Poetry Mix-Up
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Computer technology has become exceedingly integrated with modern culture, which prompted us to introduce and explore the avenues of integrating aesthetics with technology, familiar ground of modern society. With the intention of promoting aesthetic sensibilities generated in poetry, we introduce a poetry generating system called “Poetry Mix-up” which encourages users to experience the creation of a “remixed” variety of poetry by sending a simple SMS. In this system, WordNet-based Word Sense Disambiguating (WSD) and topic summarizing algorithms are implemented to understand the input short messages which will be categorized into several main topics. Based on the topics and the content of the input message, the system creates a new poem by mixing existing poem lines. The preliminary user study shows that Poetry Mix-up could be a new form of social and cultural communication in the digital era.

Categories and Subject Descriptors: H.5.2 [User Interfaces]: Natural language, Graphical user interfaces (GUI), Theory and methods
General Terms: Design, Human Factors, Algorithms
Additional Key Words and Phrases: Interactive media, cultural computing, poetry, SMS, mobile computing, human-media interaction

ACM Reference Format:

1. INTRODUCTION
Interacting by reciting or writing poetry has been an entertainment practice from ancient times. People of different cultural traditions appreciated poetry as a literary source, a direct and indirect communication medium, and as a source of entertainment. From royalty to plebeians, from great scholars to philistines, all conversed, appreciated, and were entertained by poetry. Even today poetry is a wonderful way of expressing our inner thoughts and engaging the senses. Studies have shown that poetry can be used very effectively to improve mental health [McArdle and Byrt 2001].

Contrastingly, the digital age is finding more familiar ground with modern communication methods such as instant messaging, short messaging, twitter, blogs, and similar applications expressing themselves in the form of short bits of information. For example, there is an average of approximately 900 million SMS messages sent per month in Singapore [SMS 2008], a high figure considering the fact that its population...
is approximated at four million. Furthermore, modern communication has the advantage of crossing all physical barriers and moving towards global use. People can receive information from all over the world by subscribing to SMS, Twitter, blogs, etc.

In addition, the media mix strategy also disseminates content across broadcast media and portable entertainment technologies and alternatively, this permits communication based on various forms of social interaction between users [Jenkins 2006]. Mixing was made popular in hip-hop culture during the 1980’s and 90’s and has continued to be in music and visual DJ (disk jockey) and VJ (video jockey) culture which entertains the enthusiastic young generation. Regardless of the context, the essential idea remains the same. A mash-up allows users to combine information of varying granularity from different disparate sources [Murthy et al. 2006]. Consequently, a new type of communication and entertainment system is in need to facilitate an interactive digital culture. By introducing aesthetics of traditional poetry and merging with modern technologies, a new movement of poetic literature can be established. From both short bits of literature and digital communication, we can invent a new form of literary expression called “bit literature” and introduce digital poetry as a new form of entertainment and communication.

To provide a new platform to experience such cultural and social communication, we developed a new poetry generation and entertainment system, Poetry Mix-up, by combining traditional poetry culture and modern mobile messaging technology. “Mixing” or “mash-up” using poetry is the major element of this system, which transforms users into poets by generating poems based on users’ SMS. The technique used in our system integrates a number of ideas from different disciplines such as information retrieval and natural language understanding, specifically Word Sense Disambiguation (WSD) and topic summarizing, and augments the system with genetic algorithm-based methods to create a model for coherent poetry output.

As shown in Figure 1, the user sends a short message to the system which contains a preconfigured mobile number. Then the extracted text from the SMS will be transferred to the processing unit, processed, and mixed to generate new poetry and the end result will be displayed attractively.

The rest of the article is organized as follows. We will discuss the social and cultural background and motivation behind this research in Section 2. Related research works, ranging from cultural computing, mobile computing, and natural language processing, will be presented in Section 3. In Section 4, we will explain the technical details of our Poetry Mix-up system, including WSD, topic summarization, and output optimization. Result analysis of an example message input will be discussed in Section 5. Section 6 presents the initial user interview about the system. Finally, Section 7 presents the conclusion and future direction of Poetry Mix-up.

