



# An Intelligent Embedded Marketing Service System based on TV apps: Design and implementation through product placement in idol dramas

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## ABSTRACT

Due to the increase in advertising requirements for various multi-media services, two studies were conducted to first propose an Intelligent Embedded Marketing Service System (IEMSS) and then to use this IEMSS to implement product placement strategies for idol dramas using interactive television. In study 1, the IEMSS combines TV apps, multiple agents, and multi-document summarization technologies to retrieve and store information and comments about merchandise from search engines, blogs, and forums. The IEMSS involves a multi-document summarization technique that uses the TF-IDF (term frequency-inverse document frequency), the position and an artificial neural network (ANN) to automatically generate and transmit key positive comments to the user via TV apps. The experimental results show that the IEMSS has 100% accuracy, indicating that the IEMSS is capable of helping users understand the merchandise and improving purchase intentions.

In study 2, a 2 (product description messages: shown vs. not shown) × 2 (online reviews: shown vs. not shown) between-subjects design was conducted to examine the effectiveness of the IEMSS in an actual application. The results of this empirical research reveal that the display of reviews of the embedded products obtained from the Internet using the IEMSS functionality provides the viewing audience of idol dramas with the opinions of others who have used the embedded product, thereby improving attitudes toward the brand and product placement and stimulating purchase intentions.

In sum, the IEMSS can be successfully applied to automatic summarization for advertising. Furthermore, this approach can be considered an extension of eWOM marketing and an application of Media Richness Theory that increases the effectiveness of product placement.

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## 1. Introduction

In an advertising marketing environment characterized by focused communications and fragmentation, the promotional effects of traditional advertising have gradually waned (Perez-Latre, 2009). The improvement of information technology has led to the creation of multi-media services and an increase in advertising requirements for various multi-media services. Embedded marketing services based on TV apps are the trend of the future (Mafé, Blas, & Tavera-Mesías, 2010; Ryu & Wong, 2008). In recent years, advertisers have favored product placement because audiences do not easily perceive that embedded products are actually advertisements (Gould & Gupta, 2006; McCarty, 2004). Therefore, audiences are unaware that they are receiving advertising messages that affect their perception of the product (Guido et al., 2010). For example, embedding a particular brand in a television program can be considered product placement regardless of whether the

brand is mentioned, the brand logo is shown, or the branded products are filmed (Russell, 2002). These strategies of embedding can be effectively integrated with the situations and timing of plot-lines, enabling audiences to encounter brand messages in natural situations and reducing the potential for rejection by audiences. An audience's positive view of a protagonist may even be transferred to the embedded products, effectively increasing the positive perceptions of the brand and even stimulating purchase intentions (Russell & Stern, 2006; Su, Huang, Brodowsky, & Kim, 2011; Wiles & Danielova, 2009). Thus, product placement is considered a more efficient strategy for marketing compared to other types of advertising (Smit, van Reijmersdal, & Neijens, 2009).

However, although long product exposure on a television channel may facilitate brand recognition, it may also lead to negative perceptions of the brand because the audience gradually recognizes the marketing intention behind embedded products (van Reijmersdal, Smit, & Neijens, 2010). In addition, over-familiarity with the product placement marketing strategy may limit its advertising effectiveness (Homer, 2009). To reduce audiences' negative perceptions of product placement, the current research

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examines whether an increase in the completeness and diversity of the messages as well as the richness of the media facilitates the development of positive benefits based on Media Richness Theory. This research conducted two studies, an IEMSS design and the application of the IEMSS to product placement in an idol drama.

In study 1, an Intelligent Embedded Marketing Service System (IEMSS) is proposed that combines TV apps (e.g., Yahoo TV Widgets or Android apps), multiple agents, semantic analysis and multi-document summarization technologies. The IEMSS, which is designed with a three-tier architecture, includes (1) the TV App User (TVAU), (2) the Merchandise Recommender System (MRS) and (3) the Active Database Server (ADS) to provide an introduction to and comments on the merchandise. The ADS provides a web content retrieval agent (WCRA) to retrieve and store the information and comments about the merchandise from search engines, blogs and forums. Finally, the MRS combines semantic analysis and the multi-document summarization technique, which uses the TF-IDF (term frequency-inverse document frequency), the position and artificial neural networks (ANN) to automatically generate and transmit the key positive comments to the TVAU via TV apps.

In study 2, the IEMSS was used to implement product placement strategies for idol dramas in interactive television. Empirical research was conducted to examine the effectiveness of this system in an actual application. Specifically, this study assessed whether providing descriptions and online reviews of products embedded in idol dramas using the IEMSS functions designed in study 1 could improve consumers' perceptions of products, attitudes toward product placement and purchase intentions. Study 1 and study 2 are presented in the following sections.

## 2. Study 1: IEMSS design

### 2.1. Related work

The IEMSS is designed to provide real-time positive merchandise comments from web forums or blogs. The necessary research background and relevant technology include (1) requirement classification techniques and (2) Multiple-document summarization (MDS).

#### 2.1.1. Requirement classification technique

In recent years, several classification systems for requirements have been proposed and implemented. These systems consist of two steps: (1) preprocessing and (2) the learning classifier (Ko et al., 2007; Lo, Chen, Cheng, & Kung, 2011b; Tsai, Chen, Kung, Kuo, & Lin, 2011).

The main roles of preprocessing are (i) segmenting the requirements into sentences and (ii) extracting the content terms (Ko, Park, Seo, & Choi, 2007). However, studies often focus only on the analysis of English sentences (Ko et al., 2007; Lo et al., 2011b). The CKIP group developed a very useful Chinese segmentation system that includes methods for resolving unknown terms (Ma & Chen, 2003). Although these approaches are serviceable, they are less able to handle special domains, such as topic terms. For example, the topic term “微舒打,” in which there are two segments, “微舒 (Nb)” and “打 (VC),” has specific technical issues.

There are many types of classification techniques, such as clustering, association rules, k-Nearest Neighbor (kNN) and artificial neural networks (ANN) (Ishii, Murai, Yamada, & Bao, 2006; Lo, Chen, Cheng, & Kung, 2011a; Lo et al., 2011b; Tsai et al., 2011). Ishii et al. (2006) proposed a new combination method that consists of latent semantic analysis (LSA) and kNN (Ishii et al., 2006). Lo et al. (2011a) designed a system that combines TF-IDF (term frequency-inverse document frequency), LSA and a self-organizing map

(SOM) (Lo et al., 2011b). Although this combination method results in higher accuracy, the method cannot retrieve positive comment sentences from the corpus. Therefore, this study will consider positive influential factors to improve the classification algorithm.

#### 2.1.2. Multiple-document summarization

Due to the enormous amount of information that is retrieved from web forums or blogs, this study uses MDS to simplify and eliminate repeated information so that the TVAU can minimize search time and obtain only important information. The proposed MDS is based on MEAD (Radev, Hatzivassiloglou, & McKeown, 1999; Radev, Jing, & Budzikowska, 2000; Radev, Winkel, & Topper, 2002), which is a public domain, portable, multi-document summarization system. The main procedures of MEAD are as follows: (1) preprocessing, (2) feature selection, (3) classifier, (4) reranker, (5) summarization and (6) evaluation (see Fig. 1).

