

Master Thesis

**Automatic Transformation of Web  
Pages into Comprehensible Talk Shows  
with Humors**

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# Automatic Transformation of Web Pages into Comprehensible Talk Shows with Humors

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## Abstract

Rapid progress in the Internet, in particular Web technology, brought a powerful information environment. Now, Web is regarded as the largest information resource. Using Web browsers is mainstream to get information of Web.

In order to get information of Web with current Web browsers, users must read the Web pages and click and navigate hyperlinks. It is difficult for non computer users to operate with the Web. Even for average users, it is sometimes troublesome because its active operation prevent them from doing other tasks during browsing Web.

On the other hand, passive contents like TV programs (or radio programs) are able to get without active operations. Non computer users don't feel difficulty in getting information of TV programs, and they can also do other tasks while watching TV programs.

Therefore we had proposed a framework for transforming Web contents into passive contents like TV programs in order to free users from active operations. Passive contents transformed by this framework is presented by CG character's speech. CG character reads out the sentences of the original Web pages by using synthesized speech.

This framework has succeeded in reducing active operations to get information of Web. However there are two problems in this framework. One is that users often don't feel comprehensible to get information by this framework. The other is that users often don't enjoy the obtained contents by this framework. This is because CG characters just read out the sentences of the original Web pages. Therefore the obtained TV-program-type contents are often boring and not comprehensible.

To solve the first problem, we consider that transforming Web pages into dialogical TV-program-type contents promotes comprehension of users. This is because conversation is very familiar way of information gathering and it is said to promote comprehension of users more than written words.

To solve the second problem, we consider that bringing humors in the obtained TV-program-type contents makes the contents more enjoyable. This is because humors are considered to be effective to get attentions of users.

To achieve these two ideas, we focus on Manzai, which is a dialogical contents with humors. Manzai is a Japanese traditional entertainment, and it is enjoyed as familiar comprehensible contents to us from children to old people. The dialogical expressions in Manzai are easy to understand, and the techniques of expressing humors in Manzai are enjoyable. Therefore we considered that automatic transformation of Web pages into comprehensible talk shows with humors like Manzai provides users to comprehensible and enjoyable way to get information of Web.

In this paper, we propose a framework for transforming Web pages into Manzai. At first, we propose a modeling of Manzai in order to generate Manzai automatically. In this modeling, we show the policy for transforming declarative sentences of Web pages into dialogical sentences. Next, we propose the required techniques. Then we make a prototype system of transforming Web pages on news Web site into Manzai. Then we carry out evaluation experiments against users and verify practical effectiveness of our system.

## Webの愉快的分かりやすいトークショーへの自動変換

蓬莱 博哉

### 内容梗概

近年の Web 技術を始めとするインターネット技術の進歩はめざましく、非常に強力な情報収集環境ができあがった。現在、Web は最も巨大な情報資源と行うことができるだろう。Web の情報を取得するには Web ブラウザを用いるのが主流である。

既存の Web ブラウザは、ユーザーが Web ページを読む、クリックする、ハイパーリンクをたどるといった操作を行わなければならない。しかし、情報弱者にとってはこれらの操作は難しい。一般ユーザーにとっても Web 閲覧中は操作に追われ、他の仕事を行う事は困難である。

一方、テレビ番組やラジオ番組のような受動型コンテンツは能動的な操作を全く行うことなく取得できる。ただ、見る、聞くだけで情報を取得できる。その為、ユーザーは情報の取得に困難を感じることなく、他の仕事の間を取得することもできる。

これまで我々は、ユーザーを Web 閲覧時の能動的な操作から開放するため、Web コンテンツを TV 番組のような受動型コンテンツに変換することを行ってきた。具体的には CG キャラクターを使い Web 上の文書を音声合成によって読み上げる事によって TV 番組形式のコンテンツに変換していた。

しかし、この方式ではユーザーを単に能動的な操作から解放しただけにすぎず、ユーザーに分かりやすく楽しく情報を伝えていると言うことはできなかった。なぜなら、この方式では Web ページ中の文書をそのまま CG キャラクターに読み上げさせていたので、見たり聞いたりする事に向いていないわかりにくい退屈な番組になってしまうことが多かったからである。

我々は、わかりやすいコンテンツに変換する為に、Web ページ中の文書を会話表現に変換し、対話番組形式に変換する事が有用でないかと考えた。会話は人間にとって馴染みの深い情報収集手段であり、ユーザーの理解を促進しているからである。

さらに我々は、楽しく親しみやすいコンテンツに変換するためには、ユーモアを取り入れる事が有用であると考えた。視聴者の興味や関心を惹くためにはユーモアが有効な手段だと考えられる為である。

この二つを同時に実現する為に、我々は漫才に注目した。漫才は、ユーモアのある対話番組形式のコンテンツである。漫才とは日本に古くから伝わる伝統的な演芸であり、親しみやすく理解しやすいコンテンツとして子供からお年寄りまでに広く認識されている。漫才のユーモアの表現手法の中には、視聴者の興味や関心を惹くための手法が多く見られる。我々は漫才の表現手法を導入することで楽しく親しみやすいだけでなく、わかりやすいコンテンツに変換できるのではないかと考えた。

本論文では、Web ページを自動的に漫才形式に変換する機構を提案する。まず、我々はそのために漫才の形式化を行う。この形式化によって、Web ページ中の平叙文を対話文に変換する基本的方針を示す。

次に変換の為に技術をいくつか提案する。平叙文を対話文に変換する技術として、実際の漫才にみられる手法を含むいくつかの手法と、印象語による Web ページの分類方法を提案する。

その後、これらの技術を用いてプロトタイプシステムを試作する。このシステムは、ニュース Web サイトからユーザーの選択したテーマに沿った Web ページを複数選択し、漫才形式に変換してユーザーに提示するシステムである。このシステムを用いてユーザーに対する評価実験を行い、この機構の有用性に対する評価を行う。

# Automatic Transformation of Web Pages into Comprehensible Talk Shows with Humors

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# Chapter 1 Introduction

In recent years, the WWW has rapidly expanded to be a powerful information environment. Now, Web is regarded as the largest information resource. The Web operation is easy for computer users, but it is still difficult for non-computer users and ordinary TV audiences. Current Web browsers enforce users to have knowledge about computers and activeness. In order to acquire necessary information, users must read the page and click (and navigate) hyperlinks. We call this user interface as "Read and Click Interface".

On the other hand, TV audience usually watch and listen to the TV programs, and acquire necessary information. We call this user interface as "Watch and Listen Interface". By this interface, users are free from active operations and able to do other tasks.

Therefore we had proposed a framework for transforming Web contents into passive contents like TV programs in order to free users from active operations. Passive contents transformed by this framework is presented by CG character's speech. CG character reads out the sentences of the original Web pages by using synthesized speech.

This framework has succeeded in reducing active operations to get information of Web. However there are two problems in this framework. One is that users often don't feel comprehensible to get information by this framework. The other is that users often don't enjoy the obtained contents by this framework. This is because the sentences of the original Web pages, which often do not suit for watching and listening, are read with no change by CG characters. Therefore the obtained TV-program-type contents was often boring and not comprehensible.

To solve the first problem, we consider that transforming Web pages into dialogical TV-program-type contents promotes comprehension of users. This is because conversation is very familiar way of information gathering and is said to promote comprehension of users more than written words.[5]

To solve the second problem, we consider that bringing humors in the obtained TV-program-type contents makes the contents more enjoyable. This is because

humors are considered to be effective to get attentions of users.

To achieve these two ideas, we focus on Manzai, which is a dialogical contents with humors. Manzai is a Japanese traditional entertainment and is enjoyed as familiar comprehensible contents to us from children to old people. The dialogical expressions in Manzai are easy to understand, and the techniques of expressing humors in Manzai are enjoyable. Therefore we considered that automatic transformation of Web pages into comprehensible talk shows with humors like Manzai provides users to comprehensible and enjoyable way to get information of Web.

In this paper, we aim at automatic transformation of web pages into comprehensible talk shows with humors (like Manzai) in order to make Web pages comprehensible, humorous, and easy to get contents of them.

The characteristics of transforming Web pages into Manzai are as follows:

- Manzai is a passive contents. Therefore watching Manzai frees us from increasing interactions.
- Manzai can contain many topics naturally. It suits for integrating many topics into one content. It has also story lines and a theme, so an audience can understand topics more smoothly than getting them in a random order. It also suits for the purpose of zapping of summaries of many topics.
- Manzai is so humorous and entertaining that an audience can watch it without stress.
- Manzai consists of two or more performers' conversations. It is said that conversations improve information receiver's comprehension more than texts consists of written words because conversations are more familiar to us.[5]

At first, we propose a modeling of Manzai in order to generate Manzai automatically.

Next, we propose some techniques for this. These techniques are mainly for transforming declarative sentence into dialogical sentences. Some of these techniques are embraced from real Manzai.

Then we make a prototype system of transforming Web pages into Manzai using these techniques.

Then we carry out evaluation experiments against users and verify the results.

Through this research we had a chance to think about humors. To produce laughs is the ultimate goal of Manzai, but it is very difficult and there are no measures. Now we have a hypothesis that laughs are produced from feeling of oneness and oddness. We want to prove that this hypothesis is true through our research in the future. The vision for the future is described at the last of this paper.

The remainder of this paper is organized as follows. Chapter 2 introduces motivation and basic concepts. In chapter 3 we propose the modeling of Manzai. Chapter 4 introduces techniques for talk show transformation. In chapter 5 the prototype system we propose is explained. In chapter 6 we carry out evaluation experiments against users. In chapter 7 we describe the conclusion and vision for the future.

## Chapter 2 Motivation and Basic Concepts

### 2.1 What's Manzai?

Manzai is a Japanese traditional entertainment. It is a kind of performances by two or more performers. Everything entertaining is allowed to be performed on stage in Manzai, like singing, playing music instruments, speaking and so on. However the most popular style of Manzai today is two performers' mainly speaking style known as "Syabekuri Manzai" which started in early stages of Showa by Entatsu-Achako a famous Manzai performers pair.

Before Entatsu-Achako, Manzai was based on singing and dancing. It was also described as "万歳". (Today's Manzai is described as "漫才".) In old Manzai, a pair of performers takes a role named "Tayu" and "Saizo". A performer playing a role of "Tayu" holds up a fan and says about auspicious things, then another performer playing a role of "Saizo" strikes a small hand drum and sings about it. Old Manzai was performed like this.

However Entatsu-Achako, in Showa 5, started a new style of Manzai without fans, small hand drum, and singing. They performed Manzai only by speaking. They also didn't wear kimonos, which used to be uniforms of Manzai. It was an adventure for them, but it was a sensation for an audience and amused a lot. They also changed topics dealt with Manzai from auspicious things to more close things to us, like social situations, sports games, daily lives and so on. This is the origin of today's Manzai which consists of natural conversation. The roles of Manzai performers, "Tayu" and "Saizo", has also changed. Today's Manzai roles are known as "Boke" and "Tukkomi" (came from "Saizo" and "Tayu"). "Boke" is a role as a foolish person. On the other hand, "Tukkomi" is a role as a smart person. A performer playing a role of "Boke" often says mistaken or funny things or jokes. Then a performer playing a role of "Tukkomi" points to his fault and correct it. We also call these statements "Boke" and "Tukkomi". Doing "Boke" means saying mistaken or funny things and doing "Tukkomi" means pointing to Boke's fault or correcting it. "Boke" and "Tukkomi" cause laughs and these are the most important elements of Manzai.

In Manzai there is another role called "Sujifuri". This is not so famous but



Figure 1: Old style Manzai. This is the picture of Mikawa Manzai, which is inherited in Aichi prefecture. Photo credit : Nishio city's education board

important. A performer playing a role of this explains the story line. He sometimes changes topics on real time when reactions of an audience is not good. However not all kind of topics are allowed. Every Manzai has a theme, and topics chosen by "Sujifuri" are preferred to be under the theme.

Manzai performers share these roles, "Boke" , "Tukkomi", and "Sujifuri". It is common that a performer playing a role of "Tukkomi" also plays a role of "Sujifuri".

However there is a very many styles of roles today, and it is usual to exchange roles halfway of Manzai.

## 2.2 Why Manzai?

Today, there are many topics in Web. If we want to get some topics of them, we have to click them , read them, scroll them much. These actions may be

troublesome for some users. This is the problem.

On the other hand, passive contents like TV programs (or radio programs) are able to get with no actions. All we have to do is watching.

Therefore some researches transform Web pages into passive contents.[8][6] However we consider transforming into Manzai is the best solution of this. Reasons are explained below.

