Fig. 3 shows the third MPower feature: the visualization of the device usage statistics. Specifically, Fig. 3(a) reports a pie-chart with the different networks data usage distribution, while Fig. 3(b) visualize the overall network data usage and the power consumption.

MPower functionalities allows the user to keep the battery consumption under control, without having an excessive overhead in power consumption. In fact, since it runs continuously on the mobile device, a low impact on the battery is required. For this reason, to design a non-power-hungry application, the following aspects have been addressed during the application developing phase:

sampling frequency Sampling the device status every ten seconds allow the application not to be listed in the Android OS most battery draining apps;

wake-lock The application does not make use of any wake-lock, which would requires the device to leave the *deep-sleep mode* (an energy saving state);

computation The model estimation and adaptation is up to the remote server. To display the TTL, the only computation required by the device is a single query on a lookup table.

data transfer Samples are logged on small files, to avoid power consuming accesses to a single big file. These information are then compressed and encrypted, to create smaller packets, and are sent to the server only if the device is on charge.

Conclusion

We presented MPower, an Android app for power management on mobile devices. It is able to provide the current TTL of the phone, as well as to suggest configurations to save power and extend the battery life, by basing on a power consumption model. It also provides phone usage statistics, enhancing the user awareness on the mobile power consumption. The application logs data about the device, sends them to a server, which sends back the estimated power model, ultimately providing the TTL to the user. Thanks to this architecture the system is power-friendly, flexible w.r.t. new phones and adaptive to the specific user.

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