**2.1.2.1. Preprocessing.** For preprocessing, the intelligent agent retrieves the contents of blog and forum articles using the HTML format to segment the sentences in the original document and facilitate the subsequent computation of weight (Huang & Wu, 1999; Huang, Yang, & Chu, 2001; Kung, Nguyen, Kuo, Tsai, & Chen, 2011; Lo, Chen, Cheng, Kuo, & Kung, 2010).

**2.1.2.2. Feature selection.** MDS is designed to consider several features when computing the weight of each sentence using words and phrases. The four main features are the topic term, the TF-IDF (term frequency-inverse document frequency), the sentence length, and the position (Chen, Yang, Shih, Lee, & Lo, 2011; Liu, Yeh, Ke, & Yang, 2005; Radev et al., 2000, 2002; Yeh, 2002; Yeh, Ke, & Yang, 2002; Yeh, Ke, Yang, & Meng, 2005).

**2.1.2.3. Classifier.** For the classifier, several weighting values are defined. The score of every sentence is computed using the weighting value for each feature (Kaikhah, 2004; Lo et al., 2010). However, the weighting values are usually calculated as a simple average (SA) in experiments to obtain lower accuracy. Therefore, this study combines MDS and the ANN to improve performance.

**2.1.2.4. Reranker.** Erkan and Radev (2004) indicated that the classifier is only conducted in accordance with the score for the sentence similarity calculation and sorting. Therefore, a high level of similarity between sentences can cause problems, especially in multi-document summarization (Erkan & Radev, 2004). The reranker mechanism is designed to recalculate a sentence with syntactic similarity and to set the threshold to filter out important sentences and reduce redundancy. Finally, a summary is created by extracting sentences from the original document using the compression ratio.

**2.1.2.5. Summarization.** Summarization can retrieve and recombine words and phrases in the original document according to the order of the sentences by reranker sorting (Erkan & Radev, 2004).

**2.1.2.6. Evaluation.** The evaluation process is used to measure the performance of the text summarization system, including the effect of the output results and users' satisfaction (Myaeng & Jang, 1999). A k-fold cross-validation (Han, Kamber, & Jian, 2011) is usually used in the evaluation process to provide accurate measurements (Lo et al., 2011a).

### 2.2. System design

The IEMSS, which integrates a TV app, web services (Chen, Cheng, Lin, Lu, & Lo, 2012), information retrieval and MRS techniques to recommend merchandise suitable for the user, is

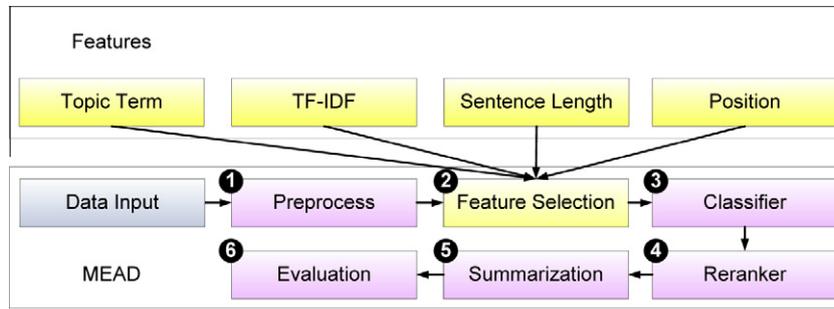


Fig. 1. The MEAD procedure.

designed with a three-tier architecture that is published to open platforms (e.g., Yahoo, Google, and other application stores). As shown in Fig. 2, the IEMSS includes (1) the TVAU, (2) the MRS and (3) the ADS.

2.2.1. TV App User

The TVAU can use any connected TV that can support Yahoo TV Widgets or Android Apps to access the embedded marketing service. The marketing information is presented on the connected TV, and a TVAU can receive the embedded marketing service supported by the software and the hardware in a communication environment.

2.2.2. Merchandise Recommender System

The MRS includes the Simple Object Access Protocol (SOAP)/RESTful Service client (Chen et al., 2012) and the MDS and analyzes web forum and blog articles from the ADS via the SOAP/RESTful interface to summarize relevant merchandise comments for the embedded marketing services. The processing procedure is as follows: (1) predefine, (2) preprocess, (3) select features, (4) classify and (5) summarize. The details are as follows.

2.2.2.1. Predefine. In this section, this study predefines and establishes the merchandise comment term ontology (MCTO), which contains topic terms (e.g., brand name “微舒打 DemiSoda Lemon Drink”) and comment terms. Fig. 3 shows the procedure for the MCTO establishment.

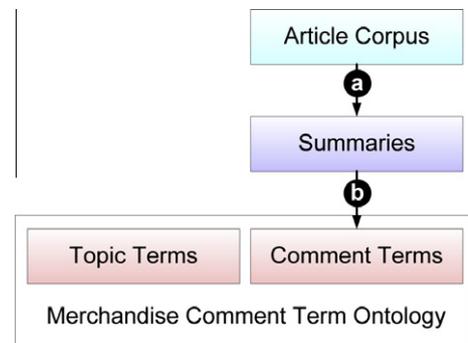


Fig. 3. The MCTO establishment procedure.

For the comment term establishment, the SOAP/RESTful Service client queries ADS to build the article corpus. These articles are sent to several domain experts to generate summaries as training data to establish the comment terms (path (a) in Fig. 3). Then, the MRS uses CKIP (Ma & Chen, 2003) to segment the sentence into terms and calculates the score of each term using the TF-IDF function (Salton & McGill, 1986), which is defined as Eq. (1) (path (b) in Fig. 3):

$$TFIDF(i, n) = TF(i, n) \times IDF(i) = \frac{F(i, n)}{\max_{t \in T} F(t, n)} \times \log \left( \frac{|N|}{DF(i)} \right), \quad (1)$$

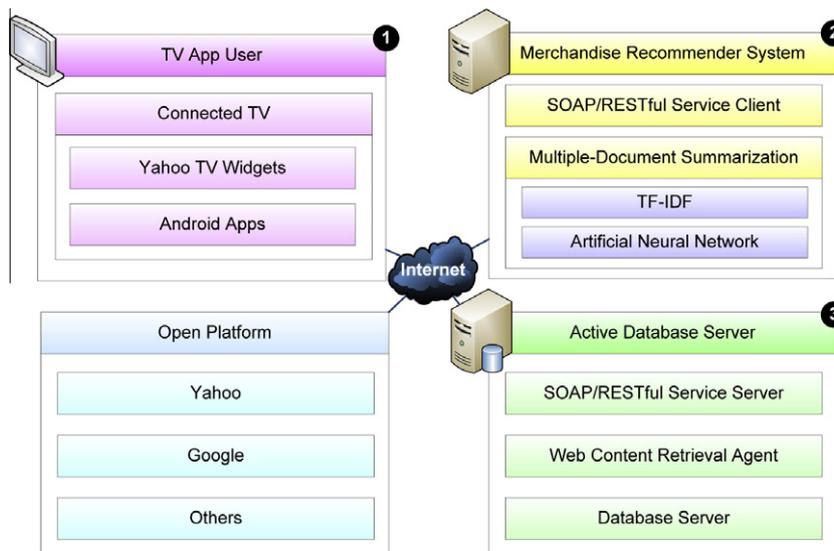


Fig. 2. The architecture of the IEMSS.

where  $TFIDF(i, n)$  is the weight of term  $i$  in article  $n$ ,  $F(i, n)$  is the frequency of term  $i$  in article  $n$ ,  $T$  is the term set in article  $n$ , and  $DF(i)$  is the frequency of term  $i$  in the article set.