2. MOTIVATION

Poetry is a literary art which uses certain forms and contents to convey the literal implication of words, thus evoking varied responses. Poetry is considered one of the most highly intellectual forms of entertainment and an exceedingly refined mode of communicating information. Since entertaining methods were scarce, poetry has been a powerful mode of interaction in the past. From rulers, courtiers, and clergy to civilians, all have participated in the enjoyment and culture through poetry. Roman poets of the imperial times wrote poetry to interpret and glorify the emperor and entertained the public, thus providing enjoyment while at the same time venerating the emperor [Nauta 2002]. Japanese Emperor Tenji (626–672), a genuine poet himself, had a very literary-oriented court where a princess had introduced the famous debate in lyrics on which season is lovelier, spring or autumn. The topic, to this day, is able to evoke a highly interactive dialog [Miner 1968]. The very famous Japanese literary work “The Tale of
"Genji" [Shikibu and Tyler 2006] reveals most eloquently the poetic communications of Genji, which comprised an exceedingly entertaining form of interaction between various subjects. Japanese haiku is also an entrancing meditation on nature, still yet entertains Japanese society [Shirane 1998]. Though history is full of poets and communities who appreciated, entertained, and formed discourses around poetry, the modern generation is distancing itself from these interests. Poetry as entertainment is becoming confined inside the school curriculum and within literary circles.

Contemporary society’s fascination with the communication methods of the information age has transformed the role of poetry. The popular cultural aspects of the modern era are highly associated with technological advancement. Mixing up various cultural elements using technological development, thus introducing hybrid aesthetics, is the forte of the modern generation. This fusion enables users to experience a wide range of cultures and information. We are primarily motivated by the necessity to communicate some aesthetic cultural aspects to the modern generation. The modern generation could immensely benefit from the pleasure and contentment of reading literature, especially poetry. To achieve this objective, we introduce the use of SMS, or Short Messaging Service, as the medium of communication which is immensely popular among mobile phone users today. Our purpose is not necessarily to bring back traditional literary examples, expecting the modern generation to embrace them with enthusiasm, but to immerse the traditional art of poetry into modern applications, introducing a “remixed” form of communication. This hybrid form of communication will be an element of popular culture, where old and new come together to form an exciting and novel interactive platform.

3. RELATED WORKS
There are a few key areas which are closely related to the Poetry Mix-up system, including natural language processing, interactive poetry generation, and mobile
interaction. Most of the works focus on natural language generation are trying to mimic human-human communication between human and machine, such as ELIZA [Weizenbaum 1983], ALICE [ALICE Chatbot 2011], and PARRY [Colby 1974]. However, the traditional technology used in these chat agents is inadequate when it comes to generating poetry. Poetry possesses characteristics such as rhythm and rhyming schemes. Furthermore, poems generally do not have clear and well-defined communication goals. They rather rely on abstract and figurative language, encouraging the reader to form her own conclusions as to the meaning. Therefore, a revised poetry generation model is required.

There have been numerous efforts put into interactive poetry generation in past decades. The Interactive Poem system [Tosa 1998] provides a platform for a human participant and a computer agent to create poetry by exchanging poetic phrases. In Hitch Haiku [Tosa et al. 2007], a user chooses arbitrary phrases from a chapter of a famous Japanese essay called “1000 Books and 1000 Nights,” and the system generates haiku which includes its essence, then translates it into English. Therefore, the essence of a Japanese book could reach those unfamiliar with traditional poetry. The Giver of Names [Dietz 2002] by David Rokeby could recognize the arrangement of objects on a pedestal and construct a poem using words inspired by the objects. Eitan Mendelowitz developed a system called Drafting Poems [Mendelowitz 2006], which can generate an original poem according to users’ drawings. Compared to Interactive Poem and Hitch Haiku, Poetry Mix-up provides a highly active platform which enables users to express themselves freely through SMS. On the other hand, in Interactive Poem and Hitch Haiku, users could passively choose from limited options provided by the systems. What differentiates our system from The Giver of Names and Drafting Poems is that Poetry Mix-up brings the social communication value of poetry and merges it into modern pop culture. Most importantly, our system is relatively high in accessibility since users can send SMS to the system at any time from any place.

