Team HomeAide

User Manual

Version 1.0

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Project Sponsors: Kelly Roberts, PH. D and Jill Pleasant, MA

Team Faculty Mentor: Fabio Santos

Team members: Seth Borkovec, Ethan Donnelly, Courtney Richmond, Noah Baxter

Table of Contents

I. Introduction

We are pleased that you have chosen AT@Home for your professional needs. AT@Home is a modest system that will allow you to connect users with assistive technologies. AT@Home can be broken down into two major components: a website and a mobile application. The website, that will be used by administrators, hosts the database that contains the information to be shared to users. The mobile application, that will be used by the end users, is the interface in which users can learn about AT devices that are best fit for their needs.

Some of the key features for the website include:

- Ability to add, edit, or remove AT devices in the database.
- Input local state resources (such as disability resources or organization that also assist with AT).
- Manage and update the terms of service contract that users must agree to when using the application.
- Send and review surveys to users.

Some of the key features of the mobile application include:

- Recommending AT devices to users.
- Allow users to create suggestions about AT devices to be added into the database.
- Connects users with the local state resources.
- Allows users to navigate a virtual home and identify trouble areas or their limitations.

The purpose of this manual is to help you install, administer, and maintain AT@Home for all future use. First, we will go over the installation. Then we will cover the configuration and daily operation. Next is the maintenance. Lastly, we give some tips for troubleshooting.

II.   Installation

In this section, we will guide you through the installation of the website and the mobile application for AT@Home. As part of the final delivery, the website has already been installed on the Microsoft Azure cloud servers, and an APK of the mobile app has been provided. However, over time, you may want to reinstall the website to another server. We also go through the steps involved to install the APK on an Android mobile device. We will start by describing the steps to install the APK on an Android device and then move on to the more complicated installation of the website. The section following this one will discuss the configuration and daily operation.

A. Mobile Application APK Install

An APK file has been provided for you with the delivery of the source code and documentation of this project. An APK file is an Android package used to distribute a mobile application built for Android. This section will instruct you on how to install the APK on an Android device.

1. Allow Unknown Apps on Android devices

    a. Go to Menu > Settings > Security > then check *Unknown Sources* which will allow the phone to install applications from sources that aren't the Google Play Store

2. Download the APK file onto your computer.

3. Connect your phone to the computer and connect as a Media Device.

4. Locate the phone's folder on your computer which should be under This PC.

5. Copy the APK file into any folder of your choosing in your Android device.

6. Search for the file location in the Android device located in the My Files folder.

7. Locate the APK file and then tap it to install the application on to your device.

B. Website Installation on Ubuntu Linux

The website is built in the Django framework, and hosted on an Ubuntu Linux server using Apache2. The database is built in SQLite3 and is included with Django.

Note about accessing the server: To install the AT@Home website on the Linux server on Azure, you will need access to SSH. SSH is included on Linux and Mac but needs to be installed on Windows. Once you have SSH, you can access the server from the command line using this login:

```
$ ssh stb224@52.151.14.66
```

The password for this account is "AqnH7nBpGXsnCSF"

Note about installing on Azure: Some Ubuntu Linux servers offered on Azure come with Ubuntu 16.04 installed. This project requires at least Python 3.6 which is not typically installed on Ubuntu 16.04. The best solution is to first upgrade to at least Ubuntu 18.04 using these commands in the terminal on the server:

```
$ sudo apt update
$ sudo apt upgrade
$ sudo do-release-upgrade
```

1. Install the AT@Home website project files

   a. Copy the AT-Home-Website source code to the server using your preferred method (SCP is recommended)

   b. Move the files to the `/var/www/` directory on the server.
      The server directory structure should look like this:
      ```
      /var/www/AT-Home-Website/
      /var/www/AT-Home-Website/www
      /var/www/AT-Home-Website/www/db.sqlite3
      /var/www/AT-Home-Website/www/www/wsgi.py
      /var/www/AT-Home-Website/venv
      /var/www/AT-Home-Website/README.md
      ```

