

Oregon State University
Capstone Project CS467
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SpaceXplorer Project: Final Report

I. Introduction

As we are approaching the final stages of our CS program at OSU we have set a goal to develop a web application that would incorporate our accumulated knowledge as well as new challenges for the capstone project.

The project is a fun, interactive and educational web application for those who are passionate about the Cosmos and for those who want to learn more about it. The application makes a usage of the NASA Open API which gets extended by our application to not only viewing imagery from the space but also sharing it with family and friends via email or social media such as Facebook.

While creating our application we had to face many challenges from working as a team to using technologies that we are completely new to. One of the challenges was to ensure the smooth flow of the application that incorporates multiple technologies and to guarantee those technologies communicating in perfect manner among each other. We made SQL database talk to our JavaScript using PHP as a middleman, NASA API body contents be saved into the database using both JavaScript and PHP, JQuery pass database fields to an external application such as Facebook or email client. We have spent a fair amount of time researching on these and other subjects.

This application was built for the purpose of accessing the NASA picture database offered to the public through an API. This is a SQL database-backed website to access the NASA imagery using NASA Open API with the options of *viewing*, *downloading*, and *storing* images as well as *sharing* images via *email* or *Facebook*. In particular, this application allow users to get pictures taken by different NASA photographic devices, such as satellites, tripulated and non-tripulated spacecraft, telescopes, and navigation and hazard detection cameras of the MARS Rovers. Users get access to NASA Astronomy Picture on the Day and be aware of what is out there as well as share the cosmic beauty using email or Facebook.

As a result of our efforts we are proud to present our final product - a web application SpaceXplorer which will take you on a journey through the Space to see a new star being born or to admire the surface of Mars through the lenses of multiple cameras of the Mars Rovers.

II. Setup & Usage

As mentioned above, this application allows users to *view*, *download*, and *store* images as well as *sharing* images via *email* or *Facebook*. Next, there is a complete set of instructions about how to navigate this application for new users and new administrator user.

HOW TO USE THE APPLICATION:

Login Function:

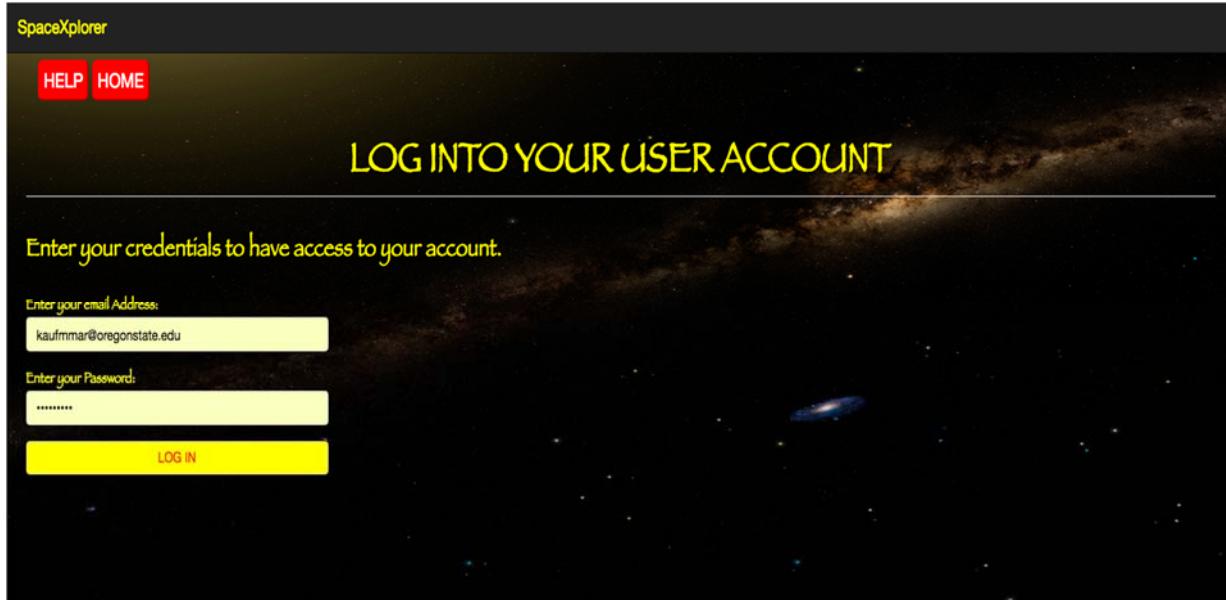
This function allows both regular and admin registered users to log into the application. Once logged in, Admin users will be exclusively directed to the admin console. Whereas regular users will be directed to the main page of the web application, which is the page in which they will actually interact with the NASA picture database. So these are the steps for a user to log into the system:

- 1) Go to the web application portal:
<http://web.engr.oregonstate.edu/~carrilca/CapstoneProject/index.php>.
- 2) Once you are here, you will see three options: "Existing User", "Existing Admin", and "New User". Click on the **EXISTING USER** or **EXISTING ADMIN** button:



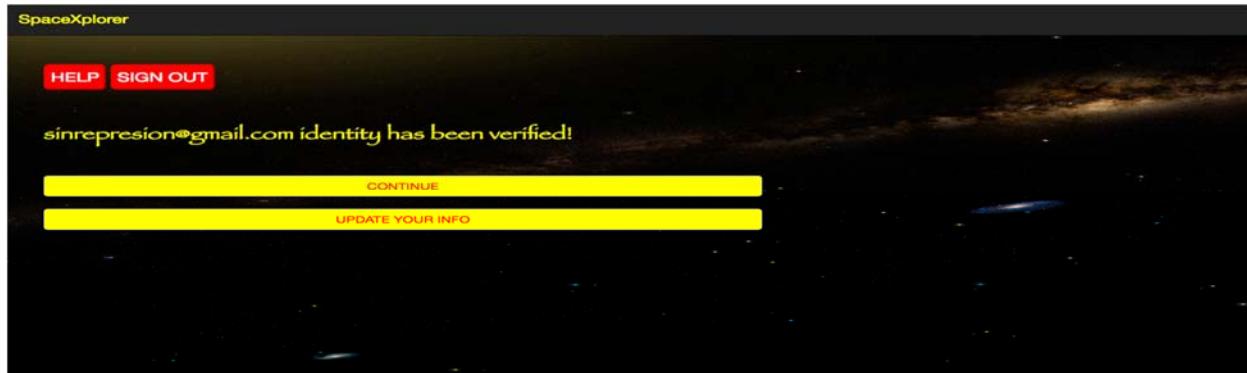
- 3) Once you click on the **EXISTING USER** or **EXISTING ADMIN** button, you will be directed to the login page. Once here, enter your credentials (see the definition.sql file

or go to the end of this report to select one of predetermined user credentials we've created for testing purposes). After that, click on **LOG IN**:



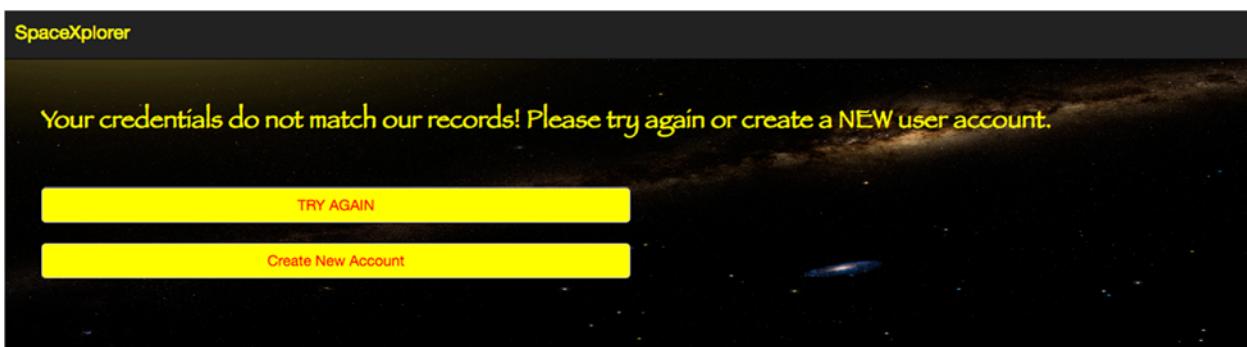
The screenshot shows the SpaceXplorer login interface. At the top left is the "SpaceXplorer" logo. Below it are two red buttons: "HELP" and "HOME". The main title "LOG INTO YOUR USER ACCOUNT" is centered at the top. A sub-instruction "Enter your credentials to have access to your account." is displayed below the title. There are two input fields: "Enter your email Address:" containing "kaufmarr@oregonstate.edu" and "Enter your Password:" containing several dots. A yellow "LOG IN" button is located at the bottom of the form area. The background features a dark space-themed image with stars and galaxies.

If your credentials are correct and match with the records stored in the system database, you will see a verification screen (see below). Click on "**CONTINUE**" to go to the user console or "**UPDATE YOUR INFO**" to make changes to your user profile.



The screenshot shows the SpaceXplorer verification screen. At the top left is the "SpaceXplorer" logo. Below it are two red buttons: "HELP" and "SIGN OUT". A success message "sinrepresion@gmail.com identity has been verified!" is displayed. Two yellow buttons are present: "CONTINUE" and "UPDATE YOUR INFO". The background features a dark space-themed image with stars and galaxies.

However, you will see a different screen if you enter the wrong credentials. In this screen will have the option to **TRY AGAIN** or **Create a New Account**:



The screenshot shows the SpaceXplorer error screen. At the top left is the "SpaceXplorer" logo. The main message "Your credentials do not match our records! Please try again or create a NEW user account." is centered. Two yellow buttons are present: "TRY AGAIN" and "Create New Account". The background features a dark space-themed image with stars and galaxies.

If you want to update your user information by clicking on “**UPDATE YOUR INFO**”, you will see a screen like this. From here you will be directed to your user console:

SpaceXplorer

HELP SIGN OUT

UPDATE YOUR PERSONAL INFORMATION

Enter the information you want to update into the corresponding fields. Then click on the “**UPDATE INFO**” button.

Update First Name: Thomas

Update Last Name: Rogers

Update Email Address: simrepson@gmail.com

Update Password: *****

Update City: Durban

Update State: Manatu

Update Country: South Africa

UPDATE INFO

GO TO YOUR PAGE

Once users log in, they will be directed to the User Console, which looks like this:

SpaceXplorer

HELP SIGN OUT

MY SPACEXPLORER

This is your SpaceXplorer personal page. We are glad you want to enjoy the beauty of the universe captured by NASA! Here you will be able to see pictures of the universe from different perspectives including pictures taken by the NASA ROVER from Mars. You can also create your own picture WALL and share all the pictures you download with your Facebook friends and email contacts. So get ready to enjoy the universe from Mars and other NASA devices!!

Choose the type of picture you want to see just by clicking on any of the next options:

GET NASA PICTURE OF TODAY

GET MARS ROVIR NAV CAM IMAGE

GET MARS ROVIR FRONT CAM IMAGE

GET MARS ROVIR NEAR CAM IMAGE

DELETE IMAGES

You can delete any of your existing pictures just by entering its ID. Find picture IDs in the table below.

Enter the ID of the picture you want to delete.

PICTURE ID:

DELETE PICTURE

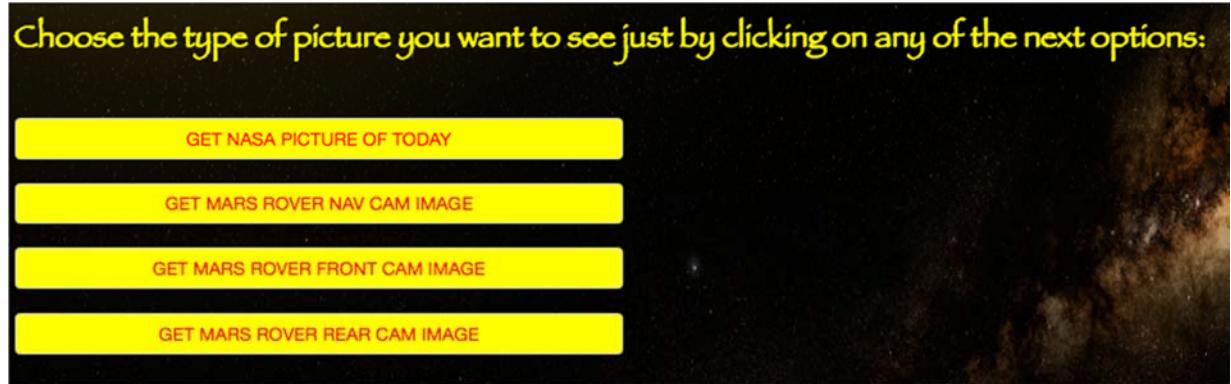
YOUR IMAGES

PICTURE ID	USERNAME	PICTURE NAME	LINK
0	simrepson@gmail.com	Jupiter	https://www.nasa.gov/sites/default/files/user_1_0.jpg
5	simrepson@gmail.com	Neptune	https://www.creativatlas.com/neptune-ring.jpg
10	simrepson@gmail.com	Pluto	http://meplanets.org/mn-chiron-neutral-bright-release.jpg
55	simrepson@gmail.com	Power	https://mars.jpl.nasa.gov/real-time-images/png/marsdepot/lauch/rovers/01001/images/ldrmcams/NRB_49000000002RL_F0481STONCAM0002RM_.JPG
26	simrepson@gmail.com	Neurosis	https://apod.nasa.gov/apod/image/1706/M27Subaru_colombia1824_d100_watermark.jpg
57	simrepson@gmail.com	Helixus	https://apod.nasa.gov/apod/image/1706/M27Subaru_colombia1824_d100_watermark.jpg

SHARE EXISTING PICTURES

From here, you will have access to all the application features offered to the user. First, you will see the access buttons to 4 different NASA space cameras that offer these

options respectively: *NASA PICTURE OF TODAY*, *MARS ROVER NAV CAM*, *MARS ROVER FRONT CAM*, and *MARS ROVER REAR CAM*.



Below this, there is the other functionality offered on the main user console, which is the *Delete Function*.



