Preparing your Seminar Talk on a Published Paper

NAME: **Rajib Dey**

Please write down your answers, in a summarized form, to each of the following questions.

1. **To prepare your seminar talk, analyze the paper and answer the following questions:**

   a. **What problem was investigated? In other words, what research question did the authors try to answer?**

   The authors tried to improve network connectivity for moving vehicles. They designed, implemented and evaluated a new protocol named "Cabernet", which is a content delivery network for moving vehicles using 802.11 access points.

   b. **What was the primary motivation for investigating the problem?**

   Generally, data transfers in moving vehicles happen using cellular data and they can cost tens of dollars. With cabernet, there would be no need for that. It will be able to use open Wi-Fi connections along the roads.

   c. **What background information (context) is relevant to understanding the problem?**

   Basic understanding of Computer networks and protocols like Wi-Fi, TCP, DHCP etc.

   As moving vehicles can not take seconds that it takes to connect to APs using the normal protocols, it needs a faster protocol. That is exactly what the authors did in this paper.

   d. **List the paper's *key points*?**

   ➤ Introduced a new protocol named "Cabernet" for delivering data to and from moving vehicles. Which does not need any changes in the currently existing APs.

   ➤ "Cabernet" has two components.
      o QuickWiFi
      o Cabernet Transport Protocol (CTP)

   ➤ QuickWiFi can connect in just 366 ms on an average significantly reducing the connection establishment time.

   ➤ By running a lightweight probing protocol between a sender and the access point to isolate congestion events, CTP handles high non-congestive wireless loss rates. Where we have high non-congestion losses, CTP can achieve double the throughput of TCP

e. **What method(s) or experimental design (if any) did the authors use? How did they evaluate their proposed methods?**

The Cabernet design and protocols presented in the paper has been evaluated by fully implementing the whole system.

It was deployed on a fleet of 10 taxis running in the Boston area. The results reported in the paper are from the real-world operation, with the in-car nodes running QuickWiFi and the system running CTP.

f. **Which of the results reported in the paper are the most significant?**

> ➢ QuickWiFi reduces connection establishment time and can connect in just 366 ms on an average.
> ➢ CTP can achieve double the throughput of TCP over paths with high non-congestion losses, with a mean throughput of 800 kbit/s.
> ➢ While performing an end-to-end performance evaluation, it was found that Cabernet is able to achieve an end-to-end throughput of 38 megabytes/hour (86 kbit/s) per car. Which is good enough for a large class of vehicular applications that are non-interactive.

g. **Did the authors note any unexpected results? If so, were those results explained sufficiently?**

Yes, a few unexpected results were noted by the authors. Some of them were explained sufficiently but to explain the rest of them more research work is needed.

h. **What were the authors' conclusions?**

Cabernet is faster than the traditional WiFi and TCP. It solves a few shortcomings of the traditional protocols related to connection establishment and throughput. Though to be implemented in a wider area, more research work is needed in few specific areas. Cabernet does provide an easier way for moving vehicles to use traditional WiFi APs as there are many open Wi-Fi networks that are currently being available all over.

i. In retrospect, what were the implications of the investigation? How did the investigation influence future work? Do authors suggest avenues of improvement?

This research work has made it possible for moving vehicles to use open Wi-Fi APs without any changes. This research has provided an easier and efficient alternative than the traditional protocols.

According to the authors, some improvement of this implementation can be achieved by doing more research on Caching historical AP connectivity information so that APs with better connectivity are selected with a higher probability which could lead to better performance. More extensive study of CTP interactions with TCP is required as the Standard deviation is lower, when the measured TCP flow is competing with CTP than when another TCP flow.

Lastly, for wider deployment, a popular Fon's model can be used. Where users open their access point to all Fon users that also open theirs. This is now supported by established ISPs such as British Telecom, Time Warner, and Neuf3.

j. What, if any, were the weaknesses of the paper?

This research work has been evaluated by implementing it in the real world, which is the best way to evaluate any research work. But it was tested on only 10 cars in Boston on very specific routes and distances. This research work needs to change the location, routes, and distances. On top of that, it needs to add many more cars to the equation, which would truly represent real-life use.

k. What is the role of communications and networking technology in the application described in the paper? Are networks considered simple communication links with loss and delay, or are they an integral part of the system?

This research work is all about a new communication and networking technology called "cabernet". This technology is applied in the real world to evaluate the technology proposed in this paper. On the architecture level, research work has been done quite extensively. So, here in this paper Communications and networking technology has played the major role as vital results of this paper depended upon them. It is considered an integral part of the system. Any kind of delay and loss has been heavily minimized, bettering the results even from the traditional protocols.