- Manzai is a passive contents. Therefore watching Manzai frees us from increasing interactions.
- Manzai can contain many topics naturally. Therefore Manzai suits for integrating many topics into one content. It has also story lines and a theme, so an audience can understand topics more smoothly than getting topics in a random order like a TV news. It also suits for the purpose of zapping of summaries of many topics.
- Manzai is so humorous and entertaining that an audience feel less stress during watching it.
- Manzai consists of two or more performers' conversations. It is said that conversations improve information receiver's comprehension more than texts consists of written words because conversations are more familiar to us.[5]

### **2.3 How to produce laughs?**

Another reason we transform Web pages into Manzai is to produce laughs. It is said to be very difficult and there are no measures. This is the ultimate goal we think. However we have a hypothesis how laughs are produced.

The hypothesis is that laughs are produced from feeling of oneness and feeling of oddness. This hypothesis are as follows.

- People laugh when their expectation is betrayed and it doesn't matter to them. For example, people laugh when another person falls over unexpectedly, but they never laugh when they themselves fall over. It is important that targets for laugh are nothing to do with him.
- Feeling of oneness is the source of producing laughs. The more people feel oneness against the target, the more their expectation can be betrayed. This can produce more laughs. For example, old people don't laugh much

when they watch entertainments for young people. We think this is because old people don't feel oneness against what young people do.

It is necessary to make people feel oneness against a target which don't have relation to them in order to make them laugh. In Manzai, performers should make the audience feel oneness. It is difficult to make the audience feel oneness by using computer, but it is worth challenging.

We want to prove that this hypothesis is true through our research in the future.

## **2.4 Related Works**

### **2.4.1 TVML**

TVML (TV program Making Language)[13, 14], proposed by NHK Science and Technical Research Laboratories, is a tool to produce an entire TV program on the desktop. It is a kind of scripting language by which a CG-based TV program is described. A TV program script written in TVML is played like a conventional TV program by the TVML player. That is, a TVML script is translated into CG animation with synthesized speech, virtual camera movement and real video. TVML originally aims at a framework for TV programs production. There had been no relationship between TVML and Web data browsing. We aim at constructing an environment to browse web content in a passive manner like TVs, and so, we chose TVML as one of target languages, by which Web content is viewed in a passive manner.

### **2.4.2 POC Caster**

POC Caster[7] is a method for transforming a text form into a conversation form by inserting different comments in a documented text. A dialogue documented in a fixed text form lacks a diversity of the original conversation. In order to evolve the stored knowledge, diverse reevaluations of the knowledge are essential. Conversational Contents is the concept that enables people to keep discussing a knowledge product by talking with the very product. The experimental result called POC caster inserts different comments into a text in order that people can focus on many sides of the text. The effects of different comments upon understanding and studying a text are discussed.

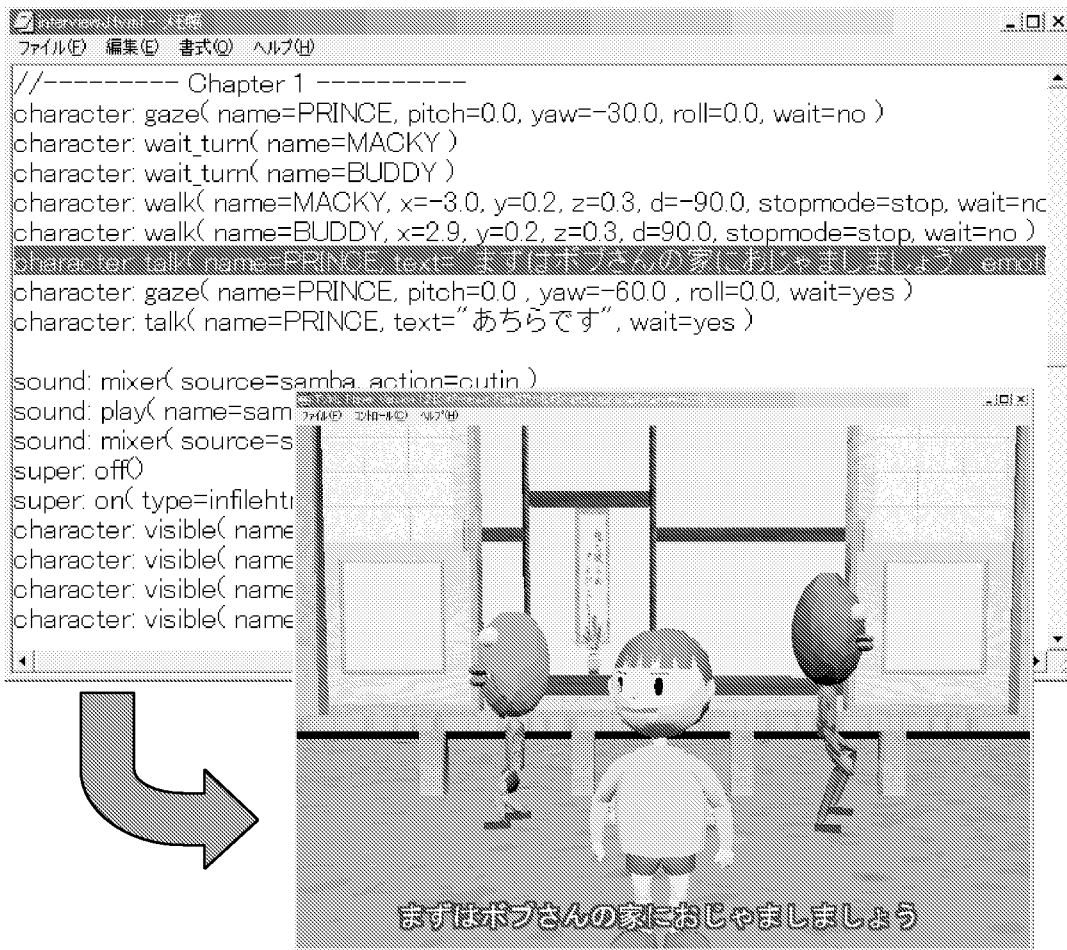
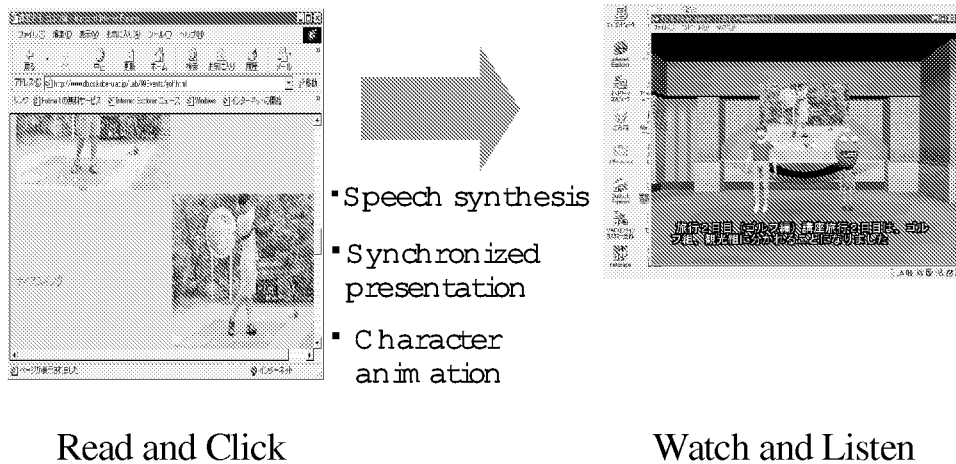


Figure 2: TVML

### 2.4.3 Passive Web-Browsing by TV-program Metaphor

Passive Web-Browsing by TV-program Metaphor is a way to browse Web pages in a passive style. The watch and listen Interface is the solution for this objective. Once a user specifies a URL, the Web page corresponding to the URL is shown like as a TV-program, which the user can watch and listen to it. Fig.3 shows an example screen image for the watch and listen interface. The left part of Fig.3 is an ordinary Web page containing texts, images and so on. The right part of Fig.3 is a screen image of our watch and listen interface. The interface presents the content of the corresponding Web page like a TV program, in which some animation characters speak the text in the original page like lines, and the images contained in the Web page are presented consecutively one by one by synchronizing with characters' speech and behaviors.



- Speech synthesis
- Synchronized presentation
- Character animation

Figure 3: Browsing Web pages by watch and listen interface.

#### 2.4.4 SiteCruise Theater

The SiteCruise Theater is also a passive-type Web browser developed at Incubation Center of NEC Corporation. Web pages of a user's interest are serialized and the content is automatically scrolled and played together with specified music etc. The idea of serializing and scrolling Web pages in an automatic manner is quite new and interesting since it provides a way to browse Web content in a passive manner. Its customizing capability is, however, not enough since users can only specify the order of Web pages and the scrolling speed. Also, users are still enforced to read the scrolling content.

#### 2.4.5 The EDR Electronic Dictionary

The EDR Electronic Dictionary[10] seeks to provide a foundation for linguistic databases, and explains the relation of electronic dictionaries to very large knowledge bases.

This dictionary consists of following subdictionaries: the word dictionary, the concept dictionary, the co-occurrence dictionary, the Corpus, and the Technical Terms Dictionary.

We used the word dictionary and the concept dictionary.

The word dictionary includes the relations between words and concepts (equivalent to the sense of a word).

The concept dictionary classifies all concepts in super-sub relations and is sim-

ilar to a thesaurus, helping computers find equivalent or similar concepts or compute the degree of similarity between concepts.

## **2.5 Positioning of Our Research**

There are some researches of transforming Web pages into passive contents, but no research of transforming into Manzai. Our research is the pioneer of this area, but also based on many researches such as natural language processing[15][17], TVML the script language for making TV programs [13][14]. Our research is so unique that it is introduced in Nikkei Sangyou Shinbun.

## Chapter 3 Modeling of Manzai

In order to transform Web pages into Manzai automatically, we model Manzai to some extent. In this paper, Manzai is modeled by dividing into the precondition and the script and the an audience. The composition of Manzai script is shown in Fig. 4, and the modeling of Manzai which we performed to is described below.

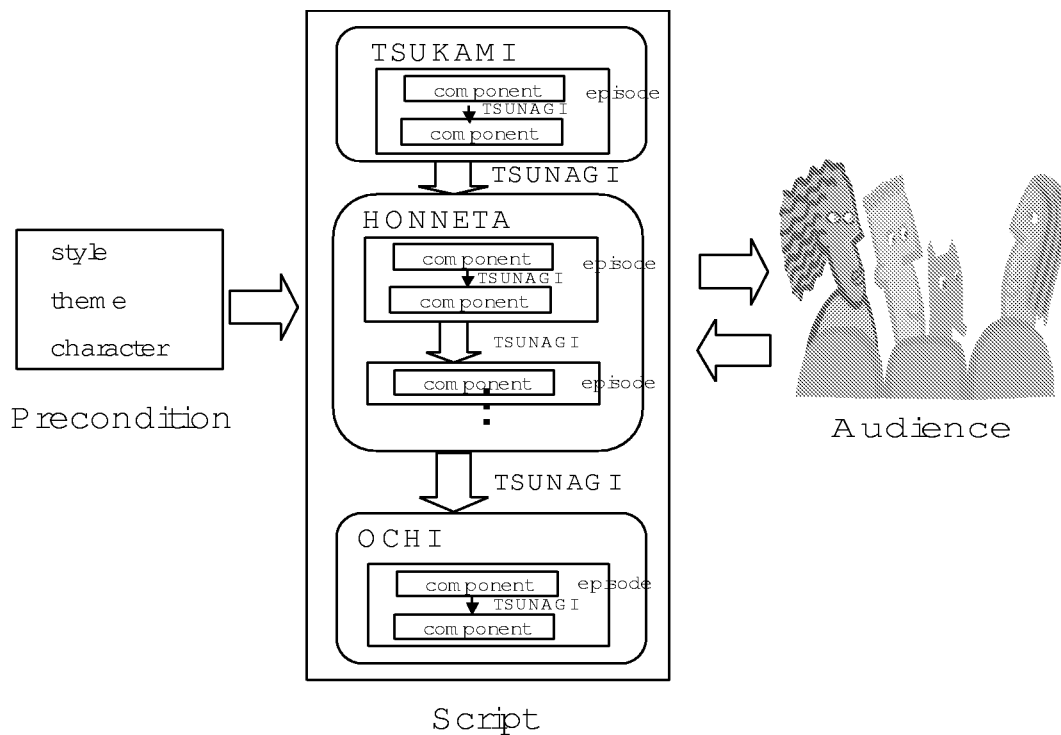


Figure 4: Modeling of Manzai

### 3.1 Precondition

Manzai presented by two characters' performing the script, which is under a theme, based on the defined style. Manzai script cannot be independent of the style, the theme and the characters. Needless to say, it is necessary to make scripts which suit them. A famous Manzai scriptwriter Minoru Akita made this the theory, "Watch Manzai to the extent that it gets bored. You cannot write Manzai script for performers if you don't know the feature of

them.”[4]. Therefore the style, the theme, in particular the characters are very important for writing Manzai script. We call these three major elements as Manzai precondition.

