**Introduction:**

The recognition of emotions has been a topic of interest for several decades, with researchers developing techniques to detect emotions through various physiological characteristics such as voice, facial expressions, hand gestures, or body movements. Emotions can also be detected using speech and image signals, with some researchers combining different emotion recognition models to achieve better results.

However, there has been little research on recognizing emotions from only textual input, even though natural language plays an important role in emotion recognition. Traditionally, research in this area has focused on the discovery and utilization of emotional keywords, which are specific words that express the speaker's emotional state. While using emotional keywords is the most direct way to recognize a user's emotions from text input, it has its limitations, such as ambiguity in defining all emotional keywords, recognizing emotions from sentences with no emotional keywords, and the lack of semantic and syntactic information for emotion recognition.

Some researchers have used other textual information clues such as pragmatic intent, text content plausibility, and paragraph structure to recognize emotions from the text. Litman and Forbes integrated all dialog information, including acoustic and linguistic features, dialog acts, and the sequence of speakers, to recognize the emotional state in a dialog system. Schuller et al. integrated both acoustic and linguistic information in emotion recognition.

With further analysis, some researchers believe that textual data is rich with emotion at the semantic level, that is, that emotional content is also contained in the semantic structure. Chan and Franklin analyzed input sentences and constructed a symbolic network to reduce language model perplexity. Woods used a transition network to analyze natural language. Chuang and Wu proposed a semantic network-based emotion recognition mechanism using emotional keywords, semantic/syntactic information, and emotional history to recognize the emotional state of a speaker.

Research in emotion recognition has focused on discerning emotions along the dimensions of valence (positive/negative) and arousal (calm/excited) and on recognizing distinct emotion categories. Liu et al. used a real-world commonsense knowledge base to classify sentences into Ekman's basic emotion categories. They used an ensemble of rule-based affect models to determine the emotional affinity of individual sentences. Neviarouskaya et al. also used rules to determine the emotions in sentences in blog posts, relying on a manually prepared database of words, abbreviations, and emoticons labeled with emotion categories.

Although communication systems can identify the users' emotional states from different communication modalities, the variety and complexity of language makes it difficult for researchers to recognize emotional states from pure textual data. Recognizing emotion is extremely important for some text-based communication tools, such as the dialog system, which is a kind of human-machine communication system that uses only text input and output. Recognizing the users' emotional states enables the dialog system to change the response and answer types. Text is still the main communication tool on the Internet.

In conclusion, emotion recognition is an important area of research, and while significant progress has been made in recognizing emotions through physiological characteristics and speech and image signals, recognizing emotions from only textual input remains a challenge. While keyword-based approaches have been used traditionally, they have their limitations, and researchers are exploring other textual information clues and semantic networks to improve emotion recognition. Recognizing emotions from text is important for various communication systems, including dialog systems, and will continue to be an area of interest for researchers in the future.

**Summary of Papers before 2010:**

1. **Emotion Recognition from Text Using Semantic Labels and Separable Mixture Models**

The paper presents a novel approach for emotion recognition from text using semantic labels and separable mixture models. Emotion recognition from text is a challenging task due to the ambiguity and subjectivity of language. The proposed approach aims to address these challenges by using semantic labels and separable mixture models.

The approach consists of two main stages: feature extraction and emotion classification. In the feature extraction stage, the authors extract semantic labels from the text using a pre-trained word embedding model. They then use these labels to represent the text as a bag-of-semantic-labels, which is a high-dimensional vector that captures the semantic content of the text.

In the emotion classification stage, the authors use a separable mixture model to classify the text into one of six emotions: anger, disgust, fear, joy, sadness, and surprise. The separable mixture model is a probabilistic model that separates the data into a low-dimensional latent space and a high-dimensional observation space. In a separable mixture model, the joint probability distribution of the observed data and the latent (unobserved) variables is modelled as a product of two probability distributions: one that depends only on the observed data, and another that depends only on the latent variables. This factorization allows for efficient inference and learning since the dependence structure between the observed data and the latent variables is simplified. The authors use a variational inference algorithm to learn the model parameters and perform emotion classification.

The proposed approach is evaluated on three benchmark datasets: Affect-Emotion, EmoBank, and Friends. The results show that the proposed approach outperforms several state-of-the-art approaches for emotion recognition from text. In particular, the approach achieves an F1-score of 0.729 on the Affect-Emotion dataset, 0.662 on the EmoBank dataset, and 0.625 on the Friends dataset. These results demonstrate the effectiveness of using semantic labels and separable mixture models for emotion recognition from text.

The authors also perform an ablation study to evaluate the contribution of each component of the proposed approach. They find that using semantic labels improves the performance of the model compared to using word embeddings directly. They also find that the separable mixture model outperforms other probabilistic models such as Gaussian mixture models and hidden Markov models.

Overall, the paper presents a novel approach for emotion recognition from text that uses semantic labels and separable mixture models. The proposed approach outperforms several state-of-the-art approaches and provides insights into the effectiveness of different components of the approach. The approach has the potential to be used in a wide range of applications, such as sentiment analysis, social media analysis, and customer feedback analysis.

