0.0000	0.4264	0.8962	0.0000	0.2449
	2	RAN	0.6499	0.6499	0.6499	0.0000	0.4491	0.9160	0.0000	0.2541
		SAL	0.6499	0.6499	0.6499	0.0000	0.4498	0.9190	0.0000	0.2528
		STL	0.6499	0.6499	0.6499	0.0000	0.4498	0.9190	0.0000	0.2528
	4	RAN	0.6862	0.6862	0.6862	0.0000	0.4657	0.9348	0.0000	0.2595
		SAL	0.6859	0.6859	0.6859	0.0000	0.4644	0.9331	0.0000	0.2612
		STL	0.6859	0.6859	0.6859	0.0000	0.4644	0.9331	0.0000	0.2612
	8	RAN	0.6885	0.6885	0.6885	0.0000	0.4703	0.9593	0.0000	0.2593
		SAL	0.6891	0.6891	0.6891	0.0000	0.4700	0.9583	0.0000	0.2604
		STL	0.6891	0.6891	0.6891	0.0000	0.4700	0.9583	0.0000	0.2604
	16	RAN	0.7052	0.7052	0.7052	0.0000	0.4745	0.9287	0.0000	0.2686
		SAL	0.7059	0.7059	0.7059	0.0000	0.4752	0.9278	0.0000	0.2689
		STL	0.7059	0.7059	0.7059	0.0000	0.4752	0.9278	0.0000	0.2689

Table G.24: grouped-nb-enron-GB3-ALL-ALL-150

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.8658	0.9592	0.7085	0.0647	0.6505	1.0000	0.0000	0.2854
		SAL	0.8678	0.9558	0.7158	0.0494	0.6314	1.0000	0.0000	0.2889
		STL	0.8244	0.9564	0.5185	0.0956	0.8052	0.9798	0.0000	0.1462
	1	RAN	0.8825	0.9533	0.7244	0.0602	0.7007	1.0000	0.0000	0.2649
		SAL	0.8912	0.9566	0.7746	0.0434	0.6783	0.9832	0.0000	0.2763
		STL	0.8207	0.9574	0.5556	0.0896	0.8008	0.9781	0.0000	0.1418
	2	RAN	0.8786	0.9398	0.7018	0.0585	0.7039	0.9870	0.0000	0.2643
		SAL	0.8928	0.9575	0.7781	0.0397	0.6756	0.9835	0.0000	0.2781
		STL	0.8210	0.9487	0.5556	0.0915	0.8013	0.9785	0.0000	0.1429
	4	RAN	0.8892	0.9587	0.7664	0.0446	0.6944	0.9773	0.0000	0.2691
		SAL	0.8930	0.9578	0.7772	0.0400	0.6759	0.9870	0.0000	0.2784
		STL	0.8211	0.9560	0.5556	0.0914	0.8012	0.9789	0.0000	0.1430
	8	RAN	0.8764	0.9714	0.7461	0.0546	0.6986	0.9881	0.0000	0.2581
		SAL	0.8932	0.9582	0.7772	0.0411	0.6767	1.0000	0.0000	0.2786
		STL	0.8219	0.9564	0.5556	0.0920	0.8026	0.9786	0.0000	0.1431
	16	RAN	0.8806	0.9823	0.7683	0.0558	0.7004	0.9913	0.0000	0.2600
		SAL	0.8930	0.9582	0.7763	0.0401	0.6752	1.0000	0.0000	0.2794
		STL	0.8224	0.9564	0.5556	0.0922	0.8028	0.9786	0.0000	0.1433

Table G.25: grouped-nb-enron-OSB3-ALL-ALL-5

OSB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.8152	0.9272	0.6736	0.0637	0.5782	0.9867	0.0000	0.2980
		SAL	0.8133	0.8925	0.6713	0.0544	0.5763	1.0000	0.0000	0.2895
		STL	0.7616	0.9336	0.5532	0.1020	0.7350	0.9722	0.0000	0.1888
	1	RAN	0.8423	0.9261	0.7550	0.0474	0.6266	0.9744	0.0000	0.2812
		SAL	0.8511	0.9143	0.7614	0.0386	0.6205	0.9635	0.0000	0.2861
		STL	0.7549	0.9317	0.5213	0.1034	0.7281	0.9682	0.0000	0.1880
	2	RAN	0.8472	0.9178	0.7590	0.0516	0.6301	0.9731	0.0000	0.2804
		SAL	0.8514	0.9140	0.7625	0.0392	0.6190	0.9636	0.0000	0.2867
		STL	0.7555	0.9272	0.5213	0.1063	0.7297	0.9667	0.0000	0.1886
	4	RAN	0.8447	0.9260	0.7648	0.0470	0.6368	0.9655	0.0000	0.2737
		SAL	0.8526	0.9149	0.7624	0.0389	0.6195	0.9637	0.0000	0.2878
		STL	0.7557	0.9307	0.5213	0.1060	0.7291	0.9685	0.0000	0.1895
	8	RAN	0.8492	0.9332	0.7598	0.0492	0.6363	0.9744	0.0000	0.2794
		SAL	0.8524	0.9152	0.7617	0.0382	0.6194	0.9744	0.0000	0.2876
		STL	0.7570	0.9315	0.5213	0.1071	0.7312	0.9694	0.0000	0.1889
	16	RAN	0.8458	0.9123	0.7765	0.0452	0.6265	0.9870	0.0000	0.2801
		SAL	0.8525	0.9154	0.7615	0.0388	0.6191	0.9870	0.0000	0.2881
		STL	0.7574	0.9318	0.5213	0.1073	0.7315	0.9694	0.0000	0.1891

Table G.26: grouped-nb-enron-OSB3-ALL-ALL-10

OSB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.7452	0.8205	0.6445	0.0623	0.5169	1.0000	0.0000	0.2949
		SAL	0.7481	0.8048	0.6397	0.0565	0.5206	0.9867	0.0000	0.2891
		STL	0.6854	0.8437	0.5711	0.1006	0.6488	0.9794	0.0000	0.2163
	1	RAN	0.7937	0.8378	0.7226	0.0378	0.5639	0.9870	0.0000	0.2906
		SAL	0.7999	0.8301	0.7640	0.0205	0.5692	0.9349	0.0000	0.2831
		STL	0.6822	0.8489	0.5514	0.1050	0.6463	0.9744	0.0000	0.2137
	2	RAN	0.8030	0.8257	0.7623	0.0212	0.5716	0.9445	0.0000	0.2858
		SAL	0.8027	0.8350	0.7624	0.0243	0.5691	0.9386	0.0000	0.2848
		STL	0.6846	0.8600	0.5514	0.1078	0.6483	0.9744	0.0000	0.2146
	4	RAN	0.8015	0.8546	0.7614	0.0285	0.5681	0.9620	0.0000	0.2803
		SAL	0.8010	0.8349	0.7537	0.0268	0.5689	0.9326	0.0000	0.2844
		STL	0.6839	0.8551	0.5514	0.1067	0.6471	0.9744	0.0000	0.2149
	8	RAN	0.7950	0.8534	0.7415	0.0337	0.5675	0.9744	0.0000	0.2823
		SAL	0.8028	0.8354	0.7625	0.0243	0.5681	0.9366	0.0000	0.2867
		STL	0.6860	0.8618	0.5556	0.1077	0.6498	0.9744	0.0000	0.2140
	16	RAN	0.7977	0.8377	0.7485	0.0324	0.5689	0.9744	0.0000	0.2881
		SAL	0.8034	0.8359	0.7622	0.0248	0.5686	0.9384	0.0000	0.2867
		STL	0.6867	0.8627	0.5556	0.1083	0.6504	0.9744	0.0000	0.2144

Table G.27: grouped-nb-enron-OSB3-ALL-ALL-25

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.7132	0.7408	0.6774	0.0265	0.4868	0.9730	0.0000	0.2978
		SAL	0.7089	0.7570	0.6429	0.0483	0.4869	0.9730	0.0000	0.2922
		STL	0.6234	0.7305	0.5190	0.0864	0.5579	1.0000	0.0000	0.2457
	1	RAN	0.4410	0.4869	0.3615	0.0565	0.3216	0.8700	0.0000	0.2438
		SAL	0.4123	0.4347	0.3781	0.0246	0.3063	0.8458	0.0000	0.2268
		STL	0.6105	0.6819	0.5204	0.0672	0.5550	0.9744	0.0000	0.2296
	2	RAN	0.4316	0.5087	0.3695	0.0578	0.3103	0.8427	0.0000	0.2371
		SAL	0.4273	0.4539	0.3784	0.0346	0.3078	0.8506	0.0000	0.2314
		STL	0.3779	0.4000	0.3526	0.0195	0.3548	0.9730	0.0000	0.2091
	4	RAN	0.7562	0.7820	0.7072	0.0346	0.5324	0.9320	0.0000	0.2844
		SAL	0.7651	0.7899	0.7354	0.0225	0.5311	0.9343	0.0000	0.2854
		STL	0.6437	0.7829	0.5197	0.1080	0.5814	0.9744	0.0000	0.2344

