Android App for Generating Station

Working of the Present Powerplant App (unchanged)

The installed smart meters read the relevant data and uploads or stores it on a central server in the powerplant. This server and the smart meters are connected on a common network. The meters uploads the data and the server stores it in the form of a JSON file which can be visualised as a simple file containing variables and their values.

The app, presently running on the server then displays the required data. Any calculations that are required (to find out the value of a variable) are performed on the server itself.

The Android app fetches the data through an API hosted on the AWS server. The data is being manipulated in a see-saw manner, i.e, every second the data is being pushed on the AWS server, and at the same moment, it is being pulled by the Retrofit API. Retrofit API helps in fetching the data through the “GET” request.

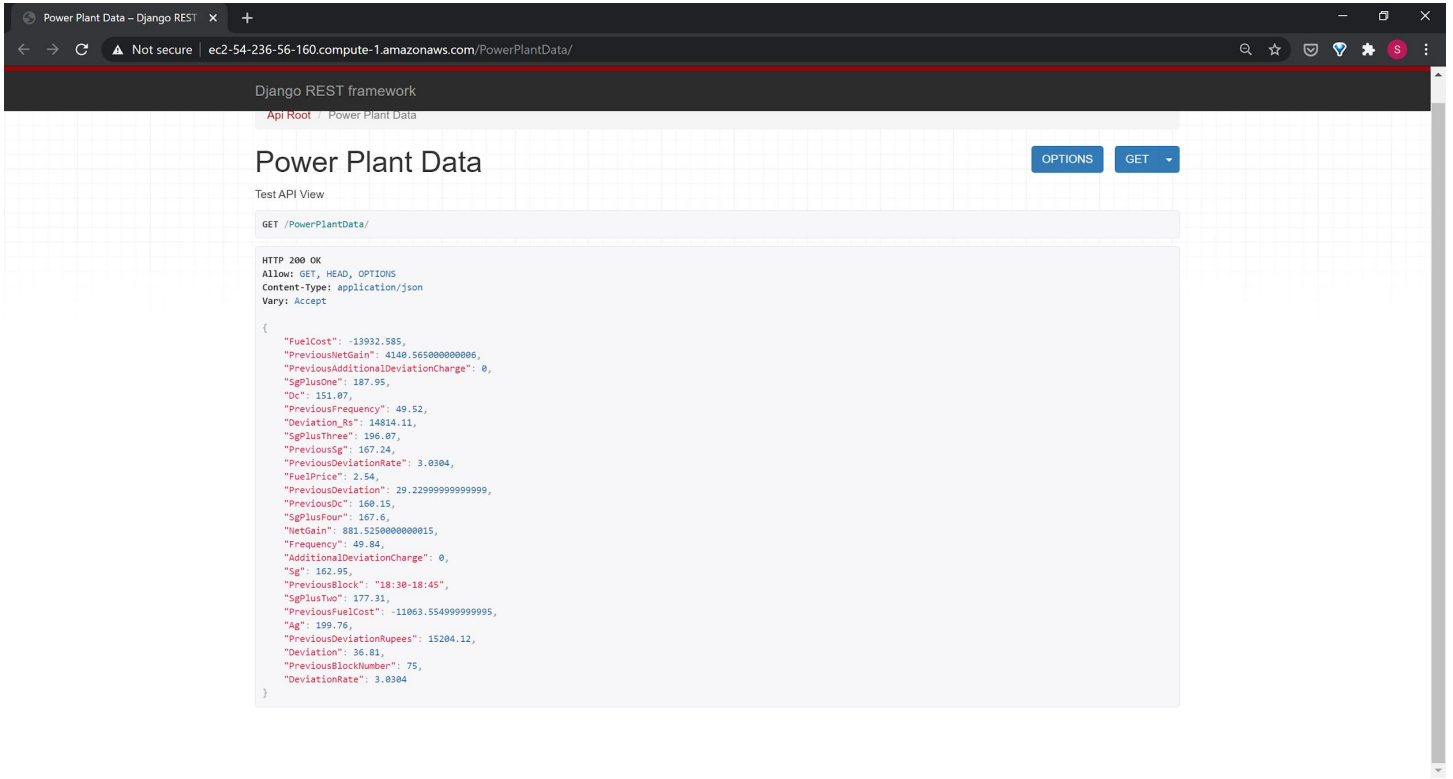
Working of our application (unchanged)

We have managed to replicate the present powerplant system. We've hosted the data on an AWS (Amazon Web Services) server. This data is randomized within the respective ranges and dynamically updated for every time block (15-minute interval) and any required calculations are performed on the server itself. This frees up the resources on the user's device and makes the app faster.