2. Apache2

    a. Install the two packages, apache2 and apache2-dev:

```
$ sudo apt install apache2
$ sudo apt install apache2-dev
```

    b. Stop the Apache2 service:

```
$ sudo service apache2 stop
```

    c. Create the virtual host conf file:

```
$ sudo nano /etc/apache2/sites-available/at-home.conf
```

    d. Enter the following into the virtual host conf file created above:

```
<VirtualHost *:80>
    ServerAdmin webmaster@localhost
    <Directory /var/www/AT-Home-Website/www>
        <Files wsgi.py>
            Require all granted
        </Files>
    </Directory>

    # The next 3 lines are actually on 1 line
    WSGIDaemonProcess www
python-home=/var/www/AT-Home-Website/venv
python-path=/var/www/AT-Home-Website/www

    WSGIProcessGroup www
    WSGIScriptAlias / /var/www/AT-Home-Website/www/www/wsgi.py
</VirtualHost>
```

    e. Enable the AT@Home site (this command is one line):

```
$ cd /etc/apache2/sites-available
/etc/apache2/sites-available$ sudo a2ensite at-home.conf
```

    f. Disable the default site:

```
/etc/apache2/sites-available$ sudo a2dissite 000-default.conf
```

3. Django

    a.   Install pip for Python3:

```
$ sudo apt install python3-pip
```

    b.   Activate the Python virtual environment included with AT@Home:

```
$ cd /var/www/AT-Home-Website
$ source /var/www/AT-Home-Website/venv/bin/activate
```

    c.   Install Django version 3.1.3:

```
(venv)$ python3 -m pip install Django==3.1.3
```

    d.   Install the required Python3 packages for AT@Home:

```
(venv)$ python3 -m pip install django-crontab
(venv)$ python3 -m pip install django-dbbackup
```

4. WSGI

    a.   Install Python headers:

```
$ sudo apt install python-dev
```

    b.   Install mod_wsgi:

```
$ sudo apt install libapache2-mod-wsgi-py3
```

    c.   Enable mod_wsgi in Apache2 (this command is one line):

```
$ cd /etc/apache2/mods-available
/etc/apache2/mods-available$ sudo a2enmod wsgi
```

5. Final Steps

    a.   Add the database backup process to the CRONTAB:

```
(venv)$ cd /var/www/AT-Home-Website/www
(venv)$ python3 manage.py crontab add
```

b. Set permissions for Apache2:

```
$ chmod 664 /var/www/AT-Home-Website/www/db.sqlite3
$ sudo chmod 777 /var/www/AT-Home-Website
$ sudo chown www-data /var/www/AT-Home-Website/www/db.sqlite3
$ sudo chown www-data /var/www/AT-Home-Website/www
```

c. Start Apache2:

```
$ sudo service apache2 start
```

III.   Configuration and Daily Operation

This section will provide you with instructions on how to use the AT@Home system. Since there are two parts including a mobile application and website, we will cover both starting with the website. In the section following this one, we will cover how to perform maintenance.

A. Website Operation

All of the operations in the website require the admin to be logged in. The main account to use for logging in and creating new accounts is:

username: **admin@at-home.com**
password: **AqnH7nBpGXsnCSF**

New accounts should be created for each user while this admin account should only be used initially. The following operations will assume that the admin is logged in.

Home

AT Inventory

Advice and Tips Inventory

Rooms

Room Areas/Objects

Define Limitations

Messages and Surveys

View User Suggestions

Manage State Resources

Other Configuration

Admin User Management

Figure 1. Website navigation

a. Creating Admin Accounts

From the navigation menu (Figure 1), select "Admin User Management." Click on "New User." Provide an email address, a password, confirm the password, and click "Create." The login information is NOT emailed to the user so be sure to copy it somewhere safe.

An admin can change their password by selecting "Change Password" that appears when placing the mouse cursor over the user's username in the top right corner of the screen. The admin must provide their old password to complete the change.

b. Creating and Managing Rooms

From the navigation menu (Figure 1), select "Rooms."

To create a new room, click the button, "New Room" at the top. A name is required, and you may also upload an icon to use for that room. After you have finished, click "Save" at the bottom.

To edit a room, click the "Edit" button in the row of the room you want to edit. You can change the name or the icon, and click "Save" to finish.

To delete a room, click the "Delete" button in the row of the room you want to delete. A confirmation message will make sure that you do not accidentally delete a room.

To change the room ordering as it will be displayed in the mobile app, select the "Edit Room Order" button at the top. You can click and drag a room to the position you want it to appear in and release the mouse button to drop it into place. When you are finished, be sure to save it by clicking the "Save" button at the top.

c. Creating and Managing Room Areas/Objects

Select "Room Areas/Objects" from the navigation menu (Figure 1). From here, you can select a room to manage the areas/objects for, or display all the areas/objects by clicking the "Show All Areas/Objects" button at the top.