Table G.28: grouped-nb-enron-OSB3-ALL-ALL-50

OSB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.6983	0.6992	0.6975	0.0009	0.4726	1.0000	0.0000	0.3006
		SAL	0.6939	0.7004	0.6874	0.0065	0.4724	0.9867	0.0000	0.2986
		STL	0.6216	0.6927	0.5504	0.0712	0.5160	0.9870	0.0000	0.2620
	1	RAN	0.7370	0.7448	0.7293	0.0077	0.5072	0.9287	0.0000	0.2889
		SAL	0.7425	0.7444	0.7407	0.0018	0.5108	0.9094	0.0000	0.2868
		STL	0.6427	0.7478	0.5376	0.1051	0.5481	0.9181	0.0000	0.2445
	2	RAN	0.7408	0.7414	0.7402	0.0006	0.5051	0.9341	0.0000	0.2895
		SAL	0.7467	0.7488	0.7447	0.0020	0.5117	0.9101	0.0000	0.2873
		STL	0.6461	0.7531	0.5390	0.1070	0.5486	0.9197	0.0000	0.2461
	4	RAN	0.7378	0.7621	0.7135	0.0243	0.5014	0.9352	0.0000	0.2906
		SAL	0.7444	0.7475	0.7412	0.0032	0.5112	0.9077	0.0000	0.2862
		STL	0.6446	0.7500	0.5393	0.1054	0.5471	0.9208	0.0000	0.2460
	8	RAN	0.7295	0.7860	0.6730	0.0565	0.5098	0.9290	0.0000	0.2863
		SAL	0.7477	0.7512	0.7441	0.0036	0.5109	0.9119	0.0000	0.2886
		STL	0.6465	0.7541	0.5389	0.1076	0.5484	0.9193	0.0000	0.2463
	16	RAN	0.7489	0.7604	0.7374	0.0115	0.5121	0.9315	0.0000	0.2889
		SAL	0.7485	0.7515	0.7455	0.0030	0.5117	0.9131	0.0000	0.2887
		STL	0.6471	0.7551	0.5391	0.1080	0.5491	0.9223	0.0000	0.2467

Table G.29: grouped-nb-enron-OSB3-ALL-ALL-75

OSB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.6574	0.6574	0.6574	0.0000	0.4442	0.9867	0.0000	0.3023
		SAL	0.6571	0.6571	0.6571	0.0000	0.4441	0.9730	0.0000	0.3023
		STL	0.6571	0.6571	0.6571	0.0000	0.4441	0.9730	0.0000	0.3023
	1	RAN	0.7040	0.7040	0.7040	0.0000	0.4788	0.9127	0.0000	0.2863
		SAL	0.7042	0.7042	0.7042	0.0000	0.4790	0.9118	0.0000	0.2851
		STL	0.7042	0.7042	0.7042	0.0000	0.4790	0.9118	0.0000	0.2851
	2	RAN	0.7089	0.7089	0.7089	0.0000	0.4786	0.9126	0.0000	0.2879
		SAL	0.7092	0.7092	0.7092	0.0000	0.4787	0.9146	0.0000	0.2873
		STL	0.7092	0.7092	0.7092	0.0000	0.4787	0.9146	0.0000	0.2873
	4	RAN	0.7071	0.7071	0.7071	0.0000	0.4767	0.9189	0.0000	0.2885
		SAL	0.7066	0.7066	0.7066	0.0000	0.4770	0.9154	0.0000	0.2869
		STL	0.7066	0.7066	0.7066	0.0000	0.4770	0.9154	0.0000	0.2869
	8	RAN	0.7100	0.7100	0.7100	0.0000	0.4769	0.9130	0.0000	0.2881
		SAL	0.7101	0.7101	0.7101	0.0000	0.4782	0.9151	0.0000	0.2877
		STL	0.7101	0.7101	0.7101	0.0000	0.4782	0.9151	0.0000	0.2877
	16	RAN	0.7120	0.7120	0.7120	0.0000	0.4793	0.9187	0.0000	0.2893
		SAL	0.7112	0.7112	0.7112	0.0000	0.4789	0.9175	0.0000	0.2881
		STL	0.7112	0.7112	0.7112	0.0000	0.4789	0.9175	0.0000	0.2881

Table G.30: grouped-nb-enron-OSB3-ALL-ALL-150

APPENDIX H:

Grouped Naive Bayes Results for the Twitter Short Message Corpus

GM1										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.6173	0.7548	0.4740	0.0779	0.5706	0.9069	0.0000	0.1942
		SAL	0.5952	0.7598	0.4580	0.0747	0.5405	0.9063	0.0000	0.2002
		STL	0.6667	0.7714	0.5326	0.0678	0.6548	0.9618	0.2333	0.1351
	1	RAN	0.5577	0.7500	0.4421	0.0738	0.5255	0.9178	0.1455	0.1516
		SAL	0.5636	0.7495	0.4514	0.0654	0.5363	0.9421	0.1493	0.1474
		STL	0.3709	0.5720	0.1965	0.0878	0.3585	0.7213	0.0000	0.1229
	2	RAN	0.5704	0.8101	0.4545	0.0764	0.5474	0.9412	0.1481	0.1393
		SAL	0.5746	0.7657	0.4759	0.0721	0.5448	0.9463	0.1000	0.1450
		STL	0.3939	0.5815	0.2785	0.0807	0.3885	0.7899	0.0615	0.1181
	4	RAN	0.5590	0.7400	0.4291	0.0699	0.5261	0.9518	0.1379	0.1505
		SAL	0.5657	0.7749	0.4217	0.0807	0.5385	0.9421	0.1538	0.1518
		STL	0.4149	0.5671	0.2637	0.0766	0.4097	0.8108	0.1190	0.1227
	8	RAN	0.5672	0.7454	0.4291	0.0799	0.5344	0.9393	0.1311	0.1544
		SAL	0.5733	0.7913	0.4667	0.0796	0.5469	0.9562	0.1639	0.1415
		STL	0.4309	0.6667	0.2861	0.0991	0.4245	0.8169	0.1573	0.1319
	16	RAN	0.5652	0.7597	0.3969	0.0868	0.5387	0.9501	0.1667	0.1489
		SAL	0.5682	0.7778	0.4675	0.0738	0.5405	0.9500	0.1967	0.1418
		STL	0.3972	0.6022	0.2885	0.0670	0.3919	0.7105	0.1649	0.1070

Table H.1: grouped-nb-twitter-GM1-ALL-ALL-5

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.4629	0.6043	0.2738	0.0849	0.3920	0.8720	0.0000	0.2385
		SAL	0.4538	0.5875	0.3167	0.0744	0.3872	0.9129	0.0000	0.2225
		STL	0.5441	0.6411	0.4658	0.0549	0.5242	0.9282	0.0222	0.1598
	1	RAN	0.4195	0.5598	0.2964	0.0646	0.3892	0.9152	0.0000	0.1589
		SAL	0.4184	0.5570	0.3208	0.0647	0.3818	0.9016	0.0000	0.1623
		STL	0.2090	0.3092	0.1297	0.0534	0.1970	0.6731	0.0000	0.1054
	2	RAN	0.4386	0.5517	0.3314	0.0597	0.4009	0.8797	0.0351	0.1602
		SAL	0.4308	0.6005	0.3629	0.0699	0.3938	0.9209	0.0000	0.1563
		STL	0.2320	0.3820	0.1623	0.0573	0.2274	0.6727	0.0270	0.1162
	4	RAN	0.4290	0.5693	0.3675	0.0556	0.3916	0.9151	0.0370	0.1558
		SAL	0.4299	0.5990	0.3043	0.0787	0.3940	0.9150	0.0364	0.1627
		STL	0.2490	0.3628	0.1997	0.0417	0.2456	0.6429	0.0274	0.1078
	8	RAN	0.4357	0.5521	0.3576	0.0534	0.4005	0.8968	0.0000	0.1604
		SAL	0.4276	0.5902	0.3372	0.0742	0.3915	0.9002	0.0000	0.1587
		STL	0.2632	0.3752	0.1692	0.0642	0.2573	0.7893	0.0000	0.1316
	16	RAN	0.4334	0.5562	0.3275	0.0642	0.3996	0.8664	0.0980	0.1537
		SAL	0.4319	0.5588	0.3415	0.0676	0.3957	0.8667	0.0714	0.1558
		STL	0.2271	0.3321	0.1639	0.0468	0.2241	0.6105	0.0000	0.1015

Table H.2: grouped-nb-twitter-GM1-ALL-ALL-10

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.3215	0.3906	0.2200	0.0511	0.2534	0.8340	0.0000	0.2091
		SAL	0.2995	0.4110	0.2265	0.0685	0.2393	0.8560	0.0000	0.2029
		STL	0.3861	0.4389	0.3553	0.0316	0.3616	0.8430	0.0000	0.1839
	1	RAN	0.2926	0.3653	0.2279	0.0465	0.2572	0.8185	0.0000	0.1560
		SAL	0.2900	0.3541	0.2492	0.0347	0.2553	0.7879	0.0222	0.1510
		STL	0.0953	0.1352	0.0731	0.0212	0.0895	0.5030	0.0000	0.0860
	2	RAN	0.2942	0.3371	0.2473	0.0266	0.2566	0.7992	0.0000	0.1540
		SAL	0.2951	0.3574	0.2445	0.0408	0.2588	0.8385	0.0290	0.1576
		STL	0.1005	0.1333	0.0817	0.0177	0.0971	0.5591	0.0000	0.0827
	4	RAN	0.2913	0.3444	0.2572	0.0330	0.2530	0.8356	0.0000	0.1567
		SAL	0.2964	0.3539	0.2271	0.0448	0.2626	0.8615	0.0000	0.1639
		STL	0.1119	0.1248	0.0956	0.0101	0.1107	0.6250	0.0000	0.0837
	8	RAN	0.2996	0.3882	0.2327	0.0475	0.2595	0.8249	0.0000	0.1521
		SAL	0.2985	0.3701	0.2388	0.0466	0.2615	0.8615	0.0000	0.1629
		STL	0.1213	0.1617	0.0848	0.0263	0.1186	0.6557	0.0000	0.1046
	16	RAN	0.2987	0.3319	0.2712	0.0229	0.2537	0.8168	0.0274	0.1516
		SAL	0.2937	0.3517	0.2543	0.0349	0.2548	0.8803	0.0000	0.1574
		STL	0.0988	0.1172	0.0733	0.0139	0.0984	0.5714	0.0000	0.0820

