Outpatient Department Recommendation
Based on Medical Summaries

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Abstract. The family medicine in some regions is not as popular as that in the
United States. Most patients choose the outpatient department without profes-
sional advice. In this work, we propose a health care aiding system that
recommends the outpatient department for a patient according to his/her chief
complaint and personal attributes. The recommendation is based on the past
medical summaries of a hospital. Three methods including language model,
support vector machine, and k-nearest neighbor algorithm along with different
features are explored. The experimental results show that the SVM classifier
with features selected from chief complaint, as well as personal attributes such
as age, gender, and disease information achieves an f-measure of 79.35%.

Keywords: Health Care Aiding, IR Application, Medical Informatics,
Recommendation.

1 Introduction

In some regions such as Taiwan, the family medicine is not popular. Rather than ask
the professional advice, most patients have to choose one of outpatient departments
from a hospital by themselves when they feel ill. The outpatient departments are clas-
sified based on the aspect of medical professionalism, rather than on the individual
patient’s cognition. For this reason, choosing a proper department is often a challeng-
ing task, especially for those patients who lack of medical knowledge or whose dis-
ease is imperceptible. Mistaking the proper department not only wastes the patients’
time and money and increases their suffering, but also is inherent in the risk of disease
progression.

Although the outpatient guide is available in some hospitals, it is still not conve-
nient for many patients because the information on the guide tends to be too brief to
help patients rapidly find their most proper departments, especially for the large hos-
pitals including dozens of departments.

Fig. 1 shows a screenshot of the patient guide provided by the website of National
Taiwan University Hospital (NTUH), the largest hospital in Taiwan. In this patient
guide, the information is organized in the style of frequently asked questions, aka
FAQ. All the health problems are classified into nine categories including “Children”,

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“Nerves and Sensory”, “Maternity and Urinary”, “Skin”, “Mental and Psychological”, “Health check and Others”, “Physique”, “Beauty and Body”, and “Eye, Ear, Nose, and Throat”. The first entry in the guide is a pair of questions, such as “Which department should be taken for the children with development delay?” and the corresponding suggestion, “The pediatric rehabilitation and child psychologist in the department of pediatrics”. For the category “Children”, only 9 questions are listed in the guide. Even in the largest category “Health check and Others”, only 19 questions are listed. It is obvious that this guide is too limited to cover thousands of health issues. In addition, the FAQ-styled data is not ideal for most patients to search the needed information. For instance, the question “Which department should be taken for the patient of stroke?” is aligned in the category “Nerves and Sensory”, and the suggestion of this question is “department of neurology”. In Chinese, “Nerves” and “Neurology” share the same terminology “神經”. If a patient knows the stroke is an issue related to the nerves, and s/he is likely to know the department of neurology is the proper department to take. On the other hand, a patient who does not have any knowledge about the stroke and the nerves will never find this entry in the category “Nerves and Sensory” in this guide. The other instance is observed in the category “Mental and Psychological”. The suggested department for all the questions in this category is “department of psychiatry”, which is already suggested in the category name. This is a case of non-informative organization because the patient will choose the department of psychiatry without any doubt since s/he knows that her/his health trouble is related to psychology.

Fig. 1. Screenshot of the patient guide on the website of NTUH