### **3.1.1 Style**

There are many Manzai styles, for example, ”Kayou Manzai” (performers sing and speak), ”Syabekuri Manzai” (performers speak only) and so on. ”Syabekuri Manzai”, which is common today, is targeted in this paper. ”Boyaki Manzai” and ”Jiji Manzai” are classified into ”Syabekuri Manzai”. ”Boyaki Manzai” is the style which two performers describe familiar things, things of the world, etc. exaggeratedly amusingly complaining of them. ”Jiji Manzai” is aimed at describing news amusingly. There are many other Manzai styles today.

### **3.1.2 Theme**

It is common to speak about subjects under a certain theme in Manzai. Therefore our Manzai transformed by Web pages has the theme. Therefore we pick up topics under the theme, that is described in later sections.

### **3.1.3 Characters**

As we described already, characters is a very important element in the composition of Manzai. Since a script will also change if characters changes, you have to determine characters first. In general, Manzai is performed by two performers. Pair of two performers have several types, such as ”husband and wife”, ”brothers”, ”sisters”, ”friends”. If considered from general common sense, these pairs are likely to have reverse characteristics, such as wife is stronger than husband, little brother is more reliable, and so on. We consider that these reverse characteristics often make an audience laugh by betraying the expectations of them. Thus, each pair of performers has unique characters and it is an essential element of Manzai. In our System, Manzai is performed in PC, so we can use fictional characters such as ”boy and robot”.

After choosing characters, the roles of performers, ”Boke”, ”Tukkomi”, ”Sujifuri” must be assigned to them. This is most important. It is popular that ”Tukkomi” and ”Sujifuri” are assigned to a smart character and ”Boke” is assigned to a foolish character.

## 3.2 Manzai script

Manzai script is the most important part of generating Manzai. It is the great portion of generating Manzai. To generate Manzai script automatically, we defined two concepts, Episode and Component, and we divide Manzai script into three elements like real Manzai, "Tsukami", "Honneta", "Ochi". Detail of these are described below.

### 3.2.1 Definition of Episode and Component

**Episode** We define Episode as one topic which consists of some Components.

In our system, Episode comes from one Web page. (when one page has one topic, such as a news Web site.)

**Component** We define Component as minimum unit of conversation, which cannot be divided any more without losing its meaning. The set of "Boke" and "Tukkomi" is the best example of Component. Humorous conversations like Manzai have some rules, that "Tukkomi" should come after "Boke", and so on. Normal conversations also have rules such as answers should come after questions.

### 3.2.2 "Tsukami", "Honneta", "Ochi"

**"Tsukami"** "Tsukami" is the introduction of Manzai. In this portion, a performer playing role of "Sujifuri" explains the theme of the Manzai and introduce the first topic. This portion consists of one Episode including introduction of the performers and the theme. After this portion, "Honneta" begins.

**"Honneta"** "Honneta" is the main portion of Manzai. In this portion, performers tell us several topics. This portion consists of several Episodes. Between Episodes, performers express their impressions about the former Episode or comment about it then a performer playing role of "Sujifuri" introduces the latter Episode. After all Episodes is finished, then Ochi begins.

**"Ochi"** "Ochi" is the comment portion of Manzai and the punch line of it. In this portion, performers express their impressions about all Episode and the theme and discuss. The last portion of "Ochi" is that a performers playing the role of "Boke" says a funny conclusion and "Tukkomi" comes.

The funny conclusion is also called "Ochi". It is very difficult to create but is very important in Manzai.

### 3.2.3 "Tsunagi"

"Tsunagi" means connection in Japanese. "Tsunagi" is inserted in "Tsukami", "Honneta", "Ochi", Episodes and Components. "Tsunagi" is inserted in order to make the flow of the talk smooth. We define "Tsunagi" as included part of "Tsukami" or "Honneta" or "Ochi" or Components or Episodes. It's not independent part of Manzai, but important to generate each part of Manzai. Tsunagi is what makes the flow of the talk smooth, such as comments or introduction to the next part.

**"Tsunagi" in "Tsukami"** "Tsunagi" in "Tsukami" is inserted at the last of "Tsukami". It connects the introduction of theme and character and beginning of "Honneta". It introduce the first topic of "Honneta" like this.  
"The next topic is . Let's listen."  
"OK."

**"Tsunagi" in "Honneta"** Tsunagi in "Honneta" is inserted between Episodes of "Honneta". It connects each Episodes like this.  
"Well, It was a cruel story wasn't it ?"  
"Yes, it is."  
"The next news story is about politics."  
"Uh-huh."

**"Tsunagi" in "Ochi"** Tsunagi in "Ochi" is inserted at the beginning of "Ochi". It connects the last Episode and the "Ochi" like this.  
"Well, all the stories were good, weren't they?"  
"Yes, they were."  
"The story of was impressive to me. Well, which news were impressive to you ?"

## 3.3 Audience

Manzai is performed in front of an audience. There in no exception even in Manzai generated by PCs because there is an audience in front of PCs. In real Manzai, a pair of Manzai performers interacts with an audience. They react

with the response of the audience, by changing topics if the response is not good or by talking to one of the audience in order to produce laughs.

In our system, we don't permit users to interact Manzai performers (which is performed by CG characters). This is why we stick to passive browsing of Web pages. However reaction between system and the audience is necessary to improve qualities of generated Manzai, so we want to adopt this concept in the future.

## Chapter 4 Techniques for Talk Show Transformation

In this section, we explain about techniques for Talk Show Transformation. (Some techniques are for Manzai Transformation.) Now we explain why these techniques are necessary, and explain contents of them. Techniques in this section are used in the prototype system described in the next section. Techniques except "pick up topics under the theme" are for transforming a declarative sentence into a Component, a minimum unit of conversation. Techniques "Giving Responses", "Asking Questions", "Dividing Sentences" are for generating natural dialogical sentences. Techniques "Exaggeration", "Misreading", "Misconception" are for generating humorous dialogical sentences which can be found in real Manzai.

### 4.1 Pick up Topics under the Theme

**Purpose** This technique is for making flows of generated talk shows smooth.

Web pages have various themes, but it is preferred that talk shows (in particular Manzai) have one theme in the background. Therefore when transforming Web pages into talk shows, categorizing Web pages based on themes should be done at first. After that, system can pick up Web pages under a theme that is chosen by a user and transform them into a talk show under one theme.

**Outline** Themes are described as following impression words. (for example)

- 明るい (which means positive or bright.)
- 物騒 (which means cruel or dangerous.)
- 情けない (which means helpless.)
- 悲しい (which means sad.)

Now we define impression words as  $l_j, j \in (1, \dots, 4)$ . When an impression word  $l_j$  is selected as a theme, system analyze titles of Web pages and choose the most related Web page to  $l_j$ . To quantify relationship between impression words and Web pages, system check cooccurrence between impression words and words in titles of Web pages. After doing this, im-

pression feature vectors of Web pages are defined. Details of calculating impression feature vectors are below.

1. The system carries out morphological analysis of the title sentence of a Web page (ChaSen[15] is used as a morphological-analysis tool.) Then, from the obtained word sequence, signs, non-independent words, and unique nouns are removed, and prefixes is added to the next noun. Then the word sequence finally obtained is set to  $W_i$ ,  $i \in (1, \dots, n)$ .  $W_i$  is a sequence of independent words.
2. The system calculate  $c_{ij}$ , the degree of cooccurrence of each impression word  $W_i$  and  $I_j$ .

$$c_{ij} = U(W_i \cap I_j) / U(W_i \cup I_j) \quad (1)$$

$U(X)$  is the number of the Web pages containing word set  $X$ . It obtained by using Google Web API[16]. Then  $V_i$ , the feature vector of  $W_i$ , is set as following.

$$V_{W_i} = \{c_{i1}, c_{i2}, c_{i3}, c_{i4}\} \quad (2)$$

3. Total of  $V_{W_i}$  for each  $W_i$  is set to  $V$ .

$$V = \sum_{W_i} V_{W_i} \quad (3)$$

Obtained  $V$  is the impression feature vector of the Web page.

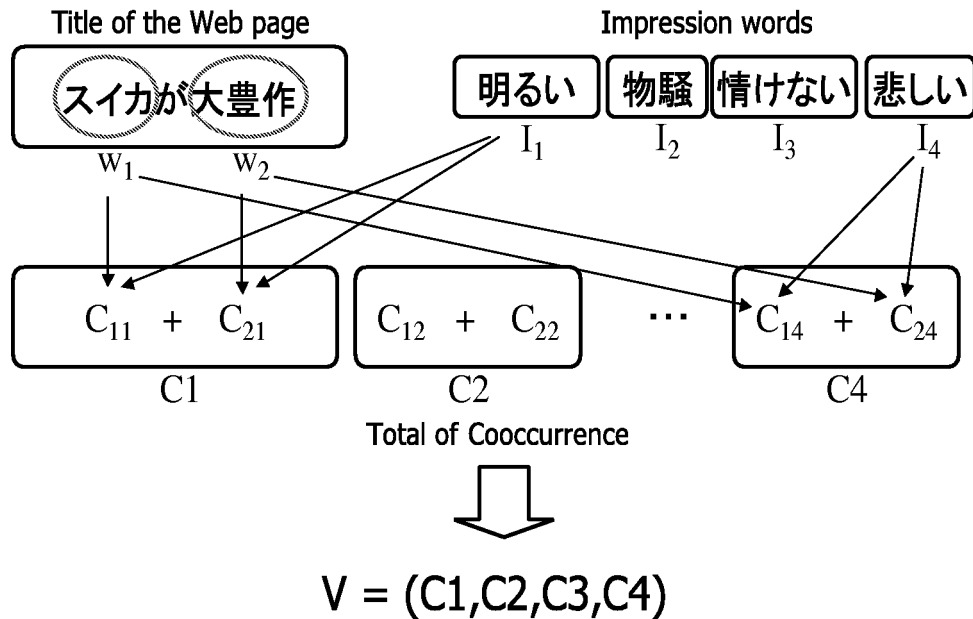


Figure 5: Calculation of an impression feature vector

## 4.2 Giving Responses

**Purpose** This technique is for generating comprehensible dialogical sentences.

It is very simple and is realized by inserting phrases of responses.

**Outline** An example of transformation by this technique are showed below.

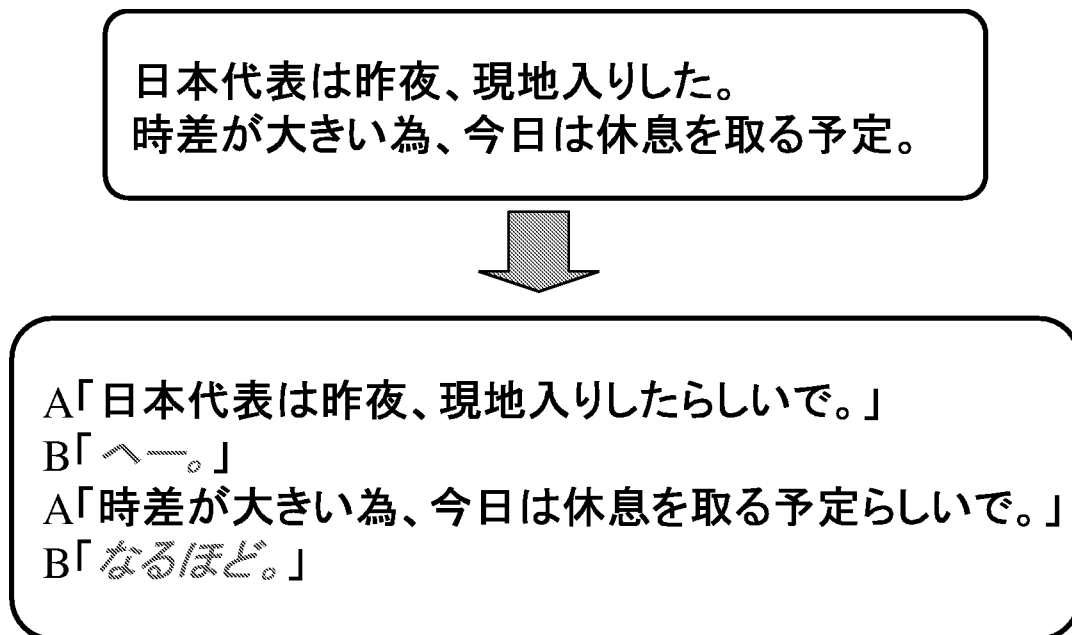


Figure 6: An example of giving responses

### 4.3 Paraphrasing

**Purpose** This technique is for generating comprehensible dialogical sentences.

It is realized by putting a certain word in another way as superordinate word. By doing this, it is possible to emphasize the paraphrased word and make an audience remember it strongly.