This functionality allow the user to delete any of her/his pictures just by entering the picture ID. The user can find the pictures IDs in the table that is located on the bottom of the page of the main console:

YOUR IMAGES			
PICTURE ID	USERNAME	PICTURE NAME	LINK
3	sinrepresion@gmail.com	Jupiter	https://www.nasa.gov/sites/default/files/jupiter_1_0.jpg
5	sinrepresion@gmail.com	Neptune	http://www.crystalinks.com/neptune-rings.jpg
15	sinrepresion@gmail.com	Pluto	http://nineplanets.org/nh-charon-neutral-bright-release.jpg

At the very bottom, there is a yellow button labeled "SHARE EXISTING PICTURES".

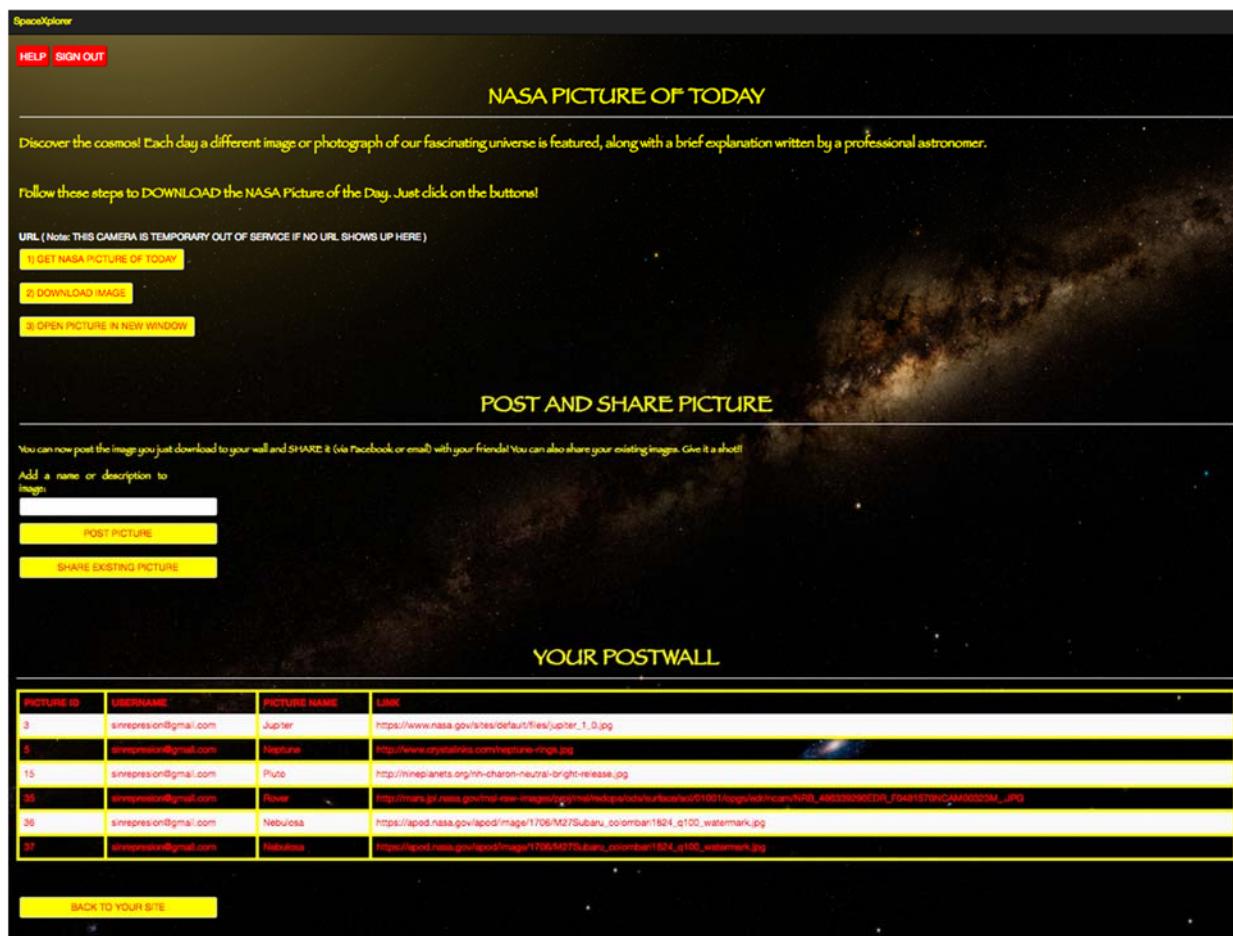
At the very bottom, the user will see the **SHARE EXISTING PICTURES** button which can be used to share any of the pictures the user has already downloaded. This is useful in case the user does not want to go through the process of downloading a new picture.

- 4) **Getting Pictures:** This is the most important function of this application. Here is where users actually get/download pictures from the NASA database. So let's suppose the user wants to see and download the *NASA PICTURE OF TODAY*. First the user has to click on the **GET NASA PICTURE OF TODAY** button:

Choose the type of picture you want to see just by clicking on any of the next options:

[GET NASA PICTURE OF TODAY](#)

Immediately after that, the user will be directed to the [Downloading Console](#) corresponding to that particular picture to be downloaded.



In order to download the picture, the user will have to click the buttons in the order they are numbered:



Note: If no URL shows up above button 1 after clicking also on button 1, it means that this particular NASA camera is out of service. Unfortunately, due to the complexity of the sending process, this situation happens regularly. If this isn't the case, users will see the actual URL of the picture they are about to download or see after clicking on button 1.

URL https://apod.nasa.gov/apod/image/1706/M27Subaru_colombari1824_q100_watermark.jpg

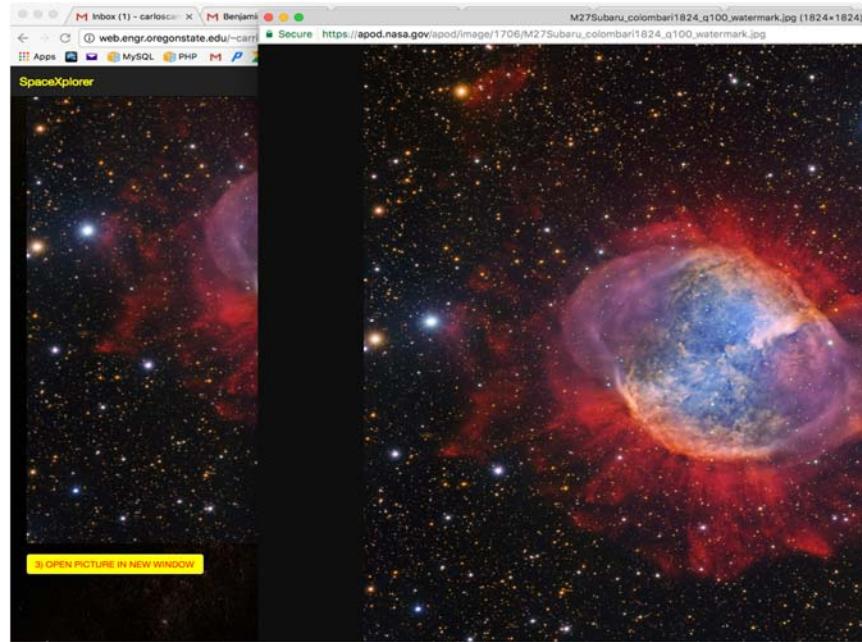
1) GET NASA PICTURE OF TODAY

Now the system is ready to download and show the selected picture. All users have to do is to click on the **2) DOWNLOAD IMAGE** button. After clicking on it, a picture preview is going to show up right below this button, like this:



After the picture is downloaded, you can also open it in a new window to see it with more detail, bigger, and in original quality. That would be the third and last step in the

downloading process. All users have to do is to click on the **3) OPEN PICTURE IN NEW WINDOW** button. It's important to highlight that this step is optional.



