Question Answering System that would help the user decide on a product to buy

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Abstract

This paper presents the design and implementation of a Question Answering System (QAS) tailored to assist users in making informed decisions about purchasing products specifically from Amazon's 500 Bestsellers list for the year 2024. With the rapid growth of online marketplaces, navigating through an extensive array of products to find the most suitable one can be intimidating. Our system aims to ease this challenge by providing users with concise and relevant answers to their inquiries regarding there products, leveraging state-of-the-art natural language processing techniques. We outline the architecture and functionality of our QA system and evaluate its performance through comprehensive experimentation. The results demonstrate the effectiveness and utility of our system in facilitating decision-making processes for consumers seeking to invest in desired products.

1 Introduction

In today's digital age, the selection of products from online marketplaces is often filled with complexity, particularly when confronted with an extensive catalog such as Amazon's 500 Bestsellers list. This list represents a collection of the most desired and popular products across a lot of categories, encompassing electronics, home goods, fashion, books, and more. Navigating through this extensive array of offerings to identify the most suitable products tailored to one's needs can be a difficult task for consumers.

To address this challenge, we propose a comprehensive Question Answering System (QAS) designed specifically to assist users in navigating Amazon's 500 Bestsellers list for the year 2024. Leveraging advanced natural language processing and machine learning techniques, our system aims to provide users with precise and relevant answers to their inquiries regarding a diverse range of products. Whether it be questions about product specifications, user reviews, pricing information, or comparisons between similar products, "Our QAS aims to simplify the process of making decisions for consumers, empowering them to make well-informed purchasing decisions across a broad spectrum of product categories.

2 Literature Review

2.1 Question Answering Systems (QAS): A Systematic Literature Review

This research contributes to understanding the current state of QAS research, highlighting limitations and effective design techniques [AMJA21]. It addresses three research questions:

1. What is the current state of QAS research?
   The current state of QAS research is characterized by a highly divergent landscape, with scholars adopting various techniques and approaches. There is significant activity and interest in the field, with research focusing on areas such as syntax and context analysis, word encoding, deep learning, and machine learning/artificial intelligence. However, it's challenging to compare these approaches objectively due to their diversity. Overall, QAS research is progressing, albeit with various challenges and limitations.

2. What are the most significant gaps and limitations in reviewed studies?
   The reviewed studies have identified several significant gaps and limitations in QAS research. These include:

   - The highly focused nature of developed QAS, limits their applicability to different tasks and settings.
   - Weaknesses in the models or algorithms used, affecting the accuracy and efficiency of QAS.
   - Dependency on standard datasets, question formats, and templates, which may not be available in practical settings.
   - Inadequate evaluation and explanation of developed QAS systems, leading to uncertainties about their effectiveness and reliability.

3. What are the most effective techniques used in designing QAS? The most effective techniques identified in designing QAS include:

   - Syntax and context analysis: Placing questions within their context to enable accurate answering.
   - Word encoding and knowledge systems: Utilizing knowledge bases and question encoding for finding correct answers.
   - Deep learning: Employing multiple layers of algorithms to extract high-level features and enable accurate answering.
   - Machine learning and artificial intelligence: Using various components beyond deep learning to answer questions effectively.

2.2 Answering Product-Questions by Utilizing Questions from Other Contextually Similar Products

This research focuses on predicting answers to product-related questions, particularly subjective and opinion-based questions in the context of e-commerce. It addresses the challenge of answering questions about new or unpopular products that lack sufficient customer reviews [RCM$^+$21].

Previous approaches primarily relied on review-aware answer prediction, which may fail for such products. In response, the research proposes a novel approach called SimBA (Similarity Based Answer Prediction), which leverages answers from similar questions asked about similar products to predict answers for new questions.

Existing approaches to product-related question answering rely heavily on product specifications and customer reviews. However, these approaches have limitations:

- They struggle with subjective and usage questions that require opinions or unique insights.
- They may not provide answers for new or less popular products lacking sufficient reviews.
- They often rely on general product information and do not consider the specific context of the question.

The proposed approach, SimBA, aims to overcome the limitations of existing methods by leveraging a large corpus of resolved product-related questions. It identifies similar questions asked about similar products and predicts answers based on the answers provided for those questions.

Overall, the paper presents SimBA as a promising approach for answer prediction in the PQA domain and highlights the importance of considering both product similarity and question-context for accurate predictions.

References

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