**2.2.2.2. Preprocessing.** The preprocessing transfers the format of the original HTML documents from the forum and blog articles. The preprocessing then sets the document ID and sentence ID sequentially to maintain the weight of the sentences in each document and production. Then, the MRS uses CKIP to segment these sentences into articles to build a vector space model (VSM) (Lo et al., 2011a).

**2.2.2.3. Feature selection.** For feature selection, the main four features, which were discussed in previous work, are the topic term, the TF-IDF, the sentence length, and the position. However, the topic term, which also exists in normal sentences and negative-comment sentences, is not significant for retrieving positive-comment sentences. Moreover, the length of positive-comment sentences is not significant in this study. Therefore, the MRS uses two features that include (i) the TF-IDF and (ii) the position to calculate the weight of each sentence.

- (i) **TF-IDF.** The VSM is used to conduct the sentence score calculation. In this paper, only the terms that are contained by the MCTO are considered. Eqs. (2) and (3) are used to calculate the value  $st_{jn}$  of the sentence  $j$  in article  $n$ .

$$ct_{jn} = TFIDF(c_{jn}, n), \text{ where the term } c_{jn} \text{ is in the sentence } j \text{ in article } n. \tag{2}$$

$$st_{jn} = \frac{\sum_{c_{jn} \in C_j} ct_{jn}}{|C_j|}, \text{ where } C_j \text{ is the term set in the sentence } j \text{ in article } n. \tag{3}$$

- (ii) **Position.** Position is used to assign weight given the position of the sentence in the document. The findings of this study show that positive comments are usually presented in the first or last sentences in the article. Therefore, this study designs Eq. (4) to build the position feature for the value  $sp_{jn}$  of sentence  $j$  in article  $n$ :

$$sp_{jn} = \begin{cases} 1, & \text{the sentence } j \text{ is the first or last sentences} \\ & \text{in article } n \\ 0, & \text{otherwise} \end{cases} \tag{4}$$

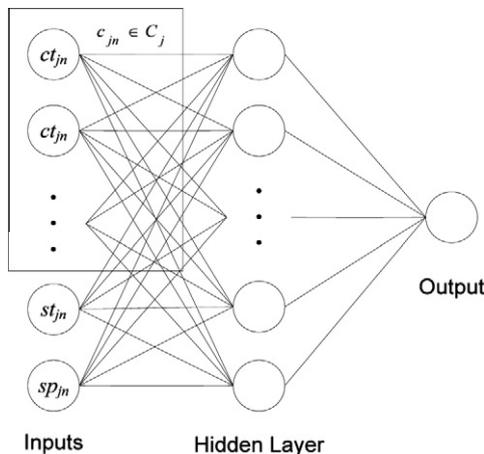


Fig. 4. The architecture of the ANN in this study.

**2.2.2.4. Classifier.** For the classifier, this study collects the values of  $ct_{jn}$ ,  $st_{jn}$ , and  $sp_{jn}$  as characteristic of the neurons in the ANN (see Fig. 4). Then, the ANN classifies the sentences as two output groups that include positive-comment sentences and non-positive-comment sentences.

**2.2.2.5. Summary.** Next, the sentences from the positive-comment sentence group are obtained to generate a summary of comments to the TVAU.

**2.2.3. Active Database Server**

The ADS includes the WCRA, the SOAP/RESTful service server, and the database server. The WCRA provides functions that support fuzzy search, an HTML crawler, and an HTML parser (Lo et al., 2011b) to retrieve the key information from web forums and blog articles and to store the information to the database server. Moreover, the ADS performs the SOAP/RESTful service to serve the client's requests and to provide data from the database server. The ADS is a powerful application tool to provide information to the MRS for embedded marketing service inference.

**2.3. System implementation and case study**

In this section, this study implements the IEMSS to provide an example of its embedded marketing service and reports the experimental results.

**2.3.1. System implementation and case study**

For the implementation of the system, this study develops a Java-based app to simulate the TV app and designs an embedded marketing service for a soft drink brand “微舒打 (DemiSoda Lemon Drink)” as a case study. Fig. 5 shows that the IEMSS provides the merchandise information embedded on the top of the screen and the positive merchandise comments embedded on the bottom of the screen.

**2.3.2. System evaluation**

For the experiments, this study randomly selects 41 articles that include 138 sentences from forums. These articles are sent to seven domain experts for summarization. This study evaluates the performance of the IEMSS using k-fold cross-validation. In iteration  $j$ , forum sentence  $j$ , which includes positive comments, is selected as the test corpus, and the other 137 forum sentences are



Fig. 5. The implementation of the IEMSS.

**Table 1**  
Experiment results.

Feature selection	Classifier	Parameter	Accuracy (%)
TF-IDF	SA		67
Topic term and TF-IDF	SA		17
TF-IDF and position	SA		83
Topic term, TF-IDF and position	SA		17
TF-IDF	kNN	$k = 3$	50
TF-IDF and position	kNN	$k = 3$	50
TF-IDF (includes $ct_{jn}$ and $st_{jn}$ ) and position	ANN	# of neurons in hidden layer = 200	100

collectively used to train the values using the proposed method. Because there are six positive-comment sentences, the training and testing are performed in six runs.

For feature selection, this study designs different experiments to evaluate the topic term, the TF-IDF and the position. First, consider SA (Kaikhah, 2004). It can be observed that the highest accuracy of this classification is 83% when the features are the TF-IDF and the position (see Table 1). Moreover, the accuracy is lower than 20% when the topic term feature is selected. Therefore, the topic term has no significance for retrieving the positive-comment sentences. The results also show that the highest accuracy of the kNN algorithm (Lo, Cheng, Chen, & Yan, 2008) is 50%, which is lower than the accuracy using the SA method. Finally, this study uses the ANN algorithm to classify these sentences as positive-comment sentences or non-positive-comment sentences. The results show that the accuracy of the IEMSS that considers the TF-IDF and the position and combines the ANN algorithm is 100%, which is better than using only the SA method and the kNN algorithm. Therefore, the IEMSS can be successfully applied to the automatic summarization for advertising.