Once the picture has been downloaded, users can post this picture to their personal wall or go back to their main user console. Users can/should give a name or add a description to the picture and hit the **POST PICTURE** button if they decide to post it to their wall. Or they can just share a picture that is already on their wall just by clicking on the **SHARE EXISTING PICTURE** button.

A screenshot of a web page titled "POST AND SHARE PICTURE". The page has a dark background with a starry texture. At the top, the title is displayed in a large, glowing font. Below the title, there is a message: "You can now post the image you just download to your wall and SHARE it (via Facebook or email) with your friends! You can also share your existing images. Give it a shot!!". There is a text input field with the placeholder "Add a name or description to image:" containing the text "Nebulosa". Below the input field are two buttons: a yellow one labeled "POST PICTURE" and a blue one labeled "SHARE EXISTING PICTURE". At the bottom of the page is another yellow button labeled "BACK TO YOUR SITE".

- 5) *Sharing Pictures:* This functionality allow users to 1) share their pictures on Facebook or 2) send the pictures via email. Once the user press the **POST PICTURE** button, they will be directed to the **Sharing Console**, which looks like this:

The Sharing Console displays all the pictures previously posted by the user in a table. Thus, users can see the picture ID (necessary to share), name, and link. Below this table, there are the 2 sharing options offered by this web application. The first one is the Facebook sharing option:

SHARE PICTURES ON FACEBOOK

Choose the picture you want to share on Facebook just by entering its ID. Find picture IDs in the table ABOVE.

ENTER PICTURE ID

Enter the ID of the picture you want to share.

PICTURE ID:

SHARE ON FACEBOOK



Once users enter the picture ID of the image to be shared and click on the **SHARE ON FACEBOOK** button, they will be directed to next screen, in which they just have to click on the “**CLICK HERE TO SHARE ON FACEBOOK**” link provided by the application.

SpaceXplorer

HELP SIGN OUT

SHARE PICTURES ON FACEBOOK

Picture called "Neptune" is ready to be shared on Facebook. Just click on the link below!

CLICK HERE TO SHARE ON FACEBOOK

[BACK TO SHARING CENTER](#)

Users can go back to the sharing console just by clicking on the **BACK TO SHARING CENTER** button. The second sharing option allows user to share their pictures via email. For this option, users also have to enter the picture ID and the recipient's email address.

SHARE PICTURES VIA EMAIL

Choose the picture you want to send via email just by entering its ID. Find picture IDs in the table ABOVE.

EMAIL PICTURE

Enter the ID of the picture you want to email.

PICTURE ID:

Enter recipient's email address.

EMAIL ADDRESS:

SEND PICTURE

A confirmation message will appear on the screen if the picture is successfully sent to the recipient's email address. The user can repeat this actions as many time as he/she wants.



IMPORTANT: Since this application is running on the OSU ENGR server, so it is subject to OSU security policy. Any non-Google email account will display a Mail delivery warning when it is sent. Thus if the user has, for instance, a Yahoo email account, the OSU server will sent his/her emails from this application within a Spam/warning generic email.

Sign Up Function:

This function allows new users to create an account and get access to the application features. These are the steps for a user to create a new user account:

- 1) Go to the web application portal:
<http://web.engr.oregonstate.edu/~carrilca/CapstoneProject/index.php>.
- 2) Once you are there, you will see the options “Existing User”, “New User”, and “Existing Admin”. Click on the **NEW USER** button:



- 3) Once you click on **NEW USER**, you will be directed to the **Sign Up Console**. Once here, users need to enter all the information they need to create a new account (including login credentials), and then hit **SUBMIT** button:

SpaceXplorer

HELP HOME

CREATE USER ACCOUNT

Thank you for being interested in creating a new account!

Please fill up all the fields with your personal information. Then click "SUBMIT".

First Name:

Last Name:

Email Address:

Create Password:

City:

State:

Country:

Users will see a screen with a table containing the data they just entered if the new account is successfully created by the system.

SpaceXplorer

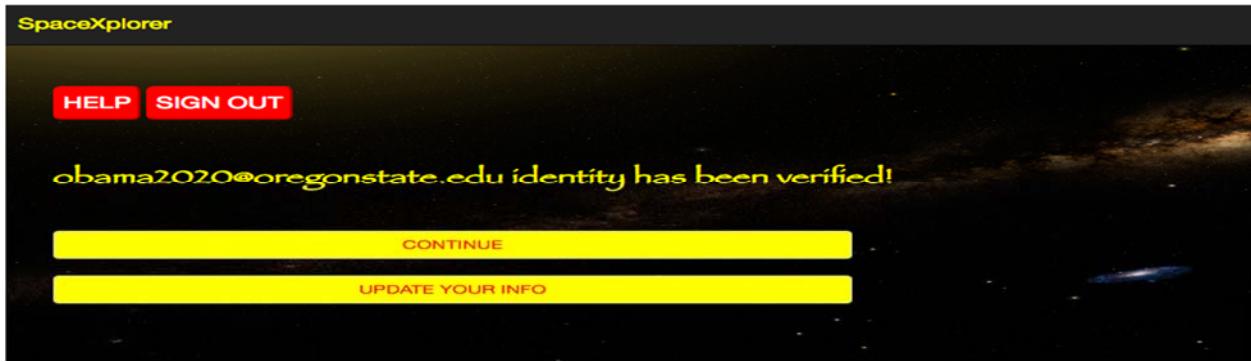
HELP SIGN OUT

User account: obama2020@oregonstate.edu has been successfully created!!

Personal Data Entered

First Name	Last Name	Email	Password	City	State	Country
Barack	Obama	obama2020@oregonstate.edu	obama2020	Chicago	Illinois	USA

At this point the new user can start using his/her account. All they need to do is to click on **GO TO YOUR NEW PAGE**. However, the system will verify the new credentials before giving access to the new user's page.



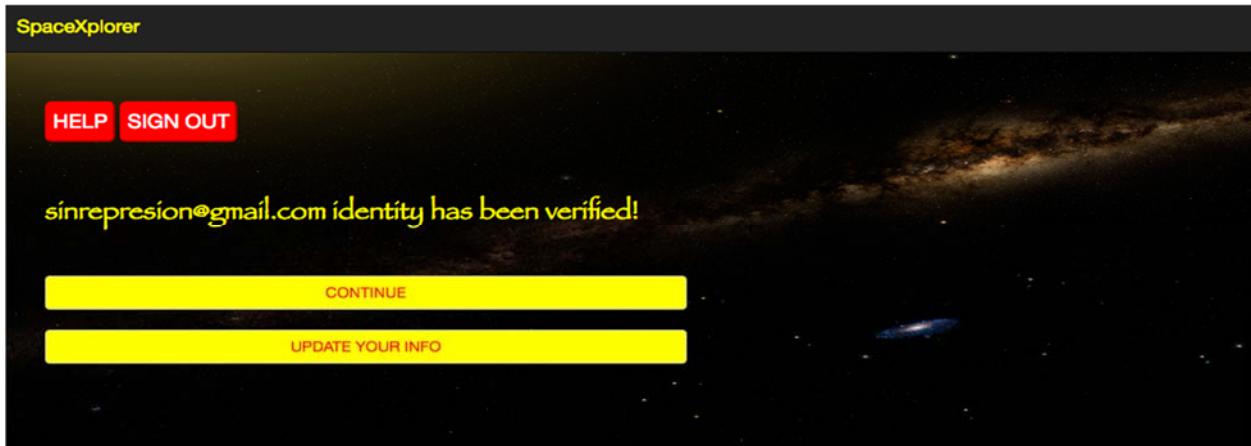
Thus, the new user will be directed to his/her brand new (no images) *User Console*.



