# Your Submission

4 messages

**Computers and Electrical Engineering** <mmalek@ieee.org>          Thu, Oct 23, 2014 at 12:07 PM
To: barriquello@gedre.ufsm.br, barriquello@gmail.com

Ms. Ref. No.:  COMPELECENG-D-14-00927
Title: A smart street lighting system based on IPv6-enabled wireless sensor network

Dear barriquello,

Following are the reviews for your paper referenced above.  Based on the reviews, I regret that I cannot accept it for publication in its present form.  However, if you feel that you can successfully address the reviewers' comments, I invite you to revise and resubmit your paper within 60 days. Please carefully address the issues raised in the comments and, up front in your revised paper, describe how the comments of each reviewer are addressed. Your revised paper will be sent to the same reviewers, as well as possibly new reviewers, for evaluation.

In case you do not intend to revise and resubmit your paper, please let us know; otherwise, your paper's status will be changed to "rejected" after 60 days.

Thank you for your interest in Computers and Electrical Engineering.

Sincerely,

Manu Malek, Ph.D.
Editor-in-Chief
Computers & Electrical Engineering


Reviewer #1: The manuscript presents a new routing protocol to be used for communications between urban street lights. The routing algorithm, GeoRank, mainly uses geographic routing but also exploits elements from RPL. The authors show simulations results outperforming RPL and geographic routing, depending on the radio range.

The idea is sound and well explained. However it is not clear why a street lighting system would need every random light to communicate with another random light in the city, for example. The authors should present a clear application to motivate this scenario, and simulate this application to evaluate the routing protocol.

Note that the title is misleading. This work only proposes a routing protocol, that could be used for lighting system (this has to be proven) or probably for other contexts as well. The title implies that the work is about a whole smart lighting system, whereas it is only about a routing protocol for wireless sensor network.

If there is no application convincing enough for a lighting system, the authors should choose another context instead. For now the results presented in the paper cannot be evaluated, as the performance or usability of a lighting system cannot be assessed from the graphs. Without a convincing application and proper evaluation of the proposed routing protocol for this application, the manuscript should not be accepted.

There are some typos and English mistakes to fix in the paper, for example:
- "On the other hand" instead of "By the other hand"
- "RPL provides" instead of "RPL provide"
- "in order for an actuator to make" instead of "in order to an actuator make"
- etc.


Reviewer #2: Dear authors,

Your work is relevant and innovative for the IoT and WSN research. I really liked the "out of the box" way of

thinking routing protocols that you proposed and how the problem was tackled. I encourage you, though, to improve the paper in a few aspects in order to make it more relevant and able to fostering new advances in this area. Below I point out some problems and may be solved:

In general I recommend that the paper is proof-read by a English-native speaker. Some terms, such as "by the other hand" that appear in the text shows that it was not written by a native speaker and may distract the reader.

- Introduction
-- Is it not clear what is the meaning of acronym CRI. Second paragraph.

- 6LoWPAN
-- Figure 2 is not clear at a glance. I guess the label mean cost,parent but this is not clear. Maybe if the LBR was located on the top part it would be more clear. And I think the letter in the labels are redundant. You could also explain in plain text in the previous paragraph, after referring the figure.

- Georank
-- Well, the main part of your work seems to be totally neglected and it is a pity for your whole paper. Section 4 should be much more "verbose", with plain text that explain both the algorithm and the diagram (figure 4). Algorithm 1 should be converted into pseudo-code. It is not clear what are the input and output variables of your algorithm. Step 3, for instance, is confusing, it should be split into more sentences or lines of pseudo-code
Diagram of Figure 4. It is not clear the different between face and greedy GOAFR. It is not even clearly defined in the text. Please, clarify this point somewhere

- Simulation results
-- It is not clear which type of simulation was performed. If you developed your own simulator you could specify more details specially related to wireless link quality and ETX values for RPL protocol
-- Finally, graph for Figure 6 does not show any higher order statistics, only the average values. You should include standard deviation or confidence interval if different seeds were used in your simulations.
-- You should also consider implementation of a real test case (small, no need for large testbeds) using real hardware and OS such as ContikiOS or TinyOS. This could contribute give more effective contributions to our community and confirm your results out of the controlled environment of simulators.