### 3. Study 2: Implementation of the IEMSS for product placement in idol dramas

#### 3.1. Literature review

##### 3.1.1. Product placement

Product placement involves paying for products, brand names, brand logos, or product messages to be subtly embedded in entertainment media vehicles, such as television plotlines, television programs, news, multiplayer online games, single-player games and novels, to achieve advertising effects through media exposure (Ferraro & Avery, 2000; Friedman, 1986; Nelson, 2002; Russell & Belch, 2005). Gupta and Lord (1998) divided product placement strategies into three categories: (1) visual only, showing products, brands, or logos in the background of television programs or movies but not verbally referencing product messages or including relevant audio; (2) audio only, in which characters verbally reference brand names or describe relevant brand information and (3) combined audio-visual, which verbally references brand names or product information while brand images appear on-screen. Similarly, d'Astous and Seguin (1999) classified product placement into the following three categories based on the degree of prominence: implicit placement, integrated explicit placement, and non-integrated placement. Implicit placement refers to the presentation of a brand in a plotline, such as a specific restaurant appearing in a scene. Integrated explicit placement involves the clear display and discussion of a product during plotlines. Non-integrated placement refers to the presentation of a product in a plotline without situational integration.

Based on the categorizations of product placement described above, this study draws upon Gupta and Lord (1998) to design product placement using a combined audio-visual approach. Most

product placements occur in television, movies, and news reports. Relatively few studies have examined product placement in interactive television vehicles. Therefore, this study examined whether an IEMSS mechanism that provided product information and on-line product reviews when embedded products appeared in television programs with product placement would improve audience response toward the embedded products and strengthen the effect of the product placement.

##### 3.1.2. Media Richness Theory

Media Richness Theory was proposed by Daft & Lengel in 1984. The core concept of this theory is that media richness and message complexity should be two criteria for medium selection. In other words, when organization members seek to reduce the vagueness and uncertainty of messages, they use the appropriate channels to decrease the gap between the amount of information needed and the actual amount received (Daft & Lengel, 1984). Byrne and Lemay (2006) used Media Richness Theory to explore the influence of various types of media on the level of satisfaction with internal organizational communication. The results showed that recipients were more satisfied when messages were received from multiple media than from a single medium. Extending this concept to advertising, media richness influences advertising effects. Otondo, Van Scotter, Allen, and Palvia (2008) used an experimental design to explore the influence of various advertising message characteristics on the effectiveness of communication as perceived by message recipients. Their research included three types of messages: text, audio, and audio/video. These authors used message length (1 min vs. 3 min) and message content (subjective and instrumental) to manipulate the messages. The results revealed that the level of consumer satisfaction produced by advertising messages with high-media richness exceeded that produced by low-media richness advertising messages.

Jacob et al. (2010) examined the influence of media richness in travel Web sites, such as navigation perspectives and actual street sounds, on the reviews, frequency of use, and travel intentions of the Web site users. Using random sampling, the authors controlled whether street sounds (e.g., bird calls and human voices) were played as a web site was used and whether the photographs of locations could be controlled using 360° mouse-driven navigation. The research results showed that the travel web sites with the highest media richness (i.e., those that included 360° photograph navigation and integrated street sounds in the browsing experience) received the best reviews from users. These results indicate that media richness has a significantly positive influence on travel web sites, thus increasing the benefits for participating cities. Therefore, Media Richness Theory is used as the theoretical basis for the current research to assess whether displaying online user reviews of embedded products directly on television screens when a product appears through IEMSS functionality produces stronger advertising effects by presenting review messages using two types of media (TV and Internet) to enhance the marketing effects of the product placement.

##### 3.1.3. Hypotheses

When brands or product information are presented to audiences through program plotlines, they directly stimulate and accelerate cognitive information processing and influence brand salience because audience members assess the efficacy of the advertising (Hong, Wang, & De Los Santos, 2008). Therefore, in this study, the IEMSS functionality was used to provide product descriptions when products appeared on-screen to produce stronger advertising effects. Thus, Hypothesis 1 was developed as follows:

**H1.** When audiences watch idol dramas, product placement with product descriptions, compared to placement without product descriptions, will produce superior brand and advertising attitudes as well as stronger purchase intentions.

By showing the functionality of the embedded product through plotlines, the exceptional performance of products can be conveyed to achieve good product placement effects (Hong et al., 2008). For example, an actor may use a phone to download files and take pictures in a movie, demonstrating the product's potential benefits to the audience. This approach is known as demonstrative product placement. Conversely, product placement without demonstrative aspects, in which products merely appear in movies, do not explain or highlight a product's benefits (Hong et al., 2008). The results of Hong et al.'s (2008) research show that of these two product placement types, demonstrative product placement is more effective than non-demonstrative product placement (Hong et al., 2008). Rungpaka, Hackley, and Szmigin (2005) found that product placement was more effective when the product's benefits and features were demonstrated through movie or television plotlines. The increase in effectiveness occurs because the product features can provide information directly, which accelerates audience cognition and reduces the time and effort needed to obtain, recall, and retrieve the relevant information. Compared to product placement that does not demonstrate the product, demonstrative product placements can accelerate the audiences' cognition of a brand and influence their attitudes toward the product.

Simon and Peppas (2004) examined whether the messages conveyed by media with differing degrees of information richness (information-poor Web sites vs. information-rich Web sites) caused participants to develop differing media attitudes and levels of satisfaction. The results showed that, compared to media-poor Web sites, media-rich Web sites generated higher levels of satisfaction and positive attitudes in test participants, indicating that greater completeness in messages and richer media provide positive benefits. The current study inferred that the use of the IEMSS functionality to directly display online product reviews on the television screen during product placement, although not a demonstration of product functionality through the plotline, nevertheless communicated the product's benefits and features through online user reviews. Therefore, by displaying the product and the online reviews simultaneously, greater advertising effects can be achieved. Furthermore, regarding interaction effects and based on Media Richness Theory, this study contended that simultaneously displaying the product descriptions that are provided by the producer and the online product reviews that are extracted using the IEMSS on the television screen is more persuasive than product placements without descriptions and online reviews. Thus, Hypothesis 2 and 3 were proposed as follows:

**H2.** When audiences view television idol dramas, product placement presented with online reviews generate superior product and advertising attitudes as well as stronger intentions to purchase compared to placements that are not paired with online reviews.

**H3.** When audiences view television idol dramas, product placement shown with product descriptions and online reviews generate superior brand and advertising attitudes as well as stronger intentions to purchase compared to placement without product descriptions and online reviews.

### 3.2. Research methods

An experiment was conducted with a 2 (product description messages: shown vs. not shown)  $\times$  2 (online reviews: shown vs. not shown) between-subjects design. The participants of this study

were recruited from a national university in northern Taiwan. Overall, 98 people (31 men and 67 women) participated in this study. Each participant was randomly assigned to an experimental group and was shown an approximately 1 min edited television idol drama clip, after which he/she was asked to complete a questionnaire.

#### 3.2.1. Selection of experimental video

This study selected *The Beautiful You*, a 2006 Taiwanese idol drama, for use as the experimental video. This drama received good viewer ratings and has numerous examples of product placement. The drama comprises 15 60-min episodes. To select the experimental video clips, a video segment was selected in which product messages that met the following conditions were shown in the drama: product messages were communicated through the dialogue, and the product's exterior could be identified in the visual images.

Beverages are a low-involvement type of product (Lockshin, Quester, & Spawton, 2001). To prevent the influence of excessive involvement and participants' personal preferences on the experimental results, DemiSoda Lemon Drink, a beverage embedded in the plot, was used as the stimulus for the experiment. The video clip was approximately 1 min in duration. The dialogue in the clip was as follows:

Female protagonist A: You're back.