Edit Info Function:

This function allows an admin or a regular user to update their personal information such as email, location, and/or password. These are the steps for users to update their personal information:

- 1) Go to <http://web.engr.oregonstate.edu/~carrilca/CapstoneProject/index.php> and login as an Existing User/Admin.



- 6) Once you are logged in, click on the **UPDATE YOUR INFO** button and you will be directed to the ***Update Info*** console.

A screenshot of a web page titled "SpaceXplorer". At the top, there are "HELP" and "SIGN OUT" buttons. The main title is "UPDATE YOUR PERSONAL INFORMATION". A sub-instruction says "Enter the information you want to update into the corresponding fields. Then click on the "UPDATE INFO" button.". The form contains several input fields:

- Update First Name:** Thomas
- Update Last Name:** Roggers
- Update Email Address:** sinrepresion@gmail.com
- Update Password:** *****
- Update City:** Durban
- Update State:** Manutu
- Update Country:** South Africa

Below the form are two yellow buttons: "UPDATE INFO" and "GO TO YOUR PAGE". The background features a dark space-themed image with a galaxy and stars.

- 7) Change any piece of your personal information you need to update and then click on the **UPDATE INFO** button to save the changes. After saving the changes, you will see a confirmation message along with a table showing the changes you just made on the top of the same page. You will also see the new changes reflected in the fields that contain your personal information. You can repeat the process as many times as you need.

SpaceXplorer

HELP SIGN OUT

sinrepresion@gmail.com information has been successfully updated!

Data Updated

First Name	Last Name	Email	Password	City	State	Country
Thomas	Sammuels	sinrepresion@gmail.com	carlos04	Cabo	Aributu	South Africa

UPDATE YOUR PERSONAL INFORMATION

Enter the information you want to update into the corresponding fields. Then click on the 'UPDATE INFO' button.

Update First Name:
Thomas

Update Last Name:
Sammuels

Update Email Address:
sinrepresion@gmail.com

Update Password:

Update City:
Cabo

Update State:
Aributu

Update Country:
South Africa

UPDATE INFO

GO TO YOUR PAGE

Once you are sure those are the changes you want, you can go ahead and click on the **GO TO YOUR PAGE** button in order to be directed to your user console/page.

Admin Console:

This page is meant to be only for the system administrators. An admin user is able to create/add a regular user or another admin user to the system, as well as update user info, delete users, and delete user data/images. Also, it provides a complete inventory list of the system resources such as a Regular users, Admin users, and User Data (which is actually the images that the user has downloaded and share).

SpaceXplorer

HELP HOME

LOG INTO ADMIN CONSOLE

Enter your credentials to have access to your account.

Enter your email Address:
kaufmman@oregonstate.edu

Enter your Password:

LOG IN

Once the admin user logs into the system as an Existing Admin, she/he is going to be directed to the Admin Console page as shown below:

The screenshot shows the "WELCOME TO THE ADMIN CONSOLE" page. At the top left are links for "HELP", "SIGN OUT", "+ ADD NEW USER", "+ ADD NEW ADMIN USER", "UPDATE USER INFO", "UPDATE ADMIN INFO", "- DELETE USER", "- DELETE ADMIN USER", and "- DELETE USER DATA". Below this is a message: "The admin console can be used to modify, add, or delete both USER and ADMIN accounts from the system database as well as deleting user's data/pictures. You are also able to monitor user download activity by looking at the 'USER DATA' table. Please select one of the following options." The main area is divided into three sections:

- SYSTEM USERS:** A table with columns: First Name, Last Name, Username, Password, City, State, and Country. Data includes rows for Alice, Bob, Lauren, Carson, Donald, Michael, Lorna, Daniel, Kate, and Barack.
- SYSTEM ADMINISTRATORS:** A table with columns: First Name, Last Name, Username, and Password. Data includes rows for Martha, Carla, Benjamin, and Leah.
- USER DATA:** A section currently showing no data.

The Admin Console offers 7 basic functionalities to the admin user:



- 1) **ADD NEW USER:** This function allows an admin to add new users. This is useful when a user has trouble to sign up and asks for help to a system administrator to do so. Also, adding new Admin Users from the Admin Console is the proper way to create a new admin account. In order to add a new user to the system from this console. The user just

has to click on **ADD NEW USER** or **ADD NEW ADMIN USER** button and then enter the corresponding information, as shown below:

SpaceXplorer

HELP SIGN OUT

WELCOME TO THE ADMIN CONSOLE

The admin console can be used to modify, add, or delete both USER and ADMIN accounts from the system database as well as deleting user's data/pictures. You are also able to monitor user download activity by looking at the "USER DATA" table. Please select one of the following options:

+ ADD NEW USER
The user will NOT be added if she/he is already in the system database.
Enter New User First Name:

Enter New User Last Name:

Enter New User Email:
 kaufmmar@oregonstate.edu
Enter New User Password:

Enter New User City:

Enter New User State:

Enter New User Country:

ADD USER

+ ADD NEW ADMIN USER



- 2) **Update User Info:** This function allows an admin to change/update any system user's personal information. All you have to do is to click on **UPDATE USER INFO** or **UPDATE ADMIN INFO** and then enter the username of the user to be updated, as shown below:

SpaceXplorer

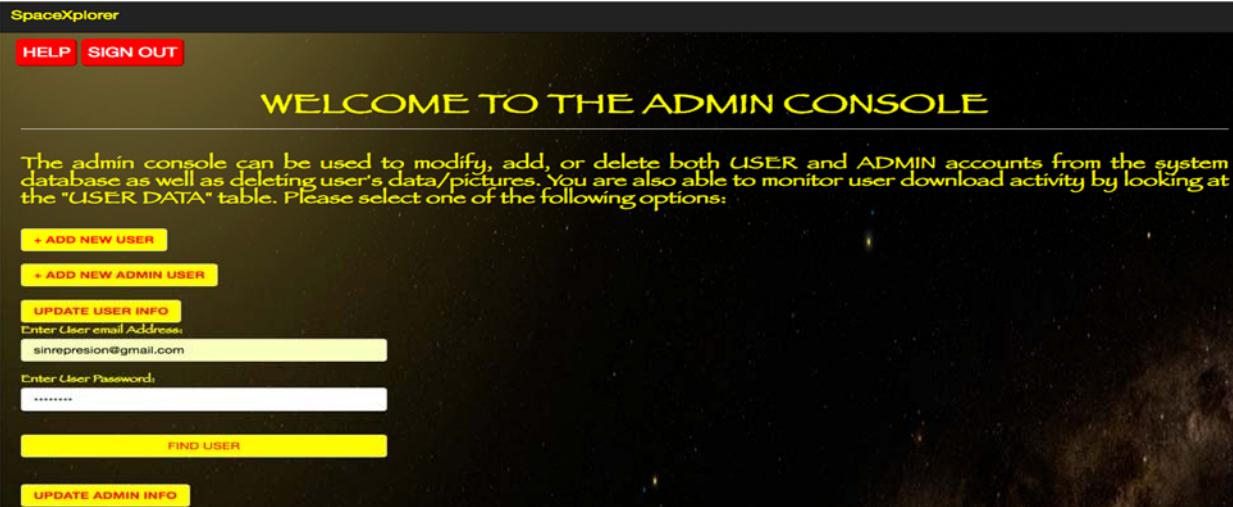
HELP SIGN OUT

WELCOME TO THE ADMIN CONSOLE

The admin console can be used to modify, add, or delete both USER and ADMIN accounts from the system database as well as deleting user's data/pictures. You are also able to monitor user download activity by looking at the "USER DATA" table. Please select one of the following options:

+ ADD NEW USER
+ ADD NEW ADMIN USER
UPDATE USER INFO
Enter User email Address:
 sinrepresion@gmail.com
Enter User Password:

FIND USER
UPDATE ADMIN INFO



If the user is found within the system database, the admin user will be allow to modify the user information and then update it.

SpaceXplorer

HELP SIGN OUT

UPDATE YOUR PERSONAL INFORMATION

Enter the information you want to update into the corresponding fields. Then click on the "UPDATE INFO" button.

Update First Name:
Thomas

Update Last Name:
Sammuels

Update Email Address:
sinrepresion@gmail.com

Update Password:

Update City:
Cabo

Update State:
Aributu

Update Country:
South Africa

UPDATE INFO

Once the info has been updated, you will see a confirmation message along with a table showing the changes you have just made. A user has an option to **GO BACK TO THE ADMIN CONSOLE** and keep working as an administrator.

SpaceXplorer

HELP SIGN OUT

sinrepresion@gmail.com information has been successfully updated!

Data Updated

First Name	Last Name	Email	Password	City	State	Country
Thomas	Roggers	sinrepresion@gmail.com	carlos04	Durban	Manutu	South Africa

GO BACK TO ADMIN CONSOLE

- 3) **Delete User:** This function allows an admin user to delete any user from the system database. You just have to 1) click on **DELETE USER** or **DELETE ADMIN USER**, 2) enter the name and username of the individual you want to delete from the system database, and then 3) click on **DELETE USER**:

SpaceXplorer

HELP SIGN OUT

WELCOME TO THE ADMIN CONSOLE

The admin console can be used to modify, add, or delete both USER and ADMIN accounts from the system database as well as deleting user's data/pictures. You are also able to monitor user download activity by looking at the "USER DATA" table. Please select one of the following options:

+ ADD NEW USER
+ ADD NEW ADMIN USER
UPDATE USER INFO
UPDATE ADMIN INFO
- DELETE USER

CAUTION: Please verify before deleting an user. This action is IRREVERSIBLE!

Enter User First Name:
John

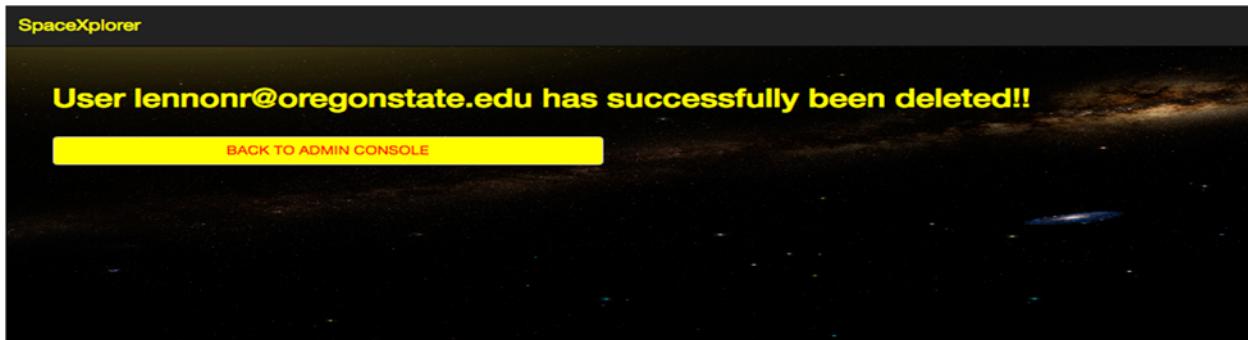
Enter User Last Name:
Lennon

Enter User Email:
lennonr@oregonstate.edu

DELETE USER

- DELETE ADMIN USER

Once you have deleted the user, you will see a confirmation message like this:



It's important to note that any data related to this user will also be deleted from the system. Thus, all the images downloaded by the deleted user will also disappear from the system inventory list.

- 4) Delete User Data: This function allows an admin to delete data from a user account. As mentioned above, the *Admin Console* shows all the images downloaded by system user, as shown below:

User First Name	User Last Name	Username	Picture Name	Picture Link
Sara	Smith	sarasmith@gmail.com	Mars	http://media.salon.com/2015/09/mars-614x412.jpg
Sara	Smith	sarasmith@gmail.com	Jupiter	https://www.nasa.gov/sites/default/files/jupiter_1_0.jpg
Sara	Smith	sarasmith@gmail.com	Saturn	https://nssdc.gsfc.nasa.gov/planetary/image/saturn.jpg
David	Atkins	davidatkins@hotmail.com	Mars	http://media.salon.com/2015/09/mars-614x412.jpg
Lauren	Jensen	laurenjensen@yahoo.es	Moon	https://www.nasa.gov/sites/default/files-thumbnails/image/christmas2015fullmoon.jpg
Carlos	Carrillo	cacarrillo@hotmail.com	Mars	http://media.salon.com/2015/09/mars-614x412.jpg
Donald	Sanders	sanders@gmail.com	Jupiter	https://www.nasa.gov/sites/default/files/jupiter_1_0.jpg
Vicente	Fernandez	vicente58@yahoo.com	Pluto	http://nineplanets.org/nh-charon-neutral-bright-release.jpg
Lorena	Gutierrez	morenita21@gmail.com	Neptune	http://www.crystalinks.com/neptune-rings.jpg
Tanner	England	englander@yahoo.uk	Moon	https://www.nasa.gov/sites/default/files-thumbnails/image/christmas2015fullmoon.jpg
Katie	Thompson	kaufmarr@oregonstate.edu	Moon	https://www.nasa.gov/sites/default/files-thumbnails/image/christmas2015fullmoon.jpg
Katie	Thompson	kaufmarr@oregonstate.edu	Pluto	http://nineplanets.org/nh-charon-neutral-bright-release.jpg
Katie	Thompson	kaufmarr@oregonstate.edu	Neptune	http://www.crystalinks.com/neptune-rings.jpg
Thomas	Roggers	sinrepresion@gmail.com	Jupiter	https://www.nasa.gov/sites/default/files/jupiter_1_0.jpg
Thomas	Roggers	sinrepresion@gmail.com	Neptune	http://www.crystalinks.com/neptune-rings.jpg
Thomas	Roggers	sinrepresion@gmail.com	Pluto	http://nineplanets.org/nh-charon-neutral-bright-release.jpg