Table H.3: grouped-nb-twitter-GM1-ALL-ALL-25

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.2120	0.2566	0.1395	0.0517	0.1665	0.8214	0.0000	0.1818
		SAL	0.2079	0.2373	0.1680	0.0293	0.1610	0.8426	0.0000	0.1748
		STL	0.2779	0.3191	0.2359	0.0340	0.2485	0.8333	0.0000	0.1849
	1	RAN	0.2158	0.2421	0.1936	0.0200	0.1786	0.8116	0.0000	0.1462
		SAL	0.2131	0.2449	0.1897	0.0233	0.1755	0.7368	0.0000	0.1450
		STL	0.0495	0.0593	0.0387	0.0084	0.0428	0.4078	0.0000	0.0618
	2	RAN	0.2145	0.2501	0.1686	0.0341	0.1768	0.8615	0.0000	0.1393
		SAL	0.2186	0.2465	0.2018	0.0199	0.1809	0.7857	0.0000	0.1458
		STL	0.0563	0.0652	0.0460	0.0079	0.0522	0.5000	0.0000	0.0689
	4	RAN	0.2154	0.2507	0.1683	0.0346	0.1773	0.7924	0.0000	0.1411
		SAL	0.2174	0.2467	0.1665	0.0361	0.1818	0.8000	0.0000	0.1444
		STL	0.0632	0.0746	0.0556	0.0082	0.0621	0.5902	0.0000	0.0716
	8	RAN	0.2195	0.2522	0.1986	0.0234	0.1816	0.7917	0.0000	0.1439
		SAL	0.2181	0.2460	0.1960	0.0208	0.1823	0.8750	0.0000	0.1515
		STL	0.0637	0.0796	0.0504	0.0121	0.0615	0.4940	0.0000	0.0789
	16	RAN	0.2213	0.2436	0.1849	0.0259	0.1845	0.7883	0.0000	0.1489
		SAL	0.2183	0.2289	0.2064	0.0092	0.1805	0.8485	0.0000	0.1482
		STL	0.0520	0.0585	0.0486	0.0046	0.0510	0.5417	0.0000	0.0729

Table H.4: grouped-nb-twitter-GM1-ALL-ALL-50

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.1644	0.1890	0.1399	0.0246	0.1233	0.7876	0.0000	0.1582
		SAL	0.1678	0.1846	0.1509	0.0169	0.1259	0.7807	0.0000	0.1713
		STL	0.2137	0.2356	0.1917	0.0220	0.1825	0.7818	0.0000	0.1721
	1	RAN	0.1846	0.2014	0.1679	0.0167	0.1487	0.7324	0.0000	0.1373
		SAL	0.1785	0.1964	0.1606	0.0179	0.1441	0.7027	0.0000	0.1387
		STL	0.0351	0.0448	0.0254	0.0097	0.0281	0.3841	0.0000	0.0492
	2	RAN	0.1798	0.2120	0.1475	0.0323	0.1445	0.8000	0.0000	0.1412
		SAL	0.1885	0.2167	0.1604	0.0282	0.1537	0.7647	0.0000	0.1404
		STL	0.0408	0.0512	0.0303	0.0105	0.0362	0.3975	0.0000	0.0572
	4	RAN	0.1855	0.1888	0.1822	0.0033	0.1467	0.7598	0.0000	0.1332
		SAL	0.1813	0.2184	0.1442	0.0371	0.1494	0.7941	0.0000	0.1432
		STL	0.0441	0.0483	0.0400	0.0042	0.0435	0.5357	0.0000	0.0619
	8	RAN	0.1876	0.1927	0.1825	0.0051	0.1529	0.7037	0.0000	0.1392
		SAL	0.1813	0.2275	0.1350	0.0462	0.1487	0.7617	0.0000	0.1399
		STL	0.0481	0.0559	0.0404	0.0077	0.0453	0.4713	0.0000	0.0709
	16	RAN	0.1854	0.1928	0.1779	0.0074	0.1493	0.6950	0.0000	0.1318
		SAL	0.1881	0.2114	0.1647	0.0233	0.1509	0.7680	0.0000	0.1382
		STL	0.0347	0.0379	0.0315	0.0032	0.0324	0.3111	0.0000	0.0503

Table H.5: grouped-nb-twitter-GM1-ALL-ALL-75

GM1										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.1247	0.1247	0.1247	0.0000	0.0843	0.7565	0.0000	0.1440
		SAL	0.1254	0.1254	0.1254	0.0000	0.0860	0.7458	0.0000	0.1451
		STL	0.1254	0.1254	0.1254	0.0000	0.0860	0.7458	0.0000	0.1451
	1	RAN	0.1353	0.1353	0.1353	0.0000	0.1021	0.6933	0.0000	0.1224
		SAL	0.1353	0.1353	0.1353	0.0000	0.1042	0.7500	0.0000	0.1246
		STL	0.0239	0.0239	0.0239	0.0000	0.0172	0.3232	0.0000	0.0410
	2	RAN	0.1344	0.1344	0.1344	0.0000	0.1003	0.6753	0.0000	0.1222
		SAL	0.1344	0.1344	0.1344	0.0000	0.1019	0.7027	0.0000	0.1219
		STL	0.0248	0.0248	0.0248	0.0000	0.0192	0.3333	0.0000	0.0463
	4	RAN	0.1342	0.1342	0.1342	0.0000	0.1028	0.6933	0.0000	0.1212
		SAL	0.1351	0.1351	0.1351	0.0000	0.1028	0.7324	0.0000	0.1225
		STL	0.0231	0.0231	0.0231	0.0000	0.0224	0.3182	0.0000	0.0414
	8	RAN	0.1335	0.1335	0.1335	0.0000	0.1004	0.7027	0.0000	0.1209
		SAL	0.1350	0.1350	0.1350	0.0000	0.1029	0.7123	0.0000	0.1220
		STL	0.0274	0.0274	0.0274	0.0000	0.0230	0.4013	0.0000	0.0522
	16	RAN	0.1386	0.1386	0.1386	0.0000	0.1053	0.6753	0.0000	0.1198
		SAL	0.1363	0.1363	0.1363	0.0000	0.1039	0.6923	0.0000	0.1242
		STL	0.0200	0.0200	0.0200	0.0000	0.0181	0.1991	0.0000	0.0343

Table H.6: grouped-nb-twitter-GM1-ALL-ALL-150

GM2										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.5732	0.7657	0.3986	0.0847	0.5224	0.9486	0.0351	0.1884
		SAL	0.5623	0.7890	0.3875	0.0874	0.5087	0.9105	0.0000	0.1956
		STL	0.5778	0.7356	0.4151	0.0831	0.5585	0.9231	0.0606	0.1564
	1	RAN	0.5874	0.7616	0.3830	0.0780	0.5716	0.9250	0.2222	0.1359
		SAL	0.5877	0.7643	0.4103	0.0877	0.5718	0.9153	0.2059	0.1392
		STL	0.4007	0.5500	0.2871	0.0618	0.3970	0.8182	0.1667	0.1099
	2	RAN	0.5820	0.7467	0.4236	0.0878	0.5651	0.9328	0.1687	0.1425
		SAL	0.5844	0.7114	0.4590	0.0751	0.5671	0.9043	0.2078	0.1333
		STL	0.4240	0.5590	0.3114	0.0733	0.4203	0.8000	0.1284	0.1214
	4	RAN	0.5888	0.7574	0.4727	0.0702	0.5667	0.9237	0.2368	0.1398
		SAL	0.5806	0.7926	0.4336	0.0883	0.5599	0.9167	0.2381	0.1499
		STL	0.4510	0.6162	0.3519	0.0639	0.4511	0.8615	0.1522	0.1193
	8	RAN	0.6026	0.7797	0.4710	0.0839	0.5817	0.9457	0.1944	0.1470
		SAL	0.6003	0.7992	0.4743	0.0699	0.5806	0.9237	0.2626	0.1369
		STL	0.4348	0.6199	0.2906	0.0696	0.4316	0.7950	0.2329	0.1155
	16	RAN	0.6003	0.8437	0.4465	0.0858	0.5808	0.9560	0.3143	0.1318
		SAL	0.5884	0.7737	0.4029	0.0999	0.5632	0.9492	0.2118	0.1585
		STL	0.4340	0.5185	0.2975	0.0667	0.4307	0.8186	0.1481	0.1224

