Abstract: Over the last two decades, the evolution of mobile technologies has led to unprecedented adoption of cellphones in mainstream society. Consumers have moved from having the ability to make telephone calls from anywhere at any time using the traditional cellphones to having an all-access pass to cyberspace using today’s smartphones. This portable device has become a reliable support system for the user because of the accessibility and flexibility it offers to maintain the users’ daily routine. Although the functionality of the smartphone is ever increasing, AI has not advanced enough to tailor its functionality and adapt to the user’s unique requirements automatically. In addition, developments in the portable device are dependent upon advances in portable battery technologies which are still lagging. To address this issue, portable electronic system designers have been implementing hardware and software-based power optimization techniques to improve the battery efficiency of smartphones. Authors in this chapter have chosen software optimization techniques to increase battery efficiency because these techniques are more robust. This chapter introduces a novel idea of an automated system for smartphones that prioritize application access based on the owner’s usage patterns and daily routine to conserve battery life. This system will serve two purposes: save battery power and improve the smartphone’s artificial intelligence.

1. INTRODUCTION
Have you ever counted how frequently you need to recharge your smartphone? Have you ever imagined how good it would be if your smartphone battery life is if your old feature phones? With the advancement of technology smartphones’ functionality has been increasing. Today they have become inseparable part of our life and now a day’s smartphones are taking over the place of one’s personal computer. In the time period of 2007-2017 number of smartphones sold to end users worldwide is 1.54 billion [1] and it is projected that in 2020 this number will be 1.7 billion. By 2021, 40% of world population is predicted to own a smartphone [2]. These smartphones are featured with large screen, multiple core processors, RAMs comparable to computers, ROMs in scale of Gigabytes and variety of sensors. Moreover, by the end of the first quarter of 2018 smartphones users have the options to choose among 3.8 mil-lion and 2 million applications in marketplaces like Google Play or Apple Appstore respectively [3]. As the time is now for versatile usage of smartphones, power consumption of this portable device becomes one of the most important issue.

2. LITERATURE REVIEW
Compared to old features phone, smartphones are capable of performing complex task which requires power hungry sensors like camera, GPS etc. So new generation of smartphones demands more efficiency in power conservation which can be in hardware, software components or both. In [4] a large-scale empirical study is done with 80,000 smartphones. They found that about 75% of smartphones can last more than 12 hours with an average batter life of about 22.6 hours. Users’ needs to charge their phones at least once or twice which is different than most of the features phone. While developing eDoctor in [5] authors studied 213 real world battery drain issues for smartphones and they concluded that about 47.9% issues are for applications. Greenify is a standout amongst the most well-known battery sparing applications. It distinguishes applications that awaken your telephone more as often as possible [6]. It can likewise help shield them from doing that so frequently. The application additionally has present day highlights for Android Nougat and past with Aggressive Doze and Doze modes. This application is helpful for both root and non-root gadgets. Be that as it may, you’ll get greater usefulness and power with root.

3. NOVELTY
After completing a literature review on technologies developed to save battery life, we found that our application has location-based feature is unique, in which a user can store location with preferences of services like WIFI, Internet Data and Bluetooth.

4. METHODOLOGY
Location-based: In location-based event option as the user travels to new and different locations, the new location is added to the application (see figure 1A). The application will be able to save the location in the database once added. The user can also enter the location manually and will be able to search for that location on the screen of the android smartphone using google maps which is already connected to the location-based event (see figure 1B and 1C). Once the user is done with searching of the desired location, the user will see three different services which are WIFI, Mobile Data and Bluetooth (see figure 1D). User will be able to make preferences for these services whether the user wants to have those services in active mode or not. Additionally, the application does show the mode of the phone as Ring, Silent, DND (see figure 1D). User will also be able to select any mode for that location and it will be saved. There is also an option to edit all preferences for the services and editing option for the mode of the phone which is saved for the location. Therefore, users do not need to manually activate or deactivate those services for the saved locations as it will retrieve preferences given to those services for saved locations each time the application is launched.

Figure 1 A

Figure 1 B
5. RESULTS AND ANALYSIS

The events in the table is based on the saved location in the application. Phone-1 has the application installed and phone-2 does not have the application installed in it. We have three different scenarios in result tables for that location. When the WIFI and Bluetooth are off and saved in the application, phone-1 saved 2% of battery life compared to phone-2. In the second scenario, WIFI is off and Bluetooth is on. The application shows phone-1 has 1% more battery life than phone-2. In the third scenario WIFI is on and Bluetooth is off, and it is saved as preferences in the application; which shows phone-1 has 1% more battery life than phone-2. For our testing and analysis, we used TracFone android smart phones. The model number is STALA502DCP. Some features which it has are as follows: Design- 9.62"x4.51"x0.61 in and weight 5.29 oz, Memory-2GB/16 ROM and SD support up to 32GB, it has NT6739WM quad-core A53 1.1 GHz with Android 8.1 Oreo. Display- size-5.43 inch, UMTS B2/4/5, LTE B2/4/5/12(MFBI)/13/66/71/GSM and battery stand by(3G): 547 hours.

<table>
<thead>
<tr>
<th>Event</th>
<th>Place</th>
<th>WIFI-on Bluetooth-On</th>
<th>WIFI-off Bluetooth-On</th>
<th>WIFI-on Bluetooth-Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>900 circle drive, Greensboro</td>
<td>Phone1-77% Phone2-75%</td>
<td>Phone1-76% Phone2-75%</td>
<td>Phone1-76% Phone2-75%</td>
</tr>
<tr>
<td></td>
<td>Saved Energy-2%</td>
<td>Saved Energy-1%</td>
<td>Saved Energy-1%</td>
<td>Saved Energy-1%</td>
</tr>
<tr>
<td>Location</td>
<td>1601 E Market street, Greensboro</td>
<td>Phone1-84% Phone2-82%</td>
<td>Phone1-83% Phone2-82%</td>
<td>Phone1-83% Phone2-82%</td>
</tr>
<tr>
<td></td>
<td>Saved Energy-2%</td>
<td>Saved Energy-2%</td>
<td>Saved Energy-2%</td>
<td>Saved Energy-2%</td>
</tr>
</tbody>
</table>

6. CONCLUSION

Our main goal is to optimize smartphone power usage which doesn’t need any manual change of settings. Phone will be the head of any decision-making regarding battery life efficiency. Our work is still in progress. But the results we have shown above can make change in everyone’s think.

And it is obvious from the result that our phone can be made self-dependent device. Present world is working how to make life easier with smart cars, smart homes, smart grids and so on. Now the time has come where we can think of our life with smarter device. Our research is first step towards this. On the other hand, with the growing technology battery efficiency is one of the biggest concerns. Our research addresses two problems together: one is saving power, and another is giving intelligence to the portable devices. At the end, we think readers have gained a full insight of how we can make a smarter world in future.

REFERENCES