Application for Sexually Transmitted Infection Risk Assessment

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Student paper

We present a web application to detect risks related to sexually transmitted infections (STIs). The application works as a questionnaire about sexual behaviour and risk factors for STIs and, based on the answers, calculates the risk of being infected. The application also works as an informational tool with educating about STIs and prevention. It uses a combination of approaches from computer science and psychology to deliver a usable, clean interface with which the user feels safe.

Povzetek: Predstavljen je študentski projekt za detekcijo spolno prenosljivih bolezni, dosegljiv na aspo.mf.uni-lj.si.

1   Introduction

Sexually transmitted infections (STIs) present an important public health issue, since daily nearly a million people contract at least one STI, including the human immunodeficiency virus (HIV) [1]. According to the World Health Organization (WHO), rates of infection are the highest among young adults [2]. One of the most important reasons is lack of proper information and counselling on safe sex, sexual behaviour, and prevention of STIs [3]. When searching for medical information, an estimated 25% of adolescents turn to web browsing, which suggests that online contexts present an open and safe space in which young people can express themselves and promote healthy habits [4,5]. Because of that, we decided to develop a web application, which combines scientifically verified information about STIs and is designed for young adults. The main component of the web application is a questionnaire, which mimics the process of diagnosing an STI by a medical doctor. The application then estimates the risk level of being infected with an STI and advises user on further actions, if needed. The application is available at aspo.mf.uni-lj.si.

2   Related work

Review of literature between 2010 and 2015 suggests that mobile technology is an effective mode for delivering safe sex behaviour and sexual health information to young adults (19-24 years) [6]. In 2012, more than 1900 HIV/STI-related applications have been reviewed. Only 6 applications provided information on all four important areas of STI prevention: disease information, information about reducing sexual transmission risk, promotion/instructions for condom use, and information about testing for STIs/testing centers [7]. Therefore, we applied these findings to our application.

3   System description

3.1   Front-end

With AngularJS [8], developed by Google, we were able to create a dynamic website. Since our target population was mostly teenagers, designing an attractive website was very important to garner an initial positive reaction from the users. By designing the website as a single-page application, we are able to use it on a variety of different platforms, most importantly mobile.

3.2   Back-end

While most of the questionnaire logic is implemented directly on the front-end side of the application, the current back-end is written in Java EE. Back-end serves as a way to store questions and their relations in a relational database while returning them to the user once they are requested. The back-end uses the Java persistence API as the object-relational mapper. The service serving questionnaire data uses the high-level interfaces and annotations used to create RESTful service resources. The content of the questionnaire is serialized with the GSON library, developed by Google [9]. Since it is designed in a way that does not require any specific relational database, we are able to use different technologies and provide a much more dynamic service for the user. Percona Server relational database is used to store the questions for further anonymous analysis. The final application is deployed on a Wildfly 9.0 Java EE application server [10] hidden behind an nginx [11] web server.

4   Website description

4.1   General information

The site stores static information about STIs together with providing information about risky sexual behaviour, protection for safe sex, sites for getting medical care and counselling, and some general information about the project.

4.2   Questionnaire

The main attraction of the site is the questionnaire, which serves as a way for the users to assess their risk level based on the answers they provide. It was composed based on the actual questionnaire a patient may receive at the Clinic for Infectious Diseases and Febrile Illnesses, University Medical Centre Ljubljana.

The questions are split into three sets. The first set asks questions about the user's demographic information (age, gender, etc). The second set consists of questions of user's sexual activity. The last set asks about possible symptoms that the user might be experiencing.

The length and the quantity of the questions mostly depends on the user's answers; if they answer a question about a particular symptom they may be having with "yes", the questionnaire might prompt them to supply more information. With this, we ensure that the users answer the questions relevant to them, but also learn something while they are reading the contents.

The final risk level is presented as one of three different stages (green, yellow and red), where green represents the lowest level of risk and red represent the highest – strongly advising the user to visit a medical doctor.

All questions are loaded onto the client as soon as the user visits our web page. This ensures the responsiveness of the questionnaire in the case of an unreliable internet connection and reduces the load on our server.

5   Conclusion

To approach the growing problem of STIs in a user-friendly, psychologically inviting, but still a technically sound way, we created an application where users can seek professional medical advice and help if they ever find themselves in a situation which might be considered compromising. By supplementing the site with actual facts and medical procedures, we encourage and prepare the user for a real life world diagnosis while providing all the necessary information for a doctor's visit.

6   Acknowledgment

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