On the other hand, the mobile phone has already been used as a medium of self-expression [Alan et al. 2005]. Many interactive systems based on mobile phones have been developed. Pauliina Tuomi’s research [Tuomi 2008] shows the great popularity of SMS-based human-hosted interactive TV in Finland. Joe Blogg [Martin et al. 2006] is a public display where users can contribute content by sending messages and images to the system using mobile phones. TexTales [Ananny et al. 2004] is a large-scale photographic installation to which people can send SMS. In spite of considerable results in mobile computing research, only few of the mobile technologies are used to promote cultural communication such as poetry, or to explore the possibility of remixing cultures and technology.

4. SYSTEM DESCRIPTION

The poetry generation process in the Poetry Mix-up system consists of three main steps: the Word Sense Disambiguating (WSD) layer, topic modeling layer, and a genetic algorithm-based selection process. Furthermore, the input message is preprocessed by a message filter using the SMS slang to English converter and swear-word blocker. The slang to English converter filters the messages and gets the most out of the input message while the swear-word blocker blocks the respective phone number for a constant time if any inappropriate word is sent to the system.

As illustrated in Figure 2, the WSD layer is used to improve the quality and quantity of poem lines being selected. The topic summarization focuses on measuring the syntactic and semantic similarity of the poem lines with the input text and issues a final list of relevant poem lines. Moreover, a genetic algorithm-based selection process is implemented to combine the best three lines in the final poem selection. According to previous research, there are several attempts where WSD was successfully used for
information retrieval purposes [Liu et al. 2004]. However, WSD itself is not sufficient to create a poem, since maintaining the coherence between poem lines is important. Remixing poems based on comparing the topics of the input text with the topics of existing poem lines is a novel approach in that it guarantees the coherence of the poem. A new algorithm was implemented with those techniques for better remixing and creation.

4.1. Word Sense Disambiguation Layer
The system understands the sense of a word by finding similarity between the input words semantically and syntactically using a WSD technique. This is essential for remixing poems as it enhances information retrieval. Measuring the semantic relatedness of concepts is an intriguing problem in natural language processing [Patwardhan et al. 2003]. Semantic relatedness implies how closely two words or concepts are related through relationships like antonyms, synonyms, and similar relationships. On the other hand, semantic similarity represents how aligned two words or concepts are. The semantic relatedness of WSD was used in this approach.

WordNet [Fellbaum et al. 1998] is a large lexical database of English which is used inside the WSD implementation. It is observed that WordNet handles only nouns, verbs, adjectives, and adverbs except determiners, prepositions, pronouns, conjunctions, and particles [Miller 1995]. This may lead to a decreased accuracy in the WSD layer, since a single preposition or punctuation mark might reduce the coherence of the input
sentence. Therefore, this algorithm was implemented by supplementing these missing features to WordNet to handle the WSD for better results. To measure semantic relatedness, the vector measure implementation [Fellbaum 1998] was found to be the best of those currently available measures used for the new algorithm. It works by forming second-order cooccurance vectors from the glosses or WordNet definitions of concepts. The relatedness of two concepts is determined as the cosine of the angle between their gloss vectors. In order to get around the data sparsity issues presented by extremely short glosses, this measure augments the glosses of concepts with glosses of adjacent concepts as defined by WordNet relations.

