"Inside-Pics"

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Abstract — *The photography industry has grew and evolved through the times. Nowadays, cameras come with many features that allow users to adjust them as their preference with a minimum effort or knowledge. However, in the case of DSLR Cameras, users must be familiar with the exposure's triangle which refer to the variables that determine the exposure, aperture,* shutter speed *and ISO of a photograph. Since this will vary based on the environment conditions, users tend to store these variables combinations for further uses. This is the main reason to develop InsidePics application. This application is a tool that provide storage and an easy access to those users who owns a DSLR camera and like to keep records of their most common and useful triangle exposure combination acquired through their experience. It is web based application built on Asp.Net MVC 6 framework and it is designed as a mobile first application so the users can navigate through it using any kind of device*

Key Terms — *Asp.Net, DSLR Cameras, Exposure's Triangle, MVC.*

INTRODUCTION

Today, the photography market has many segments. Within this market, there a plenty of options in terms of devices for the different levels of expertise, from completely automatic cameras to fully manual ones. In the case of the manual devices, the learning curve might be high. However, thanks to the internet, there are a lot online forums, tutorials and blogs that allow users to learn quickly the basic concepts and get familiar with these devices.

As the users acquire experience, they build their own style. Based on those experiences, they decide what are the best exposure's triangle for a specific scene. Thus can be very hard since there are a lot of environments variables that can influence in those camera presets. So as people get more exposure in the field, they usually start to keep records of those ideally combinations that optimize the results that ended in a photograph.

Since the mobile devices has become part of us, an application tool was created for all those users within the photography industry that like to keep records of their outstanding triangle's exposure combinations.

The name of such application is InsidePics. It is a web-based application that allow users to access their records from any kind of device. This application will serve as a log in a simple and organized interface.

InsidePics allows to create, edit, and delete records that are linked to a user account. Each record will contain information such the *aperture* [1], *shutter speed* [2] and *ISO* [3]. Also, they are categorized by scene and if users need to add additional details, there are also an area for comments.

All of user information is protected and it can be accessed only by login into the user account with an email and password.

HISTORY

Every camera uses the triangle exposure to create a balance within its elements. Nowadays, there are many devices that do this work automatically but sometimes in order to add a special effect to the result it is essential adjust that balance. This can be done by changing any of the elements of the exposure's triangle.

The exposure triangle refers to the three elements that determine the exposure of a photograph. These elements are the *ISO [3]*, *Aperture* [1] and *Shutter Speed* [2]. They all must be in balance in order obtain the expected results.

These elements are globally for all of the cameras and they will not vary between the different brands.

The first element is the *ISO* [3] which is a measure of how sensitive to the light the camera sensor is. As the *ISO* [3] increases, less light is needed and vice versa.

The second element is the *Aperture* [1], also known as f-stop. This element refers to the size of the opening in the lens when a picture is taken. This vary between the lenses and is affected by the lens zoom.

The last element is the *Shutter Speed* [2]. It is the amount of time that the lens is open. Faster *shutter speed* [2] provides less time to the camera 's sensor to catch up the light.

Exposure's triangle is not a simple as few combinations. There are many environments variables that might affect the results. The saltpeter in the beach, light pollution and the dust are few of many variables that require to adjust the presets of a camera. Those variables are the reason of the high learning curve in the photography field.

PURPOSE AND OBJECTIVES

InsidePics seeks to provide a tools to photographers to keep record of those camera preset that were successful. This web based application will serve as future reference and also it can be useful to track the progress in terms of how the user has grew as photographer. Since the application is designed as a mobile first application, it can be accessed through all kind of devices remotely which is very important since most of the time will be accessing from outdoor.

This main objective of InsidePics is to provide a very user friendly tool that were designed focusing in an easy access and usability. In overall, InsidePics objectives are:

- Simplify: Replace those logbooks with an organized and simple interface.
- Improve: Performance of photographers' tasks with an easy access to their records.
- Track: Progress of the users and how the perspective changes through the times.

Since is not expected that users may have any kind of technical knowledge background, its provide internal guidance's that help users to walk through the application with the minimum effort.

