**End users:** Bugu provides power information of apps with similar functionality so that users can choose and get the most energy-friendly one.

**Application developers:** Compare the power consumption with other apps and find out design drawbacks through event information of their own app.

**System developers:** System wide power variation information, which includes background processes, are logged for detailed analyzing.

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**Motivation**

**End users:** For the same functionality, which application is more energy-friendly?

**Application developers:** Why my application consumes such amount of power?

**System developers:** How to save and effectively control system power?

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**Bugu Overview**

**The Bugu Service**

**Collecting app power information**

- Users directly input their applications’ information to the Bugu submission page on the website (Device, AppName, Power) table

- The bugu client automatically processes the logged records and sends them to the server when users choose “upload” option (no private information)

- Bugu server periodically checks the submitted information, filters them and inserts the “new app” information to the database (we assume all the data are trustable)

**Sharing app power information**

- Users can search power information according to specific category, application name and their device type (Nexus S, Xoom …). By default, we show the popular searched ones

- For the same item (Device, AppName) stored in the database, we calculate average power

- Bugu returns ranked power info, it can get from website and bugu client

<table>
<thead>
<tr>
<th>App</th>
<th>Power (mW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opera</td>
<td>123.42</td>
</tr>
<tr>
<td>Dolphin</td>
<td>162.15</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

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**Implications**

- The daemon of Android radio service, rild generates a lot of wakelock even when the mobile device is not active

- Several background processes consume a large amount of energy, e.g., irq/308-mxt224_irq, interrupt handler

- APIs for application design should be reevaluated from energy saving aspect, e.g., wakelock release

- The mobile OS needs a group of energy-efficient design strategies to work together for saving energy.

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**Ongoing & Future Work**

- Make sure the submitted power information from users’ are useful and trustable

- Improving the accuracy of Bugu

- Providing optimization suggestions for both system developers and application developers

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http://codegreen.cs.wayne.edu/bugu/