To create a new room area/object, click on the "Create New Area/Object" button at the top. Give the area/object a name, select the room(s) it will be associated with, and optionally upload an icon to represent that area/object. Finally, click "Save."

To edit a room area/object, click the "Edit" button in the row of the area/object you wish to edit. You can change the name, the room associations, and the icon, and then click "Save" to save the changes.

To delete a room area/object, click the "Delete" button in the row of the area/object you wish to delete. A confirmation message will make sure you do not accidentally delete that area/object.

To change the room ordering as it will be displayed in the mobile app, select the "Edit Area/Object Order" button at the top when viewing a specific room. Note that this button cannot be clicked if you are currently viewing all areas/objects. You can click and drag a room area/object to the position you want it to appear in and release the mouse button to drop it into place. When you are finished, be sure to save it by clicking the "Save" button at the top.

d. Defining Limitations

Select "Define Limitations" from the navigation menu (Figure 1).

To create a new limitation that will be available to the app users, click the "New Limitation" button at the top. Enter in a descriptive name for the limitation and provide the details in case the user needs more information to understand if the limitation applies to them. Click "Save" to save the limitation.

To edit a limitation, click the "Edit" button in the row of the limitation you wish to edit. You can change the name and the description, and then click "Save" to save the changes.

To delete a room limitation, click the "Delete" button in the row of the limitation you wish to delete. A confirmation message will make sure you do not accidentally delete that limitation.

e. Creating and Managing the AT Inventory

To create an AT device in the inventory, you should first make sure that the room or room area/object you want to associate it with has already been created. If it has not, follow the appropriate steps as described above in steps (b.) and (c.).

To create a new entry for an AT device, click the button "New AT Device" at the top. Only the name field is required here, but the device will not show in the user's recommendations unless it is associated with a room or room area/object. You can provide as much or as little information as you want. You can choose to associate the AT device with a limitation to help provide better recommendations

to the app user. The AT device will always show up in the app for the room or room area/object regardless of having a limitation associated with it or not.

To edit an AT device, click on it in the table. You can view the information provided on this screen, but click "Edit" at the top to change the information. After making changes, click the "Save" button at the bottom.

To delete an AT device, click on it in the table. Click the "Delete" button at the top and a confirmation message will make sure you want to delete it.

To search the inventory, you can provide keywords in the search bar above the AT inventory table, or in the home page. Click search to view the results. You can also perform an advanced search by selecting "Advanced Search" next to the search bar. You can specify keywords in specific categories, and optionally exclude keywords as well.

f. Messages and Surveys

Select "Messages and Surveys" from the navigation menu (Figure 1).

To create a new message or survey, click the "Create New" button at the top. The content field is required for both. To send a message without a survey link, you can keep the Survey url field empty. Click "Save" when finished.

To edit a message or survey, click the "Edit" button in the row for the message or survey you want to edit. Make changes and click "Save." Any changes here will be reflected in the user's app immediately.

To delete a message or survey, click the "Delete" button in the row you want to delete. A confirmation message will make sure you do not accidentally delete it.

g. Managing User Suggestions

Select "View User Suggestions" from the navigation menu (Figure 1).

To mark a suggestion as "read" click the button for "Read." If you wish to mark a suggestion as unread, you will need to uncheck the "Reviewed" checkbox when editing the suggestion.

To edit the suggestion, click the "Edit" button next to the suggestion you want to edit. You may wish to do this to provide more information for your own reference, but the app user will not see the suggestion after having sent it. You can also set a suggestion as read or unread, or as accepted to track for your own records.

If you wish to delete a suggestion, click the "Delete" button for that suggestion and a confirmation message will make sure you want to delete it.

h. Managing State Resources

Select "Manage State Resources" from the navigation menu (Figure 1).

To add a new state resource, click the "New State Resource" button at the top. The only fields required are the state and the title. The other fields are optional but help the user to connect with their local resources. Click "Save" at the bottom when finished.

To edit a state resource, click "Edit" for the row you wish to edit. Make changes to the resource information and click "Save" to save the changes.

To delete a state resource, click "Delete" for the resource you wish to delete. A confirmation message will make sure you do not accidentally delete it.

i. Other Configuration

Here you can manage miscellaneous configurations such as custom wording in the app, custom categories for the AT, and change the levels for prices of the AT.

Select "Other Configuration" from the navigation menu (Figure 1).

To edit the Terms of Service, make changes to the wording. You can drag the text box to be bigger for more convenience. When finished, click the "Save Terms of Service" button, and the date will be automatically updated for you.