REQUIREMENTS

The main requirement for this application is a cloud host service where the application can be held. The host service must provide support to applications that are built within framework *Asp.Net MVC 6* [4] from Microsoft. Also, it must provide a database server management tool, enough bandwidth to resist the volume of users that will be accessing it and security.

In terms of security, it its essentials that security features like SSL certificates, DDoS and Attack Response can be provided by the host service to ensure users that they are in a safe place and their information is protected.

SCHEME

The application has a login system that is used to restrict anonymous users and also to consult the database and extract only those records that belongs to a specific user. This login system uses the model system that visual studio provides for web application. The system also use hash sort to encrypt user's passwords. Once the user creates an account, a profile will be available to start using it. Within the profile the list of records created by the user will be displayed.

Within the user profile section, the user will be able to create, delete and edit existing records. Each entry is validating against the database records. Since there is a standard in the photography field, all of the possible values from the *ISO* [3], *Aperture* [1] and *Shutter Speed* [2] will be stored in the database, that way all of the profile will be consistent in terms of data. In case of additional details, there is also a comment section where user can provide more details about that specific record.

Since the entry data will be validated against the database and to prevent unnecessary modifications to the core code, administrator's

accounts were also created. Instead a profile section, these kind of users will be accessing to a dashboard interface that is in charge to route the administrator to the different sections. As part of dashboard, administrators will be able to add new categories, *ISOs* [3], *Apertures* [1] and *Shutter Speed* [2]. That way the direct access to the database is restricted and the application can be maintained easily.

DATABASE

Currently, InsidePics is using a local database that can be accessed with *SQL server express* [5]. This server allows up to 10GB per database, so for testing purposes it will be enough. After deployment, the database will be migrated to a larger one that can resist the volume of the multiples interactions.

The database has a total of eleven different tables. Each of these tables store information such user accounts, roles, database history, user records and record variables. The hardcoded literals within the core code is minimum and most of the possible texts that can appear within the interface are stored in the database.

The whole database was designed and normalized up to the third normal form to reduce the data duplication and ensure referential integrity. Also, since the volume of data and queries per day cannot be estimated at this moment, this design will be very helpful to eliminate stress to the database. See Figure 1 below for the. Entity Relationship Diagram;
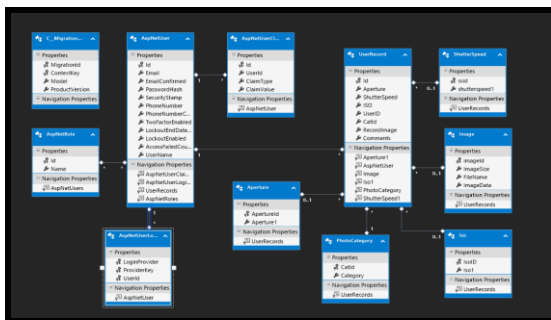

Figure 1
Entity Relationship Diagram

The database has a total of eleven different tables. The table in database are:

- MigrationHistory
- AspNetRoles
- AspNetUserClaims
- AspNetUserLogins
- AspNetUserRoles
- Images
- Aperture
- Iso
- ShutterSpeed
- PhotoCateogyr
- UserRecords

TECHNOLOGIES

InsidePics merge a variety of components in the background. In order to make it a response, secured and dynamic web based application, different technologies were combined. The technologies used in InsidePics are:

- EDI: Visual Studio 2015
- Programming Language: C#
- Architecture Pattern: Model-View-Controller
- Web Application Framework: Asp.Net
- Markup Language: HTML5
- Front-Ent Framework Bootstrap
- JavaScript Library: JQuery
- SQL Client: Microsoft SQL Server Express Edition.

Microsoft Visual Studio 2015 is an Integrated Development Environment (EDI). This EDI provides a variety of features such code editor, debugger, designer and extensibility. For the scope of this project, it does include all the necessary tools that could be needed during the development.

The programming language used for this application is *C Sharp* [6]. This is object-oriented language that can be used to create desktop applications and web based applications on the .Net Framework. As object oriented programming language, it does support encapsulation, inheritance and polymorphism. Beside visual studio is allowed to build web applications, the first one is more

commonly used by the developers. So in case of need contributors to this application, it will be easier to find someone that do a quickly catch up and get familiar with this application in no time.

