

Smart Note Taking on PDA

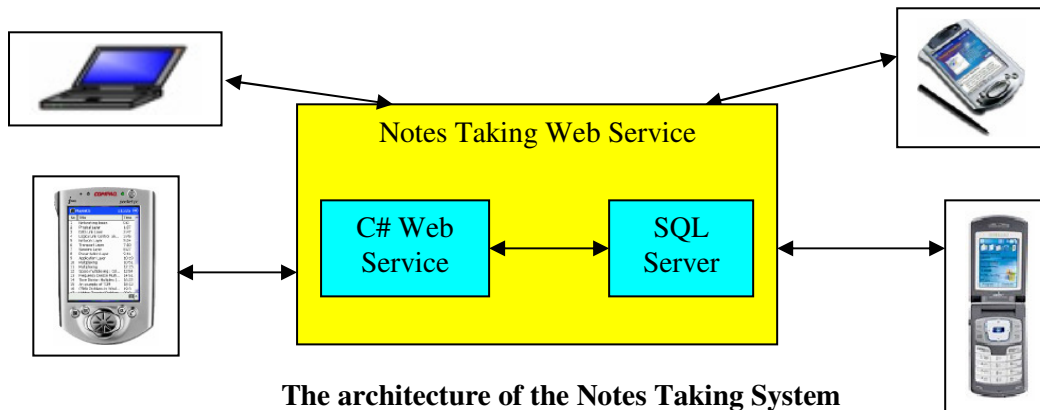
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1. Design and Implementation

1.1 Introduction

The Notes Taking System works as follow: when user types in some hint characters, the client will call a Web Service from the Notes Taking Server to get back a list of hint keywords.

1.2 The architecture



The Notes Taking Server is C# Web Services using an SQL Server Database. Some users take notes using PDAs that support wireless connection. Others may also be typing notes on PCs or laptops. Texts are sent to the Server. The server filters notes and sent keywords back to users when they request.

1.3 Learning element

The most important step is the filtering. A good filter will return only the keywords that have a good “Ranking”. So, how to evaluate the Ranking of a keyword according to a user request? (A request can be some hint characters that the user already typed in).

In terms of Keyword Ranking, the following criteria are to be considered:

- C1 How frequent has the keyword been used so far?*
- C2 Has the keyword been used recently?*
- C3 How important is the keyword in the related lecture materials?*
- C4 How similar is the keyword to the user request?*

The learning technique is to evaluate each of these criteria with a number c_i . Each criterion itself has a weight w_i (i.e. how important the criterion is). The resulting Ranking of a Keyword can be calculated as a linear distribution of those criteria and their weight:

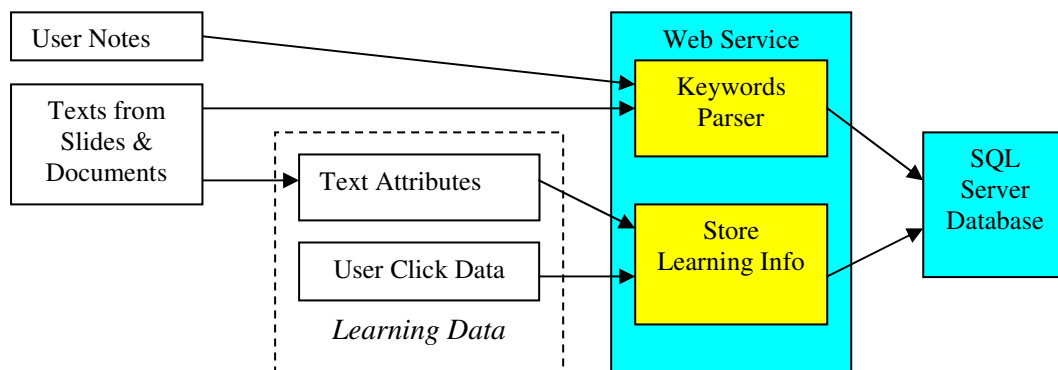
$$\text{Ranking (Keyword, Request)} = w_1 * c_1 + \dots + w_n * c_n.$$

Where n is the number of criteria.

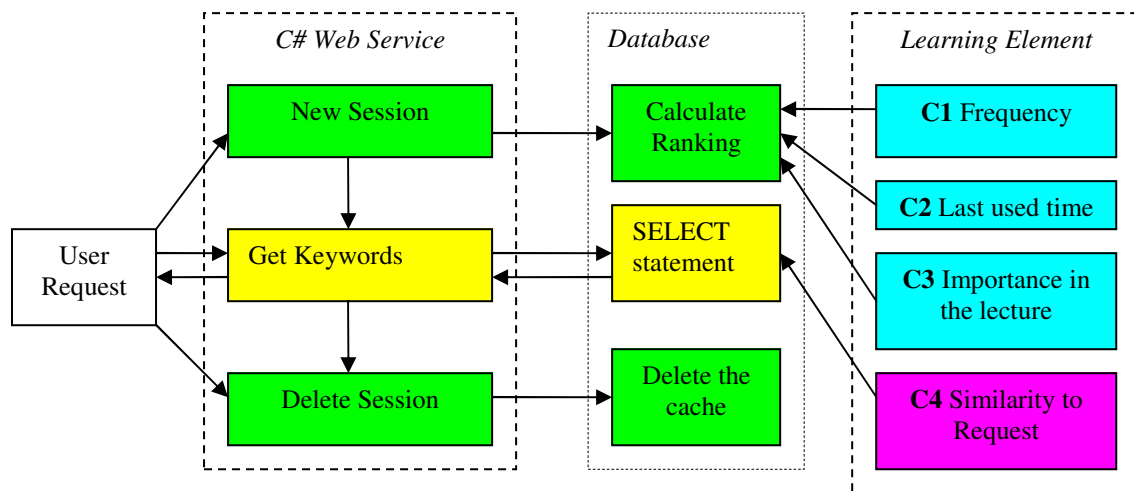
After all the Rankings were calculated, M keywords with highest ranking will be returned. The number M can be decided according to the available screen space of the PDA.

1.4 Notes collecting process

The user notes and texts from slides and related documents will be parsed to get the keywords, then parsed keywords will be stored into the database. Moreover, some learning data, including the number of user click-on-keyword actions (criteria C1, C2) and text attributes in the slides (criterion C3), will also be stored to the database. These informations are helpful to the learning element.



1.5 Client process



Firstly, the user has to create one new session, which will pre-calculate the static rankings of all keywords in the database, which combine all the static learning data (criteria C1, C2, C3). This ranking information will be stored into a cache.

Then user can repeatedly call the GetKeyWords Web Service to return the top highest ranking Keywords by combining precalculated ranking and the similarity of the Keywords to the user request (criterion C4).

At last user can close the session, which will delete all the caching information from the database.

2.2.6 Conclusion and future works

There have been some proposals with the aim of supporting user input in the PDA devices. Our approach improves the idea by a learning algorithm, resulting in a filtering system in the core of the notes taking system.

Some improvements should be implemented in the next version such as a better learning function instead of linear function, or a learning technique to automatically learn the weight of each criterion.