Male protagonist A: This is for you.

Female protagonist A: This is my favorite drink! I didn't expect Quan to remember.

Does his giving me a drink mean that he saw the note and scarf I gave him?

Male protagonist A: Should I say that I got the note and scarf she gave me? After all.

She is a considerate girl.

This study selected a segment in which DemiSoda Lemon Drink was embedded primarily because DemiSoda Lemon Drink is not well known in the market. To verify that the participants did not have a preference for the DemiSoda Lemon Drink brand, an online pretest survey was conducted to determine the brand awareness of the drink. A total of 15 participants completed the pretest and answered five questions each. The questions were based on the scale of brand awareness developed by Yoo and Donthu (2001). The measured items included 'I can recognize DemiSoda Lemon Drink from among other competing brands,' 'I am aware of DemiSoda Lemon Drink,' 'A number of characteristics of DemiSoda Lemon Drink easily come to mind,' 'I can easily recall the symbol or logo of DemiSoda Lemon Drink,' and 'I have difficulty imagining DemiSoda Lemon Drink.' A 7-point Likert scale was used for measurement. Of the 15 participants who completed the pretest, three were male and 12 were female. The participants' ages ranged from 20 to 27 years. Regarding the participants' educational level, seven were undergraduate university students, and eight were graduate students. The results from one sample *t*-test indicated that the participants' responses regarding brand awareness ( $M = 2.89$ ,  $SD = 0.90$ ) differed significantly from the neutral value of four,  $t(14) = -4.76$ ,  $p < .001$ . Thus, the pretest showed that the brand awareness for DemiSoda Lemon Drink was relatively low. Accordingly, brand awareness would not influence the measurement of the other variables in the primary experiment.

#### 3.2.2. Independent variables

*Product description messages:* Product description messages appeared at the top of the television screen, similar to a news ticker, during the product placement. The product message was "This

product uses high-quality lemons – the sweet and sour taste and the bubbles provide you with an unbeatably refreshing sensation.”

**Online reviews:** Online reviews appeared at the bottom of the television screen, similar to a news ticker, during the product placement. The content consisted of online reviews of the Demi-Soda Lemon Drink. Appropriate reviews were extracted using the IEMSS program. The following six items remained after filtering:

1. Reviewer “Xiaojin”: Cool in the mouth, refreshing for the heart.
2. Reviewer “momo”: Drinking a bottle on a hot summer day is super refreshing!!
3. Reviewer “malle”: Very cooling on a summer day.
4. Reviewer “Lemon lover”: I like this type of DemiSoda drink a lot, although it is a little hard to choose between this and the grape flavor. However, drinking a cup of this lemon drink after exercising is super refreshing; I enjoy the sour and sweet taste a lot.
5. Reviewer “jean”: The best choice for a summer day.
6. Reviewer “cisual”: Thirst-quenching and great-tasting on a summer day.

### 3.2.3. Dependent variables

**Brand Attitude:** Brand attitudes were measured based on the extremes of “negative/positive, unfavorable/favorable, and bad/good” (Lee & Aaker, 2004, p. 215) using a 7-point Likert scale to calculate the average score for brand attitude (Cronbach’s  $\alpha = 0.93$ ).

**Attitude toward product placement:** Attitude toward product placement was assessed by modifying the items that were originally developed by Cesario, Grant, and Higgins (2004) for advertising attitudes: persuasiveness, convincingness, effectiveness, and coherency. A 7-point Likert scale was used for the measurements. The question scores were summed and averaged to produce the score for attitude toward product placement (Cronbach’s  $\alpha = 0.84$ ).

**Purchase Intention:** Purchase intentions toward products embedded in television idol dramas were measured using a 7-point Likert scale (where 1 denoted strongly disagree and seven denoted strongly agree) and using questions adapted from Meyers-Levy and Maheswaran (2004). Examples of the questionnaire items include ‘The brand embedded in this television drama produces a desire to purchase this product,’ ‘I will immediately consider purchasing the brand shown in this television idol drama,’ and ‘Maybe in the future I would consider purchasing the brand shown in the television idol drama’. Scores for all of the questions were summed and averaged to produce the score for purchase intentions (Cronbach’s  $\alpha = 0.86$ ).

## 3.3. Research results

### 3.3.1. Manipulation check

The results of an independent *t*-test indicated that the average score for the products with a description and the products without a description was 3.81 and 4.65, respectively. The results for Levene’s test of homogeneity showed that the variance was not significant ( $F = .007$ ,  $p > 0.05$ ), indicating that no significant difference in dispersion existed between the two samples. The *t*-value and the significance equal to the hypothesis indicated that the experimental results reached significance ( $t(95) = -3.11$ ,  $p < 0.01$ ); therefore, the manipulation of the presence/non-presence of the product description messages was successful. The average scores when online reviews were shown and when online reviews were not shown were 3.60 and 4.20, respectively. The results of Levene’s test of homogeneity showed that the variance was not significant ( $F = .247$ ,  $p > 0.05$ ), indicating that no significant difference in dispersion existed between the two samples. The *t*-value and the significance results for the hypothetically equal variance were significant ( $t(95) = -1.99$ ,  $p < 0.05$ ), indicating that

the manipulation of the presence/non-presence of online reviews was successful (see Table 2 for further details).

### 3.3.2. Hypothesis testing

To test Hypotheses 1, 2 and 3, a 2 (product description messages: shown vs. not shown)  $\times$  2 (online reviews: shown vs. not shown) multivariate analysis of variance (MANOVA) was used to examine the dependent variables, including brand attitude, attitude toward product placement, and purchase intention. The results for the product description messages were Wilks’  $\Lambda = 0.92$ ,  $F(3,92) = 2.73$ ,  $p < 0.05$  and partial  $\eta^2 = 0.08$ , and those for the online product reviews were Wilks’  $\Lambda = 0.88$ ,  $F(3,92) = 4.31$ ,  $p < 0.05$  and partial  $\eta^2 = 0.12$ . Both the messages and the reviews had a significant and primary effect on the dependent variables (see Table 2). For the product description messages  $\times$  the online product reviews, the Wilks’  $\Lambda = 0.99$ ,  $F(3,92) = 0.4$ ,  $p = 0.75$  and partial  $\eta^2 = 0.13$ , indicating that there were no significant interaction effects (see Table 3).

A subsequent univariate analysis was used to assess the influence of product description messages on attitudes toward product placement; the results were  $F(1,94) = 4.39$ ,  $p < 0.05$  and  $\eta^2 = 0.05$ . For the intention to purchase, the results were  $F(1,94) = 4.48$ ,  $p < 0.05$  and  $\eta^2 = 0.05$ . Thus, the influence on both aspects was significant. However, the influence on brand attitude,  $F(1,94) = 1.59$ ,  $p > 0.05$  and  $\eta^2 = 0.17$ , was not significant. The follow-up planned contrasts separately showed that product placement with product descriptions produced more positive attitudes toward product placement than did product placement without product

**Table 2**

Manipulation test for the presence/non-presence of product description messages and the presence/non-presence of online reviews.