The "Grant Information" section is the information shown on the resources screen in the mobile app when the user selects their state. To edit the Grant Information, make changes to the wording. You can drag the text box to be bigger for more convenience. When finished, click the "Save Grant Information" button, and the date will be automatically updated for you.

The "Email Text Content for Sharing Recommendations" section is the wording for the auto-generated email in the mobile app when the user wants to share their recommendations by email. The "Email Subject" controls the text for the email subject line. The "Email Greeting and Explanation" is the message body before

the user's limitations and recommendations are listed in the email. The "Email Closing" field is in the email message after the user's limitations and recommendations have been listed. Any of these may be left empty if you wish. You can drag the text box for the "Email Greeting and Explanation" to be bigger for more convenience. When finished, click the "Save Email Text" button.

The "Webpage Text Content for Sharing Recommendations" section is similar to the email section, but for the web page created when the user chooses to share their recommendations via a web page. This text comes before the user's list of limitations and recommendations. When finished, click the "Save Webpage Text" button.

The "Manage Extra Categories for the AT Inventory" section is used to add or remove the custom categories you may want to display with the regular AT categories. When you add more categories, these also appear in the advanced search. You can also set them to be visible to the user in the mobile app as well. To add another category, click the "Add Another Category" button. Give the category a name, choose if it is visible in the app, and save it. You can also edit or delete the extra categories as needed by clicking the appropriate button for that category.

The "Manage Relative Prices for AT" section controls the levels of relative prices, along with the wording for each level. You can add a new level by clicking the "New Relative Price" button. Select the price level as a number and give it a name. The number must be unique, so it cannot duplicate an existing price level. You can edit or delete a price level using the appropriate buttons. These descriptions also change the wording that the app user sees when viewing the AT details.

B. Mobile Application Operation

a. Registering an Account

The first step to using the app is to create an account. When the app first loads, the user is presented with a login screen. At the bottom is a link to register which switches to a screen for creating an account. The user must input values for all of the username, password, age range, and state. The password must be a minimum of 8 characters but there are no further rules applied. After clicking the "Register" button, the user is shown the terms of service, which the user must accept to continue and use the app.

b. Editing the Account

To make changes to the user account, access your "Profile" screen by clicking the link in the navigation bar at the bottom (Figure 2).
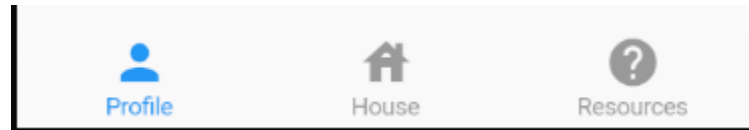

Figure 2. Navigation bar

From the Profile, access "My Account" and then select "Edit My Profile." The information is prefilled with the user's current profile and only the values that are changed here will be updated when the user selects "Save Changes."

c. Deleting the Account

To delete an account, follow the steps above in "Editing the Account" to access the Profile. From there, select "My Account" and then "Delete My Profile." A confirmation message will ask to make sure the user wants to delete their profile. After selecting yes, the profile will be deleted and the app will restart to the login screen.

d. Selecting Limitations

To select the user's general limitations, follow the steps above in "Editing the Account" to access the Profile. From there, select "My Account" and then "Select My General Limitations." A list of limitations will be displayed. A user can check the description of a limitation by clicking on the question mark next to it. To select a limitation, click the checkbox next to that limitation. These are saved in the phone storage and used when getting AT recommendations.

e. Viewing Messages

Navigate back to the Profile using the link in the navigation bar at the bottom (Figure 2). Select "View Messages" and the app will show a list of messages and surveys from the administrators. The user can mark a message as "read" by clicking on it above the link if it contains a link. The user can click on the link to be taken to the web page with the Qualtrics survey. To dismiss a message, swipe a message off to either side of the screen.

f. Navigating the House

To navigate the house, begin by selecting the "House" in the center of the navigation bar at the bottom of the screen (Figure 2). Then you may select any room in the house by clicking on it. This will present another screen with a list of areas and objects inside that room. Select any of these areas/objects to view the recommendations, or go back to the room selection to choose a different room.