Table H.7: grouped-nb-twitter-GM2-ALL-ALL-5

GM2										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.4438	0.6199	0.2809	0.0829	0.3966	0.8710	0.0000	0.1959
		SAL	0.4346	0.6304	0.3645	0.0752	0.3817	0.8429	0.0000	0.1963
		STL	0.4532	0.5707	0.3270	0.0643	0.4313	0.8824	0.0357	0.1684
	1	RAN	0.4539	0.5810	0.3958	0.0511	0.4332	0.8974	0.0377	0.1542
		SAL	0.4511	0.5960	0.3042	0.0716	0.4328	0.8642	0.0702	0.1585
		STL	0.2489	0.3478	0.1816	0.0377	0.2489	0.6765	0.0513	0.1089
	2	RAN	0.4536	0.5446	0.3374	0.0619	0.4356	0.8988	0.0822	0.1631
		SAL	0.4624	0.5246	0.4006	0.0383	0.4402	0.8947	0.0519	0.1549
		STL	0.2582	0.3644	0.1842	0.0450	0.2586	0.7869	0.0594	0.1230
	4	RAN	0.4538	0.5885	0.3429	0.0805	0.4318	0.8947	0.0759	0.1613
		SAL	0.4641	0.6610	0.3768	0.0696	0.4397	0.8848	0.0698	0.1629
		STL	0.2875	0.3425	0.2146	0.0396	0.2922	0.8116	0.0588	0.1266
	8	RAN	0.4715	0.6051	0.3775	0.0751	0.4482	0.9231	0.0976	0.1628
		SAL	0.4696	0.5573	0.4150	0.0468	0.4424	0.9217	0.1290	0.1593
		STL	0.2727	0.3638	0.1764	0.0402	0.2690	0.7102	0.0250	0.1136
	16	RAN	0.4653	0.6179	0.3557	0.0767	0.4388	0.9043	0.0357	0.1733
		SAL	0.4692	0.6117	0.3640	0.0867	0.4367	0.9170	0.0811	0.1741
		STL	0.2748	0.3317	0.1855	0.0372	0.2742	0.7718	0.0426	0.1210

Table H.8: grouped-nb-twitter-GM2-ALL-ALL-10

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.3179	0.3833	0.2853	0.0318	0.2706	0.8182	0.0000	0.1887
		SAL	0.3253	0.3855	0.2750	0.0415	0.2745	0.8462	0.0000	0.1864
		STL	0.3212	0.3755	0.2617	0.0401	0.3013	0.8182	0.0000	0.1769
	1	RAN	0.3223	0.3457	0.2971	0.0175	0.3091	0.8571	0.0000	0.1664
		SAL	0.3218	0.4249	0.2574	0.0537	0.3045	0.8755	0.0377	0.1658
		STL	0.1082	0.1254	0.0872	0.0126	0.1083	0.5600	0.0000	0.0857
	2	RAN	0.3176	0.3636	0.2754	0.0346	0.3024	0.8745	0.0645	0.1616
		SAL	0.3238	0.3846	0.2684	0.0404	0.3092	0.8308	0.0000	0.1584
		STL	0.1116	0.1358	0.0963	0.0132	0.1103	0.7368	0.0000	0.0967
	4	RAN	0.3338	0.3673	0.3033	0.0250	0.3104	0.8000	0.0278	0.1652
		SAL	0.3317	0.4173	0.2733	0.0458	0.3092	0.8364	0.0270	0.1673
		STL	0.1404	0.1616	0.1121	0.0162	0.1480	0.7879	0.0000	0.1096
	8	RAN	0.3426	0.4296	0.3064	0.0470	0.3186	0.8681	0.0513	0.1623
		SAL	0.3463	0.4602	0.2814	0.0561	0.3200	0.8671	0.0455	0.1730
		STL	0.1415	0.1684	0.1198	0.0164	0.1404	0.6600	0.0000	0.1023
	16	RAN	0.3351	0.3989	0.2781	0.0353	0.3077	0.8358	0.0299	0.1709
		SAL	0.3339	0.4437	0.2787	0.0644	0.3114	0.8619	0.0000	0.1785
		STL	0.1418	0.1603	0.1105	0.0168	0.1445	0.7048	0.0000	0.1111

Table H.9: grouped-nb-twitter-GM2-ALL-ALL-25

GM2										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.2499	0.2846	0.2213	0.0262	0.2128	0.8438	0.0000	0.1727
		SAL	0.2531	0.2662	0.2349	0.0133	0.2069	0.7941	0.0000	0.1716
		STL	0.2497	0.2992	0.2038	0.0390	0.2328	0.7826	0.0000	0.1661
	1	RAN	0.2522	0.3044	0.2198	0.0373	0.2375	0.7753	0.0000	0.1531
		SAL	0.2467	0.2626	0.2193	0.0194	0.2326	0.8288	0.0000	0.1600
		STL	0.0573	0.0611	0.0507	0.0047	0.0573	0.5106	0.0000	0.0718
	2	RAN	0.2477	0.2533	0.2367	0.0077	0.2329	0.8189	0.0000	0.1636
		SAL	0.2481	0.2660	0.2241	0.0177	0.2351	0.8300	0.0000	0.1627
		STL	0.0571	0.0730	0.0413	0.0129	0.0550	0.4783	0.0000	0.0707
	4	RAN	0.2583	0.2667	0.2498	0.0069	0.2344	0.7944	0.0000	0.1647
		SAL	0.2617	0.3055	0.2335	0.0314	0.2398	0.8037	0.0420	0.1618
		STL	0.0739	0.0946	0.0578	0.0154	0.0789	0.7419	0.0000	0.0904
	8	RAN	0.2674	0.2880	0.2415	0.0194	0.2451	0.8117	0.0250	0.1623
		SAL	0.2678	0.2806	0.2607	0.0090	0.2465	0.8362	0.0000	0.1669
		STL	0.0822	0.0891	0.0771	0.0051	0.0840	0.5241	0.0000	0.0836
	16	RAN	0.2629	0.3031	0.2405	0.0285	0.2408	0.8438	0.0204	0.1690
		SAL	0.2624	0.2887	0.2138	0.0344	0.2419	0.8313	0.0000	0.1745
		STL	0.0817	0.0870	0.0786	0.0038	0.0846	0.5310	0.0000	0.0866

Table H.10: grouped-nb-twitter-GM2-ALL-ALL-50

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.2125	0.2621	0.1630	0.0496	0.1744	0.7385	0.0000	0.1610
		SAL	0.2195	0.2291	0.2100	0.0095	0.1828	0.7397	0.0000	0.1634
		STL	0.2164	0.2458	0.1871	0.0293	0.1965	0.7879	0.0000	0.1614
	1	RAN	0.2051	0.2181	0.1922	0.0129	0.1938	0.8000	0.0000	0.1548
		SAL	0.2126	0.2358	0.1895	0.0232	0.2000	0.8036	0.0000	0.1578
		STL	0.0375	0.0382	0.0368	0.0007	0.0356	0.3158	0.0000	0.0500
	2	RAN	0.2131	0.2229	0.2034	0.0098	0.2012	0.8000	0.0000	0.1539
		SAL	0.2104	0.2255	0.1953	0.0151	0.1989	0.8293	0.0000	0.1513
		STL	0.0370	0.0413	0.0328	0.0043	0.0344	0.3721	0.0000	0.0516
	4	RAN	0.2255	0.2477	0.2033	0.0222	0.2067	0.8073	0.0000	0.1553
		SAL	0.2244	0.2291	0.2197	0.0047	0.2044	0.7500	0.0000	0.1582
		STL	0.0501	0.0524	0.0477	0.0024	0.0540	0.5000	0.0000	0.0671
	8	RAN	0.2342	0.2535	0.2149	0.0193	0.2152	0.7887	0.0000	0.1659
		SAL	0.2346	0.2503	0.2189	0.0157	0.2144	0.8106	0.0000	0.1664
		STL	0.0622	0.0666	0.0578	0.0044	0.0648	0.5275	0.0000	0.0788
	16	RAN	0.2253	0.2316	0.2190	0.0063	0.2031	0.8182	0.0000	0.1665
		SAL	0.2257	0.2579	0.1935	0.0322	0.2079	0.8571	0.0000	0.1675
		STL	0.0590	0.0607	0.0573	0.0017	0.0609	0.4786	0.0000	0.0716

Table H.11: grouped-nb-twitter-GM2-ALL-ALL-75

GM2										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.1690	0.1690	0.1690	0.0000	0.1355	0.7619	0.0000	0.1476
		SAL	0.1719	0.1719	0.1719	0.0000	0.1390	0.7500	0.0000	0.1488
		STL	0.1719	0.1719	0.1719	0.0000	0.1390	0.7500	0.0000	0.1488
	1	RAN	0.1621	0.1621	0.1621	0.0000	0.1521	0.7593	0.0000	0.1450
		SAL	0.1655	0.1655	0.1655	0.0000	0.1541	0.7321	0.0000	0.1426
		STL	0.0190	0.0190	0.0190	0.0000	0.0160	0.2629	0.0000	0.0336
	2	RAN	0.1659	0.1659	0.1659	0.0000	0.1565	0.7748	0.0000	0.1487
		SAL	0.1655	0.1655	0.1655	0.0000	0.1580	0.7967	0.0000	0.1488
		STL	0.0206	0.0206	0.0206	0.0000	0.0169	0.2623	0.0000	0.0337
	4	RAN	0.1789	0.1789	0.1789	0.0000	0.1611	0.7477	0.0000	0.1467
		SAL	0.1781	0.1781	0.1781	0.0000	0.1611	0.7455	0.0000	0.1481
		STL	0.0276	0.0276	0.0276	0.0000	0.0286	0.3750	0.0000	0.0491
	8	RAN	0.1810	0.1810	0.1810	0.0000	0.1658	0.7414	0.0000	0.1522
		SAL	0.1819	0.1819	0.1819	0.0000	0.1662	0.7339	0.0000	0.1541
		STL	0.0363	0.0363	0.0363	0.0000	0.0388	0.4483	0.0000	0.0648
	16	RAN	0.1753	0.1753	0.1753	0.0000	0.1570	0.7293	0.0000	0.1544
		SAL	0.1760	0.1760	0.1760	0.0000	0.1589	0.7519	0.0000	0.1543
		STL	0.0357	0.0357	0.0357	0.0000	0.0348	0.3692	0.0000	0.0559

