

Identifying Primary (Original) Scholarly Research Answer Key
Computer Science/Technology

Students were asked to examine each of the following abstracts and highlight or underline any evidence or language that may indicate if the article is primary or secondary research.

Article 1

Menozzi, M., Lang, F., Napflin, U., Zeller, C., & Krueger, H. (2001). CRT versus LCD: Effects of refresh rate, display technology and background luminance in visual performance. *Displays*, 22 (3), 79-85.

Abstract:

Two experiments were carried out in this study. The first experiment assessed a subject's performance while carrying out a visual search task using a liquid crystal display (LCD) and a cathode ray tube (CRT) with varying refresh rate (48-75 Hz). The subject's task consisted of detecting a target character among distractor characters presented in positive contrast. Search time was similar in all conditions of the experiment. Error frequency was correlated positively with the refresh rate of the CRT. However, this effect failed to be significant ($p = 0.090$). In the condition where LCD was used, error frequency was found to be 22% lower when compared to the condition where the CRT was used with a refresh rate of 75 Hz. A second experiment aimed to assess the role of background luminance in the same task as reported above. The task was carried out on the liquid crystal LCD. The background luminance was varied between 45 and 150 cd/m^2 at the LCD and between 45 and 110 cd/m^2 at the CRT. Results of this experiment revealed no statistical significant effect of background luminance on visual performance (number of hits, search time). These findings suggest that replacing CRTs with LCDs will improve ergonomics in workplaces using visual displays. Improvements can also be achieved by increasing the refresh rate of the CRT but a very high refresh rate may be required.

1. Is this a primary research article? Why or why not?

Primary. The abstract clearly states that experiments were carried out and that the article is presenting the findings.

Article 2

Salkintzis, A.K. (1999). Packet data over cellular networks: the CDPD approach. *IEEE Communications Magazine*, 37(6), 152-160.

Abstract:

The use of cellular digital packet data (CDPD) over cellular telephone networks has been studied. CDPD is a mobile packed data technology that operates on the spectrum assigned to a telephone cellular network, such as the Advanced Mobile Phone Service. It can be implemented as an independent cellular system or as a packet-switching overlay to the present cellular network. The latter case allows for quick deployment and minimize installation costs.

2. Is this a primary research article? Why or why not?

Probably secondary. The descriptive abstract mentions that the technology has been studied, but not by the authors.

Article 3

Hankui, E., Harada, T., & Kuriyama, T. (2001). Estimation of current distribution on cellular telephone antennas affected by human body interaction. *IEICE Transactions on Electronics, E84-C(9)*, 1260-1263.

Abstract:

This paper describes an estimation method for an antenna current distribution including the interaction between a cellular telephone antenna and a human body. **In our experiments**, current distributions on a half wavelength dipole antenna at 900 MHz are evaluated by measuring the magnetic field near the antenna, when a human head-sized phantom model is located near the dipole antenna. **From the experiments**, the antenna current around a feed point is confirmed to increase by 30% due to the interaction effect. **This result shows** that antennas of portable phones should be designed by considering the effect of a human presence for the development of the higher performance antenna, and our estimation method will contribute to optimizing the design of such antennas.

3. Is this a primary research article? Why or why not?

Primary. The abstract clearly states that experiments were carried out and that the article is presenting the findings.

Article 4

Mangione-Smith, W.H. (1999). Technical challenges for designing personal digital assistants. *Design Automation for Embedded Systems, 4(1)*, 23-39.

Abstract:

Personal Digital Assistants are battery powered portable computing devices that are targeted to the horizontal consumer market. These products contain more features than laptop computers in a much smaller form factor and with more intense price pressure. This paper will use the Apple Newton MessagePad and the Motorola Envoy to frame consideration of the design tradeoffs involved with Personal Digital Assistants. The issues considered include mechanical engineering and industrial design, analog I/O, display technology and power supply design. Each of these concerns is considered in the context of four key design criteria: low cost, small size and weight, advanced features, and long battery life. The MessagePad and Envoy indicate that a range of engineering choices exists and effective system design requires closely integrated optimization across multiple engineering disciplines.

4. Is this a primary research article? Why or why not?

Cannot be sure from the abstract. The article compares specific brands, but does not indicate if an actual scientific study was conducted.

Article 5

Kasper, C.E. (1996). Personal digital assistants and clinical practice. *Western Journal of Nursing Research, 18(6)*, 717-21.

Abstract:

The Personal Digital Assistant (PDA) is a hand-held computer operated with an electronic pen which incorporates note-taking features, access to medical databases, patient data and communications capabilities. Several models are available in 1996, including Pocket Doc, Virtual Intern, and GraviPAD. PDA technology provides new ways to maintain records and manage patient data, and can prove crucial to improving patient care.

5. Is this a primary research article? Why or why not?

Secondary. The abstract indicates that there is a description and explanation of PDAs, but not that a research study is presented.

Article 6

Stark, W., Wang, H., Worthen, A., Lafortune, S., Teneketzis, D. (2002) Low-energy wireless communication network design. *IEEE Wireless Communications*, 9(4), 60-72.