g. AT Recommendations, and Advice and Tips

The main point of AT@Home is to provide AT recommendations to the app user. After navigating through the house to a specific room area or object that the user would like assistance with, the app will display a list of AT recommendations by default. Any recommendations that have a star to the left match the user's limitations that they selected in Step "d. Selecting Limitations." To instead view tips and advice, select the "Tips and Advice" tab at the top of the screen (Figure 3).
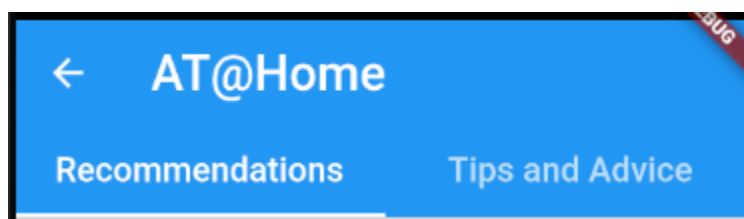

Figure 3. Recommendations, and Tips and Advice

h. Suggesting New AT

While viewing the AT recommendations, the app user may wish to suggest an AT that was not recommended to them. To do this, the app user can select the "Suggest an AT" button located just above the bottom navigation bar (Figure 4).
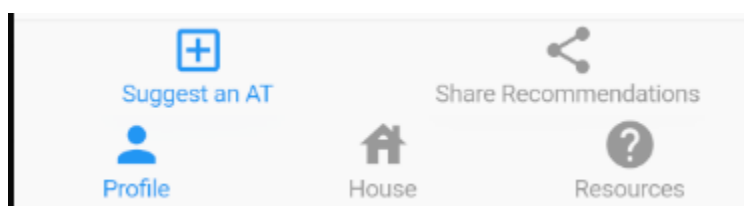

Figure 4. Suggest an AT, and Share Recommendations

A new screen will appear that allows the user to input an AT Device name, comments (optional), and a website link (optional).

i. Sharing Recommendations

An app user may wish to share their recommendations with someone else such as a professional. The AT@Home app allows the user to do this by auto-generating an email or web page for them. To start the process, the user can select "Share Recommendations" from just above the navigation bar at the bottom of the screen where they have received their recommendations (Figure 4). A dialog asks the user if they would like to share their recommendations by email or a web page. If the user selects email, the app will fill in most of the information in the user's email application. The user will still need to enter in the email address for the recipient. If the user selects web page, the app will generate a web page for them and open it in the browser. The user can share the URL for this web page, or print it if they have a printer set up.

j. Viewing State Resources

To help connect users with local state organizations that can give them professional assistance, the app provides a screen to show the resources for a chosen state. The user can select the "Resources" tab in the navigation bar at the bottom of the screen (Figure 2). From here, the app defaults to selecting the user's state that was entered in their profile. The user can choose another state or click "View State" to see the resources. A list of state resources will be displayed to the user, and the user can select one of them to see more information about it.

IV. Maintenance

Having gone over the installation and configuration of the AT@Home project, we will now discuss maintenance. This includes tasks that are expected to be performed periodically to keep the system running smoothly and using backups.

A. Mobile App

The only maintenance required is to update the IP address for the AT@Home website in case it changes. If the IP address changes, the app will not be able to connect to the website.

To update the IP address for the AT@Home website in the mobile app, edit the file `at_home_app/lib/Utils/app_settings.dart` on line #5. Change the IP address for the constant `SERVER_URL` to the new IP address.

Now rebuild the app by running this command in the terminal:

```
$ flutter build apk --release
```

The new APK file with the updated IP address can be found in the `at_home_app/build/app/outputs/apk/release/` directory. Copy this file to your mobile devices and reinstall the app from the new APK.

B. Website

Occasionally, the IP address of the web server may change. This can happen when the server is restarted or when Microsoft Azure updates dynamic IP addresses. When it happens, the IP address needs to be updated in the Django settings file.

To change the IP address of the Django settings file, first access the site via the terminal using SSH as described in the section on installation.

Run this command to edit the settings file:

```
$ nano /var/www/AT-Home-Website/www/www/settings.py
```

On line 32, add the new IP address to the `ALLOWED_HOSTS` list. Then save the file and restart Apache2 with the following command:

```
$ sudo service apache2 reload
```

C. Database Backups

The database has been configured to create backups automatically every Sunday at Midnight, UTC. Up to four weeks (one month) of backups are kept, and can be found in the folder `/var/www/AT-Home-Website/www/cron_backup`.

1. To change the frequency of backups

Remove the existing cron job by connecting via SSH in the terminal, and running the following commands:

```
$ cd /var/www/AT-Home-Website/www
$ source ../venv/bin/activate
(venv)$ python3 manage.py crontab remove
```

Edit the Django settings file by opening the settings.py file in a text editor:

```
(venv)$ nano /var/www/AT-Home-Website/www/www/settings.py
```

Line 52 has the configuration for the frequency of backups using CRONTAB notation. Make changes to the schedule, and save the settings.py file.