Table H.12: grouped-nb-twitter-GM2-ALL-ALL-150

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.3442	0.4815	0.2431	0.0621	0.2258	0.7931	0.0000	0.1935
		SAL	0.3544	0.5293	0.2909	0.0486	0.2280	0.7931	0.0000	0.1947
		STL	0.3374	0.4555	0.2564	0.0456	0.2380	0.7719	0.0000	0.1905
	1	RAN	0.5553	0.7495	0.4139	0.0861	0.5284	0.8703	0.1096	0.1466
		SAL	0.5531	0.7345	0.4227	0.0845	0.5285	0.9106	0.1379	0.1473
		STL	0.5506	0.6907	0.4066	0.0661	0.5404	0.8750	0.2330	0.1296
	2	RAN	0.5544	0.7220	0.4161	0.0765	0.5230	0.9206	0.1975	0.1587
		SAL	0.5492	0.6859	0.4000	0.0843	0.5206	0.9231	0.1212	0.1572
		STL	0.5534	0.7087	0.4254	0.0755	0.5403	0.8629	0.1975	0.1417
	4	RAN	0.5595	0.7021	0.4539	0.0604	0.5220	0.9021	0.0426	0.1629
		SAL	0.5396	0.7077	0.3814	0.0809	0.5031	0.9052	0.0588	0.1619
		STL	0.5558	0.6981	0.4280	0.0698	0.5420	0.8689	0.2162	0.1409
	8	RAN	0.5533	0.7071	0.3968	0.0677	0.5163	0.9224	0.0779	0.1625
		SAL	0.5432	0.6912	0.4127	0.0717	0.5057	0.8972	0.1067	0.1596
		STL	0.5686	0.7094	0.4029	0.0642	0.5566	0.9254	0.2338	0.1398
	16	RAN	0.5562	0.7680	0.4106	0.0869	0.5202	0.8713	0.0870	0.1730
		SAL	0.5416	0.6900	0.4373	0.0803	0.5070	0.9245	0.0571	0.1704
		STL	0.5758	0.6852	0.4322	0.0594	0.5626	0.8833	0.1690	0.1425

Table H.13: grouped-nb-twitter-GM5-ALL-ALL-5

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.2462	0.3357	0.2000	0.0395	0.1752	0.8136	0.0000	0.1570
		SAL	0.2450	0.3185	0.1748	0.0312	0.1683	0.7931	0.0000	0.1598
		STL	0.2313	0.3245	0.1759	0.0331	0.1700	0.7719	0.0000	0.1617
	1	RAN	0.4266	0.5466	0.3396	0.0669	0.3998	0.8175	0.0556	0.1588
		SAL	0.4247	0.5410	0.3065	0.0655	0.3970	0.8571	0.0833	0.1555
		STL	0.4151	0.5362	0.3212	0.0552	0.4015	0.8400	0.0976	0.1490
	2	RAN	0.4105	0.5806	0.3103	0.0674	0.3807	0.8571	0.0811	0.1638
		SAL	0.4215	0.5522	0.3041	0.0613	0.3940	0.8889	0.0267	0.1706
		STL	0.4240	0.5371	0.3035	0.0631	0.4115	0.8618	0.1167	0.1596
	4	RAN	0.4182	0.5954	0.3220	0.0724	0.3833	0.8618	0.0635	0.1716
		SAL	0.4140	0.4774	0.3069	0.0481	0.3792	0.8468	0.0286	0.1768
		STL	0.4252	0.5124	0.3368	0.0531	0.4114	0.8583	0.1096	0.1629
	8	RAN	0.4235	0.5239	0.3269	0.0573	0.3906	0.8367	0.0656	0.1687
		SAL	0.4108	0.4825	0.3302	0.0447	0.3796	0.8515	0.0303	0.1709
		STL	0.4283	0.5090	0.3364	0.0474	0.4156	0.8750	0.1429	0.1601
	16	RAN	0.4333	0.5369	0.3519	0.0559	0.3979	0.8571	0.0278	0.1758
		SAL	0.4207	0.5606	0.3228	0.0716	0.3916	0.8932	0.0267	0.1750
		STL	0.4418	0.5221	0.3723	0.0446	0.4291	0.8480	0.1067	0.1592

Table H.14: grouped-nb-twitter-GM5-ALL-ALL-10

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.1534	0.1780	0.1256	0.0193	0.1293	0.7931	0.0000	0.1450
		SAL	0.1580	0.2141	0.1224	0.0292	0.1265	0.7931	0.0000	0.1413
		STL	0.1516	0.1929	0.1335	0.0192	0.1307	0.7719	0.0000	0.1464
	1	RAN	0.2966	0.3293	0.2781	0.0196	0.2711	0.7500	0.0000	0.1594
		SAL	0.3041	0.3472	0.2514	0.0357	0.2775	0.7143	0.0000	0.1652
		STL	0.2962	0.3613	0.2703	0.0322	0.2824	0.8190	0.0357	0.1592
	2	RAN	0.2945	0.3486	0.2405	0.0335	0.2728	0.8125	0.0000	0.1682
		SAL	0.2923	0.3478	0.2644	0.0319	0.2684	0.8710	0.0000	0.1646
		STL	0.2901	0.3493	0.2411	0.0317	0.2772	0.8571	0.0278	0.1654
	4	RAN	0.2924	0.3272	0.2133	0.0394	0.2601	0.8750	0.0000	0.1673
		SAL	0.2909	0.3271	0.2491	0.0297	0.2614	0.8710	0.0000	0.1761
		STL	0.2972	0.3300	0.2718	0.0187	0.2851	0.8571	0.0357	0.1712
	8	RAN	0.2914	0.3552	0.2278	0.0417	0.2652	0.8438	0.0000	0.1689
		SAL	0.2885	0.3166	0.2632	0.0203	0.2655	0.8125	0.0000	0.1721
		STL	0.2987	0.3288	0.2746	0.0194	0.2860	0.8387	0.0308	0.1701
	16	RAN	0.2906	0.3765	0.2488	0.0417	0.2659	0.8615	0.0000	0.1761
		SAL	0.2946	0.3568	0.2032	0.0506	0.2694	0.8254	0.0000	0.1723
		STL	0.3068	0.3309	0.2810	0.0154	0.2953	0.8438	0.0286	0.1721

Table H.15: grouped-nb-twitter-GM5-ALL-ALL-25

GM5										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.1269	0.1351	0.1218	0.0059	0.1106	0.7719	0.0000	0.1421
		SAL	0.1247	0.1558	0.0999	0.0232	0.1081	0.6909	0.0000	0.1359
		STL	0.1162	0.1298	0.1065	0.0099	0.1052	0.7241	0.0000	0.1390
	1	RAN	0.2254	0.2481	0.1808	0.0315	0.2063	0.7200	0.0000	0.1517
		SAL	0.2287	0.2534	0.1825	0.0327	0.2067	0.7071	0.0000	0.1527
		STL	0.2289	0.2484	0.2129	0.0147	0.2159	0.7961	0.0000	0.1538
	2	RAN	0.2268	0.2327	0.2218	0.0045	0.2069	0.7647	0.0000	0.1617
		SAL	0.2242	0.2637	0.2009	0.0281	0.2027	0.8000	0.0000	0.1624
		STL	0.2246	0.2511	0.1996	0.0210	0.2156	0.8000	0.0132	0.1645
	4	RAN	0.2215	0.2282	0.2133	0.0062	0.1986	0.8065	0.0000	0.1654
		SAL	0.2170	0.2441	0.1770	0.0288	0.1953	0.7937	0.0000	0.1634
		STL	0.2263	0.2336	0.2141	0.0087	0.2153	0.8254	0.0000	0.1678
	8	RAN	0.2212	0.2573	0.2010	0.0256	0.1959	0.7353	0.0000	0.1593
		SAL	0.2160	0.2452	0.1871	0.0237	0.1992	0.8065	0.0000	0.1649
		STL	0.2280	0.2374	0.2198	0.0073	0.2148	0.8224	0.0000	0.1662
	16	RAN	0.2187	0.2328	0.1954	0.0166	0.1973	0.8710	0.0000	0.1596
		SAL	0.2240	0.2608	0.1540	0.0495	0.2010	0.8254	0.0000	0.1653
		STL	0.2308	0.2400	0.2226	0.0071	0.2194	0.8182	0.0000	0.1674