**Outline** Let's show an example to generate conversation sentences from a sentence "Many tulips bloomed." by this technique. After one performer says paraphrasing a word in the sentence like "Many flowers bloomed.", the other performer asks a question like "What kind of flowers?". Then former performer answers "Tulips."

The outline of the algorithm is below.

1. System carries out morphological analysis of the original Web page which includes the target sentence.
2. Nouns are selected from the obtained word sequence. Then nouns of which frequencies of appearances are set to keywords. (For example, tulips.)
3. If the sentence contains keywords, system finds superordinate words of them in the concept dictionary and replace them of superordinate words. One performer read this sentence.
4. The other performer asks "What kind of 'superordinate words'? Then one performer answers "It's a 'original word'".

An example of transformation by this technique are showed below.

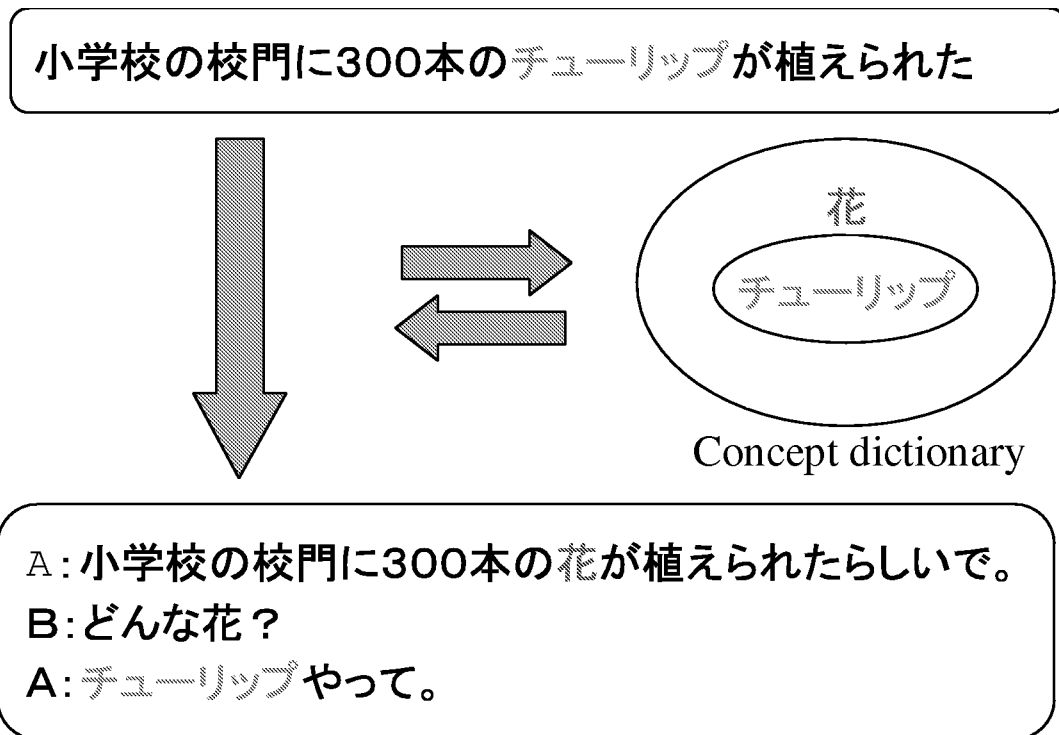


Figure 7: An example of paraphrasing

#### 4.4 Asking Questions

**Purpose** This technique is for generating comprehensible dialogical sentences.

It is realized by making questions about unique nouns or unknown words which are classified by morphological analysis. The answers are generated by finding the meanings of those words in a concept dictionary or Web retrieval. By this technique, users can understand Web pages with difficult words.

**Outline** System makes questions and answers like below.

1. System carries out morphological analysis of the original Web page which includes the target sentence.
2. Unique nouns and unknown words are selected from the obtained word sequence.
3. System finds the meaning of the obtained words in a concept dictionary or Web retrieval.
4. One performer asks question about the obtained word like, "What(Who) is 'obtained word'?"

5. The other performer answers its meaning.

An example of transformation by this technique are showed below.

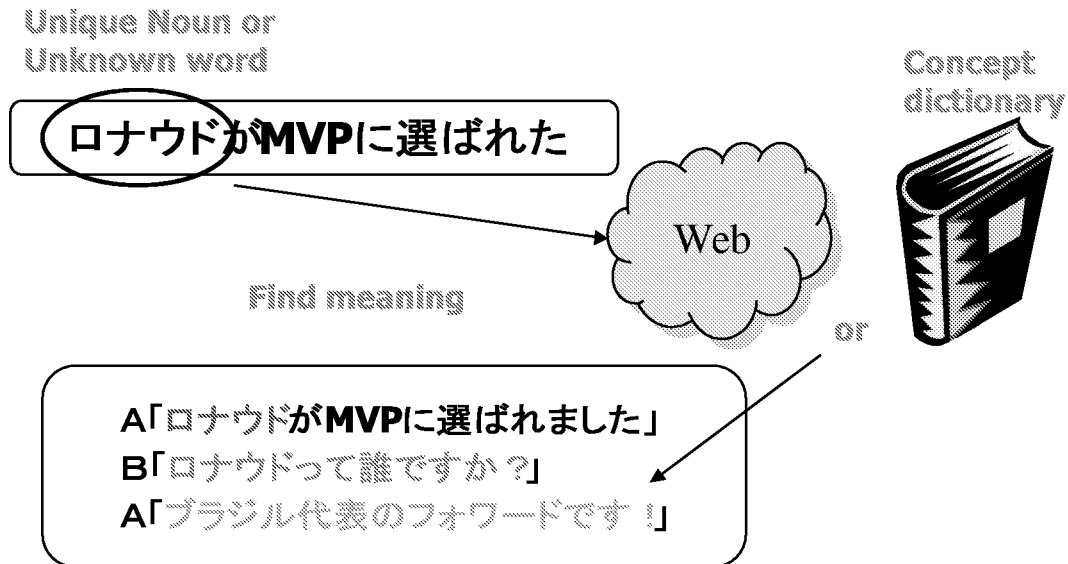


Figure 8: An example of asking questions

## 4.5 Dividing Sentences

**Purpose** This technique is for generating comprehensible dialogical sentences.

It is performed by dividing the stating part and the predicate of the original sentence of the Web page. It has a role making each long dialogical sentence short and making it easy to understand.

**Outline** System divides the stating part and the predicate of the original sentence like below.

1. System carries out morphological analysis of original sentence.
2. Case-marking particle "が" and charge particle "は" are selected form the obtained word sequence.
3. Clauses consist of nouns and following "が" of "は" are selected as stating parts. Clauses is determined by using CaboCha[17] the Japanese dependency structure analyzer.

Two example of transformation by this technique are showed below.

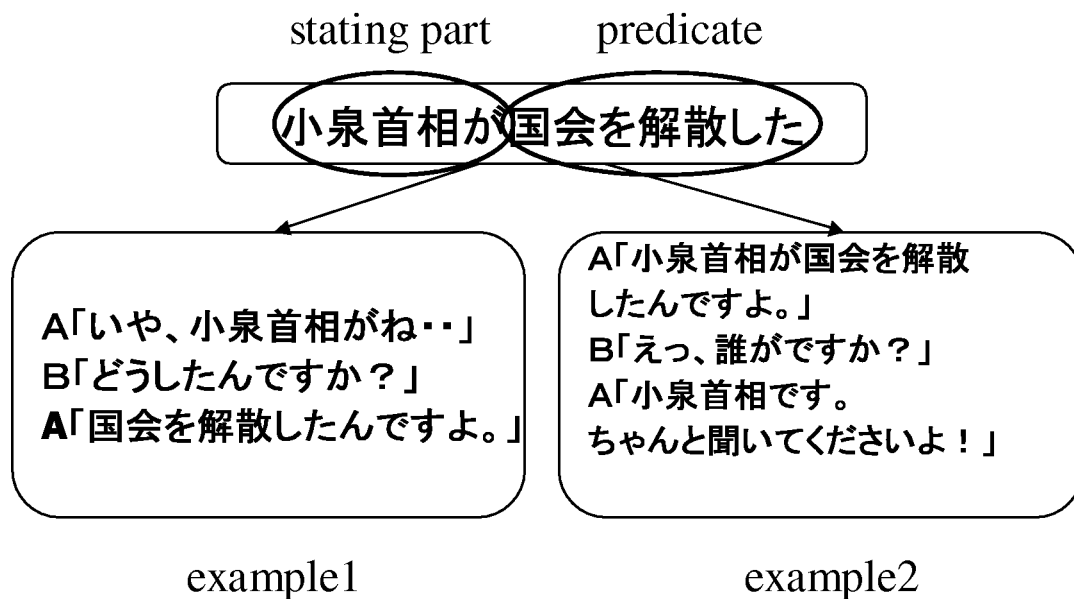


Figure 9: Two Examples of dividing sentences

#### 4.6 Exaggeration

**Purpose** This technique is for generating humorous dialogical sentences. It is performed by exaggerating a numerical value in the Web page. By doing this, effects which strengthens impressions of the Web page are expectable.

**Outline** When system find numerical values in a sentence of the Web page, system replaces it by the exaggerated value as one speaker's statement. Then "Tukkomi" is added as another speaker's comment. An Example of Transformation by this technique is showed below.

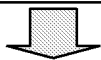
#### 4.7 Misreading

**Purpose** This technique is for generating humorous dialogical sentences. It also has a role which emphasizes misread words. Therefore misread words should be important words in the Web pages.

**Outline**

1. System picks up important words in the Web page. This is performed by checking frequency of appearance of words.
2. System misread the obtained words. Misreading is performed as below.
  - The right reading of a word is investigated using ChaSen. (For example, 「台風」 「たいふう」.)

(例) 地元消防団と一般市民が協力して  
3000人体制で捜索を行っている。



A「地元消防団と一般市民が協力して3000万人  
体制で捜索を行っているらしいで。」  
B「3000万人って多すぎやろ！」  
A「あ、3000人やったわ。」

Figure 10: Example of exaggeration

- Words which appears near the right reading of the word in the Japanese dictionary are investigated that the numbers of characters of them are the same in Hiragana. Then obtained word is set to misread word. (For example, 「大福：だいふく」.)
3. The sentence misread by System is generated to be a conversation sentences like this :
- One speaker reads the original sentence of Web page misreading the word that is important. This is performed as "Boke".
  - Another speaker performs TSUKKOMI into it.

An Example of Transformation by this technique is explained below.

台風6号は時速15Km で北北西の方向に進んでいる



A「大福6号は時速15Km で北北西の方向に  
進んでいるらしいで。」  
B「大福？台風ちゃうんかい！」  
A「あ、ホンマや。ごめん。」

Figure 11: Example of misreading

## 4.8 Misconception

**Purpose** This technique is for generating humorous dialogical sentences. Misconception to an impression of the Web page is added as a comment as "Boke" at the last part of generated dialogical sentences. Then "Tukkomi" is added after that. It also has a role which emphasizes impressions of Web pages.

**Outline** System can know the usual impression of the Web page by the impression feature vector. Therefore misconception to a Web page is generated by expressing the opposite impression. An Example of Transformation by this technique is showed below.