The server is accessed through the app by providing a link. While running the app on the powerplant, this link can be modified to access data from the powerplant's server and the app would function in the same way.

The hosted data is shown in the next slide.

Hosted Data on the Server (unchanged)



Links to access the data (unchanged)

- http://ec2-54-236-56-160.compute-1.amazonaws.com/PowerPlantData/
- http://ec2-54-236-56-160.compute-1.amazonaws.com/TimeData/

Changes Implemented

I. The following parameters (as discussed) have been added:
   a. Previous Block: AG/SG%
   b. Current Block: AG/SG% Number of Continuous +ve Blocks, Number of Continuous -ve Blocks, Number of Sign Violations

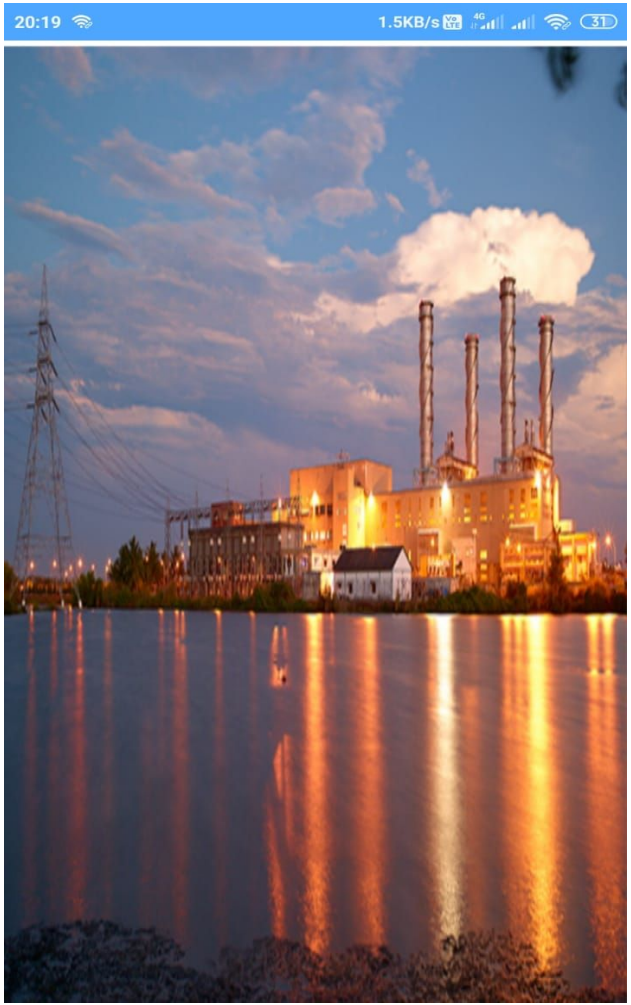
II. The following features have been implemented:
   a. Alarm will be raised if there is sustained deviation of more than 20MW in one direction for 11 blocks.
   b. Graph of AG and SG values against the block number for the current day can be plotted.

Working of the app

The following slides present the working of the app:

Loading Screen

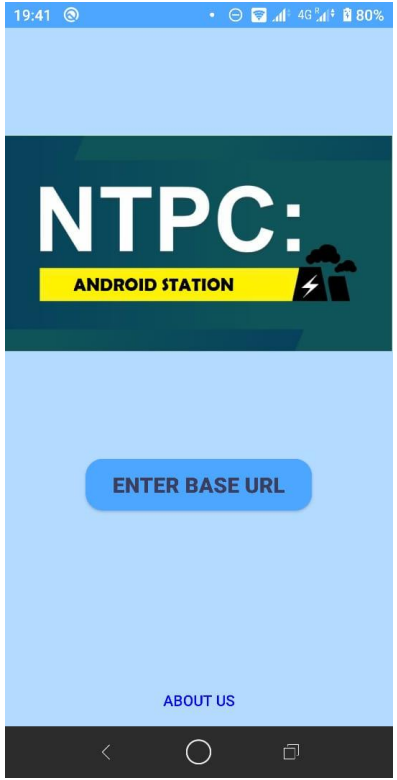
On launching the app, the following loading screen appears. The required data in the app is loaded in the background and the user is then redirected to the menu activity (in the next slide).