In addition, instead of the traditional WordNet tagging which produces noun, verb, adjective, and adverb, the tags of pronoun, preposition, connector, and auxiliary verbs were added into WordNet database. These handling measures enhanced the accuracy in the WSD layer.

4.2. Topic Summarization Layer

The results (estimated definition and topic of each word) transferred from the WSD layer are further analyzed to calculate the salience measure [Boguraev and Kennedy 1997] of a particular topic and to select those topics with highest salience measure. The salience measure used in this algorithm is a combination of the following factors (in decreasing order of importance) and the weights shown within brackets are derived by experiments to produce the best results.

1. **As Subject Term Frequency (10%)**. Subjects are found by a very simple parse tree algorithm. If a statement lacks a subject and if it starts with a verb, we add “you” in front of the imperative sentence to make it the subject.

2. **Cooccurrence Frequency (15%)**. We use summation of the term frequencies of the words with which the index is syntactically related over the total number of words. Syntactic relation is measured by whether it occurs in conjunction with the following relationships: adjective to noun, adverb to verb, verb to noun (subjects and objects), connectors and prepositions to nouns, and the rest.

3. **Term Frequency (20%)**. The term frequency is a measure of how often a term is found in a collection of documents, in this case poem lines.

4. **Gloss Overlap Factor (15%)**. This measures how closely related are the meanings of the index word against the words in the content. This needs to increase exponentially with each word match; hence we choose to square the number of overlaps [Banerjee and Pedersen 2003]. Also we need to remove “a”, “an”, “the”, and other such common words from the calculations. This is measured by the formula

\[
\text{Glossoverlapfactor} = n^2, \quad (1)
\]

where \( n \) = number of important words overlapped in the glosses of the two words compared.

5. **Hypernym Relatedness Factor (25%)**. This measures how closely two hypernym chains are related to each other. This is a combined factor of the number of levels that match (and this factor should contribute exponentially) and also the depth of the lowest hypernym match, as this indicates further closeness.

The formula is

\[
\text{Hypernymrelatednessfactor} = ((1 - \lfloor n/m \rfloor) * k)^2, \quad (2)
\]

where:

- \( n \) = lowest level of hypernym match;
- \( m \) = level of belonging category;
- \( k \) = number of hypernym levels matched.
(6) **POS (Part Of Speech) Frequency Factor** (5%). This implies the frequency with which a word occurs within a particular POS.

(7) **POS Salience** (10%). The importance of various types of topics (words) is different while summarizing. The decreasing order of importance of word types is as follows:
- nouns (includes pronouns and prepositions);
- verbs, adverbs, and adjectives;
- auxiliary verbs, connectors (excluding just coordinating and topicless ones), and prepositions.

Therefore, the final equation for salience measure can be derived as

\[ SalienceMeasure = k + l + m + n + o + p + q. \]

where:

\[
\begin{align*}
k &= \text{[Subject Term Frequency } \times (10/100)] \\
l &= \text{[Cooccurrence Frequency } \times (15/100)] \\
m &= \text{[Term Frequency } \times (20/100)] \\
n &= \text{[Gloss Overlap Factor } \times (15/100)] \\
o &= \text{[Hypernym Relatedness Factor } \times (25/100)] \\
p &= \text{[POS Frequency Factor } \times (5/100)] \\
q &= \text{[POS Salience } \times (10/100)]
\end{align*}
\]

Eq. (3) was used to summarize the content into the five best topics, each associated with a salience measure. As an example, for the phrase “If you have to be a man, do this” the first topic is person. By matching the topics in the input message with existing poem lines, the system will generate a preliminary list of probable poem lines in the topic summarizing layer. By using a specific topic it measures syntactic and semantic similarity of the poem lines with the input message. Finally, a list of suitable poem lines will be generated from the system. The overview of the process is illustrated in Figure 3.