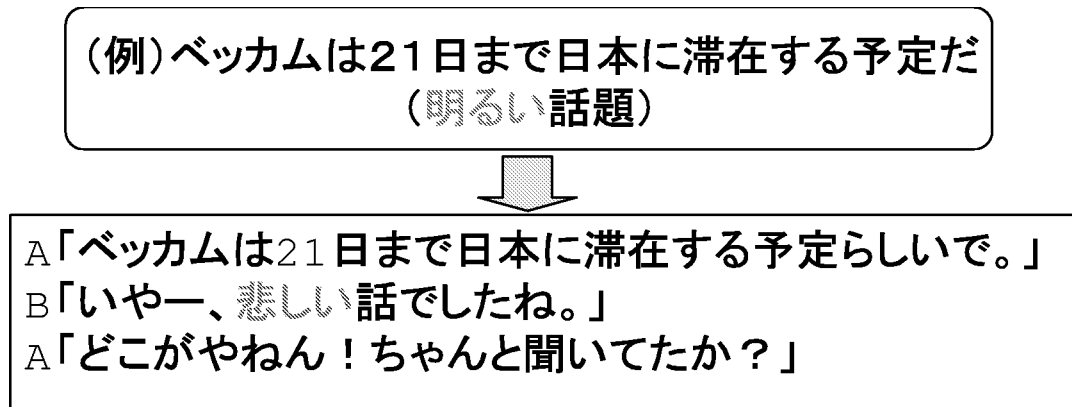


Figure 12: Example of misconception

## Chapter 5 Prototype System

We made the prototype system as an experiment in order to show the usefulness of the technique proposed in this paper. It is assumed that Web pages which the system transforms are today's news on a news Web site. The user select a theme of Manzai which he want to watch, then the system selects the news under the theme from the list of news stories on the news Web site and transform them into Manzai and show him. The flow of the system are as follows:

1. Users select these two elements of the precondition, theme and character. (In our system style is fixed to "Jiji Manzai" because we aim at only news stories, so selection of style is not necessary.)
2. System selects news stories under the theme from a news Web site.
3. System generates the Manzai script from brief overviews of obtained news stories using techniques for talk show transformation described in chapter 4.
4. System saves the Manzai script as TVML script.
5. System plays the TVML script with TVML player and show users the Manzai performed by CG characters.
6. System also allows users to browsing of the original Web pages during watching Manzai because this lets users know the details of the news if they want.

We explain why we chose the prototype system like this.

The existing passive Web browsing systems transform one Web page into a passive contents without changing the details of the original Web page. In these system there are problems that it takes longer time to watch the transformed contents than to read the original Web page and that users have to concentrate on watching the transformed contents in case they don't miss the important part. Therefore it cannot be said that transformations of these systems decrease user's burdens.

Therefore we consider that passive browsing is suitable for the purpose to interest users in things which they don't know and active browsing is suitable for the purpose to let users know things in detail which they are interested in.

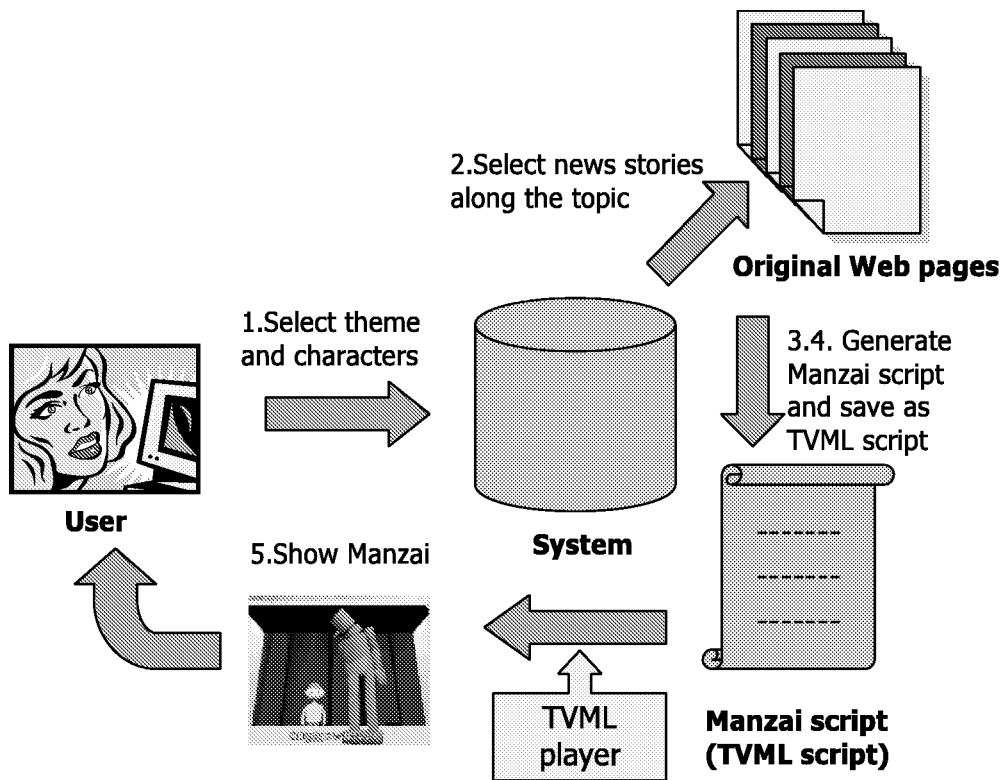


Figure 13: Flow of the system

Therefore we transform brief overviews of news stories instead of transforming all of news stories. Users get bored if showed all of news story which they are not interested in. Therefore we need to summarize the news story. However automatic summarization is very difficult today. Therefore we specialize the system in news Web site. The reason why the system is specialized in news Web site is that a brief overview of a news Web page can be get easily because the first paragraph of the news is the brief overview. The reason we treat multiple Web pages instead of treating one Web page is that multiple Web pages tend to interest users more than one Web page and this helps users to find interesting Web pages for them.

## 5.1 User Interfaces

In our system, users can get Web pages in both passive and active way. For the purpose of active browsing, the system has the function of Web browser inside. For the purpose of passive browsing, watching transformed Manzai, the system has several functions. Let's show the Fig. 14.

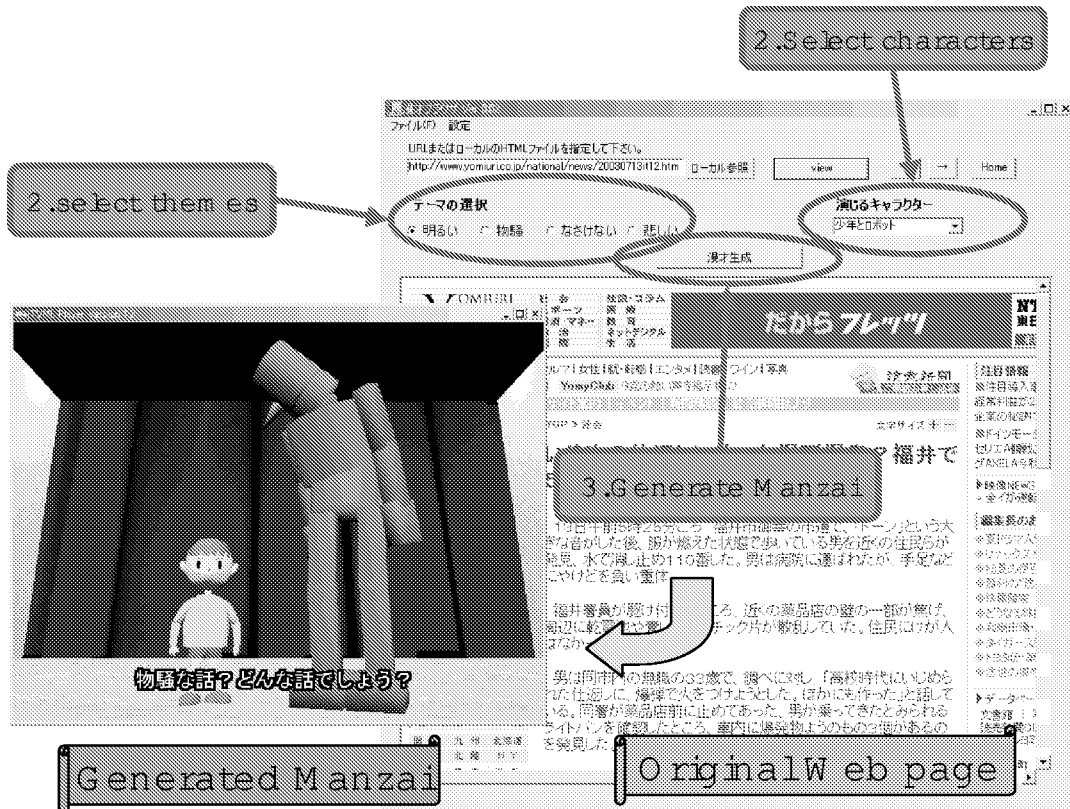


Figure 14: Interfaces of the system

## 5.2 User Operations

In this subsection, user operations, selecting themes, selecting characters and browsing Web pages, are explained.

### 5.2.1 Selecting Themes

In our system, users can select theme of Manzai. The themes users can select are these impression words, "明るい (which means positive or bright.)", "物騒 (which means cruel or dangerous.)", "情けない (which means helpless.)", and "

悲しい (which means sad.)". Users can select these by checking a radio button. (See Fig. 14) After users have selected themes, system selects topics under the theme from Web pages.(See 4.1.)

### 5.2.2 Selecting Characters

In our system, users can select characters who performs Manzai. We prepare two pairs of characters, "boy and robot", "doctor and assistant". Let's explain these.

1. "boy and robot"

**boy** Boy plays roles of "Sujifuri" and "Tukkomi". He is very smart and teaches the contents of the Web pages to the robot. Robot is foolish and don't understand well. He does "Tukkomi" when robot says strange things.

**robot** Robot plays a role of "Boke". Robot is not so smart and often says strange funny things about the boy's statement.

2. "doctor and assistant"

**assistant** Assistant plays roles of "Sujifuri" and "Tukkomi". He sometimes asks questions to doctor when he can't understand the meaning of words or asks for a comment to doctor. He also does "Tukkomi" when doctor does "Boke".

**doctor** Doctor plays a role of "Boke". He is a specialist of various topics, but he often gives strange comments or does "Boke".

## 5.3 System Operations

After the user selected themes and characters, system select several news stories under the theme. Then system generates Manzai script which is performed by selected characters.

Manzai script is divided into three elements, so generating Manzai script is different in each elements. The most remarkable difference is that "Honneta" is generated directly from the original Web pages. "Tsukami" and "Ochi" is generated from the original Web pages indirectly. That is, "Tsukami" and "Ochi" is generated from the theme and the titles of the original Web pages. Another difference is that "Honneta" consists of multiple Episodes. "Tsukami"

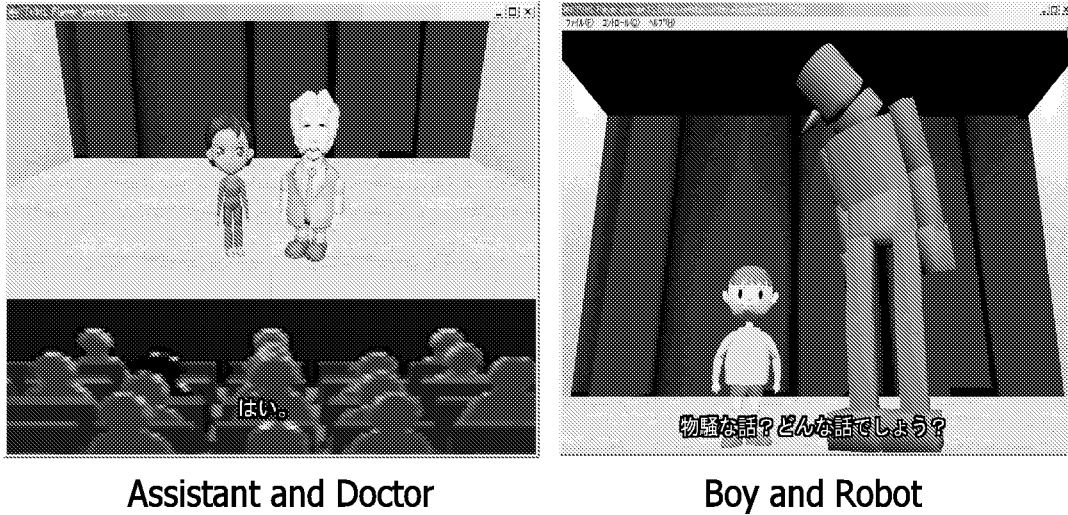


Figure 15: CG characters to be selected

and "Ochi" consist of one Episode. Each Episode in "Honneta" are generated from one news story and it consists of Components. Each Component are generated from one sentence in the original news story.

