

## Smartphones for Imaging: Challenges and Recommendations



Smartphones are becoming an indelible part of everyday life and also finding their way into healthcare. A new study explores the challenges and opportunities of their applications in biomedical imaging (Hunt et al. 2021).

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Smartphones, together with wearable devices, possess a wide array of capabilities such as cameras and other optical sensors, touchscreens, networking, computation, 3D sensing, audio and motion. With proper user-centred hardware and software design these can be turned into convenient point-of-care biomedical imaging systems to assist with diagnosis and treatment.

Aiming to identify the most efficient applications of smartphone capabilities, a group of researchers at Dartmouth College's Thayer School of Engineering (USA) studied the available and emerging smartphone-related technologies and hardware interface components, such as microscopy or dermatology clips. These were evaluated within three application contexts of monitoring, diagnosis and treatment.

The authors note that while there are many factors that make smartphone utilisation in biomedical imaging look rational, such as scalability or ease-of-use, its justification is not always sufficiently rigorous and "the majority of original research for [smartphone-based imaging] systems is limited to a single phone model and utilises manual, often fragmented image acquisition and analysis pipelines".

To optimise the assessment of a smartphone platform's suitability for biomedical imaging, they provide the 'Six C's' as recommended guidelines to evaluate appropriateness of smartphone utilisation:

- Clinical context: an understanding of the clinical need and the intended user
- Completeness: a complete implementation of the intended clinical workflow
- Compactness: portability and small size for the intended application
- Connectivity: wireless communication for the intended application
- Cost: not a priority in comparison to other C's.
- Claims: ease-of-use, cost, or scalability.

The study concludes by recommending several areas for advancing research in smartphone applications in biomedical imaging, including adjustment of hardware design and calibration techniques to the versatile and volatile smartphone ecosystem as well as creation of open-source systems for image acquisition and processing.

Source: [SPIE](#)

Image credit: Hunt et al. (2021)

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