### 4.3. Final Selection

To enhance the coherence of the poems, a genetic algorithm-based approach is used for the final poem line selection. The topic summarized input message with the topic summarized and dependency-marked poem lines will be further analyzed by this layer to produce the final poetry output. A brief overview of this process is shown in Figure 4.

Topic summarized and dependency-marked poem lines are used as the current population and salience measure for the fitness function for the genetic algorithm. The system will generate random combinations of three poem lines from the shortlisted list iteratively. The short-listed poem lines which pass the fitness function or have the highest salience measure in the fitness function are selected as the final output.

### 5. AN EXAMPLE ANALYSIS OF POEM MIX-UP

Suppose the user sends the SMS “On this day, I speak only of the glorious consequence.”

For this example, the words are identified by the POS Tagger as shown in Table I.

Based on the Russell dimensions, the line is assigned numerical values based on the emotional weight along two axes. The poetry mixer maintains a list of words and qualifiers that influence the emotional state of the line or message. The system searches for the occurrence of these words in the message. In this example, the result is as shown in Table II. The word “glorious” produces a positive value (+1) on the degree of pleasantness axis.

Important words selected are “day”, “speak”, and “on” based on term importance. The number of words selected corresponds to the number of poetry lines generated by the
Provide super sense for words with hypernyms

Use other relations such as synset to find hypernym and use it as super sense for non nouns with no direct hypernym,

Measure syntactic & semantic similarity of the poem lines with input (using specific topic)

For words for which hypernyms cannot be found use the word as a specific topic and mark super sense as ‘other’

Resolve negations using antonyms etc…

Rank the salient measures and obtain the top five as the summary of the document

Calculate the document’s salience measures for each super sense as well as those super sense less specific topic

Use the hypernym chains for similar super senses to find the specific topic that occurs the most and is not a pronoun

Fig. 3. Topic summarization process.

system. The application selects three words in the default setting. The $tf - idf$ weights of all the words in the SMS are shown in Table III. Note that a weight of $-1$ indicates that the word or phrase did not appear in the poetry corpus in the poetry mixed.

The system then searches synonyms for each of these selected words. For example, synonyms found for word “on” would include “along,” “about,” and “during.” Similar sets of synonyms are found for “speak” and “day.” In this case, the following words were chosen from the set augmented with synonyms: “day”, “speak”, and “on”. The complete sets are shown in Table IV.

Based on the types of the original words in the SMS, the system calculates the $tf$-$idf$ weights of all the words in these augmented sets once again. The final lists of $tf$-$idf$
weights, sorted in descending order, are shown in Tables V, VI, and VII. Note that words not in the system database are not shown in the tables.

In each set, the word with the highest weight is selected (“day”, “talk,” and “about”). Subsequently in the first step, for each selected word the system shortlists poetry lines where the term frequency of the word is highest, the selected word is used in the same context as in the original SMS, the emotional weight of the poetry lines is closest to the emotional weight of the SMS, and all are shown in Tables VIII, IX, and X.
Table I. POS Tagger Tags

<table>
<thead>
<tr>
<th>Tag</th>
<th>Tag Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>On</td>
<td>IN</td>
<td>Preposition or subordinating conjunction</td>
</tr>
<tr>
<td>this</td>
<td>DT</td>
<td>Determiner</td>
</tr>
<tr>
<td>day</td>
<td>NN</td>
<td>Noun, singular or mass</td>
</tr>
<tr>
<td>I</td>
<td>PRP</td>
<td>Personal Pronoun</td>
</tr>
<tr>
<td>speak</td>
<td>VBP</td>
<td>Verb, non-3rd person singular present</td>
</tr>
<tr>
<td>only</td>
<td>RB</td>
<td>Adverb</td>
</tr>
<tr>
<td>of</td>
<td>IN</td>
<td>Preposition or subordinating conjunction</td>
</tr>
<tr>
<td>the</td>
<td>DT</td>
<td>Determiner</td>
</tr>
<tr>
<td>glorious</td>
<td>JJ</td>
<td>Adjective</td>
</tr>
<tr>
<td>consequence</td>
<td>NN</td>
<td>Noun, singular or mass</td>
</tr>
</tbody>
</table>