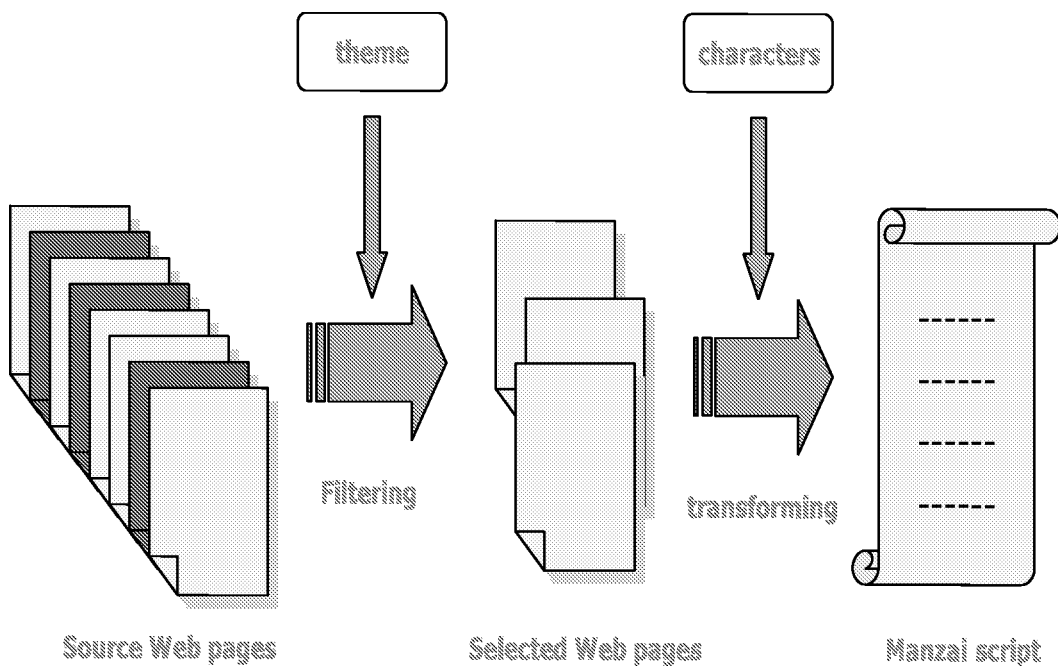


Figure 16: System operations

### 5.3.1 "Tsukami"

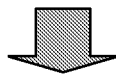
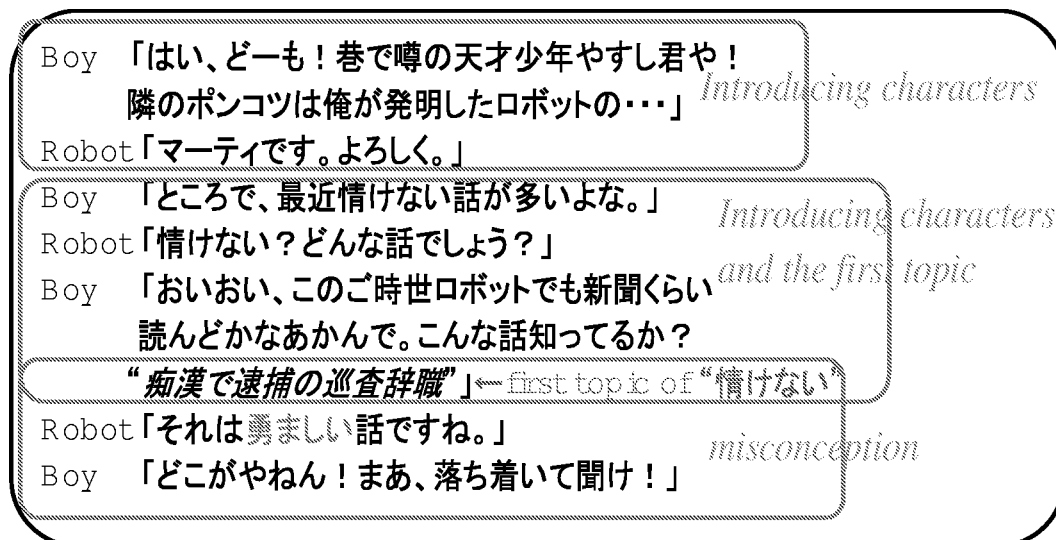
In "Tsukami", performers say hello to the audience first and introduce themselves. For example,

"Hi! I am a genius boy Yasushi!",

"I am a robot Marty, nice to meet you."

Then the performer playing role of "Sujifuri" introduce the theme and the first topic. Then the performer does "Boke" by using technique of misconception (See 4.8) or something.

Let's see an example of "Tsukami" when characters "boy and robot" and theme "情けない (which means helpless.)" are selected.



Then explain the first topic in Honneta

Figure 17: Example of Tsukami

### 5.3.2 "Honneta"

In "Honneta", performers explain brief overviews of news stories. News stories are written in declarative sentences and Manzai consists of dialogical sentences, so it is necessary to transform them. The techniques for doing this is described in 4.2 - 4.8. Generating "Honneta" is realized by transforming each sentence into Components.(See Fig.18.) There are several rules for which Components a

sentence are transformed into. The rules are described below.

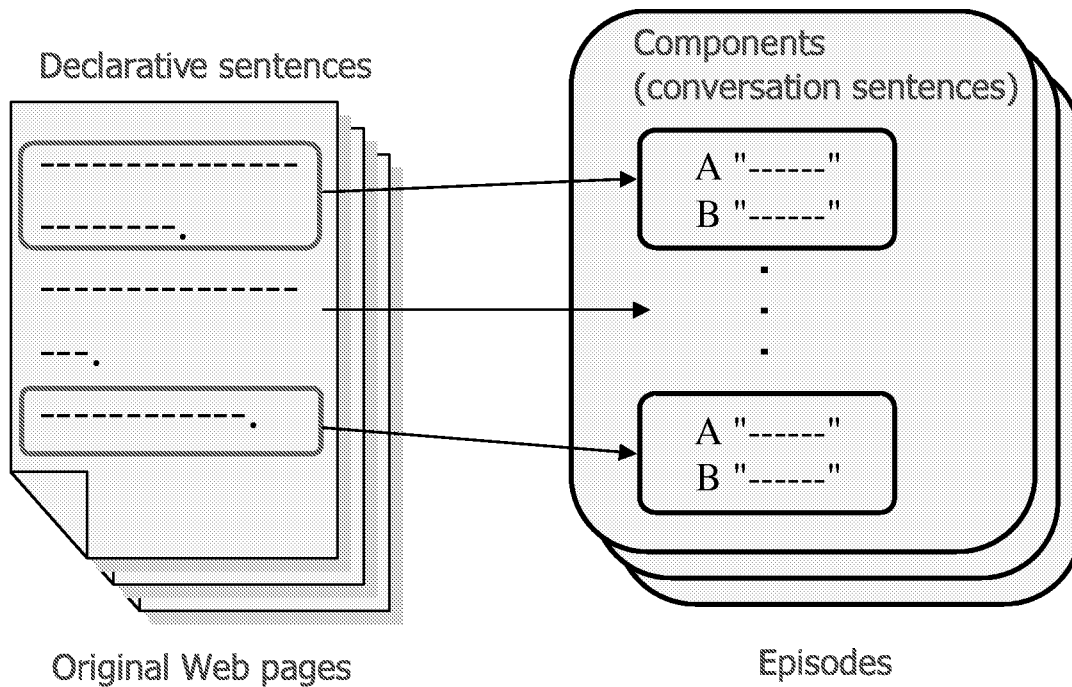


Figure 18: Generating Honneta

- If the sentence is long, it should be divided by using the technique for dividing sentences (4.5).
- If the sentence contains some keywords of the original Web page (words which appear frequently), it should be transformed into a Component by using the technique for misreading or asking questions (4.7, 4.4).
- If the sentence contains unknown words, it should be transformed into a Component by using the technique for asking questions (4.4).
- If the sentence contains numerical values, it should be transformed into a Component by using the technique for exaggeration (4.6).
- A Component by using the technique for misconception (4.8) should be placed at the end of an Episode.

### 5.3.3 "Ochi"

In Ochi, performers comment about the Episodes explained already. It is realized by saying "Dajare" related to the Episodes or by saying fixed sentences prepared. "Dajare" is a kind of jokes. We prepared "Dajare" dictionary , so

system can find proper "Dajare" for keywords which appeared in the Episodes. Here is an example of "Ochi", when characters are "boy and robot" and theme is "明るい (which means positive or bright.)". (Before this "Ochi", performers explained a topic " 漁をするサルに人気集中".)

Boy 「どや、マーティ。明るい話題ばかりやったろ？  
俺は“漁をするサルに人気集中”の話が好きやった  
けどなあ。マーティはどれが気に入った？」

Robot 「サルがツハーサル。」 ← Dajare

Boy 「ありゃ？またバグってもうた。このポンコツロボめ！  
帰ってデバッグし直さなあかんわ。」

Figure 19: Example of Ochi

## Chapter 6 Evaluation Experiment

### 6.1 Method

To prove the usefulness of our frame work of transforming Web pages into Manzai, we made the prototype system and carried out an experiment. The method of this experiment is showed below.

1. Experimental subjects are divided into two groups A and B.
2. Three news stories are selected under the theme ”物騒 (which means cruel or dangerous.)” from a news Web site by using the system. Each story is chosen in social section and politics section and international section.
3. We generate two Manzai scripts A and B.
4. Script A is generated by assigning sentences of the three news stories to two performers by turns. (See Fig.20)
5. Script B is transformed from the three Web pages by the system automatically. (See Fig.21-23.)
6. The script A (reading only style) is played by TVML player and showed to the group A.
7. The script B (Manzai style) is played by TVML player and showed to the group B.
8. Then two groups of experimental subjects fill out the questionnaire we made. (See Fig.24.)

We carried out this experiment against 6 people. 3 subjects are classified into group A and other 3 subjects are classified into group B. Before discussing about the results, let’s explain about difference between script A between script B and about the questionnaire.

**difference between script A and script B** In script A, two performers read the news stories by turns. The sentences of news stories are not changed at all. Therefore each sentence is long. In script B, original sentences are transformed into Components, so each sentence is short. However the total length of the script is large. This is because additional information are added to original sentences. Let’s explain detail of script B.

In the first Episode of Honneta, which is generated from the first news

story, there is a Component like this.

”アンケートに回答した約3500万人分の名前などの個人情報が閲覧可能な状態になっていたことが3日、分かったらしいわ。”

”3500万人もですか?”

”あ、3500人やったわ。ごめん。”

This Component is generated from the original sentence by using the technique of "exaggeration". "3500", the number in the original news story, is replaced into "35,000,000". "Sujifuri" performer reads this line, then another performer asks "Isn't 35,000,000 too big?", then "Sujifuri" performer apologizes for the mistake. These lines don't have new information other than the original sentence, but have an effect in emphasizing the number. This can be seen in the result.

In the second Episode of Honneta, the technique of "asking questions" is used. After the sentence containing a keyword "ダム (dam)", "Boke" performer asks "What is that?", then "Tukkomi" performer answers the meaning of the keyword.

In the third Episode of Honneta, no techniques other than "dividing sentences" are used. After introducing the last news, the performers comment about the three news and say "Dajare" and "Tukkomi".

**questionnaire** The questionnaire is composed by three part.

The first part is a cloze test of three news stories. This is made for the purpose to test how much the experimental subjects remember the news stories.

The second part includes three questions about system. Experimental subjects answer these questions with the value 1 - 5. The questions are below.

1. Can you watch without stress?
2. Did you enjoy?
3. Can you keep concentration while watching?

The third part is a free comment for this system.

## 6.2 Result

The result of the experiment is showed in Fig.25.

character: talk(name=Yasushi,text= "こんにちは。今から物騒なニュースを伝えます。")  
 character: talk(name=Marty,text= "「国土地理院HP、3500人個人情報が一時間閲覧可能に」")  
 character: talk(name=Yasushi,text= "国土地理院(茨城県つくば市)のホームページで、アンケートに回答した約3500人分の名前などの個人情報が閲覧可能な状態になっていたことが3日、分かった。")  
 character: talk(name=Marty,text= "昨年9月のシステム調整の際の不備が原因とみられ、今年1月末に利用者から指摘があり、すでに改修を済ませた。")  
 character: talk(name=Yasushi,text= "「埼玉県、八ッ場ダムの負担減額要求へ・国の責任追及」")  
 character: talk(name=Marty,text= "国が建設費を倍増させる計画変更を示している八ッ場(やんば)ダム(群馬県長野原町)について、最大利水予定者の埼玉県は3日、国に自治体の建設費負担額の減額を求める方針を固めた。")  
 character: talk(name=Yasushi,text= "「核実験再開の準備期間短縮へ、米で予算3千万ドル要求」")  
 character: talk(name=Marty,text= "米エネルギー省は2日、1992年に米国が凍結した核実験の再開に必要な準備期間を3年から1年半に短縮するため、2005会計年度予算として約3000万ドル(約32億円)を議会に要求したことを明らかにした。")

Figure 20: Script A : only reading out

Six lines of the beginning express the percentage of correct answers of the cloze test. Last three lines express the average values for the answers to questions. In addition, experimental subjects left many comments.

Group A's comments are below:

- "It's boring. It's not a fun."
- "It's difficult to understand the point of the news stories."