The software architecture of InsidePics is based on the model-view-controller (MVC). This architecture pattern divides the application into three components, the model, the view and the controller. The model area is used to retrieve a store the logic related to the data domain. In the case of view, it is the component that display the application's user interface. Controller is the component that handle the user interactions. It communicates with the model and route the obtained information to the corresponding view See figure 2 below for the pattern process flow
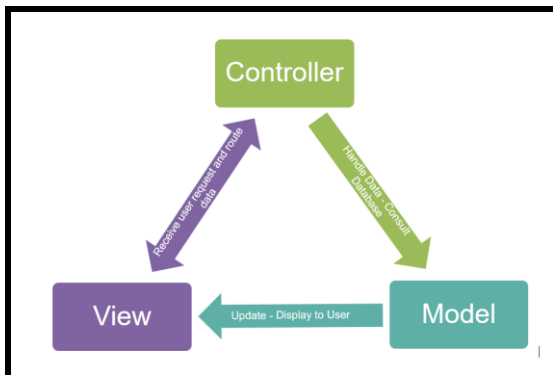

Figure 2
Model-View-Controller Process Flow

Asp.net MVC 6 [4] is being used as application interface. It is an open source server side framework. It is part of Microsoft .Net platform and it does accept programming languages such *C Sharp* [6], Visual Basic.Net, Jscript and J#. It is designed to handle large dynamic applications, web sites and web services. This framework allows developers to combine HTML logic with HTTP request in harmony.

HTML5 was used to create the views of the user interfaces. HTML stand for Hyper Text Markup Language. It is used to create web pages. This language is made up with tags that describes the different areas and its behavior within a page. The browser reads those tags and translate it into a web page.

Since the application was focus to be a mobile firs application. The front-end framework *bootstrap* [7] was implemented. It combines HTML, CSS and *JQuery* [8] to create response mobile first application. It was created for faster and easier web development. This framework is based on a grid system of columns and rows. There can be a maximum of twelve columns per row and also can be combined together. It provides methods to handle the different sizes of the devices, to create tables, slideshows, dropdown buttons etc. Also, as part of the framework, it includes different *JQuery* [8] libraries that contribute to create special effects within the application.

To manage the event handling, animation and ajax, the application is being used *JQuery* [8]. *JQuery* [8] is a powerful JavaScript library that requires just few lines of codes to perform different tasks within the application. In addition to the core library, *JQuery* [8] has different kind of plug-ins that are accepted in *Asp.Net MVC 6* [4] so developers can invoke them without the needs of write hundreds of lines.

To manage the database, the application is currently using *SQL Server Express* [5]. This technology is a database management system that has functionalities like create table, script to fill up tables, database normalization designer and retrieve data as requested. This come as part of the package of Visual Studio 2015 and it does has the necessary tools to manage SQL Server instances including Local DB and SQL Azure.

RESULTS

As final result, InsidePics will be a mechanism that will allow users to keep records of those exposure triangles that provide excellent results in terms of a photograph. This will be very helpful for the photography industry due the lack of existence of this kind of tools at the moment. Also, since the cell phone has become an essential part of everyone, not additional resources will be required to access this application by the users.

The web application consists of the different interfaces that are all connected and can be invoked based of the user account authentication or the user role. The interfaces in InsidePics are:

- Main View – Provides general information about the application like description, application sections and contact information
- Register View – Allows new users to create an account to use the application.
- Login View – Existing users use this form to get access to their profile by providing user Id and password.
- User Profile View – Dynamic view where all of the user records are displayed. It also has links to create new records and delete/edit existing ones.
- Create View – Allows user to create new records. All of the fields will be validating against the database values.
- Delete Record View- Based on the selected records, users can confirm if indeed they want to delete the record.
- Edit Record View - Based on the select record, user can be edit the existing values and replace them by new ones.