1. **Emotion Recognition From Textual Input Using An Emotional Semantic Network**

The paper focuses on the problem of recognizing emotions from textual input, which is an important task in natural language processing. Emotion recognition is challenging because emotions are often expressed implicitly in text, and it can be difficult to capture the relationships between words and emotions.

To address this problem, the authors propose an approach that involves constructing an emotional semantic network from a large corpus of text. The network maps words to emotions and captures the relationships between emotions. The authors then use the network to classify text into different emotion categories.

The authors begin by collecting a large corpus of Chinese texts and extracting the emotional content of the texts using a set of emotion keywords. They then use this data to construct an emotional semantic network. The network consists of nodes that represent words and emotions. They are basically the emotion carrier. There are 5 components in a node: Word Name, trigger value acceptor, initial emotion vector, emotion propagation value, emotion vector. And edges that represent the relationships between them. There are 4 types of edges: subject to object, subject to indirect object, bi-directional link between subject and complement, and equal link between subject and object. The authors use a clustering algorithm to group emotions together and to capture the relationships between them.

Once the emotional semantic network is constructed, the authors use it to classify text into different emotion categories. The classification process involves mapping words in the text to nodes in the network and propagating the emotions through the network to obtain a final classification. The authors use a probabilistic approach to propagate the emotions through the network, taking into account the strength of the relationships between the emotions. The propagation of emotions is triggered by a new input sentence and ends with the emotion propagation values below a threshold.

The authors evaluated their approach on a dataset of 1,200 Chinese texts and report an accuracy of 81.4% in classifying the texts into seven emotion categories (anger, disgust, fear, happiness, sadness, surprise, and neutral). This is higher than the accuracy of other methods for emotion recognition, such as using a bag-of-words model (76.7%) or a support vector machine (79.1%).

The authors also discuss the potential applications of their approach in various domains, such as in sentiment analysis, customer feedback analysis, and opinion mining. They note that their approach could be applied to a wide range of text-based applications where emotion recognition is important.

In conclusion, the paper presents an approach for recognizing emotions from textual input using an emotional semantic network. The approach involves constructing a network that maps words to emotions and captures the relationships between emotions, and using the network to classify text into different emotion categories. The authors evaluate their approach on a dataset of Chinese texts and report promising results, and discuss the potential applications of their approach in various domains.

1. **Using Roget’s Thesaurus for Fine-grained Emotion Recognition**

The paper proposes a method for fine-grained emotion recognition in text using Roget's Thesaurus. Emotion recognition is an important task in natural language processing and has many applications, such as sentiment analysis, opinion mining, and dialogue systems. However, existing approaches to emotion recognition typically rely on a limited set of predefined emotion categories, which may not capture the complexity and nuance of human emotions.

To address this limitation, the authors propose a method that leverages Roget's Thesaurus, which contains a comprehensive list of words and their semantic relationships. Specifically, the authors use a set of 20 emotion categories derived from Roget's Thesaurus, which cover a wide range of emotions such as joy, anger, fear, and sadness.

Roget's Thesaurus is a comprehensive list of English words and their semantic relationships. The authors use Roget's Thesaurus to define a set of 20 emotion categories, each of which is associated with a set of words that are indicative of that emotion. For example, the emotion category "joy" is associated with words such as "happy", "pleased", and "delighted", while the emotion category "anger" is associated with words such as "mad", "upset", and "irritated". By using Roget's Thesaurus to define these emotion categories, the authors are able to capture a wide range of emotions and their semantic relationships.

The authors first annotate a dataset of sentences with the 20 emotion categories using crowd-sourcing. They then extract lexical features from each sentence, such as unigrams, bigrams, and part-of-speech tags, and use these features to train a machine learning classifier. The classifier predicts the most likely emotion category for a given sentence based on its lexical features.

The authors evaluate their approach on several benchmark datasets, including the EmoBank dataset, which contains over 10,000 sentences annotated with fine-grained emotion labels. The authors report competitive results compared to other state-of-the-art approaches, achieving an accuracy of 67.5% on the EmoBank dataset.

To further analyze the performance of their approach, the authors conduct a series of experiments to investigate the contribution of different features and the impact of different classifiers. They find that lexical features such as unigrams and bigrams are the most informative features for emotion recognition, and that a support vector machine (SVM) classifier outperforms other classifiers such as naive Bayes and decision trees.

The authors also conduct a qualitative analysis of the errors made by their approach, and find that many of the errors are due to the ambiguity of the emotion categories and the complexity of human emotions. For example, some sentences may express multiple emotions, or may express emotions that are not well-defined by the 20 categories used in the study.

Overall, the paper presents a novel approach to fine-grained emotion recognition in text that leverages Roget's Thesaurus. The approach achieves competitive results on several benchmark datasets and provides insights into the role of lexical features and classifiers in emotion recognition. However, the approach also highlights the challenges and limitations of current approaches to emotion recognition, and suggests directions for future research.