Documentation

[VERSION 1.0] AIRPACT-Fire platforms covered: Website, Android, and iOS.

Hi, there! Here's a little documentation about our project. If you have questions which are not answered here, please send an email to one of us (you can find our contact info in the **Developer** tab).

1. Tutorials

1.1. Managing Profile

1.1.1. Logging In

If you don't already have an account, you're going to want to register for one [here](#).

Now, we're going to assume you've already got an account. If you're not logged in yet, go to the navigation bar at the top of the page (see Figure 5) and click *Login* on the right — this will bring you to a page where you will need to login with your credentials. The page you see should be the same as in Figure 6.

Figure 5. Navigation bar on home page.
Figure 6. Login page.

As soon as you login, you'll be brought to your profile page, as you can see in Figure 7.

Figure 7. Profile page.

1.1.2. Edit Profile Information

Once you're looking at your profile page (Figure 7), click the *Edit* button at the top of the content area, directly underneath your *Bio*. That'll bring you to the page where you can edit your profile (Figure 8). Go ahead and edit any of these fields, and once you are done don't forget to click *Submit* at the bottom!

Figure 8. Edit profile page.

1.1.3. Managing Pictures

At your profile page (Figure 7), there will be a link labelled *Manage Pictures* right above your personal image gallery. Click that.

Here's is the control panel (Figure 9) of all the pictures you've taken. Currently, we only support deleting images, so you can click *Delete* on any image you'd like. We recommend only excersizing this functionality when necessary, because we are primarily interested in collecting your data!

Figure 9. Manage pictures control-panel.

1.2. Uploading an Image

1.2.1. Website [[video](#)]

Before you do anything, you need to log into your account. Please follow Section 1.1.1 for how to log on to the site.

There will be a navigation menu on the left of the main page content, as seen in Figure 7. Click on *Upload*, and you will be directed to a page that looks like Figure 8.

Figure 8. Navigation menu. Figure 9. Image upload page.

Note: Your site Administrator must certify your account in order for you to upload an image on the website. Please contact this person if you are brought to a page saying that your account is not certified.

Obviously, first thing you need to do is upload an image. It's a good idea to visit Section 3.1. to see what types of images we support! Once you've uploaded a good image, you'll see something like in Figure 9.

Figure 10. Uploaded image.

But, you're not done yet! You must place the near and far targets on your image. What you must do here is place the *Near Object* on a solid natural object, such as a mountain; then, you must place the *Far Object* on a point in the sky, which is hopefully a light blue color (take a look at Figure 10).

Figure 11. Targets correctly placed on uploaded image.

Great! now you must add the estimated *Visual Range* in the image, which we'll use to compare with our computation. Next, enter the distance to the *Near Target* (we're assuming you're good at this).

Note: Currently, all distances on the site are in kilometers.

Now enter the *Location* of the image, but first please read Section 3.2 on how to give a nice, descriptive location tag. After that you have the option of adding a simple description about image, but you should only do this if there is some information which is missing from the picture itself that would be useful for researchers to know.

Voila! Your image has just been uploaded and you can now view it in the gallery.

1.2.2. Android [video]

First off, make sure you download and install the latest AIRPACT-Fire Android app here. Once you've done that, you're ready to get started!

Go ahead and open your app up. It should look something like in Figure 1.

Figure 1. App in Android home screen.

Once clicked, it may take a little bit to open up the login page (until then, you may just be staring at a blank white screen for about 10 seconds). The login page will appear (Figure 2) and you will then see the available *Username* and *Password* fields. You will need to be registered as a user, and that can be done either on the app (by hitting *Register here*) or through the website here. If you area have trouble registering, please contact your Administrator.

Note: An internet connection is required the first time you login to app. After that point, you are free to use the app locally (for that particular username and password).

Figure 2. Login screen.

Okay, so you've logged in. Cool! Now you have access to all the app's functionality. Since we're trying to get you to submit a picture, go ahead and click the *Capture* button on the top-left of the home screen.

Following the previous step will open up your default camera app. Take a picture of the landscape or scene of interest and press the confirmation button. Please see Section 3.1 for our standard on what images should contain.

