



## MyEyes - Automatic Combination System of Clothing Parts to Blind People

Daniel Rocha, Vitor Carvalho, Eva Gonçalves, Joaquim Gonçalves, Filipe Azvedo

**BACKGROUND:** The aesthetic follow us in almost all the things that surround us. In the way we dress, in the environment we live in and in more or less subtle ways, guides us. Sometimes for personal reasons, particularly in our self-esteem, in our well-being, but also in practical terms as aesthetics also helps us to be more functional. It is in the search of these features that comes the motivation for this project to instill these feelings and characteristics in a blind with total loss of eyesight.

**OBJECTIVES:** Thus, we intend to develop a support system for the blind in a web platform to provide greater independence and consequent welfare in aid to the combination of garments. The purpose is to develop a REST (Representational State Transfer) architecture system composed of an API (Application Programming Interface) and a front-end application. The user's device must have NFC (Near Field Communication) technology so that the front-end application obtains the NFC sensor data.

**METHODOLOGY:** The way of identifying the various pieces of clothing focuses on the use of NFC technology. The NFC is an open wireless technology that allows the exchange of information between devices within a short distance; we will use tags in the pieces of clothing in a minimally invasive way for their identification.

Moreover, we will consider an Arduino platform chosen together with a module PN532, which allows the tag to be read on the clothing. The Arduino is connected to a PC and allows the interface with the web platform.

In the development of all software it is used Laravel, which is a PHP Framework that uses the MVC (model-view-controller) architecture.

**RESULTS AND CONCLUSIONS:** This project was submitted to a preliminary validation of blind people, namely, the user interface and the database build. The feedback was very positive where the general opinion was classifying it as interesting and advantageous for blind people.. According to blind people, they considered that technology has evolved a lot, but the aesthetics and the visual image is a part that has to be more explored because its influence of the well-being and confidence.

As future work we intend to implement machine learning in combinations of garments, as well as the insertion of garments automatically using a camera and image processing algorithms in the extraction of characteristics. Moreover, real world tests of the application with blind people will be considered.

**Keywords:** Blind people; Computer Vision; Clothes; Combination; NFC.

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Master Degree Electronic Engineering

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2nd SYMPOSIUM  
OF APPLIED  
RESEARCH

## BACKGROUND

There are 39 million visually impaired people worldwide, representing 13% of the global population. The technological evolution targeting to the visually impaired has grown sharply, much because of their difficulties. Today, there are a lot of technology resources that guides the visually impaired in their tasks, improving their autonomy in various aspects.

Despite the abundance of technology already available, there are still gaps, and the aspect of aesthetics and the visual image has not been properly explored. The aesthetic follow us in almost all the things that surround us. In the way we dress, in the environment we live in and in more or less subtle ways, guides us. Sometimes for personal reasons, particularly in our self-esteem, in our well-being, but also in practical terms as aesthetics also helps us to be more functional. It is in the search of these features that comes the motivation for this project to instill these feelings and characteristics in a blind with total loss of eyesight.

## OBJECTIVES

Thus, we intend to develop a support system for the blind in a web platform to provide greater independence and consequent welfare in aid to the combination of garments.

The purpose is to develop a REST (Representational State Transfer) architecture system (Figure 1) composed of an API (Application Programming Interface) and a front-end application. The user's device must have NFC (Near Field Communication) technology so that the front-end application obtains the NFC sensor data.

The API is responsible for processing all requests required by the user application, such as the image processing, automatic combinations, among other

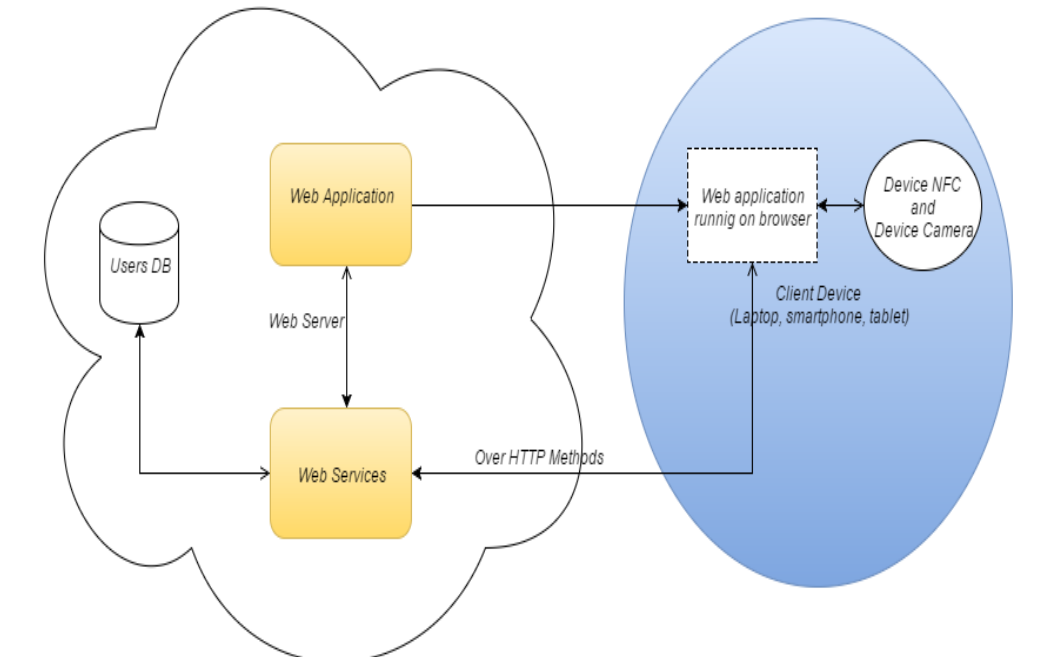


Figure 1 - REST architecture system

## METHODOLOGY

The way of identifying the various pieces of clothing focuses on the use of NFC technology. The NFC is an open wireless technology that allows the exchange of information between devices within a short distance; we will use tags in the pieces of clothing in a minimally invasive way for their identification.