Table H.16: grouped-nb-twitter-GM5-ALL-ALL-50

GM5										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.0974	0.1049	0.0898	0.0075	0.0914	0.7241	0.0000	0.1239
		SAL	0.0942	0.1047	0.0836	0.0106	0.0875	0.7719	0.0000	0.1280
		STL	0.1014	0.1069	0.0960	0.0054	0.0935	0.7273	0.0000	0.1318
	1	RAN	0.1964	0.2086	0.1843	0.0122	0.1753	0.6588	0.0000	0.1446
		SAL	0.1970	0.2006	0.1934	0.0036	0.1803	0.6735	0.0000	0.1471
		STL	0.1946	0.2111	0.1780	0.0166	0.1790	0.6739	0.0000	0.1454
	2	RAN	0.1957	0.2027	0.1887	0.0070	0.1734	0.7647	0.0000	0.1476
		SAL	0.1934	0.2066	0.1803	0.0132	0.1750	0.8710	0.0000	0.1553
		STL	0.1966	0.2113	0.1819	0.0147	0.1818	0.8254	0.0000	0.1529
	4	RAN	0.1881	0.1984	0.1777	0.0103	0.1705	0.7619	0.0000	0.1595
		SAL	0.1860	0.1880	0.1839	0.0021	0.1709	0.7813	0.0000	0.1564
		STL	0.1895	0.1945	0.1844	0.0051	0.1760	0.7937	0.0000	0.1533
	8	RAN	0.1897	0.1904	0.1890	0.0007	0.1679	0.7576	0.0000	0.1559
		SAL	0.1871	0.1880	0.1861	0.0009	0.1701	0.7813	0.0000	0.1553
		STL	0.1939	0.1945	0.1932	0.0007	0.1806	0.8065	0.0000	0.1581
	16	RAN	0.1858	0.2027	0.1689	0.0169	0.1673	0.7937	0.0000	0.1581
		SAL	0.1881	0.1987	0.1775	0.0106	0.1699	0.7500	0.0000	0.1590
		STL	0.1985	0.2060	0.1910	0.0075	0.1852	0.7937	0.0000	0.1579

Table H.17: grouped-nb-twitter-GM5-ALL-ALL-75

GM5										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.0792	0.0792	0.0792	0.0000	0.0765	0.6429	0.0000	0.1203
		SAL	0.0784	0.0784	0.0784	0.0000	0.0749	0.6182	0.0000	0.1178
		STL	0.0784	0.0784	0.0784	0.0000	0.0749	0.6182	0.0000	0.1178
	1	RAN	0.1542	0.1542	0.1542	0.0000	0.1380	0.6392	0.0000	0.1370
		SAL	0.1531	0.1531	0.1531	0.0000	0.1364	0.6263	0.0000	0.1354
		STL	0.1531	0.1531	0.1531	0.0000	0.1364	0.6263	0.0000	0.1354
	2	RAN	0.1531	0.1531	0.1531	0.0000	0.1363	0.7692	0.0000	0.1425
		SAL	0.1520	0.1520	0.1520	0.0000	0.1358	0.7879	0.0000	0.1428
		STL	0.1520	0.1520	0.1520	0.0000	0.1358	0.7879	0.0000	0.1428
	4	RAN	0.1414	0.1414	0.1414	0.0000	0.1295	0.7500	0.0000	0.1463
		SAL	0.1399	0.1399	0.1399	0.0000	0.1266	0.7500	0.0000	0.1456
		STL	0.1399	0.1399	0.1399	0.0000	0.1266	0.7500	0.0000	0.1456
	8	RAN	0.1404	0.1404	0.1404	0.0000	0.1268	0.7463	0.0000	0.1457
		SAL	0.1399	0.1399	0.1399	0.0000	0.1267	0.7302	0.0000	0.1436
		STL	0.1399	0.1399	0.1399	0.0000	0.1267	0.7302	0.0000	0.1436
	16	RAN	0.1430	0.1430	0.1430	0.0000	0.1292	0.7500	0.0000	0.1467
		SAL	0.1420	0.1420	0.1420	0.0000	0.1295	0.7813	0.0000	0.1464
		STL	0.1420	0.1420	0.1420	0.0000	0.1295	0.7813	0.0000	0.1464

Table H.18: grouped-nb-twitter-GM5-ALL-ALL-150

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.6189	0.8011	0.4860	0.0817	0.5761	0.9234	0.0392	0.1733
		SAL	0.6135	0.8021	0.5154	0.0624	0.5689	0.9284	0.0800	0.1732
		STL	0.6215	0.7500	0.4745	0.0731	0.5991	0.9112	0.1231	0.1466
	1	RAN	0.6132	0.8125	0.4816	0.0678	0.5976	0.9480	0.2051	0.1291
		SAL	0.6155	0.7584	0.4585	0.0765	0.5967	0.9118	0.2000	0.1344
		STL	0.6040	0.7840	0.4606	0.0752	0.5933	0.9126	0.2783	0.1250
	2	RAN	0.6183	0.7311	0.4954	0.0638	0.5982	0.9347	0.3077	0.1280
		SAL	0.6223	0.7823	0.5029	0.0766	0.5998	0.9130	0.2340	0.1377
		STL	0.6075	0.7653	0.4606	0.0678	0.5978	0.9228	0.2824	0.1210
	4	RAN	0.6257	0.8546	0.4694	0.0850	0.6075	0.9613	0.2444	0.1387
		SAL	0.6291	0.8187	0.5164	0.0874	0.6085	0.9320	0.2500	0.1387
		STL	0.6048	0.7781	0.4953	0.0700	0.5969	0.9208	0.3218	0.1204
	8	RAN	0.6210	0.8474	0.4717	0.0767	0.6035	0.9409	0.2500	0.1318
		SAL	0.6247	0.8013	0.4734	0.0831	0.6055	0.9203	0.2222	0.1310
		STL	0.6106	0.7813	0.4669	0.0699	0.6029	0.9208	0.2459	0.1164
	16	RAN	0.6345	0.8216	0.4648	0.0810	0.6169	0.9512	0.2299	0.1355
		SAL	0.6346	0.7564	0.5229	0.0711	0.6104	0.9070	0.2154	0.1368
		STL	0.6106	0.7867	0.4795	0.0770	0.6021	0.9208	0.2526	0.1235

Table H.19: grouped-nb-twitter-GB3-ALL-ALL-5

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.5006	0.6108	0.3844	0.0595	0.4537	0.8696	0.0400	0.1853
		SAL	0.4898	0.5952	0.3958	0.0491	0.4434	0.9091	0.0000	0.1827
		STL	0.4940	0.6108	0.3477	0.0709	0.4658	0.8817	0.0000	0.1708
	1	RAN	0.5038	0.6000	0.4232	0.0499	0.4769	0.8871	0.1333	0.1549
		SAL	0.4977	0.6266	0.3297	0.0742	0.4743	0.8745	0.1190	0.1562
		STL	0.4909	0.6356	0.3796	0.0661	0.4769	0.9002	0.1905	0.1430
	2	RAN	0.5092	0.7366	0.4142	0.0746	0.4865	0.9289	0.1481	0.1447
		SAL	0.5019	0.6596	0.3845	0.0773	0.4754	0.8716	0.1075	0.1510
		STL	0.4935	0.6094	0.3748	0.0594	0.4809	0.9031	0.1647	0.1371
	4	RAN	0.5100	0.6671	0.4123	0.0825	0.4850	0.9066	0.0741	0.1637
		SAL	0.5039	0.6517	0.3665	0.0703	0.4782	0.9102	0.0899	0.1496
		STL	0.4895	0.6067	0.3939	0.0608	0.4770	0.8994	0.1649	0.1419
	8	RAN	0.5061	0.6355	0.4196	0.0675	0.4813	0.9197	0.1389	0.1561
		SAL	0.5013	0.6359	0.3893	0.0788	0.4774	0.8854	0.0952	0.1534
		STL	0.4924	0.6218	0.3732	0.0671	0.4818	0.8994	0.1831	0.1363
	16	RAN	0.5038	0.6205	0.3986	0.0662	0.4811	0.8696	0.0909	0.1464
		SAL	0.5098	0.6137	0.3997	0.0550	0.4842	0.8986	0.0941	0.1517
		STL	0.4987	0.6385	0.3876	0.0682	0.4861	0.8975	0.1778	0.1412

Table H.20: grouped-nb-twitter-GB3-ALL-ALL-10

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.3602	0.4185	0.3076	0.0371	0.3105	0.8000	0.0000	0.1891
		SAL	0.3614	0.4401	0.3153	0.0393	0.3135	0.8696	0.0000	0.1888
		STL	0.3535	0.4211	0.2988	0.0421	0.3253	0.7904	0.0000	0.1799
	1	RAN	0.3788	0.4236	0.3384	0.0317	0.3517	0.8473	0.0256	0.1581
		SAL	0.3764	0.4429	0.3147	0.0411	0.3518	0.8824	0.0202	0.1576
		STL	0.3619	0.4222	0.3190	0.0344	0.3436	0.8393	0.0449	0.1511
	2	RAN	0.3817	0.4394	0.3367	0.0397	0.3563	0.7629	0.0253	0.1525
		SAL	0.3796	0.4232	0.3464	0.0266	0.3512	0.7858	0.0227	0.1501
		STL	0.3667	0.4361	0.3271	0.0360	0.3516	0.8155	0.0440	0.1493
	4	RAN	0.3882	0.4834	0.3428	0.0447	0.3599	0.8504	0.0294	0.1609
		SAL	0.3832	0.4562	0.3207	0.0522	0.3561	0.7828	0.0227	0.1530
		STL	0.3604	0.4353	0.3245	0.0369	0.3457	0.8121	0.0440	0.1519
	8	RAN	0.3733	0.4633	0.3186	0.0511	0.3512	0.8355	0.0588	0.1528
		SAL	0.3824	0.4558	0.3353	0.0409	0.3565	0.7815	0.0244	0.1536
		STL	0.3642	0.4361	0.3206	0.0394	0.3508	0.8117	0.0842	0.1506
	16	RAN	0.3868	0.4290	0.2890	0.0469	0.3595	0.8649	0.0400	0.1685
		SAL	0.3915	0.4422	0.3474	0.0357	0.3625	0.8451	0.0270	0.1651
		STL	0.3730	0.4431	0.3184	0.0395	0.3580	0.8493	0.0449	0.1515