	Levene's test of equal variance			
	F-test	Significance	t	Significance (two-tailed)
Product description message	.007	.936	-3.11	.002
Online product review	2.474	.119	-1.99	.048

**Table 3**

Multivariate analysis of main and interaction effects.

Source	Df	F	Partial $\eta^2$	p
<i>Main effects</i>				
Product description message (A)	3	2.73	0.08	0.04
Online product reviews (B)	3	4.31	0.12	0.01
<i>Interaction effects</i>				
A $\times$ B	3	0.40	0.13	0.75
Error	92			

**Table 4**

ANOVA analysis of main and interaction effects.

Source	Df	Brand attitudes	Attitudes toward product placement	Purchase intentions
		F	F	F
<i>Main effects</i>				
Product description message	1	1.59	4.39 <sup>a</sup>	4.48 <sup>a</sup>
Online product reviews	1	7.54 <sup>b</sup>	5.35 <sup>a</sup>	4.95 <sup>a</sup>
Error	94			

<sup>a</sup>  $p < .05$ .

<sup>b</sup>  $p < .01$ .

descriptions,  $M = 4.19$  vs.  $3.69$ . Messages presented with the product also produced higher intentions to purchase compared to messages presented without the product,  $M = 3.36$  vs.  $2.82$ .

In addition, the univariate analysis showed that the online product reviews had a significantly positive influence on brand attitude,  $F(1,94) = 7.54$ ,  $p < 0.01$  and  $\eta^2 = 0.07$ , attitudes toward product placement,  $F(1,94) = 5.35$ ,  $p < 0.05$  and  $\eta^2 = 0.05$ , and purchase intentions,  $F(1,94) = 4.95$ ,  $p < 0.05$  and  $\eta^2 = 0.05$  (see Table 4). Further comparisons showed that product placement with online reviews presented on screen with the product produced more positive brand attitudes ( $M = 4.75$  vs.  $4.08$ ,  $t = 2.75$ ,  $p < 0.01$ ), attitudes toward product placement ( $M = 4.22$  vs.  $3.66$ ,  $t = 2.31$ ,  $p < 0.05$ ) and purchase intentions ( $M = 3.37$  vs.  $2.80$ ,  $t = 2.22$ ,  $p < 0.05$ ) compared to product placement without online reviews.

Thus, the test results supported H2. However, regarding brand attitude in H1, although the product descriptions generated higher attitude scores compared to an absence of product descriptions ( $M = 4.57$  vs.  $4.27$ ), the difference was not significant; thus, H1 was only partially supported. The interaction effects were not significant; thus, H3 was not supported.

#### 4. Discussion and conclusion

In this research, the IEMSS was introduced and used to implement product placement strategies for idol dramas in interactive television. Empirical research was conducted to examine the effectiveness of this system in an actual application. Study 1 proposed an IEMSS that combined TV apps (e.g., Yahoo TV Widgets or Android apps) and included the TVAU, the MRS and the ADS to provide an introduction to the merchandise and comments regarding the merchandise for embedded marketing services. The MRS considers the TF-IDF and the position and combines an ANN algorithm to improve the MDS technique. In the experiments, this study randomly selected 41 articles that included 138 sentences from forums and used the k-fold cross-validation method to evaluate the performance of the IEMSS. The results showed that the accuracy of the IEMSS that combined the ANN algorithm was 100%. Therefore, the IEMSS was sufficient to help users understand the merchandise.

In study 2, the results indicated that when product descriptions appeared on screen as the participants watched video clips, more positive attitudes toward product placement and higher purchase intentions were generated than when the product descriptions did not appear. However, no significant influence on brand attitude was observed. A possible reason for this result may be that although a product description appeared on the screen, the description was written by the producer. Thus, the audience may have detected the advertising intention, which did not lead to a significantly more positive assessment of the brand. However, when online reviews of the embedded product appeared simultaneously with the product, more positive brand attitudes, attitudes toward product placement, and purchase intentions were generated compared to when the reviews were not shown. As noted by Bickart and Schindler (2001) and Gruen, Osmonbekov, and Czaplewski (2006), electronic word-of-mouth (eWOM) information is considered more trustworthy, relevant and powerful than manufacturer-provided marketing information. Consumer-to-consumer knowledge exchanges can provide an additional source of product messages and allow participants to notice product-relevant messages and reliable user reviews. Accordingly, this study inferred that because eWOM includes anonymous and broad usage content, consistent product messages can generate trust among consumers, providing an opportunity to increase consumers' preference for the marketed product (Doh & Hwang, 2009).

The results of study 2 indicate that product-related messages shown on television and online generate stronger advertising

effects than do messages shown only on television. These results validate the concept of Media Richness Theory, which holds that high media-rich messages are more capable of increasing audience satisfaction than are low media-rich messages. Therefore, the use of the IEMSS functionality to display reviews of embedded products obtained from the Internet to the audience of an idol drama may provide the audience with the views of others who have used the embedded product, improving their attitude toward the brand and product placement and stimulating their purchase intentions. This approach can be considered an extension of eWOM marketing and an application of Media Richness Theory, which increases the effectiveness of product placement.

Regarding the interaction effects, the interaction between product descriptions and online reviews was not significant because 56% of the participants considered it distracting when both appeared on screen and felt that this presentation diverted their attention away from the idol drama. When both product descriptions and online reviews appeared simultaneously (that is, if other messages appeared on screen in addition to the online reviews), cognitive overload and distraction resulted, which increased audiences' irritation with the mechanism. This result echoes the research of Xu, Oh, and Teo (2009), who indicated that MMS is a double-edged sword that can increase audiences' perceived sense of invasion even if the perceived information and entertainment value is also increased. Another interesting finding was that 68% of the participants believed that if the embedded product and the online reviews appeared simultaneously, the online review was relevant to the product. Thus, based on interference and correlation data, the participants held these two extreme views of the system simultaneously. Therefore, eliminating the interference produced by the system and maintaining the relevance of the system for audiences are subjects worthy of examination.

Another important finding was that of the 73 participants who experienced the three conditions in which only the product description was shown, only the online product review was shown, and the product description and online review were shown simultaneously, 22% did not notice any of the streaming information when it was shown on the screen. The Limited Capacity Model of Attention suggests that when individuals face two or more stimuli, they divide their attention between a primary task and a spare task. The primary task requires most of their cognitive space, with only a small portion of cognitive space allocated to the spare task (Kahneman, 1973; Nebenzahl & Secunda, 1993). The participants allocated most of their attention to the main task, the program plotlines, when they watched idol dramas. Only a small portion of their attention was allocated to the spare task, the product-relevant descriptions or online product reviews shown on the screen. Some people did not even notice these messages on the screen. Therefore, the results suggest that when the IEMSS is formally employed for product placement in television programs, the audio and combined audio-visual methods described by Gupta and Lord (1998) should be used to design product placement. The characters appearing in the program can verbally mention the brand or can integrate explicit placement, as defined by d'Astous and Seguin (1999), to clearly reference and discuss the product in the plotline. These approaches are more effective than merely including the product, brand, or logo in the background. Thus, when the audience sees products integrated into the plotline, they will already have an initial understanding of the product and will not have to allocate excessive cognitive capacity to the spare task. In summary, when implementing the IEMSS functionality, industry players should carefully consider their methods of presentation and execution to ensure that audiences feel that the product placements are relevant, which more effectively attracts their attention.