You will now see the *Select Targets* page. Here you will do the following:

a. *Algorithm* — Select desired visual range algorithm to run on the image.
b. *Select* — Place your *Low* and *High* targets, with the *Low* target being the one placed on the low-contrast point (e.g. a mountain, tree, etc.), and the *High* target being placed at a point dependent on the algorithm you picked. Right now, we have two options:
   ○ *Near-Far*: The *High* target would be placed on a similar low-contrast point, further from the object upon which the *Low* target was placed.
   ○ *Near-Sky*: The *High* target would be placed on a point on the sky almost directly above the low-contrast point.
   Once you've got both your targets placed, now comes the tricky part. You must now estimate the distance of the object under your *Low* target. We're assuming you're an expert user (e.g. forest ranger), so this should be pretty easy for you. You have your choice of distance units, miles or kilometers.
c. *Submit* — Alright, so you've got the main stuff done. Now, we just need you to enter a custom *Location* tag to this particular image. A good example would be "mount baker" if you are at Mount Baker, or "palouse hills" if you're staring at the Palouse hills. This will be used to group with other images of both a similar view and location, so do keep this in mind. Once you've added your location tag, you can add an optional description about any additional information that would be of use to either you or your fellow users or data analyst researchers.

Depending on your internet connectivity, you can either locally *Queue* the image, which allows you to submit the image later in your local post gallery; or, you could *Submit* the image, which will attempt to push the image (along with the accompanying data you've provided) to the website. You'll see a message indicating the success or failure of your submission. If it's successful, you can visit the image in website's gallery. Otherwise, it'll just be queued locally. From there, you can attempt to submit a later time.

There you go! If all went well, you've just successfully submitted your image to the website.

1.2.3. iOS

Our iOS app is currently under development. Stay tuned for the alpha build!

1.3. Search Gallery

Once on the site, make sure you head over to the gallery, which you can also find on the navigation menu as *Gallery*. Either way, you will arrive at a page which looks like Figure 12.

Figure 12. Gallery page.

Either you can simply browse the gallery manually, moving through the many pages through the page navigation controls at the bottom, or you can search through specific types of images using the search tools at the top (Figure 13). Note that you first must click the button labelled *Show Search Options*.

Figure 13. Gallery search tools.

Here are the fields that can be used when filtering through image posts:

1. Visual range.

2. Location — this is a user-defined location tag. like "mount-baker."
3. Beginning date.
4. End date.

These search fields can be used exclusively or in conjunction, and furthermore, you can sort posts (ascending or descending) by either time or visual range.

To conduct your search, all you need to do is hit the *Search* button. Your results should should up within a second or two.

1.4. View Image Data

Head over to the website's gallery page. Then select any single image of interest; if you want specific search tools for finding that image, refer to Section 1.3.

Once you've got your image, just click it and you will arrive at a page that looks just like Figure 14.

Figure 14. Image details page.

1.5. Post Image from Queue (Android)

Make sure you're at the home screen of the app (Figure 3). From the home screen, hit the *Gallery* button and you will be brought to a page like Figure 15.

Figure 15. Gallery screen.

Okay, so you can see all your posts here (if you don't, you probably haven't posted anything). Now you need to find your queued post in the gallery, which will be indicated by a yellow/orange bar directly above the image. Once you've found the image, click it and you'll be brought to a page like Figure 16.

Figure 16. Post details page.

Now, all you've got to do is hit the *Submit* button and practice patience as you await a response from the server. If it's successful, then you'll see a message at the bottom of your screen indicating so. Otherwise, this message will indicate a failure. If it doesn't work, make sure you've got a good internet connection and try again. (If you're continuing to see erros, contact you website's Administrator. They'll be able to see more clearly what's going on.)

Sweet! If all the preceding steps went well for you, then the image should be successfully removed from your phone's local image gallery.

2. API

For the API documentation, please download this PDF.

3. Standards

3.1. Images

Here are some things that really help us out as we try to process and analyze the images you submit. Please keep the following things in mind when capturing an image:

- Capture your images in daylight. Our algorithms are not suited for nighttime lighting conditions.

- We do not currently support landscape photos. Please keep your phone completely vertical (portrait mode) when capturing an image.
- Avoid facing the sun. If this cannot be avoided, try and find a positioning of the phone in which the image will contain no "glare."
- We recommend taking a picture of natural landscapes (like mountains, hillsides, forests, etc.) with about 10-20% of the picture containing open sky (clouds are okay). See Figure 4 for an example of the type of images we're looking for.

Figure 4. Camera app on landscape scene.

3.2. Location

How you specify the location on each of your uploaded image matters quite a bit. We use this word or phrase to help us group your image with other similar images of the same scene (but perhaps at different date in times). Doing this right helps us see trends in (our computed) visual range, which helps indirectly measure the changes in air quality over time.

When giving a location tag, take into account the following:

- Your absolute position.
- The direction you're facing.

Here are some examples of good location tags:

- mount-baker-front
- mount-ranier-forest
- palouse-hills
- moscow-mountain-back

4. Algorithms

4.1. Near-Sky

The Near-Sky algorithm is currently under development.

4.2. Near-Far

TODO

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