Add the new cron job by running the following command:

```
(venv)$ python3 manage.py crontab add
```

2. To change the number of stored backups

Edit the Django settings file by opening it in a text editor:

```
$ nano /var/www/AT-Home-Website/www/www/settings.py
```

On line 76, change `DBBACKUP_CLEANUP_KEEP` to the number of backups you want to store, and save it.

Restart Apache2:

```
$ sudo service apache2 reload
```

3. ## To restore a backup

SSH into the server as described in the installation instructions, navigate to this directory, and activate the virtual environment:

```
$ cd /var/www/AT-Home-Website/www
$ source ../venv/bin/activate
```

List the available backups:

```
(venv)$ python3 manage.py listbackups
```

Choose a backup file to use and enter the following command, replacing the file name with the name of your backup file (without the leading path):

```
(venv)$ python3 manage.py dbrestore -i 2021-04-28.dump
```

Change the group ownership of the database file so that Apache2 can access it:

```
(venv)$ sudo chgrp www-data db.sqlite3
```

Restart Apache2:

```
(venv)$ sudo service apache2 reload
```

V. Troubleshooting

This section will cover some of the known cases in which an issue with the AT@Home system can occur and how to fix it or to at least gain some insight into the problem for further troubleshooting. This is not a comprehensive strategy to cover all situations because it's not possible for us to determine all the possible errors or bugs that may happen. After this section, we will conclude this user manual.

A. Mobile App Cannot Connect To Website

The website as delivered is assigned the numerical IP address of 52.151.14.66 and does not include a user-friendly domain name such as "nau.edu." This is important to remember because the mobile app depends on this specific IP address, and if it were to change, the mobile app will no longer be able to connect. This can happen if the server is restarted either manually or forced by Microsoft Azure, or if the Azure service experiences a problem and the server restarts.

To fix this issue, the IP address that is coded into the mobile app source code needs to be updated to the new IP address of the website. The exact file is located at: `at_home_app/lib/Utils/app_settings.dart` on line #5. Once this IP address is changed here, the APK will need to be rebuilt using this command in the terminal:

```
$ flutter build apk --release
```

If the IP address has changed, you will also need to update this in the Django settings:

```
$ nano /var/www/AT-Home-Website/www/www/settings.py
```

On line 30 of `settings.py`, add the new IP address to the `ALLOWED_HOSTS` list.

B. Server Error 500 on the Website

This error means that Apache2 is working, but there is a configuration problem with Django. This error can happen for a variety of reasons and can include:

- File/directory permissions
  Verify that Apache2 has permissions to access the database, and website directory as explained in the Installation section of this user manul.

- Website IP address changed
  This requires reconfiguring the mobile app as well as Django using the same steps mentioned above in part "A. Mobile App Cannot Connect To Website."

To see the specific error message and determine the problem, there are two ways to check:

- Check the Apache2 error log
  In the server command line, type the following to view the most recent entries in the error log:

  ```
  $ less +F /var/log/apache2/error.log
  ```

- Enable debugging in Django
  To see the actual error given by Django in your browser instead of the 500 error, edit the Django settings file to enable debugging:

  ```
  $ nano /var/www/AT-Home-Website/www/www/settings.py
  ```

  Set `DEBUG = True` on line 28. Try refreshing the page and you should see the debugging information in your browser.

The Django documentation (https://docs.djangoproject.com/en/3.1/) can also aid in troubleshooting errors with the website. The Flutter documentation (https://flutter.dev/docs) may be helpful for problems with the mobile app. Unfortunately, we cannot fully prevent errors from happening, but we hope this section will aid you in resolving them.

VI.   Conclusion

This user manual should have provided you with all the relevant information you will need to use AT@Home, as well as assistance in troubleshooting any potential issue you may run into. Here at team HomeAide, we have been honored to be a part of such an interesting and impactful project. We hope that you will be able to get a lot of use out of the final product and that it helps as many people as possible find the AT devices they need to remain independent. We wish you all the best in using our app to its fullest potential. While we are all moving on after graduation, we would be happy to answer short questions in the coming months to help you get AT@Home deployed and operating optimally in NAU-IHD. Best wishes from your development team: Seth Brokovec, Ethan Donnelly, Courtney Richmond, and Noah Baxter.