Regarding the theoretical implications, although a fair number of studies have examined the effects of product placement, few

studies have examined the persuasive effects of product placement combined with the on-screen presentation of online reviews. However, increasing media richness using the IEMSS program developed in this study facilitated the discussion of various aspects of product placement and provided a more comprehensive understanding of product placement effects. Regarding practical applications, the experimental results can provide a reference for the future use of the IEMSS in product placement strategies for interactive television. Specifically, in an environment of widespread product placement, the results of this research provide industry players with another method for product placement.

Regarding the limitations and suggestions for future research, this research emphasized the R&D behind the IEMSS and the planning of product placement, but it only examined product placement in the context of idol dramas. This approach could be expanded to other applications in the future. For example, television shopping programs that typically feature a host marketing a product often face audience skepticism and criticisms of exaggerated marketing. The IEMSS mechanism could be employed to show online user reviews, thereby producing more persuasive results. Another important topic is how to display the summaries of the online reviews extracted using the IEMSS on the screen. In this research, the online reviews were displayed in a news ticker style. Other methods of displaying these messages that do not interfere with the image but that provide adequate information to the audience could be considered. Regarding the design of the IEMSS, in the future, this system could combine cloud computing techniques to analyze a large amount of Internet information, and it could be applied to different types of merchandise for embedded marketing services. In summary, numerous advertising methods currently exist. Thus, the development of an alternative advertising display method using advancements in technology to reduce audience resistance and eliminate the commercialism of advertising is an area worthy of further research.

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## References

- Bickart, B., & Schindler, R. M. (2001). Internet forums as influential sources of consumer information. *Journal Interact Market*, 15(3), 31–40.
- Byrne, Z. S., & LeMay, E. (2006). Different media for organizational communication: Perceptions of quality and satisfaction. *Journal of Business and Psychology*, 21(2), 149–173.
- Cesario, J., Grant, H., & Higgins, E. T. (2004). Regulatory fit and persuasion: Transfer from “feeling right. *Journal of Personality and Social Psychology*, 86(3), 388–404.
- Chen, C. H., Cheng, D. Y., Lin, B. Y., Lu, Y. J., & Lo, C. C. (2012). A trust mechanism for web services registries data exchanging. *International Journal of Innovative Computing, Information and Control*, 8(11), 7955–7968.
- Chen, C. H., Yang, Y. C., Shih, P. L., Lee, F. Y., & Lo, C. C. (2011). A cloud-based recommender system – A case study of delicacy recommendation. *Procedia Engineering*, 15(1), 3174–3178.
- Daft, R. L., & Lengel, R. H. (1984). Information richness: A new approach to managerial behavior and organizational design. In L. L. Cummings & B. M. Staw (Eds.), *Organizational behavior* (pp. 191–233). Homewood, IL: JAI Press.
- d'Astous, A., & Seguin, N. (1999). Consumer reactions to product placement strategies in television sponsorship. *European Journal of Marketing*, 33(9/10), 896–910.
- Doh, S. J., & Hwang, J. S. (2009). How consumers evaluate eWOM (electronic word-of-mouth) messages. *Cyberpsychology & Behavior*, 12(2), 193–197.
- Erkan, G., & Radev, D. R. (2004). Lexpagerank: Prestige in multi-document text summarization. In *Proceedings of the EMNLP*. Barcelona, Spain, 25–26 July.
- Ferraro, R., & Avery, R. J. (2000). Brand appearances on prime-time television. *Journal of Current Issues and Research in Advertising*, 22(2), 1–15.
- Friedman, M. (1986). Commercial influences in the lyrics of popular American music of the postwar era. *Journal of Consumer Affairs*, 20, 193–213.
- Gould, S. J., & Gupta, P. B. (2006). Come on down – How consumers view game shows and the products placed in them. *Journal of Advertising*, 35(1), 65–81.
- Gruen, T. W., Osmonbekov, T., & Czaplewski, A. J. (2006). eWOM: The impact of customer-to-customer online know-how exchange on customer value and loyalty. *Journal of Business Research*, 59(4), 449–456.
- Guido, G., Peluso, A. M., Tedeschi, P., Nicole, C., Lauretti, C., & Caciula, A. (2010). Acceptance of product placement in Italy: Effects of personality and product/consumer interactions. *International Journal of Marketing Studies*, 2(2), 34–46.
- Gupta, P. B., & Lord, K. R. (1998). Product placement in movies: The effect of prominence and mode on audience recall. *Journal of Current Issues and Research in Advertising*, 20(1), 47–59.
- Han, J., Kamber, M., & Jian, P. (2011). *Data mining: Concepts and techniques*. Elsevier: Morgan Kaufmann.
- Homer, P. M. (2009). Product placements: The impact of placement type and repetition on attitude. *Journal of Advertising*, 38(3), 21–31.
- Hong, S., Wang, Y. J., & De Los Santos, G. (2008). The effective product placement: Finding appropriate methods and contexts for higher brand salience. *Journal of Promotion Management*, 14(1–2), 103–120.
- Huang, C. M., & Wu, Y. Y. (1999). Automatic Web structuring and summarization for Chinese text. In *Proceedings of the Taiwan network conference*. Kaohsiung, Taiwan, 29 September.
- Huang, C. M., Yang, C. I., & Chu, L. F. (2001). A study of a Chinese-English web document summarization. In *Proceedings of the 7th information management practice*. Taipei, Taiwan, 17 December.
- Ishii, N., Murai, T., Yamada, T., & Bao, T. (2006). Text classification by combining grouping, LSA and Knn. In *Proceedings of the first IEEE/ACIS international workshop on component-based software engineering* (pp. 148–154). Honolulu, Hawaii, 10–12 July.
- Jacob, C., Guéguen, N., & Petr, C. (2010). Media richness and internet exploration. *International Journal of Tourism Research*, 12, 303–305.
- Kahneman, D. (1973). *Attention and effort*. Englewood Cliffs, NJ: Prentice Hall.
- Kaikhah, K. (2004). Text summarization using neural networks. *WSEAS Transactions on Systems*, 3(2), 960–963.
- Ko, Y., Park, S., Seo, J., & Choi, S. (2007). Using classification techniques for informal requirements in the requirements analysis-supporting system. *Information and Software Technology*, 49(11/12), 1128–1140.
- Kung, H. Y., Nguyen, T. M. P., Kuo, T. H., Tsai, C. P., & Chen, C. H. (2011). Intelligent personalized food recommendation system based on a semantic sensor web. *Lecture Notes in Electrical Engineering*, 165(1), 61–68.
- Lee, A. Y., & Aaker, J. L. (2004). Bringing the frame into focus: The influence of regulatory fit on processing fluency and persuasion. *Journal of Personality and Social Psychology*, 86(2), 205–218.
- Liu, C. C., Yeh, J. Y., Ke, H. R., & Yang, W. P. (2005). A concept extraction approach for document clustering. In *Proceedings of the conference on computational linguistics and speech processing*. Tainan, Taiwan, 15–16 September.
- Lo, C. C., Chen, C. H., Cheng, D. Y., & Kung, H. Y. (2011a). Ubiquitous healthcare service system with context-awareness capability: Design and implementation. *Expert Systems with Applications*, 38(4), 4416–4436.
- Lo, C. C., Chen, C. H., Cheng, D. Y., Kuo, T. H., & Kung, H. Y. (2010). On the design and development of a healthy-life map guiding system. *Service Science*, 1(2), 1–12.
- Lo, C. C., Cheng, D. Y., Chen, C. H., & Yan, J. S. (2008). Design and implementation of situation-aware medical tourism service search system. In *Proceedings of the 4th IEEE international conference on wireless communications, network and mobile computing (WiCOM 2008)*. Dalian, China, 12–14 October.
- Lo, C. C., Kuo, T. H., Kung, H. Y., Kao, H. T., Chen, C. H., Wu, C. I., et al. (2011b). Mobile merchandise evaluation service using novel information retrieval and image recognition technology. *Computer Communications*, 34(2), 120–128.
- Lockshin, L., Quester, P., & Spawton, T. (2001). Segmentation by involvement or nationality for global retailing: A cross-national comparative study of wine shopping behaviours. *Journal of Wine Research*, 12(3), 223–236.
- Ma, W. Y., & Chen, K. J. (2003). Introduction to CKIP Chinese word segmentation system for the first International Chinese word segmentation bake off. In *Proceedings of the second SIGHAN workshop on Chinese language processing* (Vol. 17, no. 1, pp. 168–171).
- Mafé, C. R., Blas, S. S., & Tavera-Mesías, J. F. (2010). A comparative study of mobile messaging services acceptance to participate in television programmes. *Journal of Service Management*, 21(1), 69–102.
- McCarty, J. A. (2004). Product placement: The nature of the practice and potential avenues of inquiry. In L. J. Shrum (Ed.), *The psychology of entertainment media: Blurring the lines between entertainment and persuasion* (pp. 45–63). New Jersey: Lawrence Erlbaum Associates.
- Meyers-Levy, J., & Maheswaran, D. (2004). Exploring message framing outcomes when systematic, heuristic, or both types of processing occur. *Journal of Consumer Psychology*, 14(1&2), 159–167.
- Myaeng, S. H., & Jang, D. (1999). Development and evaluation of a statistically based document system. In I. Mani & M. Maybury (Eds.), *Advances in automated text summarization* (pp. 61–70).
- Nebenzahl, I. D., & Secunda, E. D. (1993). Consumers' attitudes toward product placement in movies. *International Journal of Advertising*, 12(1), 1–11.
- Nelson, M. R. (2002). Recall of brand placements in computer/video games. *Journal of Advertising Research*, 42(2), 80–92.
- Otondo, R. F., Van Scotter, J. R., Allen, D. G., & Palvia, P. (2008). The complexity of richness: Media, message, and communication outcomes. *Information & Management*, 45, 21–30.
- Perez-Latre, F. J. (2009). Advertising fragmentation: The beginning of a new paradigm. In H. Powell, J. Hardy, S. Hawkin, & I. MacRury (Eds.), *The advertising handbook* (3rd ed.) (pp. 34–46).