Table II. Emotional Weight of Message

<table>
<thead>
<tr>
<th>x-value (Degree of pleasantness)</th>
<th>y-value (Degree of agitation/arousal)</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>0</td>
<td>On this day, I speak only of the glorious consequence (1,0)</td>
</tr>
</tbody>
</table>

Table III. The tf-idf Weights of the Words

<table>
<thead>
<tr>
<th>Word</th>
<th>tf-idf weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>day</td>
<td>2.12</td>
</tr>
<tr>
<td>speak</td>
<td>1.71</td>
</tr>
<tr>
<td>on</td>
<td>1.59</td>
</tr>
<tr>
<td>glorious</td>
<td>1.49</td>
</tr>
<tr>
<td>only</td>
<td>1.47</td>
</tr>
<tr>
<td>I</td>
<td>1.04</td>
</tr>
<tr>
<td>this</td>
<td>0.95</td>
</tr>
<tr>
<td>of</td>
<td>0.60</td>
</tr>
<tr>
<td>the</td>
<td>0.55</td>
</tr>
<tr>
<td>consequence</td>
<td>-1.00</td>
</tr>
</tbody>
</table>

Table IV. Fetching Synonyms

<table>
<thead>
<tr>
<th>Word</th>
<th>Synonyms</th>
</tr>
</thead>
<tbody>
<tr>
<td>day</td>
<td>24-hour interval, clarence day, clarence shepherd day jr., daylight, daytime, mean solar day, sidereal day, solar day, twenty-four hour period, twenty-four hours, day</td>
</tr>
<tr>
<td>speak</td>
<td>address, mouth, talk, utter, verbalise, verbalize, speak</td>
</tr>
<tr>
<td>on</td>
<td>along, about, during, upon, with, on</td>
</tr>
</tbody>
</table>

Table V. The tf-idf Weights of Synonyms for “day”

<table>
<thead>
<tr>
<th>Word</th>
<th>tf-idf weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>day</td>
<td>2.12</td>
</tr>
<tr>
<td>daylight</td>
<td>1.21</td>
</tr>
</tbody>
</table>

Table VI. The tf-idf Weights of Synonyms for “speak”

<table>
<thead>
<tr>
<th>Word</th>
<th>tf-idf weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>talk</td>
<td>1.33</td>
</tr>
<tr>
<td>utter</td>
<td>0.91</td>
</tr>
<tr>
<td>speak</td>
<td>0.86</td>
</tr>
</tbody>
</table>
Table VII. The tf-idf Weights of Synonyms for “on”

<table>
<thead>
<tr>
<th>Word</th>
<th>tf-idf weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>about</td>
<td>1.72</td>
</tr>
<tr>
<td>on</td>
<td>1.59</td>
</tr>
<tr>
<td>upon</td>
<td>1.48</td>
</tr>
<tr>
<td>along</td>
<td>1.47</td>
</tr>
<tr>
<td>with</td>
<td>1.41</td>
</tr>
</tbody>
</table>

Table VIII. Poetry Lines for “day” (selected for “day”)

<table>
<thead>
<tr>
<th>Line</th>
<th>tf</th>
<th>Emotional weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>One day I’ll find happiness again</td>
<td>0.14</td>
<td>(1,0)</td>
</tr>
<tr>
<td>For the joy that the day has brought,</td>
<td>0.11</td>
<td>(1,0)</td>
</tr>
<tr>
<td>Her sights and sounds; dreams happy as her day;</td>
<td>0.09</td>
<td>(1,0)</td>
</tr>
</tbody>
</table>

Table IX. Poetry Lines for “talk” (selected for “speak”)