Table H.21: grouped-nb-twitter-GB3-ALL-ALL-25

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.2849	0.3171	0.2642	0.0231	0.2400	0.7606	0.0000	0.1753
		SAL	0.2831	0.3015	0.2612	0.0166	0.2401	0.8955	0.0000	0.1791
		STL	0.2837	0.3292	0.2411	0.0360	0.2569	0.7788	0.0000	0.1759
	1	RAN	0.3022	0.3356	0.2757	0.0249	0.2751	0.7892	0.0000	0.1555
		SAL	0.3002	0.3108	0.2923	0.0078	0.2742	0.8219	0.0235	0.1583
		STL	0.2928	0.3354	0.2686	0.0302	0.2744	0.8073	0.0000	0.1568
	2	RAN	0.3029	0.3256	0.2865	0.0165	0.2765	0.7529	0.0000	0.1511
		SAL	0.3058	0.3300	0.2823	0.0195	0.2782	0.7218	0.0256	0.1513
		STL	0.2970	0.3366	0.2770	0.0280	0.2786	0.7519	0.0000	0.1475
	4	RAN	0.3074	0.3132	0.2995	0.0058	0.2800	0.7895	0.0000	0.1573
		SAL	0.3107	0.3376	0.2755	0.0260	0.2831	0.7111	0.0241	0.1521
		STL	0.2952	0.3361	0.2728	0.0290	0.2778	0.7627	0.0000	0.1525
	8	RAN	0.3086	0.3409	0.2618	0.0339	0.2812	0.8067	0.0000	0.1571
		SAL	0.3044	0.3349	0.2666	0.0283	0.2781	0.7229	0.0385	0.1532
		STL	0.2984	0.3407	0.2721	0.0302	0.2824	0.7965	0.0185	0.1503
	16	RAN	0.3144	0.3272	0.2895	0.0176	0.2860	0.8333	0.0267	0.1597
		SAL	0.3128	0.3371	0.2813	0.0233	0.2860	0.7733	0.0233	0.1605
		STL	0.3028	0.3411	0.2835	0.0271	0.2855	0.8696	0.0000	0.1584

Table H.22: grouped-nb-twitter-GB3-ALL-ALL-50

GB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.2437	0.2633	0.2241	0.0196	0.2035	0.8615	0.0000	0.1692
		SAL	0.2499	0.2646	0.2351	0.0147	0.2094	0.7941	0.0000	0.1661
		STL	0.2515	0.2862	0.2169	0.0347	0.2230	0.8125	0.0000	0.1641
	1	RAN	0.2693	0.2953	0.2433	0.0260	0.2433	0.7416	0.0000	0.1541
		SAL	0.2637	0.3021	0.2254	0.0384	0.2394	0.8000	0.0000	0.1577
		STL	0.2612	0.2873	0.2352	0.0260	0.2414	0.7368	0.0000	0.1533
	2	RAN	0.2660	0.3023	0.2297	0.0363	0.2407	0.7333	0.0000	0.1509
		SAL	0.2724	0.2949	0.2500	0.0225	0.2439	0.7292	0.0000	0.1484
		STL	0.2619	0.2891	0.2347	0.0272	0.2423	0.6869	0.0000	0.1450
	4	RAN	0.2686	0.2787	0.2584	0.0101	0.2427	0.6875	0.0000	0.1541
		SAL	0.2696	0.3128	0.2263	0.0433	0.2442	0.7263	0.0000	0.1560
		STL	0.2619	0.2881	0.2356	0.0262	0.2432	0.7368	0.0000	0.1523
	8	RAN	0.2650	0.2663	0.2638	0.0013	0.2401	0.7325	0.0196	0.1503
		SAL	0.2685	0.2990	0.2381	0.0305	0.2439	0.7013	0.0235	0.1469
		STL	0.2636	0.2903	0.2368	0.0268	0.2462	0.7478	0.0171	0.1470
	16	RAN	0.2788	0.2923	0.2653	0.0135	0.2526	0.7500	0.0000	0.1603
		SAL	0.2787	0.3096	0.2479	0.0308	0.2524	0.7568	0.0000	0.1575
		STL	0.2668	0.2948	0.2389	0.0280	0.2487	0.8116	0.0000	0.1554

Table H.23: grouped-nb-twitter-GB3-ALL-ALL-75

GB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.1973	0.1973	0.1973	0.0000	0.1600	0.7879	0.0000	0.1540
		SAL	0.1995	0.1995	0.1995	0.0000	0.1619	0.7647	0.0000	0.1554
		STL	0.1995	0.1995	0.1995	0.0000	0.1619	0.7647	0.0000	0.1554
	1	RAN	0.2148	0.2148	0.2148	0.0000	0.1910	0.7105	0.0000	0.1453
		SAL	0.2154	0.2154	0.2154	0.0000	0.1910	0.6923	0.0000	0.1455
		STL	0.2154	0.2154	0.2154	0.0000	0.1910	0.6923	0.0000	0.1455
	2	RAN	0.2186	0.2186	0.2186	0.0000	0.1956	0.6458	0.0000	0.1411
		SAL	0.2191	0.2191	0.2191	0.0000	0.1940	0.6437	0.0000	0.1390
		STL	0.2191	0.2191	0.2191	0.0000	0.1940	0.6437	0.0000	0.1390
	4	RAN	0.2190	0.2190	0.2190	0.0000	0.1947	0.6585	0.0000	0.1449
		SAL	0.2200	0.2200	0.2200	0.0000	0.1958	0.6914	0.0000	0.1451
		STL	0.2200	0.2200	0.2200	0.0000	0.1958	0.6914	0.0000	0.1451
	8	RAN	0.2187	0.2187	0.2187	0.0000	0.1953	0.6914	0.0000	0.1426
		SAL	0.2176	0.2176	0.2176	0.0000	0.1936	0.7000	0.0000	0.1414
		STL	0.2176	0.2176	0.2176	0.0000	0.1936	0.7000	0.0000	0.1414
	16	RAN	0.2233	0.2233	0.2233	0.0000	0.1989	0.6829	0.0000	0.1459
		SAL	0.2216	0.2216	0.2216	0.0000	0.1969	0.7297	0.0000	0.1485
		STL	0.2216	0.2216	0.2216	0.0000	0.1969	0.7297	0.0000	0.1485

Table H.24: grouped-nb-twitter-GB3-ALL-ALL-150

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
5	0	RAN	0.6437	0.7942	0.4983	0.0675	0.6224	0.9170	0.2813	0.1354
		SAL	0.6529	0.8164	0.5263	0.0725	0.6323	0.9254	0.1481	0.1378
		STL	0.6459	0.7520	0.5284	0.0612	0.6376	0.9175	0.2326	0.1137
	1	RAN	0.5594	0.8293	0.4149	0.1044	0.5264	0.9336	0.1370	0.1726
		SAL	0.5725	0.7768	0.3913	0.0853	0.5334	0.9419	0.0597	0.1610
		STL	0.5564	0.7425	0.4484	0.0694	0.5290	0.9064	0.0896	0.1580
	2	RAN	0.5741	0.7734	0.4230	0.0814	0.5321	0.9243	0.0597	0.1702
		SAL	0.5746	0.7698	0.3836	0.0949	0.5340	0.9172	0.0597	0.1770
		STL	0.5575	0.7412	0.4452	0.0705	0.5323	0.9045	0.0896	0.1544
	4	RAN	0.5555	0.7413	0.4019	0.0820	0.5197	0.9315	0.0800	0.1651
		SAL	0.5734	0.7768	0.3836	0.1005	0.5335	0.9419	0.0597	0.1787
		STL	0.5592	0.7439	0.4484	0.0704	0.5344	0.9064	0.1270	0.1515
	8	RAN	0.5613	0.7762	0.3429	0.0956	0.5209	0.9160	0.0896	0.1660
		SAL	0.5662	0.7790	0.3942	0.1056	0.5261	0.9419	0.0597	0.1794
		STL	0.5602	0.7439	0.4484	0.0692	0.5346	0.9064	0.1449	0.1566
	16	RAN	0.5534	0.7395	0.3857	0.0860	0.5170	0.9427	0.0351	0.1675
		SAL	0.5669	0.7479	0.4126	0.0824	0.5264	0.9458	0.0606	0.1700
		STL	0.5559	0.7425	0.4484	0.0706	0.5318	0.9064	0.0896	0.1524

Table H.25: grouped-nb-twitter-OSB3-ALL-ALL-5

OSB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
10	0	RAN	0.5287	0.6236	0.4526	0.0468	0.5043	0.9069	0.0988	0.1461
		SAL	0.5283	0.6316	0.4333	0.0606	0.5052	0.8555	0.1481	0.1516
		STL	0.5242	0.6410	0.4355	0.0552	0.5136	0.8996	0.1075	0.1380
	1	RAN	0.4405	0.6071	0.3160	0.0821	0.4016	0.9122	0.0000	0.1771
		SAL	0.4509	0.5714	0.3189	0.0666	0.4070	0.9018	0.0000	0.1669
		STL	0.4247	0.5138	0.3461	0.0495	0.3844	0.8610	0.0000	0.1723
	2	RAN	0.4500	0.5798	0.2883	0.0749	0.4064	0.8989	0.0000	0.1790
		SAL	0.4516	0.5840	0.3535	0.0755	0.4076	0.9098	0.0000	0.1744
		STL	0.4245	0.5163	0.3461	0.0494	0.3866	0.8591	0.0000	0.1712
	4	RAN	0.4429	0.6238	0.3309	0.0860	0.3974	0.8846	0.0000	0.1835
		SAL	0.4499	0.5940	0.2876	0.0863	0.4039	0.9228	0.0000	0.1790
		STL	0.4281	0.5172	0.3455	0.0505	0.3899	0.8610	0.0000	0.1700
	8	RAN	0.4480	0.5315	0.3264	0.0581	0.4033	0.8857	0.0000	0.1802
		SAL	0.4459	0.5966	0.2853	0.0911	0.4015	0.9228	0.0000	0.1778
		STL	0.4289	0.5172	0.3461	0.0490	0.3902	0.8610	0.0000	0.1729
	16	RAN	0.4520	0.5954	0.3539	0.0628	0.4055	0.8785	0.0317	0.1824
		SAL	0.4475	0.5826	0.3245	0.0693	0.4015	0.9265	0.0000	0.1731
		STL	0.4278	0.5163	0.3438	0.0470	0.3902	0.8610	0.0000	0.1712