- Radev, D. R., Hatzivassiloglou, V., & McKeown, K. R. (1999). A description of the CIDR system as used for TDT-2. In *Proceedings of DARPA broadcast news workshop*. Herndon, VA, 28 February–3 March.
- Radev, D. R., Jing, H., & Budzikowska, M. (2000). Centroid-based summarization of multiple documents: Sentence extraction, utility-based evaluation, and user studies. In *Proceedings of the 2000 NAACL-ANLP workshop on automatic summarization, NAACL-ANLP-AutoSum '00 Proceedings of the 2000 NAACL-ANLP Workshop on Automatic Summarization* (pp. 21–29). Stroudsburg, PA.
- Radev, D. R., Winkel, A., & Topper, M. (2002). Multi document centroid-based text summarization. *Proceedings of the ACL-02 demonstration session*. Pennsylvania, 6–12 July.
- Rungpaka, T., Hackley, C., & Szmigin, I. (2005). Explicit, non-integrated product placement in British television programmes. *International Journal of Advertising*, 24(1), 95–111.
- Russell, C. A. (2002). Investigating the effectiveness of product placements in television shows: The role of modality and plot connection congruence on brand memory and attitude. *Journal of Consumer Research*, 29(3), 306–318.
- Russell, C. A., & Belch, M. (2005). A managerial investigation into the product placement industry. *Journal of Advertising Research*, 45(1), 73–92.
- Russell, C. A., & Stern, B. B. (2006). Consumers, characters, and products – A balance model of sitcom product placement effects. *Journal of Advertising*, 35(1), 7–21.
- Ryu, H., & Wong, A. (2008). Perceived usefulness and performance of human-to-human communications on television. *Computers in Human Behavior*, 24, 1364–1384.
- Salton, G., & McGill, M. (1986). *Introduction to modern information retrieval*. New York: McGraw-Hill.
- Simon, S. J., & Peppas, S. C. (2004). An examination of media richness theory in product Web site design: An empirical study. *Info*, 6(4), 270–281.
- Smit, E., van Reijmersdal, E., & Neijens, P. (2009). Today's practice of brand placement and the industry behind it. *International Journal of Advertising*, 28(5), 761–782.
- Su, H. J., Huang, Y. A., Brodowsky, G., & Kim, H. J. (2011). The impact of product placement on TV-induced tourism: Korean TV dramas and Taiwanese viewers. *Tourism Management*, 32(4), 805–814.
- Tsai, C. P., Chen, C. H., Kung, H. Y., Kuo, T. H., & Lin, C. H. (2011). Situation-aware music therapy service recommendation system: Design and implementation. *Lecture Notes in Electrical Engineering*, 165(1), 53–59.
- van Reijmersdal, E., Smit, E., & Neijens, P. (2010). How media factors affect audience responses to brand placement. *International Journal of Advertising*, 29(2), 279–301.
- Wiles, M. A., & Danielova, A. (2009). The worth of product placement in successful films: An event study analysis. *Journal of Marketing*, 73(4), 44–63.
- Xu, H., Oh, L. B., & Teo, H. H. (2009). Perceived effectiveness of text vs. multimedia location-based advertising messaging. *International Journal of mobile communication*, 7(2), 154–177.
- Yeh, J. Y. (2002). A study on automated text summarization and its application on Chinese documents. Unpublished master's thesis, Department of Computer and Information Science, National Chiao Tung University.
- Yeh, J. Y., Ke, H. R., & Yang, W. P. (2002). Chinese text summarization using a trainable summarizer and latent semantic analysis. In *Proceedings of the 5th international conference on Asian digital libraries: Digital libraries: People, knowledge, and technology*. Singapore, 11–14 December.
- Yeh, J. Y., Ke, H. R., Yang, W. P., & Meng, I. H. (2005). Text summarization using a trainable summarizer and latent semantic analysis. *Information Processing & Management*, 41(1), 75–95.
- Yoo, B., & Donthu, N. (2001). Developing and validating a multidimensional consumer-based brand equity scale. *Journal of Business Research*, 52(1), 1–14.