<table>
<thead>
<tr>
<th>Line</th>
<th>tf</th>
<th>Emotional weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>when we talk all night</td>
<td>0.20</td>
<td>(0,0)</td>
</tr>
<tr>
<td>We talk the battle over</td>
<td>0.17</td>
<td>(0,0)</td>
</tr>
</tbody>
</table>

Table X. Poetry Lines for “about” (selected for “one”)

<table>
<thead>
<tr>
<th>Line</th>
<th>tf</th>
<th>Emotional weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poem is about beauty and tragedy</td>
<td>0.14</td>
<td>(0.7,0)</td>
</tr>
<tr>
<td>There is something about a Martini,</td>
<td>0.14</td>
<td>(0,0)</td>
</tr>
</tbody>
</table>

In the final phase, the poetry line that maximizes the term frequency and minimizes the emotional weight difference (closest in emotional weight to the input message (which as mentioned before is (1, 0))) is selected. The following is the final output of the system as shown in Figure 5.

Poem is about beauty and tragedy
when we talk all night
One day I’ll find happiness again

In the meantime, the poem will be uploaded to Twitter\(^1\) as shown in Figure 6, therefore users can also communicate using poetry in Twitter.

Preliminary results of the algorithm are very encouraging, and definitely qualitative. People find the system entertaining, and are curious to experiment. The output of the system generally appeals to the user. The key novelties in the algorithm that make it more efficient are listed as follows.

—*Information Summarization.* This is a direct result of the topic summarization method. Understanding of the context gives rise to a more efficient summary of the poem.

—*Information Retrieval.* Qualitative: By understanding intradocument links and understanding the sense of the words, the quality of poem lines selected is achieved. Quantitative: By understanding the context, the algorithm is able to retrieve more relevant poem lines.

\(^1\)http://twitter.com

ACM Computers in Entertainment, Vol. 9, No. 2, Article 8, Publication date: July 2011.
Remixing Quality (Especially Coherence). The remixed poem is created by using interline links to reinforce the input message’s theme.

Limited Information Loss. The top five topics were used to obtain the relevant poem lines with minimal information loss.

6. USER EVALUATION

To evaluate the validity of the system, a preliminary user evaluation has been conducted under three main categories. Usability, social communication, and the possibilities of preserving the poetry culture are the measured aspects of the system. For this user study, 15 participants were selected (age 22–35; M = 26.5; SD = 2.35) from different nations, including Singapore, Sri Lanka, Malaysia, China, Canada, Japan, and the USA. Most of them were students and researchers in the university specialized in different disciplines. Furthermore, the participants were requested to answer these issues based on three factors: usability, social communication, and on preserving poetry culture. All the items were measured with a 5-point Likert scale, ranging from
Table XI. The Summarized Results of User Evaluation

<table>
<thead>
<tr>
<th></th>
<th>Negative</th>
<th>Neutral</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usability</td>
<td>18%</td>
<td>29%</td>
<td>53%</td>
</tr>
<tr>
<td>Social Communication</td>
<td>16%</td>
<td>32%</td>
<td>52%</td>
</tr>
<tr>
<td>Preserve poetry culture</td>
<td>15%</td>
<td>32%</td>
<td>53%</td>
</tr>
</tbody>
</table>

“Strongly Disagree” to “Strongly Agree”. Following are the three research questions we focused on in this study.

**Question.** Are users comfortable with Poetry Mix-up?

**Question.** Could Poetry Mix-up be used as a tool for social communication?

**Question.** Could Poetry Mix-up be used preserve the diminishing poetry culture?

Based on these questions we have prepared statements to answer. The statements were derived and modified based on the theory of flow [Jackson and Marsh 1996; Radikovic et al. 2005].

We gave the subjects 15 minutes to play with the system before they answered the questionnaire.