Group B's comments are below:

- "Repeated part is impressive (such as Component by exaggeration), but other part is not."
- "Last half of Manzai is boring"
- "The second news story don't seem to be under the theme 物騒 (which means cruel or dangerous)."

These results show following things.

character: talk(name=Yasushi,text="どうも！巷で噂の天才少年やすし君や！  
 横のポンコツは俺が発明したロボットの・・・")  
 character: talk(name=Marty,text="マーティです。ヨロシク。")  
 character: talk(name=Yasushi,text="いやー最近、物騒な話が多いね。")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="物騒な話？どんな話でしょう？")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="おいおい、このご時世、ロボットでも新聞くらい読んど  
 かなあかんで。")  
 character: look(name=Yasushi,what=camera,wait=no)  
 character: look(name=Marty,what=camera,wait=no)  
 character: talk(name=Yasushi,text="「国土地理院HP、3500人個人情報が一時閲覧可能  
 に」って話知ってるか？")  
 character: talk(name=Marty,text="それは愉快的な話ですね。")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="どこがやねん！とりあえず落ち着いて聞け！")  
 character: look(name=Yasushi,what=camera,wait=no)  
 character: talk(name=Marty,text="はい。")  
 character: talk(name=Yasushi,text="国土地理院(茨城県つくば市)のホームページでな・・・");  
 character: talk(name=Marty,text="ふむふむ")  
 character: talk(name=Yasushi,text="アンケートに回答した約3500万人分の名前などの  
 個人情報が閲覧可能な状態になっていたことが3日、分かったらしいわ。")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="3500万人もですか？")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="あ、3500人やったわ。ごめん。")  
 character: look(name=Marty,what=camera,wait=no)  
 character: look(name=Yasushi,what=camera,wait=no)  
 character: talk(name=Yasushi,text="昨年9月のシステム調整の際の不備が原因とみられ、  
 今年1月末に利用者から指摘があり、すでに改修を済ませたらしいわ。")  
 character: talk(name=Marty,text="へー。")

Figure 21: script B (1/3): Generated Manzai

1. Total scores of the cloze test are the same between group A and group B.
2. Group B marked higher score in (ア),(イ) than group A.
3. Group B marked lower score in (エ),(オ),(カ) than group B.
4. The group B felt less stress in watching than group A.
5. The group B enjoyed more in watching than group A.
6. The group B was able to concentrate more in watching than group A.

On the point of view to make Web browsing more entertaining than existing passive browsing , this system succeeded.

On the point of view to make Web browsing more comprehensible, it seems to

character: talk(name=Yasushi,text="次は政治の物騒な話やで。")  
 character: talk(name=Marty,text="ふむふむ。")  
 character: talk(name=Yasushi,text="「埼玉県、ハッ場ダムの負担減額要求へ・国の責任追及」って話や。")  
 character: talk(name=Marty,text="しゃーないし聞いてやるか。")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="なんか言った？")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="いいえ。")  
 character: look(name=Marty,what=camera,wait=no)  
 character: look(name=Yasushi,what=camera,wait=no)  
 character: talk(name=Yasushi,text="国が建設費を倍増させる計画変更を示しているハッ場(やんば)ダム(群馬県長野原町)についてな。")  
 character: talk(name=Marty,text="ふむ。")  
 character: talk(name=Yasushi,text="最大利水予定者の埼玉県は3日、国に自治体の建設費負担額の減額を求める方針を固めたらしいわ。")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="で、ダムって何？")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="水利や発電などのため、川をせき止めて水を貯蔵する提防って意味や。なんも知らんなあ君は。")  
 character: talk(name=Marty,text="たまたまです。")  
 character: look(name=Marty,what=camera,wait=no)  
 character: look(name=Yasushi,what=camera,wait=no)  
 character: talk(name=Yasushi,text="いやー政治の世界って物騒やなあ。")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="たまたまだと思いますが。")  
 character: look(name=Marty,what=camera,wait=no)  
 character: look(name=Yasushi,what=camera,wait=no)

Figure 22: script B (2/3): Generated Manzai

be a fault. However this result is not disappointing. The reasons are below.

- The reason of higher scores in (ア),(イ) is considered that the technique of "exaggeration" worked efficiently.
- The reason of lower scores in (工),(才),(力) is considered that the second news and the third news stories are not transformed properly. Actually, sentences of the third news story is divided but not changed.

character: talk(name=Yasushi,text="じゃあ最後は世界の物騒な話や。")  
 character: talk(name=Marty,text="了解。")  
 character: talk(name=Yasushi,text="「核実験再開の準備期間短縮へ、米で予算3千万ドル要求」  
 って話や。")  
 character: talk(name=Marty,text="はいはい。")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="やる気ある？")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="はい。")  
 character: look(name=Marty,what=camera,wait=no)  
 character: look(name=Yasushi,what=camera,wait=no)  
 character: talk(name=Yasushi,text="米エネルギー省は2日、1992年に米国が凍結した核実験  
 の再開に必要な準備期間を3年から1年半に短縮するため、")  
 character: talk(name=Marty,text="ふむふむ")  
 character: talk(name=Yasushi,text="2005会計年度予算として約3000万ドル(約32億円)  
 を議会に要求したことを明らかにしたらしいわ。")  
 character: talk(name=Marty,text="へー。")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="どや、世界の物騒な話は。")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="やはり世界はスケールが違うこともないこともないですね…")  
 character: talk(name=Yasushi,text="なにが言いたいねん！で、どの話が印象に残った？  
 俺は「国土地理院HP、3500人個人情報が一時閲覧可能に」の話かな。")  
 character: talk(name=Marty,text="僕もそれですね。チリの地理はパッチリ！")  
 character: talk(name=Yasushi,text="もうええわ！")

Figure 23: script B (3/3): Generated Manzai

「実験のパターン」:あなたが視聴したコンテンツはどちらですか?○をつけてください。

漫才形式・読み上げ形式

「分かりやすさについて」:各ニュースの要約文の空白に適切な語句を埋めてください。

・(ア)のホームページで、アンケートに回答した約(イ)人分の名前などの個人情報が閲覧可能な状態になっていたことが3日、分かった。昨年9月のシステム調整の際の不備が原因とみられ、今年1月末に利用者から指摘があり、すでに改修を済ませた。

・国が建設費を倍増させる計画変更を示している(ウ)について、最大利水予定者の(エ)は3日、国に自治体の建設費負担額の減額を求める方針を固めた。

・(オ)は2日、1992年に米国が凍結した(カ)の再開に必要な準備期間を3年から1年半に短縮するため、2005会計年度予算として約3000万ドル(約32億円)を議会に要求したことを明らかにした。

(ア) \_\_\_\_\_ (イ) \_\_\_\_\_ (ウ) \_\_\_\_\_ (エ) \_\_\_\_\_ (オ) \_\_\_\_\_ (カ) \_\_\_\_\_

「おもしろさについて」:以下の質問について5点満点で教えてください。

負荷なく閲覧できましたか? :

楽しんで閲覧できましたか? :

集中力は持続できましたか? :

「ご意見、感想」:改善して欲しい点、感想などありましたらお書きください。

\_\_\_\_\_  
\_\_\_\_\_

Figure 24: The questionnaire used in this experiment

| Questions      | Group A | Group B |
|----------------|---------|---------|
| (ア)            | 2/3     | 3/3     |
| (イ)            | 1/3     | 3/3     |
| (ウ)            | 3/3     | 3/3     |
| (エ)            | 1/3     | 0/3     |
| (オ)            | 1.5/3   | 0.5/3   |
| (カ)            | 2/3     | 1/3     |
| With no stress | 1.6     | 4       |
| Enjoyable      | 1.3     | 3.3     |
| Concentration  | 1.6     | 3.3     |

Figure 25: The result of the experiment

# Chapter 7 Conclusion and Vision for the Future

## 7.1 Conclusion

In this paper we proposed a framework for automatic transformation from Web pages into talk shows with humors for the purpose of making Web browsing passive, comprehensible and entertaining. In order to achieve this, we formulated Manzai, which is a Japanese traditional entertainment. Then we made a prototype system and carried out evaluation experiments. Conclusions which we got through this research are as follows.

- Our approach improves existing passive Web browsing at the point of entertainment.
- Our approach will make Web pages easy to understand in the future.

In our prototype system, we deal with news stories on the news Web site. In general, news stories are formal and far from entertaining. To understand something, we must pay attention to it at first. However formal things are hard to pay attention to for some people, like children. Once they pay attention to it, they may be able to understand. Thus, to make formal things informal is very useful to be understood. The results of the evaluation experiment shows that our system has effects to get attentions of users. Therefore this system will make Web pages easy to understand in the future. However to achieve this, there are many issues to solve which are described below.

## 7.2 Existing Problems and Vision for the Future

### 7.2.1 Existing Problems

Our research has two different purposes. One is to make Web browsing comprehensible and the other is to make it enjoyable. Coexistence of these two different purposes is very difficult, so there are many issues to solve, some of which are found in the experiment.

**The accuracy of impression feature vector** The accuracy of impression feature vector is not so good, we think. In the evaluation experiment, there are some comments that the second news story selected from a news

Web site automatically is not under the theme ”物騒 (which means cruel or dangerous.)”.

This is because we don't care about contexts of the title of the Web page. For example, ”The cruel murderer was arrested.” is not a miserable news to us , but each word, ”cruel”, ”murderer”, ”arrested” is consider to have high cooccurrence between a word ”miserable” so it is possible to be recognized as a miserable news by our system. Natural language analysis of a semantic level is necessary to solve this matter.

Another reason for this is considered to be that our system doesn't normalize the cooccurrence. In our system, we regard an impression value of a word as cooccurrence between the word and impression word, such as ”明るい (which means positive or bright.)”. Then we measured the value of cooccurrence by using Google Web API like below.

$$c_{ij} = U(W_i \cap I_j) / U(W_i \cup I_j) \quad (4)$$

$U(X)$  is the number of the Web pages containing word set  $X$  and is obtained by using Google Web API. This approach seemed to be no problem. However this doesn't work well when  $U(W_i)$  is very small. For example, let's think a case like Fig.26. In this case  $W_i$  is very small and included in  $I_j$ . In this case,  $C_{ij}$  will be small because it will be  $U(W_i) / U(I_j)$  according to the equation 4. However this value is regarded as the impression of  $W_i$  so this should be large. It's because all Web pages containing  $W_i$  also contain  $U(I_j)$ . To solve this matter, the alternate equation for this may help.

$$c_{ij} = U(W_i \cap I_j) / U(W_i) \quad (5)$$

By using this equation,  $C_{ij}$  would be 1 however large  $W_i$  is. It seems to be suitable for our purpose. It should be experimented.

**Instantiation** We call instantiation as transforming no familiar topics into familiar topics. Audience pay more attention to performers who are talking about familiar topic than performers who are talking about topics with no relation to them. This technique is often used in Manzai. However to achieve this is very difficult. To realize this, system should have know

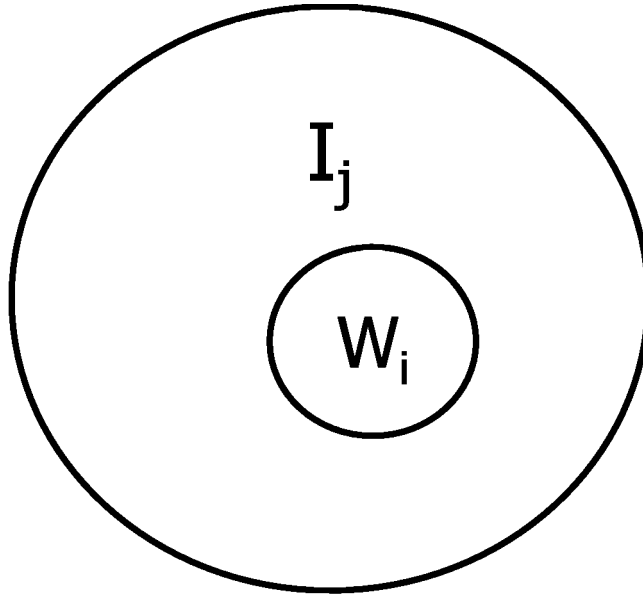


Figure 26: When  $W_i$  is included in  $I_j$

what is familiar to users. Replacing words to hyponym words is possible by concept dictionary, but it is not enough. We need a large data of knowledge of users.

**Questions other than "what? or who?"**. It is very useful to make questions and answers in order to improve comprehension of users. If there is an unknown word, users want to know the meaning. To find the meaning of the word is able to achieve by using dictionaries. However finding reasons is very difficult. Therefore we can't make questions kind of "Why? or How?". This may be solved by the power of AI or large semantic data in the future.