Abstract:

Energy-efficient wireless communication network design is an important and challenging problem. Its difficulty lies in the fact that the overall performance depends, in a coupled way, on the following subsystems: antenna, power amplifier, modulation, error control coding, and network protocols. In addition, given an energy constraint, improved operation of one of the aforementioned subsystems may not yield better overall performance. Thus, to Soptimize performance one must account for the coupling among the above subsystems and simultaneously optimize their operation under an energy constraint. In this article **we present a generic integrated design methodology** that is suitable for many kinds of mobile systems and achieves global optimization under an energy constraint. By pointing out some important connections among different layers in the design procedure, **we explain why our integrated design methodology is better than traditional design methodologies**. We present numerical results of the application of our design methodology to a situational awareness scenario in a mobile wireless network with different mobility models. **These results illustrate** the improvement in performance that out integrated design methodology achieves over traditional design methodologies, and the trade-off between energy consumption and performance.

6. Is this a primary research article? Why or why not?

This article is probably primary. While the language is not as clear as some abstracts, the authors do mention that they are presenting a methodology and numerical results. Thus, the article could be primary, but may also be theoretical.

Article 7

Hartwig, S., Lueck, M., Aaltonen, J., Serafat, R., & Theimer, W. (2000). Mobile multimedia - challenges and opportunities invited paper. *IEEE Transactions on Consumer Electronics*, 46(4), 1167-1178.

Abstract:

Today, we observe the creation of an increasing number of multimedia consumer devices for mobile and home use. This includes set-top-boxes, game consoles, Personal Digital Assistants (PDA), e-books, but also mobile phones. Although these devices have many things in common with desktop PCs - above all Internet access - it is widely accepted that they will serve a different purpose. Many committees and companies are currently trying to define the open application platform for tomorrow's consumer terminals for home use, among others the so-called Multimedia Home Platform (MHP) of the European Digital Video Broadcasting (DVB) project. Meanwhile, on the cellular end of the multimedia business, portable appliances like cellular phones, e-books and PDAs are evolving to multimedia terminals, starting from narrow band Internet services like the Wireless Application Protocol (WAP) and slowly adopting video technologies. One of the main obstacles to overcome is bandwidth limitation - even for 3G mobile systems - and broadcast technology is considered to be a serious candidate to fill this gap, both for TV and data services. A special challenge is to provide multimedia services in vehicles, where, due to the static environment relative to the driver, some requirements for mobile and static terminals apply at the same time. **This paper shall summarize some trends and opportunities of mobile multimedia** - especially in the DVB and GSM (Global System for Mobile communications) domain, while outlining the different requirements for mobile, home, and car use of multimedia services.

7. Is this a primary research article? Why or why not?

If the paper does nothing more than summaries the trends, it is secondary.

Article 8

Plush, L. (2000). Surgical services management. *Nephrology Nursing Journal*, 27(4), 417.

Abstract:

This descriptive article detailed the development of innovative systems such as wireless telemedicine. Wireless technology allows us to communicate via pagers, telephones, and computer networking. Wireless technology's positive impact on the health care industry is manifested by the provider's ability to quickly respond to the patient's needs. While bedside monitoring alarm systems have been effective, wireless technology has further improved patient care and has had a positive financial impact for hospitals.

8. Is this a primary research article? Why or why not?

This abstract clearly indicates that the article is descriptive and therefore secondary.

Article 9

Hasegawa, G., Kurata, K., & Murata, M. (2003). A study of a high speed packet scheduling method for achieving fairness among TCP connections. *Journal of High Speed Networks*, 12(1-2), 29-49.

Abstract:

In this paper, we first investigate the fairness between TCP Reno and TCP Vegas by focusing on the situation where Reno and Vegas connections share the bottleneck link. From the analysis and the simulation results, we find that the performance of TCP Vegas is much smaller than that of TCP Reno as opposed to an expectation on TCP Vegas. The RED algorithm improves the fairness to some degree, but there still be an inevitable trade-off between fairness and throughput. Accordingly, we propose a ZL-RED (Zombie Listed RED) algorithm, which enhances the RED algorithm to provide fair service for many flows at the bottleneck router. ZL-RED uses the Zombie List, which has been originally proposed by SRED, to detect misbehaving flows which send packets at higher rate than others. Then, ZL-RED sets higher packet discarding probabilities for those misbehaving flows. We evaluate an effectiveness of ZL-RED by simulation experiments, and show that ZL-RED can actually improve fairness among TCP connections.

9. Is this a primary research article? Why or why not?

Primary. The abstract mentions that the authors are conducting a simulation and analyzing the results.

Article 10

Curran, K., Woods, D., McDermot, N., Bradley, C. (2003). The effects of badly behaved routers on Internet congestion. *International Journal of Network Management*, 13(1), 83-94.

Abstract:

From an exhaustive series of trace packets to a diverse set of destinations, our research has discovered that specific routers are the cause of bottlenecks in the Internet. We found that packets took the same route each time towards their destination. Our research has also found that over periods as large as seven days these routers continue to cause bottlenecks with no re-routing of packets to alleviate congestion. This research begs the question as to why these bottlenecks occur at the same places and for so long a period and also queries the extent of implementation of dynamic routing algorithms.

10. Is this a primary research article? Why or why not?

Primary. The abstract clearly states that research was carried out and that the article is presenting the results.