Moreover, we will consider an Arduino platform chosen together with a module PN532, figure 2, which allows the tag to be read on the clothing.

The Arduino is connected to a PC and allows the interface with the web platform.

In the development of all software it is used Laravel, which is a PHP Framework that uses the MVC (model-view-controller) architecture.

This architecture allows to simplify the application in 3 layers, namely, the interaction with the user (view), the layer of manipulation of data (model), responsible for the reading and writing, and the layer of controller, responsible for all the requests of the user who controls the model to use and the view to be shown to the user.



Figure 2 - Hardware Set

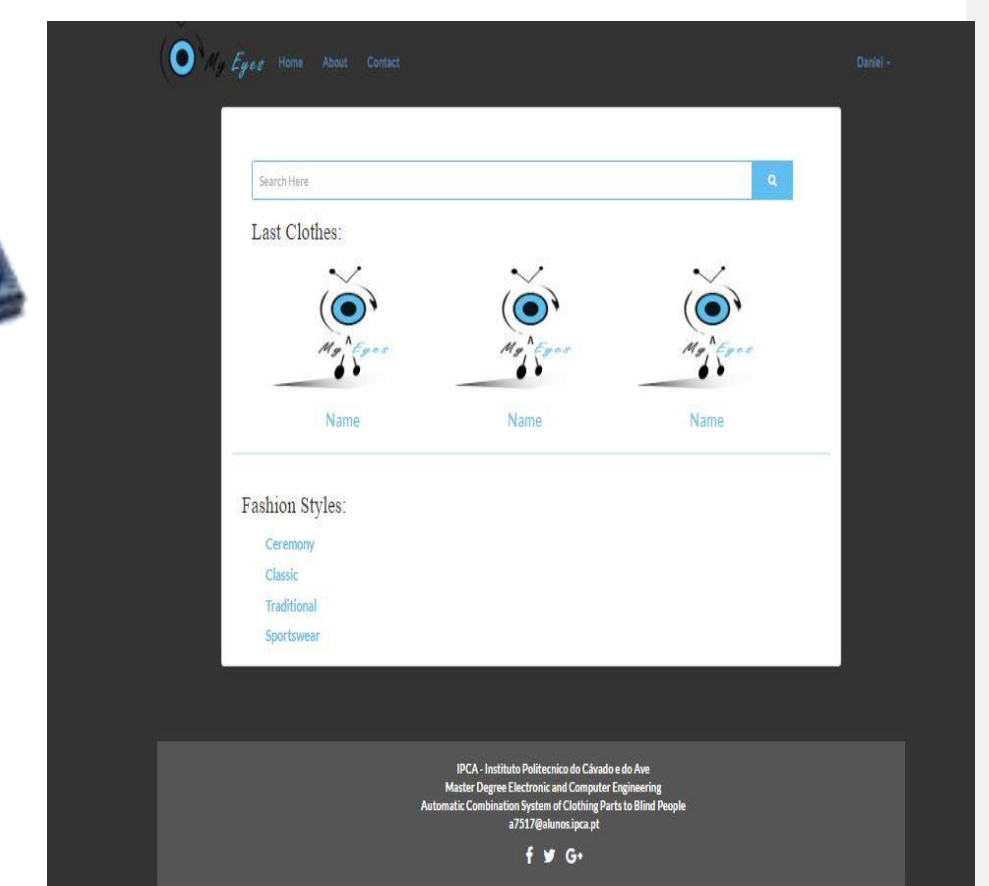


Figure 3 - Web Application

## RESULTS AND CONCLUSIONS

This project was submitted to a preliminary validation of blind people, namely, the user interface and the database build. The feedback was very positive where the general opinion was classifying it as interesting and advantageous for blind people. However, some remarks were indicated, namely, some links should be identified by accessibility attributes in the HTML (Figure 3), as well as the methodology to choose the colors relative to clothes should be improved. According to blind people, they considered that technology has evolved a lot, but the aesthetics and the visual image is a part that has to be more explored because its influence on the well-being and confidence.

The introduction of NFC technology in clothing allows the creation of an autonomous clothing management for a visually impaired person. Being a web application it makes it accessible to all. This application will make possible to contribute to the lack of investment in the existing technology in relation to the aesthetics and visual image of a blind person. The user interface is intuitive and of great usability. As future work we intend to implement machine learning in combinations of garments, as well as the insertion of garments automatically using a camera and image processing algorithms in the extraction of characteristics. Moreover, real world tests of the application with blind people will be considered.

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