**Personalization** Personalization is necessary to produce laughs. There are no entertainment which make everyone laugh. To make a user laugh, it is necessary to know him. If he is a French man, you cannot make him laugh by speaking Chinese. Complaint for politics may produce laughs to men in street, but may not to a politician. Therefore personalization is very important.

### 7.2.2 Vision for the future

There exists many problems in automatic transforming Web pages into Manzai. These problem mainly comes from that the system has no idea about what users think or know. In chapter 2.3, we propose a hypothesis about how to produce laughs. In this hypothesis, we consider that feeling of oneness is very important to produce laughs. It is possible to say about producing comprehensions, we think. To produce feeling of oneness, data of knowledge of users is necessary. Moreover clustering of users are necessary too. For example, talk about fashions doesn't produce feeling of oneness to old people. To solve these problems, we propose a vision for the future. See Fig.27.

- The system is composed of a server and a database of knowledge of users.
- The system transforms many Web pages into many Manzai for various users by using the database of knowledge of users.
- The system show one of Manzai when a user request. The user specifies theme and characters. Some information of the users such as age, sex are requested too. These information are used in selecting proper Manzai for the user.
- After watching of Manzai, the user is requested to fill out questionnaire such as "Was it interesting?", "Which part of the Manzai was interesting?", "Please tell me the part of Manzai which was hard to understand.". Then these feedbacks are reserved in the database.
- The system generate more proper Manzai for users for the next time.

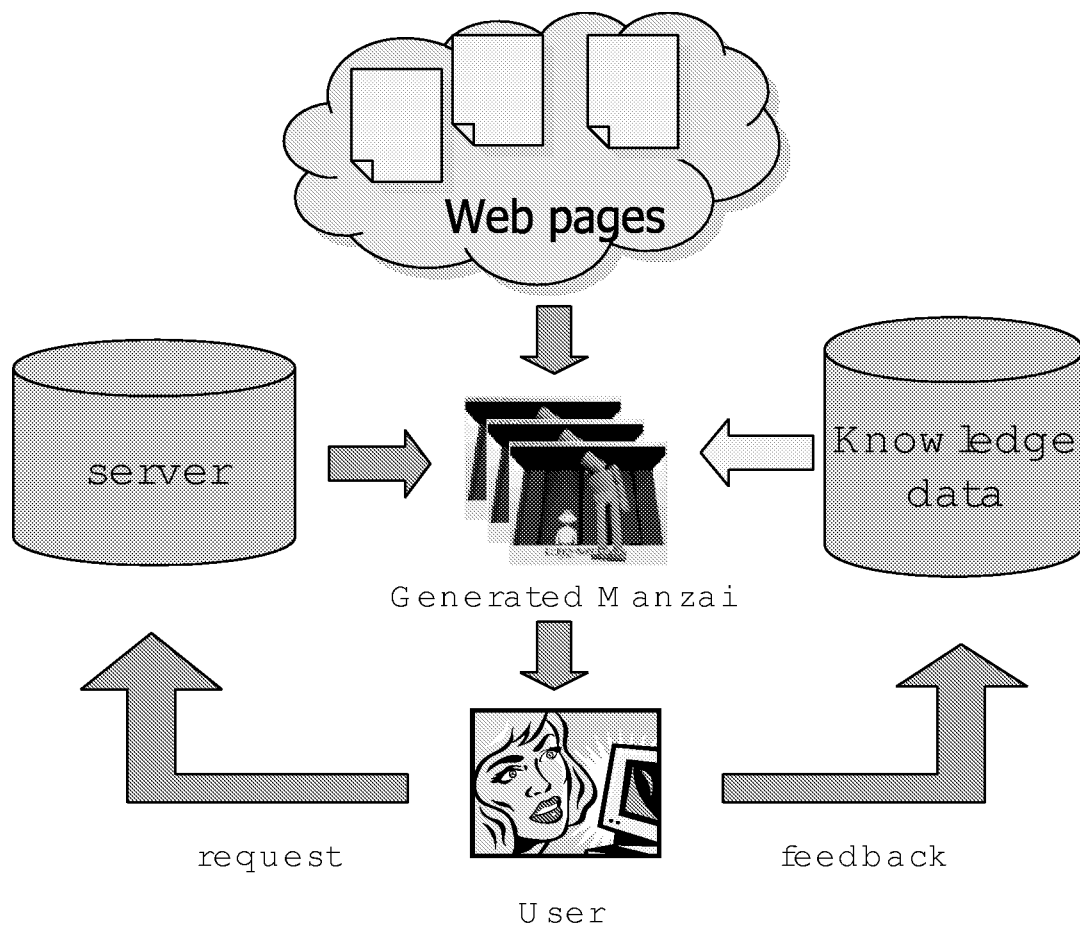


Figure 27: Manzai server reserving feedback of users

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All of my friends and my family gave me constant source of encouragement and spiritual support, and I appreciate them all. Thank you.

2004/2/6

Hiroya Hourai

## Appendix

Fig.20-24 translated into English are as follows.

character: talk(name=Yasushi,text= " Hello. From now on, we show you cruel news. ")  
character: talk(name=Marty,text= " By the homepage of the Geographical Survey Institute, perusal of the personal information for 3500 persons was attained temporarily.")  
character: talk(name=Yasushi,text= "It turned out on the 3rd that perusal of personal information, such as a name for about 3500 persons answered to the questionnaire, was attained by the homepage of the Geographical Survey Institute (Tsukuba-shi, Ibaraki). ")  
character: talk(name=Marty,text= " The reason is regarded as the defect in the case of the system adjustment in September last year. And the system was already repaired. ")  
character: talk(name=Yasushi,text= " Saitama Prefecture is planning to demand to the government the reduction of the burden of Yamba dam. ")  
character: talk(name=Marty,text= "The government is planning to double construction costs of Yamba dam (Naganohara-cho, Gumma). On February 3, the Saitama Prefecture, which would be irrigated by it, made the policy which demands to the government the reduction of obligation fees of the construction costs.")  
character: talk(name=Yasushi,text= " Preparation period for resumption of the nuclear test will be shortened. 30 million dollars was required of U.S. Congress as the budget. ")  
character: talk(name=Marty,text= "On February 2, the U.S. Department of Energy showed clearly that about 30 million dollars (about 3,200 million yen) were required of the Congress as a budget in the 2005 fiscal year in order to shorten a preparation period required for resumption of the nuclear test, which the U.S. froze in 1992, from three years to one year and a half. ")

Figure A.1: Script A : only reading out (English)

character: talk(name=Yasushi,text= "Hi! I am a genius boy Yasushi. This is what I invented• ☺)  
 character: talk(name=Marty,text="I am a robot Marty, nice to meet you.")  
 character: talk(name=Yasushi,text="Well, there are many cruel news in recent society.")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="Cruel news? What kind of ?")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text= "Hey, you had better read newspaper, even though you are a robot.")  
 character: look(name=Yasushi,what=camera,wait=no)  
 character: look(name=Marty,what=camera,wait=no)  
 character: talk(name=Yasushi,text= "Do you know this news? *By the homepage of the Geographical Survey Institute, perusal of the personal information for 3500 persons was attained temporarily.*")  
 character: talk(name=Marty,text="It sounds funny.")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="Why do you say that? OK. Be calm and listen.")  
 character: look(name=Yasushi,what=camera,wait=no)  
 character: talk(name=Marty,text="I see.") Exaggeration

---

character: talk(name=Yasushi,text=" "It turned out on the 3rd that perusal of personal information, such as a name for about 35 million persons answered to the questionnaire ... ");  
 character: talk(name=Marty,text="Uh-huh.")  
 character: talk(name=Yasushi,text= " ... was attained by the homepage of the Geographical Survey Institute (Tsukuba-shi, Ibaraki). ")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="35 million? Isn't it too many?")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="Oh, it was a mistake. 3500 is right.")  
 character: look(name=Marty,what=camera,wait=no)  
 character: look(name=Yasushi,what=camera,wait=no)  
 character: talk(name=Yasushi,text= " The reason is regarded as the defect in the case of the system adjustment in September last year. And the system was already repaired. ")  
 character: talk(name=Marty,text="I see.")

Figure A.2: script B (1/3): Generated Manzai(English)

character: talk(name=Yasushi,text="The next is cruel news in politics.")  
 character: talk(name=Marty,text="Uh-huh.")  
 character: talk(name=Yasushi,text=" This is the news. *Saitama Prefecture is planning to demand to the government the reduction of the burden of Yamba dam.* ")  
 character: talk(name=Marty,text=" I will listen. I am not interested in though.")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="Did you say something?")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="No.")  
 character: look(name=Marty,what=camera,wait=no)  
 character: look(name=Yasushi,what=camera,wait=no)  
 character: talk(name=Yasushi,text=" The government is planning to double construction costs of Yamba dam (Naganohara-cho, Gumma). ")  
 character: talk(name=Marty,text="Uh-huh.")  
 character: talk(name=Yasushi,text=" On February 3, the Saitama Prefecture, which would be irrigated by it, made the policy which demands to the government the reduction of obligation fees of the construction costs.")  
 character: look(name=Marty,what=Yasushi,wait=no)

*Asking questions*

character: talk(name=Marty,text="Any way, what is dam?")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="It means a special wall built across a river, stream etc to stop the water from flowing, especially to make a lake or produce electricity. You know nothing.")  
 character: talk(name=Marty,text="It's a rare case.")  
 character: look(name=Marty,what=camera,wait=no)  
 character: look(name=Yasushi,what=camera,wait=no)  
 character: talk(name=Yasushi,text="All the news in politics are cruel. Don't you think?")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="Not all, I think.")  
 character: look(name=Marty,what=camera,wait=no)  
 character: look(name=Yasushi,what=camera,wait=no)

Figure A.3: script B (2/3): Generated Manzai(English)

character: talk(name=Yasushi,text="The last is a cruel news story in the world.")  
 character: talk(name=Marty,text="I see.")  
 character: talk(name=Yasushi,text=" This is the story. *Preparation period for resumption of the nuclear test will be shortened. 30 million dollars was required of U.S. Congress as the budget.* ")  
 character: talk(name=Marty,text="Ah.")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="Get serious!")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="Yes.")  
 character: look(name=Marty,what=camera,wait=no)  
 character: look(name=Yasushi,what=camera,wait=no)  
 character: talk(name=Yasushi,text=" On February 2, the U.S. Department of Energy showed clearly that about 30 million dollars (about 3,200 million yen) were required of the Congress as a budget in the 2005 fiscal year. . .")  
 character: talk(name=Marty,text="mm.")  
 character: talk(name=Yasushi,text=" . . . in order to shorten a preparation period required for resumption of the nuclear test, which the U.S. froze in 1992, from three years to one year and a half. ")  
 character: talk(name=Marty,text="I see.")  
 character: look(name=Yasushi,what=Marty,wait=no)  
 character: talk(name=Yasushi,text="How was the news in the world?")  
 character: look(name=Marty,what=Yasushi,wait=no)  
 character: talk(name=Marty,text="You can say the scale is large or not.")  
 character: talk(name=Yasushi,text="What do you mean? Well, which news story was impressive? The news about *Kokudochirin* was impressive to me.")  
 character: talk(name=Marty,text="That's the same as me. *Chiri no chiri ha bacchiri.*") Dajare  
 character: talk(name=Yasushi,text="Don't say nonsense!")

Figure A.4: script B (3/3): Generated Manzai(English)

*-style- :Which type of contents did you watch?*

Manzai style/Just reading out style

*-comprehension- :Please fill in the blanks.*

- By the homepage of (a), perusal of the personal information for (b) persons was attained temporarily.

- The government is planning to double construction costs of (c). On February 3, (d), which would be irrigated by it, made the policy which demands to the government the reduction of obligation fees of the construction costs.

- On February 2, (e) showed clearly that about 30 million dollars (about 3,200 million yen) were required of the Congress as a budget in the 2005 fiscal year in order to shorten a preparation period required for resumption of (f), which the U.S. froze in 1992, from three years to one year and a half.

(a) \_\_\_\_\_ (b) \_\_\_\_\_ (c) \_\_\_\_\_ (d) \_\_\_\_\_ (e) \_\_\_\_\_ (f) \_\_\_\_\_

*-entertainment- : Please evaluate your experience on a scale of 1 - 5, with 5 representing the most satisfied*

Did you watch without stress? :

Did you enjoyed? :

Did you concentrate on it ?:

*-comments-: We would appreciate you informing us of comments or requests you may have.*

\_\_\_\_\_  
\_\_\_\_\_

Figure A.5: The questionnaire used in this experiment(English)

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