Reviewer #3: The abstract identifies three novel contributions:

1)      GeoRank finds shorter routes than RPL with high link densities, and GOAFR in low link densities.
2)      GeoRank avoids bandwidth-consuming control messages required in RPL
3)      GeoRank is more scalable in terms of memory usage than storing-mode RPL

However, it is hard to find results that substantiate these claims. (2) is not substantiated and quantified in the results; hence there is little evidence of this. I also cannot see any results providing evidence of (3). In general, the 'philosophy' of the paper is interesting, but I find the explanation/motivation and analysis poor.

The requirements of street light networks are not expressed. What demands do these put on communication networks? What kinds of topologies do they have? What kinds of traffic patterns do they exhibit? How often are packets transmitted? Discussion is had around "an example of the necessity of P2P messages is a scenario where actuators require data from sensors to decide when and how to act." What are the actuators and sensors in a street light network? Later in the paper it says that "approach is mainly suitable for large scale and heterogeneous networks, such as a network of wireless streetlight nodes" - why are street light nodes heterogeneous? Simulations are made conducted with "1000 random source-destination pairs": why would a streetlight in one street want to randomly communicate with a streetlight in a different street?

The actual contribution of the paper seems minor - taking two existing protocols, and selecting between them based on a parameter at runtime. This contribution takes up half a page (plus one page of algorithm and diagram), while the background section is 13 pages long. Likewise, the detail in the experimental setup and results is lacking. What was the simulation setup: tool used, radio model etc? If there are only 5 different sink node locations, why pick 10 random locations in the network (rather than 5 actual locations)?

Figure 6: is the 'mean' the best metric to present here? Is the RPL implementation compared against the

original RPL, or the enhanced version proposed by Winter et al., 2012? Why is GeoRank compared to RPL and GOAFER rather than the improved CDF technique?

What other routing schemes exist/are suitable for streetlights? Why is IPv6 needed/a good candidate? It is not clear to me why IPv6/6LoWPAN is needed/suitable for streetlight systems - the only real motivation given is "The IP protocol is an open, mature and field proven technology, with free and well documented standards, and thus it is very reasonable to reuse it for WNSs instead of creating new proprietary protocols". This is not a clear argument. Also, in this case, why do the authors propose using a proprietary routing algorithm - why not use something like AODV?

There is a need for more interaction with the literature in some sections, for example there are none to support the 'drawbacks of PLC technology'.

It is claimed that "the scalability and reliability of cellular networks are questionable", but this is not referenced or substantiated. Cellular networks have done pretty well for themselves, I think this is a little dismissive!

What is the problem of adapting RPL in streetlighting systems?

Page 8 claims that RPL exchanges very few DIOs when the topology is stable. Street light networks are very stable - they're not going anywhere!

In section 4, low and high link density is mentioned, but it is not clear how to differentiate a low link density to a high link density and how it is modelled during the simulations.

The last paragraph of the results section explain that "in a smart street lighting [network], there may be some places where the link density is very low due to obstacles". Were obstacles simulated in the simulation environment? How low is very low? Generally, a street light will have visibility of some other nodes in the same street?

The last sentence of the conclusions is speculation.

The abstract has a lot of acronyms in it, which are obviously undefined. Are they all needed?

The English needs a *lot* of work, if accepted, as there are numerous spelling and grammatical errors including:

> "…streetlighting system based on AN ipv6-enabled wireless…"
> "…the main drawbacks of THE rpl routing protocol…"
> "It is responsible FOR guaranteeing 'the society security and living during nighttime'…" (part in " makes little sense)
> "mesopic visual conditions", "PLC", "RFCs" and "CRI" are not defined/explained on first use
> "…to reuse THE existing ipv6 protocol for THE networking layer…"
> etc etc