To delete data from a particular user is an admin has to click on the **DELETE USER DATA** button, enter the username/email of the system user to be deleted, and then click on the **ACCESS USER DATA** bottom as shown below:

The screenshot shows the "SpaceXplorer" Admin Console. At the top, there are "HELP" and "SIGN OUT" buttons. Below them is a "WELCOME TO THE ADMIN CONSOLE" message. A descriptive text explains the purpose of the console: "The admin console can be used to modify, add, or delete both USER and ADMIN accounts from the system database as well as deleting user's data/pictures. You are also able to monitor user download activity by looking at the 'USER DATA' table. Please select one of the following options:". Below this text are several buttons: "+ ADD NEW USER", "+ ADD NEW ADMIN USER", "UPDATE USER INFO", "UPDATE ADMIN INFO", "- DELETE USER", "- DELETE ADMIN USER", and "- DELETE USER DATA". A text input field labeled "Enter User Email" contains the value "sinrepresion@gmail.com". At the bottom, a large yellow button labeled "ACCESS USER DATA" is visible.

Once you click on **ACCESS USER DATA**, the system verifies if the user exists in the database. If so, you will be directed to the user's **Delete Data Console** in which you will be able to see all the data downloaded by this particular user. Once here, an admin needs to select the ID of the resource/image he/she wants to delete from this user's account and then click on **DELETE PICTURE**:

SpaceXplorer

Username: sinrepresion@gmail.com

HELP SIGN OUT

DELETE USER DATA

Choose the picture you want to delete by entering its ID. Find the pictures owned by this user in the table below.

Enter the ID of the picture to be deleted.

PICTURE ID:

21

DELETE PICTURE

USER DATA

PICTURE ID	USERNAME	PICTURE NAME	LINK
3	sinrepresion@gmail.com	Jupiter	https://www.nasa.gov/sites/default/files/jupiter_1_0.jpg
5	sinrepresion@gmail.com	Neptune	http://www.crystalinks.com/neptune-rings.jpg
19	sinrepresion@gmail.com	Jupiter	https://www.nasa.gov/sites/default/files/jupiter_1_0.jpg
21	sinrepresion@gmail.com	Neptune	http://www.crystalinks.com/neptune-rings.jpg

BACK TO ADMIN CONSOLE

SpaceXplorer

Picture number 21 has successfully been deleted!!

DELETE MORE DATA FROM THIS USER

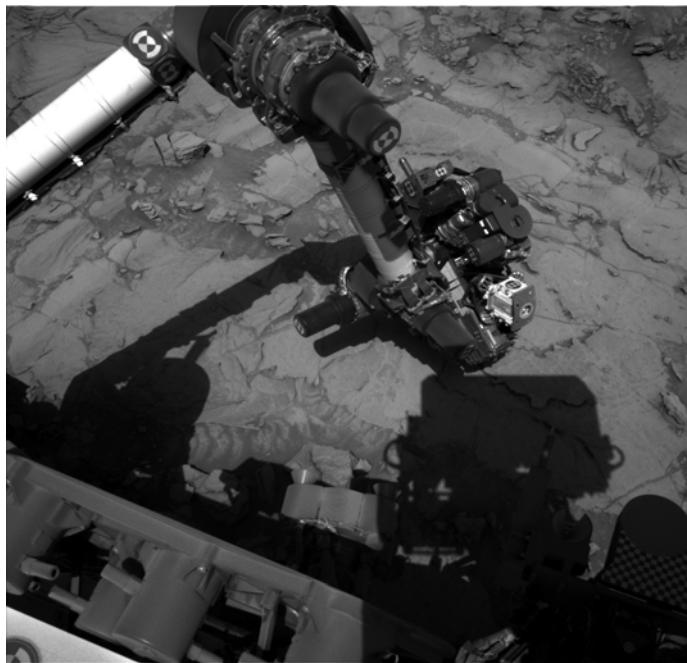
BACK TO ADMIN CONSOLE

NASA Pictures offered by this application:

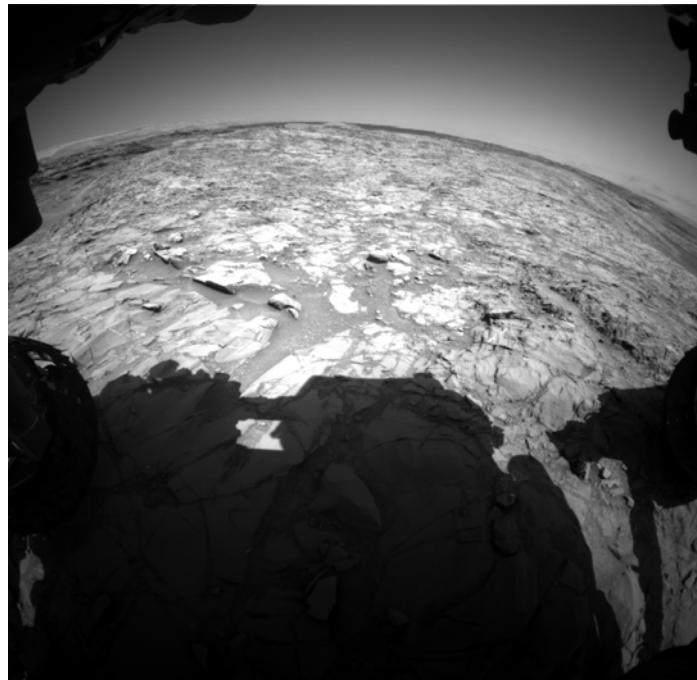
- 1) NASA PICTURE OF THE DAY: This option gives a description of the Nasa Astronomy Picture of the Day as well as the actual image. For instance, NASA choose a picture of Jupiter's moon *Ganymede*, which is larger than even Mercury and Pluto, taken by NASA's Galileo telescope. This is a sample:



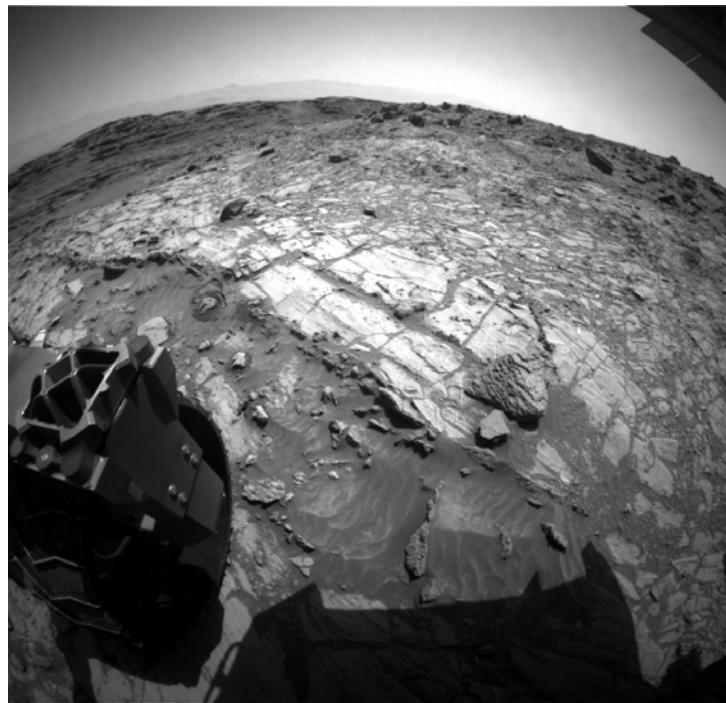
- 2) MARS ROVER NAV CAM: This option allows user to access Navigation Camera image of Mars Curiosity Rover. This is a sample:



- 3) MARS ROVER FRONT CAM: This option allows user to access Front Hazard Camera image of Mars Curiosity Rover. This is a sample:



- 4) MARS ROVER REAR CAM: This option allows user to access Rear Hazard Camera image of Mars Curiosity Rover. This is a sample:



III. Software Systems

Client

To start using our web application all you have to do is to open a web browser and type one of these links: <http://web.engr.oregonstate.edu/~carrilca/CapstoneProject/index.php> or <http://web.engr.oregonstate.edu/~kaufmmar/CapstoneProject/index.php>.

Server

We have hosted our application on the OSU ENGR Unix server which will serve PHP files to a client. The setup is straightforward. The web application file structure is located in public_html folder of the server which makes it accessible via requests sent to ENGR server.

Programming Languages

A combination of several programming languages was used to meet the requirements of the application. NASA Open API have been accessed primarily using JavaScript. JSON object has been parsed to obtain the contents of the response.

PHP has been used as a primary programming language of the server side. It has been used a middle man to pass variables between JavaScript and SQL as well as run SQL queries to store and obtain SQL tables data.

API

To access the imagery of the NASA database we have used two NASA Open APIs. APOD API allows access to Astronomy Picture of the Day which is an image or a photograph of our fascinating universe. This picture is updated on a daily basis.

Mars Rovers API is designed to collect imagery data gathered by NASA's Curiosity, Opportunity and Spirit Rovers on Mars and make it available to developers for further use.

GitHub

GitHub repository has been an excellent tool for our collaboration technique. Although, we had to delete and re-clone local repository a few times and we had some challenges regarding teamwork GitHub eased our efforts greatly.

SQL

SQL has been a primary tool for backing our web application with the database. SQL queries were run inside of PHP code to store or retrieve data saved in the database.

Other tools

HTML, CSS and DOM structure have been used to organize the contents of the PHP files.

JQUERY has been used to pass data to an external application.
OSU ENGR server email extension was used for email functionality.

IV. Teammate Contributions

Marina Kaufman

- Produced HTML, CSS and DOM structure for PHP pages and obtained resources (images, fonts) for the pages.
- Researched on NASA Open API documents, obtained NASA Open API key and created JavaScript files that are responsible for making API requests and parsing the body of the response for each of the four buttons.
- Researched on the date range of available images stored in NASA database. Therefore, each button can generate random new picture every time user presses that button.
- Dynamically allocated DOM elements to use the URL and description of the response body as its attributes.
- Converted dynamically allocated URLs to PHP variables and saved them into SQL database for later manipulation of the URL field.
- Used JQuery to provide Facebook share functionality of the stored imagery by users.

Carlos Carrillo-Calderon

- Produced database scheme and table for both user and admin pages and created definition.sql file.
- SQL Database creation on OSU ENGR server.
- Provided logging in and signing up functionalities for both user and admin.
- Provide admin console functionality to manipulate admin and user data.
- Created PHP code responsible for updating, viewing and storing data in SQL Database.
- Provided code to save PHP variables from dynamically allocated URLs to SQL database for later usage.
- Used OSU ENGR server email to provide email share functionality of the stored imagery by users.

V. Deviations from Original Plan

By examining the proposed project plan it is clear that the team has been able to meet all of the client's requirements for the web application. It is worth mentioning that there were some deviations in implementation of certain functionalities of the application from those planned originally.

The deviations were primarily caused by the fact that there is always more than one way to implement the same functionality and as the project was becoming more complex we have learned that a particular implementation benefits the project as whole in a long run. Therefore, we had to pick and choose the best approach.

Initially, we were planning to set up a server using EC2 instance on the Amazon Web Services. We have set up the server using Node JS but unfortunately the free version did not allow us to use PHP files structure as we had to purchase additional SDK and Relational Database Services from Amazon. After discussing the issue we have decided to use the OSU ENGR web server.

The initial application structure has stated that the webpage owner/owners would grant an administrator access to an individual by providing a private access code to him/her. We have reconsidered using the access code as it can be easily shared and would cause security risks for the application. We have changed the application structure in a way that the existing administrators can grant an administrative rights to a new administrator by adding his/her credentials to admin database in the admin console.

VI. Conclusion

In conclusion we want to mention that working on this application has been challenging but rewarding experience. We both loved the idea and goals of the application which served as a great basis for motivation and strive to perfection. As a result, we got very engaged into the development process.

As the application has been progressing we have started to realize that many things were not as easy as they seemed to be in the first place. Sometimes, processes that made perfect sense logically did not produce expected results. Eventually we would learn that there are many ways to implement a single aspect and a decision on how to implement that aspect would have to be made with the long term perspective in mind.

Since the application is complex and makes use of multiple technologies, keeping big picture in mind and provide communication among those technologies was essential part of the project. One of the biggest challenges was to ensure that we are able to pass variables among different programming languages or different views of the application. This is where creativity had to come into place and things that seemed to be impossible did work in the end!

We also have to mention that team working has been a big part of this project. Although not without its challenges and difficulties at times we have learned that working together provides great rewards. In the end we have created the product that we both love.

Welcome to SpaceXplorer! We hope you will enjoy your cosmic journey on the board of our application from the comfort of your home!

VII. References

- [1] <http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/get-set-up-for-amazon-ec2.html>
- [2] <http://stackoverflow.com/questions/6084360/using-node-js-as-a-simple-web-server>
- [3] <https://nodejs.org/api/synopsis.html>
- [4] <https://www.w3schools.com/html/>
- [5] <https://www.w3schools.com/css/default.asp>
- [6] <https://www.w3schools.com/js/default.asp>
- [7] <https://www.w3schools.com/sql/default.asp>
- [8] <https://api.nasa.gov/index.html#getting-started>
- [9] <https://developers.facebook.com/docs/plugins/share-button>
- [10] <http://www.sharelinkgenerator.com/>
- [11] <https://developers.facebook.com/>
- [12] <https://stackoverflow.com/questions/21215676/facebook-share-button-for-dynamic-url>
- [13] <https://stackoverflow.com/questions/34082002/html-button-opening-link-in-new-tab>
- [14] <https://stackoverflow.com/questions/8191124/send-javascript-variable-to-php-variable>
- [15] <https://stackoverflow.com/questions/4772774/how-do-i-create-a-link-using-javascript>
- [16] <https://stackoverflow.com/questions/23740548/how-to-pass-variables-and-data-from-php-to-javascript>
- [17] https://www.w3schools.com/php/func_mail_mail.asp