Chapter 17
An E-Commerce Customer Service Robot Based on Intention Recognition Model

Minjing Peng
Wuyi University, China

Chenxin Tang
Wuyi University, China

Yanwei Qin
Wuyi University, China

Xiangming Deng
Wuyi University, China

ABSTRACT

There are three defects for providing human-labor customer services in e-commerce operations: high costs of human labors, staff turnover, and lack of service quality assurance. Breakthroughs made in artificial intelligence, natural language processing and related fields make it possible to replace human labors with online artificial intelligent robots to provide the e-commerce customer service, which indicates the online robots are the future of e-commerce customer services. However, most of the current robots are designed to reply with knowledge matching the key words in question sentences from the database, rarely involving in research on customer intentions that are key factors influencing user experience and online sales. In this research, an intention recognizing model was proposed to obtain intentions of e-commerce consumers by computing the strengths of candidate intention nodes in the intention graph, which was used to describe relations between different goods that could be the intentional targets of e-commerce consumers. The proposed robot was constructed based on the intention recognizing model to identify intentions of consumers and use the located knowledge combined with the AIML based sentence composition template to produce the response sentences for consumers. At last, the proposed robot was evaluated using F3 and ROUGE metrics by comparing with a keyword matching robot. And the evaluation results proved the validity of the proposed robot.

DOI: 10.4018/978-1-5225-2599-8.ch017

Copyright © 2018, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

INTRODUCTION

With vigorous development of instant communication and electronic commerce in recent years, online shopping is accepted by more and more people and leads to huge market demands. But customer-service human labors are under increasing working pressure at the same time [Heiberg et al., 2002]. There are three problems for current pattern of e-commerce customer service of online shopping: (1) the human labor providing the customer service has to repeatedly answer identical and boring questions which have the same template most of the time; (2) the serving persons are usually multitasked and need time to take a rest, which makes it impossible to provide a 24-hour customer service; (3) the turnover of customer-service staff increases the costs of human resources. All the problems are illuminated by breakthroughs achieved in artificial intelligence, deep learning [Schmidhuber, 2015], language computing, graph analysis and other related fields [Sun et al., 2014]. The breakthroughs indicate great possibilities to use online robots to provide customer services for e-commerce users. There have been some online robots applied in customer services of e-commerce operations, but they are mainly designed to simply reply according to the key words obtained through sentence templates of questions of e-commerce customers by using knowledges stored in the database, and rarely involve in research on customer intentions of e-commerce customers. And the intentions are key factors influencing the purchasing behaviors and consequently improving purchasing rates and the sales volumes of the e-commerce online shops [Zhao et al., 2015].

This paper is focused on providing an e-commerce customer service robot based on artificial intelligence markup language (AIML) [Xia et al., 2003], Chinese word segmentation [Ren and Fu, 2014] and intention recognizing model to conduct a more considerate customer service of question-answering to improve the customer satisfaction degrees and purchasing rates in operations of e-commerce businesses [Holtgraves, 2008].

SYSTEM FRAMEWORK

As shown in Figure 1, the system consists of three layers: the interaction layer, the knowledge layer and the intention layer. Each layer plays its own role by executing functions of the modules.

Interaction Layer

The interaction layer is responsible for interacting with consumers: getting questions from consumers and producing answers to consumers. There are four functional modules in the layer:

1. **AIML Files:** AIML is an artificial intelligence markup language extended by XML. In this module, knowledge and question-answering patterns are stored using different tags. Some important tags are <template>, <pattern>, <topic>, <that>, <srai>, <set>, <get>, <random>, <star>, <condition> and <think>.
2. **Chinese Segmentation Module:** Three parts in Figure 1 cooperate with this module. AIML memory tree and AIML reference engine are organized by the words which are the segmented results of user questions by the module under the support of AIML files.
3. **Sentence Composition Module:** The AIML response engine is under supports of this module and the module of AIML files to composite answers according to the template logic.

10 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:
www.igi-global.com/chapter/an-e-commerce-customer-service-robot-based-on-intention-recognition-model/183293

Related Content

Lightweight Opportunistic Mobile Data Offloading
Sanjit Kumar Dash, Aiswaryalaxmi Pradhan, Sasmita Mishraand Jibitesh Mishra (2018). *International Journal of Mobile Devices, Wearable Technology, and Flexible Electronics (pp. 1-15).*
www.irma-international.org/article/lightweight-opportunistic-mobile-data-offloading/227062

A Trusted Ubiquitous Healthcare Monitoring System for Hospital Environment
Durga Prasad, Niranjan N. Chiplunkarand K. Prabhakar Nayak (2017). *International Journal of Mobile Computing and Multimedia Communications (pp. 14-26).*
www.irma-international.org/article/a-trusted-ubiquitous-healthcare-monitoring-system-for-hospital-environment/183628

Combined Queue Management and Scheduling Mechanism to Improve Intra-User Multi-Flow QoS in a Beyond 3,5G Network
Amine Berqia, Mohamed Haniniand Abdelkrim Haqiq (2012). *International Journal of Mobile Computing and Multimedia Communications (pp. 57-68).*
www.irma-international.org/article/combined-queue-management-scheduling-mechanism/63051

Authentication, Authorisation, and Access Control in Mobile Systems
Josef Nolland György Kálmán (2009). *Mobile Computing: Concepts, Methodologies, Tools, and Applications (pp. 2792-2806).*
www.irma-international.org/chapter/authentication-authorisation-access-control-mobile/26693

Deep Reinforcement Learning for Task Offloading and Power Allocation in UAV-Assisted MEC System
Nan Zhao, Fan Ren, Wei Duand Zhiyang Ye (2021). *International Journal of Mobile Computing and Multimedia Communications (pp. 32-51).*
www.irma-international.org/article/deep-reinforcement-learning-for-task-offloading-and-power-allocation-in-uav-assisted-mec-system/289163