Evaluating the Potentials of Open Source in Medical Field: Are We Ready to Embrace it?

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ABSTRACT

Open source software has gained significant traction in recent years, along with some concerns. Here we discuss the features open source model like greater transparency, cost-effectiveness, and customization. It also addresses the rising concerns on privacy and security issues in internet. This article highlights the benefits and limitations of open source software in medical services and health education.

Keywords: collaboration, open source, privacy, security, transparency

INRODUCTION

Open source software (OSS) refers to computer programs whose source code is available for anyone to view, use, modify or distribute without cost or restriction. This means that users can adapt it to their needs with appropriate changes in the source itself. An open source product is licensed under some open nature license, such as GNU general public license, MIT and Mozilla public license, among others.[1]

Closed source (proprietary) software is owned and controlled by an entity, and is licensed with restrictions on usage, distribution, or modification. A hidden source essentially makes the software a black-box, requiring you to blindly trust its company.[2,3]

In contrast, open source offers several advantages. They are typically free of charge, although one can monetize it. The open nature of source makes it more flexible, transparent, cheap, privacy-friendly and durable than proprietary ones. This allows for quicker identification and resolution of security vulnerabilities, compared to proprietary products. Open source software is ahead in terms of privacy and security of users. Furthermore, the open-source development model encourages collaboration and peer review of the code, resulting in better security. Problems are addressed at the open source community more frequently (and for free).[4] Open source software has gained popularity in recent years, especially in the medical field.

Application in Medical Services

OSS benefits the medical field with cost-effectiveness, transparency and interoperability. Electronic Health Records (EHRs) can be better customized and integrated with other medical software through OSS.

OSS plays a critical role in modern health IT infrastructure.[5] Medical imaging software provides a cost-effective and flexible solution for storing, viewing, and analyzing medical images.[6] Another use of OSS in health research is for genetic (-omics) study, especially by EU researchers compared to US and China who tend to lock-down their products.[7] Telemedicine software provides a cost-effective and secure solution for healthcare providers to connect with patients remotely. This is important in remote areas with limited access to healthcare services.

While most of the IT system are rapidly embracing OSS, healthcare system is lagging in this regard. The publications about OSS-healthcare are scarce and its documentation in health sector is also short.[8]

Artificial Intelligence and open Source

Artificial Intelligence (AI) is a rapidly growing field that can revolutionize many industries. AI-based software are already being used in medical data analysis and prediction, and are heavily discussed about its routine real-world application, along with its complications such as patient privacy.[9]

OSS has contributed to the advancement of AI by providing a platform for collaboration and development. TensorFlow and PyTorch libraries are widely used by researchers and developers to build and train machine learning models. These projects are highly secure and reliable, ensuring transparency accountability, and ethical considerations.

Article information		
Received: 23 December 2023	**Accepted:** 29 December 2023	**Published online:** 31 December 2023

Application in Health Education

Sharing information has always been a mainstay in the academic environment and in the development of science and technology. Online learning platforms provide affordable and flexible solutions for delivering health education. Some useful open source programs we can choose in our daily computing are LibreOffice office suite instead of MS office, Linux-based operating systems, GNU PSPP for statistical analysis against SPSS, Zotero replacing Mandeley for referencing and Jitsi meet video conferencing platform. Online learning platforms like Moodle provide affordable and flexible solutions for delivering health education. Additionally, educational simulation (such as BioGears) allow students to interact with medical concepts in a visual and interactive way for an engaging and effective learning experience.

We may consider choosing open source alternatives for our daily computing, such as Libreoffice instead of MS office. For publication of our articles, we may choose the open access journals. Our journal is also licensed under Creative Commons CC-BY-4.0 license, making all the articles of JKAHS available to read, distribute and modify for free worldwide. These practices make us more responsible and ethical of our choices.

Limitations of Open Source

Few limitations of open source products need to be understood. OSS typically lack any technical support. They are usually developed by volunteers and don't come with formal support. It may also struggle in integration, making OSS sometimes incompatible with proprietary software, which hinders information exchange and collaboration.

However, contrary to common belief, OSS does not compromise security. In fact, vast majority of cloud computing are run by Linux servers. Even most of the proprietary programs have some OSS component. Moreover, the security of open source projects can be maintained by a global community of developers.

Prospect

We need to consider the option of open source software in our computer use. Medical institutes could implement open source products in their IT infrastructure, hospital services and in education. Companies can use the open source products and give technical support as their service with charge. Government also need to consider using OSS whenever possible, as it benefits the national economy and promotes the use of open standards. Unlike proprietary products, which result in the export of national currency, OSS is a global resource. As the European Union is recognizing the potential risks of relying on proprietary software, it is time for us to be aware before it's too late.[10] The open source philosophy encompasses the values of community, meritocracy, and free exchange of ideas. Thus, the open source movement goes beyond software production and uses the decentralized model to find better solutions in various communities and industries. It represents a way of life and a mindset that values sharing, collaboration, and a commitment to improvement. At a deeper level, the concept of "source code" can be extended to the world, where the rules, recipes, and expectations that guide our behaviour are open, accessible, shared, and modifiable. Adopting an open source approach means striving for better future and playing an active role in creating it.

CONCLUSION

Open source software (OSS) is a smart option for computer operation. It offers cost-effectiveness, flexibility, and security benefits, making it ideal for office work, healthcare, and general use. Despite its challenges in technical support, the growing popularity of open source software in the healthcare sector suggests that it will continue playing crucial role in improving medical services and education in the future.

Data Availability: Related photograph of this case will be available on request

Informed Consent: Not applicable.

Source of Funding/Support: No external funding/ support available.

Conflict of Interest: None declared.

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