Main Menu

This is the main menu layout of the app which gives the user the option to enter the address of the server (where the data is stored).

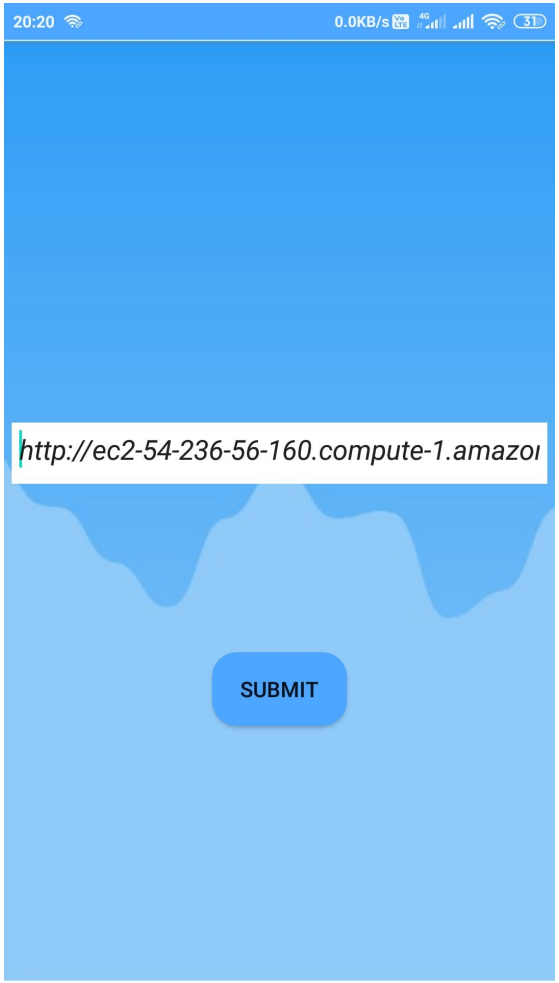
The About Us button shows a brief description of the powerplant.



Enter URL

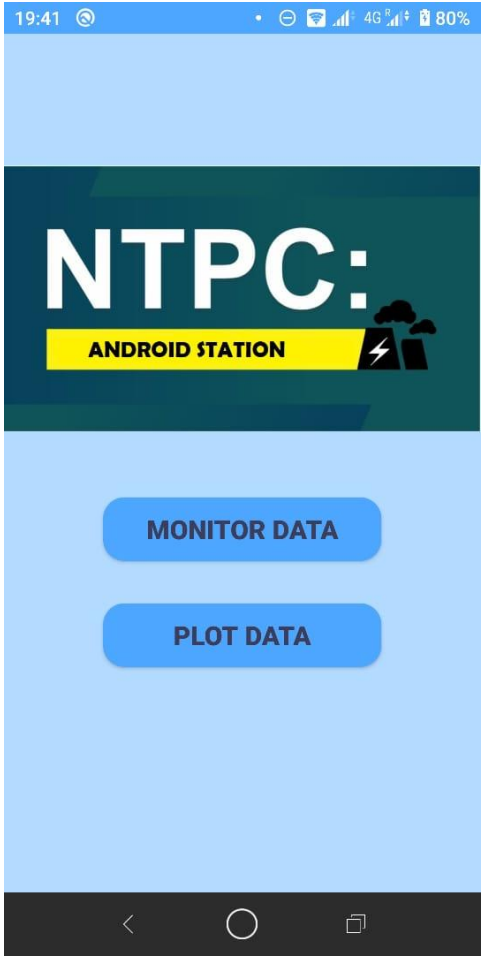
This allows the user to enter the address of the server where the data is stored. By default, it uses the address of the mock server where we've stored the data.

Upon clicking submit, we're taken to the following screen (next slide).



