**Android Energy Manager**

A user friendly, fine-grained energy tool for Android Phones

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*Index Terms*—Component, formatting, style, styling, insert. *(key words)*

# Introduction *(Heading 1)*

The use of mobile devices has now permeated our everyday lives. Cellular phones and other devices are merely an extension of the self. They are used and relied upon for everyday tasks such as phone calls, emails, text message, social media, web browsing and more. As the usage of smartphones increases, the battery life of phones has began to decrease. In the days of flip phones, devices could be used for multiple days without charging. However, now, most devices don’t last more than 6-8 hours.

The source of the loss in battery life is two-fold. First, the increased usage of the cell phone will naturally cause some loss in battery life. It is unrealistic to expect that we use a device much more and still have it maintain the same battery life. Second is the rise of power-hungry mobile applications. Mobile applications are consuming increasingly more of the phone’s energy.

There are two general classes of applications that consume disproportionally large amounts of energy. The nature of some applications is such that they must use large amounts of energy. Applications such as maps that rely heavily on real-time sensor data will naturally and inevitably use more battery. Other applications, such as Facebook, run continuously in the background polling for updates or user information, unbeknownst to the user, draining battery significantly. The second class is particular instances of applications that happen to consume more energy. This can sometimes be due to a faulty launch in the application and a simple restart is enough to cure the issue. Other times, the software itself has a bug.

Distinguishing between these two cases is difficult for a computer to do given that it has no information about the baseline of how much energy the app is expected to consume. However, this information is often intuitive to the user. It is simple for the user to determine whether the app is a naturally energy intensive application or it is consuming unexpected amounts of energy. Therefore, Android Energy Manager delegates the task of determining these thresholds to the user. The choice of this approach will be discussed in future work.

# Related Wrok

Discuss carat, other energy discussion papers, and limitations of those approaches that builds up to this approach.

# Design

Explain the choices of this paper

User defined thresholds

Simple selection

Hourly detection and user notification (android does not give access killing apps immediately + more user defined control so apps aren’t killed when they are undergoing some desired behavior)

# Measuring Energy

Cpu usage is highly proportional to energy usage.

V. Evaluation

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Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE and SI do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

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Use either SI or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as “3.5-inch disk drive”.

Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly state the units for each quantity that you use in an equation.

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Number equations consecutively. Equation numbers, within parentheses, are to position flush right, as in Eq. 1, using a right tab stop. To make your equations more compact, you may use the solidus ( / ), the exp function, or appropriate exponents. Italicize Roman symbols for quantities and variables, but not Greek symbols. Use a long dash rather than a hyphen for a minus sign. Punctuate equations with commas or periods when they are part of a sentence, as in

 

Note that the equation is centered using a center tab stop. Be sure that the symbols in your equation have been defined before or immediately following the equation. Use “Eq. 1” or “Equation 1”, not “(1)”, especially at the beginning of a sentence: “Equation 1 is . . .”

## Some Common Mistakes

The word “data” is plural, not singular.

The subscript for the permeability of vacuum **0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter “o”.

In American English, commas, semi-/colons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)

A graph within a graph is an “inset”, not an “insert”. The word alternatively is preferred to the word “alternately” (unless you really mean something that alternates).

Do not use the word “essentially” to mean “approximately” or “effectively”.

In your paper title, if the words “that uses” can accurately replace the word “using”, capitalize the “u”; if not, keep using lower-cased.

Be aware of the different meanings of the homophones “affect” and “effect”, “complement” and “compliment”, “discreet” and “discrete”, “principal” and “principle”.

Do not confuse “imply” and “infer”.

The prefix “non” is not a word; it should be joined to the word it modifies, usually without a hyphen.

There is no period after the “et” in the Latin abbreviation “et al.”.

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An excellent style manual for science writers is given by Young [7].

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#### Change Number of Columns: Select Format > Columns >Presets > One Column.

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Headings, or heads, are organizational devices that guide the reader through your paper. There are two types: component heads and text heads.

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Use 8 point Times New Roman for figure labels. Use words rather than symbols or abbreviations when writing figure-axis labels to avoid confusing the reader. As an example, write the quantity “Magnetization”, or “Magnetization, M”, not just “M”.

If including units in the label, present them within parentheses. Do not label axes only with units. In the example, write “Magnetization (A/m)” or “Magnetization {A[m(1)]}”, not just “A/m”. Do not label axes with a ratio of quantities and units. For example, write “Temperature (K)”, not “Temperature/K”.

## Footnotes

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Table Type Styles

| Table Head | Table Column Head | | |
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a. Sample of a table footnote. *(table footnote)*

Example of a figure caption. *(figure caption)*

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# References

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For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [6].

G. Eason, B. Noble, and I. N. Sneddon, “On certain integrals of Lipschitz-Hankel type involving products of Bessel functions,” Phil. Trans. Roy. Soc. London, vol. A247, pp. 529–551, April 1955. *(references)*

J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.

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K. Elissa, “Title of paper if known,” unpublished.

R. Nicole, “Title of paper with only first word capitalized,” J. Name Stand. Abbrev., in press.

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