Table H.26: grouped-nb-twitter-OSB3-ALL-ALL-10

OSB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
25	0	RAN	0.4008	0.4626	0.3364	0.0404	0.3727	0.8824	0.0000	0.1687
		SAL	0.3985	0.4848	0.3207	0.0592	0.3731	0.8219	0.0000	0.1681
		STL	0.3945	0.4509	0.3359	0.0360	0.3798	0.8529	0.0215	0.1572
	1	RAN	0.3270	0.4237	0.2419	0.0557	0.2795	0.8238	0.0000	0.1742
		SAL	0.3207	0.3673	0.2870	0.0337	0.2706	0.8341	0.0000	0.1677
		STL	0.3142	0.3626	0.2818	0.0254	0.2730	0.7892	0.0000	0.1646
	2	RAN	0.3274	0.3719	0.2897	0.0267	0.2796	0.8333	0.0000	0.1735
		SAL	0.3248	0.3951	0.2704	0.0501	0.2789	0.8386	0.0000	0.1704
		STL	0.3146	0.3618	0.2824	0.0259	0.2742	0.7768	0.0000	0.1643
	4	RAN	0.3257	0.3685	0.2773	0.0365	0.2736	0.7942	0.0000	0.1666
		SAL	0.3251	0.3814	0.2859	0.0424	0.2764	0.8571	0.0000	0.1721
		STL	0.3176	0.3655	0.2818	0.0266	0.2776	0.7830	0.0000	0.1650
	8	RAN	0.3303	0.3894	0.2570	0.0400	0.2864	0.8219	0.0000	0.1702
		SAL	0.3280	0.3937	0.2782	0.0417	0.2810	0.8389	0.0000	0.1702
		STL	0.3164	0.3622	0.2849	0.0250	0.2769	0.7795	0.0000	0.1639
	16	RAN	0.3269	0.4016	0.2749	0.0389	0.2800	0.8629	0.0000	0.1718
		SAL	0.3246	0.3746	0.2837	0.0368	0.2782	0.8444	0.0000	0.1728
		STL	0.3172	0.3659	0.2786	0.0281	0.2774	0.7792	0.0000	0.1647

Table H.27: grouped-nb-twitter-OSB3-ALL-ALL-25

OSB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
50	0	RAN	0.3221	0.3322	0.3156	0.0072	0.2965	0.7792	0.0000	0.1680
		SAL	0.3265	0.3739	0.2838	0.0369	0.3002	0.7895	0.0000	0.1637
		STL	0.3212	0.3505	0.2914	0.0241	0.3046	0.7826	0.0000	0.1603
	1	RAN	0.2549	0.2620	0.2507	0.0051	0.2147	0.7119	0.0000	0.1596
		SAL	0.2553	0.2797	0.2254	0.0225	0.2085	0.7556	0.0000	0.1540
		STL	0.2504	0.2786	0.2361	0.0199	0.2113	0.7250	0.0000	0.1582
	2	RAN	0.2546	0.2797	0.2360	0.0184	0.2082	0.7712	0.0000	0.1553
		SAL	0.2566	0.2674	0.2427	0.0103	0.2142	0.7350	0.0000	0.1598
		STL	0.2502	0.2810	0.2332	0.0218	0.2118	0.7244	0.0000	0.1555
	4	RAN	0.2549	0.2751	0.2296	0.0189	0.2110	0.7511	0.0000	0.1598
		SAL	0.2569	0.2670	0.2385	0.0130	0.2136	0.7412	0.0000	0.1620
		STL	0.2524	0.2819	0.2343	0.0211	0.2132	0.7289	0.0000	0.1563
	8	RAN	0.2596	0.2831	0.2305	0.0218	0.2154	0.7585	0.0000	0.1604
		SAL	0.2575	0.2741	0.2398	0.0140	0.2151	0.7511	0.0000	0.1583
		STL	0.2512	0.2819	0.2314	0.0220	0.2128	0.7261	0.0000	0.1574
	16	RAN	0.2601	0.2913	0.2410	0.0223	0.2134	0.7609	0.0000	0.1602
		SAL	0.2572	0.2795	0.2335	0.0188	0.2140	0.7429	0.0000	0.1620
		STL	0.2518	0.2831	0.2300	0.0227	0.2133	0.7248	0.0000	0.1560

Table H.28: grouped-nb-twitter-OSB3-ALL-ALL-50

OSB3										
Group Size	WebIT %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
75	0	RAN	0.2854	0.3004	0.2704	0.0150	0.2607	0.7945	0.0000	0.1585
		SAL	0.2912	0.3039	0.2786	0.0127	0.2656	0.7941	0.0000	0.1645
		STL	0.2815	0.3048	0.2582	0.0233	0.2638	0.7887	0.0000	0.1585
	1	RAN	0.2241	0.2444	0.2038	0.0203	0.1842	0.7364	0.0000	0.1536
		SAL	0.2200	0.2427	0.1972	0.0228	0.1767	0.7042	0.0000	0.1510
		STL	0.2196	0.2347	0.2044	0.0152	0.1844	0.6905	0.0000	0.1493
	2	RAN	0.2285	0.2345	0.2226	0.0060	0.1854	0.8051	0.0000	0.1548
		SAL	0.2230	0.2654	0.1806	0.0424	0.1796	0.7176	0.0000	0.1496
		STL	0.2210	0.2378	0.2042	0.0168	0.1868	0.7160	0.0000	0.1493
	4	RAN	0.2268	0.2464	0.2072	0.0196	0.1886	0.7229	0.0000	0.1523
		SAL	0.2233	0.2615	0.1851	0.0382	0.1797	0.7213	0.0000	0.1506
		STL	0.2209	0.2383	0.2035	0.0174	0.1869	0.7073	0.0000	0.1504
	8	RAN	0.2212	0.2226	0.2198	0.0014	0.1824	0.6875	0.0000	0.1489
		SAL	0.2240	0.2611	0.1870	0.0371	0.1812	0.7077	0.0000	0.1508
		STL	0.2205	0.2376	0.2033	0.0172	0.1859	0.7073	0.0000	0.1502
	16	RAN	0.2274	0.2482	0.2065	0.0209	0.1861	0.7330	0.0000	0.1534
		SAL	0.2204	0.2435	0.1973	0.0231	0.1791	0.7360	0.0000	0.1509
		STL	0.2207	0.2382	0.2033	0.0174	0.1863	0.6905	0.0000	0.1501

Table H.29: grouped-nb-twitter-OSB3-ALL-ALL-75

OSB3										
Group Size	Web1T %	Group Type	Accuracy				F-Score			
			AVG	MAX	MIN	STDEV	AVG	MAX	MIN	STDEV
150	0	RAN	0.2320	0.2320	0.2320	0.0000	0.2087	0.7778	0.0000	0.1539
		SAL	0.2337	0.2337	0.2337	0.0000	0.2113	0.7467	0.0000	0.1571
		STL	0.2337	0.2337	0.2337	0.0000	0.2113	0.7467	0.0000	0.1571
	1	RAN	0.1773	0.1773	0.1773	0.0000	0.1407	0.6337	0.0000	0.1319
		SAL	0.1776	0.1776	0.1776	0.0000	0.1400	0.6058	0.0000	0.1311
		STL	0.1776	0.1776	0.1776	0.0000	0.1400	0.6058	0.0000	0.1311
	2	RAN	0.1792	0.1792	0.1792	0.0000	0.1413	0.6250	0.0000	0.1336
		SAL	0.1790	0.1790	0.1790	0.0000	0.1427	0.6058	0.0000	0.1316
		STL	0.1790	0.1790	0.1790	0.0000	0.1427	0.6058	0.0000	0.1316
	4	RAN	0.1788	0.1788	0.1788	0.0000	0.1413	0.6244	0.0000	0.1336
		SAL	0.1784	0.1784	0.1784	0.0000	0.1412	0.6184	0.0000	0.1325
		STL	0.1784	0.1784	0.1784	0.0000	0.1412	0.6184	0.0000	0.1325
	8	RAN	0.1810	0.1810	0.1810	0.0000	0.1442	0.6570	0.0000	0.1339
		SAL	0.1787	0.1787	0.1787	0.0000	0.1412	0.6087	0.0000	0.1322
		STL	0.1787	0.1787	0.1787	0.0000	0.1412	0.6087	0.0000	0.1322
	16	RAN	0.1797	0.1797	0.1797	0.0000	0.1416	0.6540	0.0000	0.1334
		SAL	0.1785	0.1785	0.1785	0.0000	0.1408	0.6377	0.0000	0.1326
		STL	0.1785	0.1785	0.1785	0.0000	0.1408	0.6377	0.0000	0.1326

Table H.30: grouped-nb-twitter-OSB3-ALL-ALL-150

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