(1) **Acceptance of Poetry Mix-up**

**Question.** Are users comfortable with Poetry Mix-up?

**Hypothesis.** Users would be satisfied with the system in relation to the experience and the related outputs.

**Example Statement 1.1.** I like the system.

**Example Statement 1.2.** Generated poetry is related to the input SMS.

**Example Statement 1.3.** I prefer to see the SMS directly on the screen.

**Example Statement 1.4.** I prefer generating poetry from the SMS.

**Example Statement 1.5.** When using the system I felt like I was a poet.

(2) **Social Communication Using Poetry Mix-up**

**Question.** Could Poetry Mix-up be used as a tool for social communication?

**Hypothesis.** The system could be used for indirect social communication through poetry.

**Example Statement 2.1.** I think this system could be used to communicate with others.

**Example Statement 2.2.** I think this system could be used as an indirect communication tool with my friends (for example, blogs, Facebook, and Twitter are used as indirect communication tools).

**Example Statement 2.3.** Poetry could be used as a medium for communicating at present.

(3) **Preserving Poetry Culture**

**Question.** Could Poetry Mix-up be used preserve the waning poetry culture?

**Hypothesis.** The system could preserve a poetry culture.

**Example Statement 3.1.** I think the traditional poetry culture is receding from the new generation.

**Example Statement 3.2.** I think this system could help to preserve the poetry culture.

**Example Statement 3.3.** I would like to communicate with others through poetry.

In addition, the open-ended questions contained several questions to obtain the subjects’ general understanding on poetry culture and opinions. Data collected from the survey after using the system are expressed as mean unless otherwise specified in Table XI.
More than 50% of the subjects commented positively in all three aspects of the system. In the usability aspects, one participant said it was really nice to see the response corresponding to the SMS. Another user commented that the poems generated by the system are meaningful to some extent and observed the various possibilities for further improvements. On the other hand, many comments on improvement were received during the user evaluation. For example, the system still needs more accurate results in understanding the input SMS. In social communication aspects, most of the participants commented that poetry could be used as a medium for communicating at present and they could use the system to communicate with their friends. Another suggested that as a communication media it would be better if the system could give related images which will provide visuals.

In the final section on preserving poetry culture, many users did agree that the system provides prospects to preserve poetry culture. Since the vision behind the creation of the system is remixing traditional culture with modern applications, thus promoting robust social interactions and helping to preserve the poetry culture, considering the user responses, the system has been a success. It is more interesting to observe that, even though most of the participants believe that traditional poetry culture is diminishing in the new generation, they would like to communicate with others through poetry. In addition, in each aspect of the study 15%–18% of participants gave negative ratings to the system. There were several reasons for that. Notably, several participants were thinking that traditional cultural elements may recede due to human evolution. Especially, they thought that poetry culture is not suitable for the rapid pace of lives in the 21st century. This could be due to their unawareness of latest research works or due to their thinking patterns. Further developments in this sphere would be a revitalizing immersive experience to contemporary society, which will eventually reflect their actual cultural transactions.

7. CONCLUSION AND FUTURE WORK

It is understood that the current interest in new technologies will stimulate theoretical discussion on their significance for aesthetic studies. However, not everyone is able to compose a poem or interact with a poem. In particular, the modern generation may not possess the desire or inclination towards poetic literature. Poetry Mix-up introduces a “remixed” form of poetry making, where modern society will be operating in its familiar territory of remixing and technology. The SMS provides the ideal foundation for this application since it is a frequently used and very familiar communication method. Poetry Mix-up allows each individual to create his own customized and unique work of personal poetry while experiencing literary interaction with a contemporary technology.

In addition to the available features, captivating possibilities can be provided to the users to pick genre types and authors for the poem. Examples could include a “Shakespearean poetry generator” or “Limerick generator”. This could increase the appeal of the application, and potentially increase the effectiveness of coming up with a poem that is relevant and entertaining. It could also have a layer that checks for rhyme and rhythm aspects of the poem in the genetic algorithm section.

REFERENCES