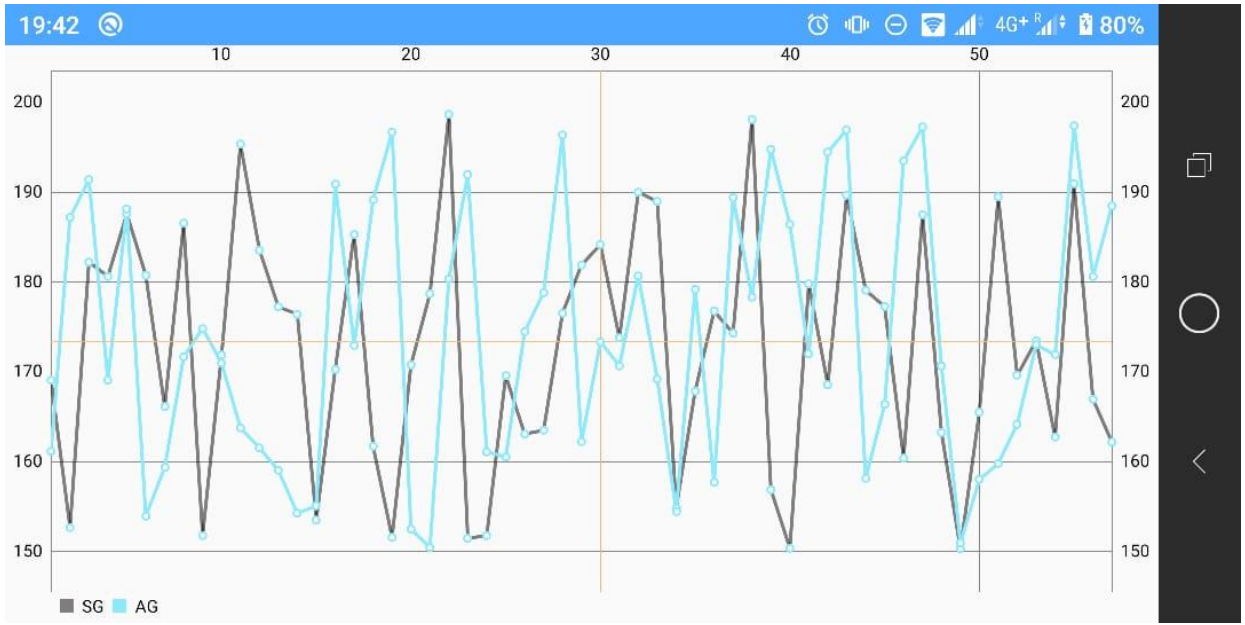
Monitor or Plot

Now, we have two options: we can either see the values of the various parameters using “Monitor Data” or we can see a line chart of AG and SG values plotted against time block.



Plot Data

AG and SG values are plotted against the time block number (up to the present time block) for the current day. The graph is more clearly visible in the landscape mode (as shown).



Monitor Data

This screen shows the data for the current time block. There are three tabs below which, upon clicking, show the data for the previous, (additional data) for the current and the next block (SG values for the next four blocks).

We've used mock data, i.e. randomized values based on appropriate ranges for each parameter is used.

The following slide shows the screen on clicking the three tabs:

Note: The discrepancy between the device time and the block time shown on the app is because the server's (which is based in the US) time is used. We've tested the app and it doesn't affect the working of the app.

Previous Block Data	
Block No	56.0
Block Time	00:00
DC (MW)	158.53
SG (MW)	166.96
AG/SG %	108.19
Avg Hz	49.54
Dev. MW	13.67
Dev. Rate	3.0304
Dev. (₹)	10356.39
Add. Dev.(₹)	0.0
Total Dev.(₹)	10356.39
Fuel Cost.(₹)	5174.1
Net Gain (₹)	5182.29

Current Block Data	
Block No	57
Block Time	13:45-14:00
DC (MW)	165.1
SG (MW)	162.17
AG/SG %	116.24
Avg Hz	0
Dev. MW	26.34
Dev. Rate	3.0304
Dev. (₹)	14743.2
Addi Dev.(₹)	0.0
Total Dev.(₹)	14743.2
Fuel Cost.(₹)	9969.69
Net Gain(₹)	4773.51
No. of Cont. +ve Blocks	4
No. of Cont. -ve Blocks	0
No. of Sign Violations	0

Next Block Data (SG Values)	
SG (+1)	189.76
SG (+2)	162.07
SG (+3)	198.41
SG (+4)	170.7

Additional Feature: Alarm

If there is sustained deviation of more than 20MW in the same direction for 11 Time Blocks, the warning is raised as shown:

Future Work

Additional graphs can be plotted, if necessary. One or two parameters required explanation, and will be added as per Bhaskar Sir’s direction.