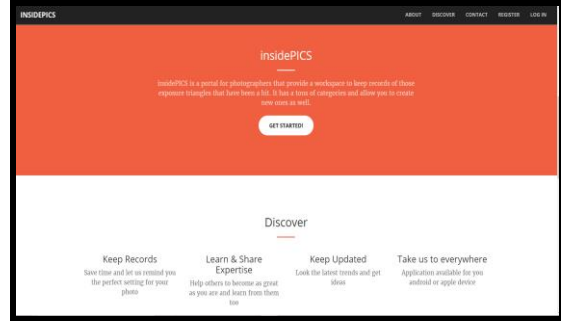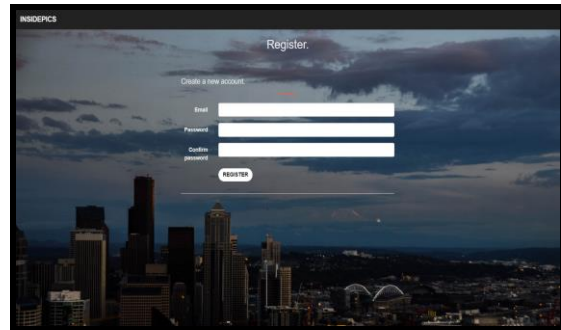The following figures show the results for the different windows.
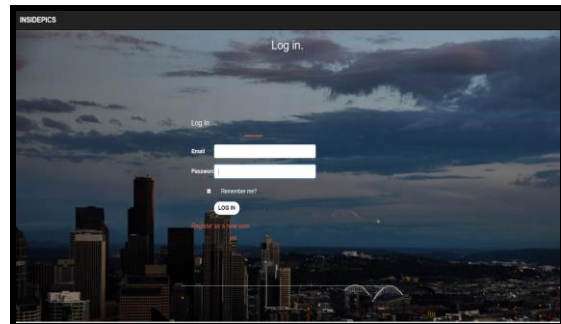

Figure 3
Main View 1

Figure 4
Main View 2

Figure 5
Register View

Figure 6
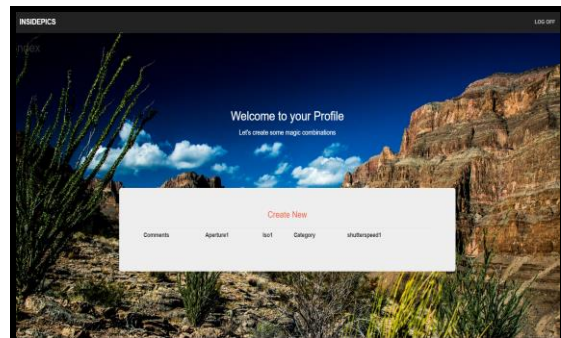**Log in View**

Figure 7
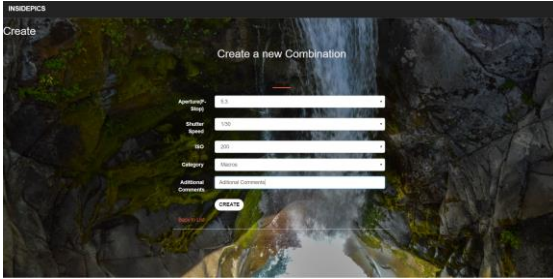**User Profile View**
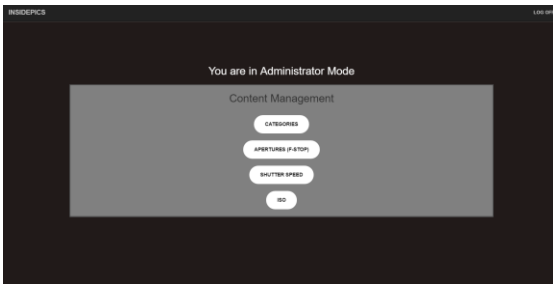
Figure 8
Create New Record View

Figure 9
Administrator Dash Board

FUTURE PLANS

As future plan, InsidePics seeks to become a whole portal for the photography community that will not be limited only to allow users to keep their records within their profile. Discussion Forums, marketplace, extract metadata from uploaded images and incorporate Amazon S3 to store those images are the sections to be developed in the near future. Due the time restriction, this cannot be possible for the project purposes but as a personal project.

CONCLUSION

InsidePics application will definitely be a tool that will be very helpful to photographers of all level of experience. The tool will serve a reference and also to measure the progress of users as photographers.

Since this kind of applications does not exist in the market yet, it is highly probably that it will be accepted and successfully within the industry.

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