

An affordable, handheld multimodal microscopic system with onboard cell morphology and counting features on a mobile device

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Supplementary Information

Table S1: List of essential components for the construction of the proposed smartphone microscopic system-

Sl. No.	Component	Quantity	Source/Supplier	Cost (\$)	Purpose
1	Achromatic doublet lens	1	Edmund Optics (#63-714)	127.20	Objective lens
2	3 mm Ball lens	1	Edmund Optics (#43-711)	25.97	Objective lens
3	Plano-convex lens	1	Holmarc Opto-Mechatronics Ltd.	8.70	Tube lens
4	Aspherical compound lens (Reversed)	1	Amazon/local electronics market	4.28	Relay or coupling lens
5	Emission filter	1	Edmund Optics (#67-016)	267.78	Fluorescence signal filter
6	LED	3	RS Components	<1.5	Illumination source
7	ESP32 development board with micro USB cable	1	Amazon/local electronics market	10.18	Illumination control
8	Smartphone USB OTG	1	Amazon/local electronics market	< 1.99	Serial communication and powering
9	Wires	-----	Amazon/local electronics market	< 0.1	Connection

10	Screw and spring	1 each	Local market	<0.1	For focusing mechanism in 3D-printed translational stage
11	3D-printed embodiments	-----	Designed and fabricated in the laboratory	<1	Holding of opto-electronics components
Total				< \$448.8	

Table S2: Comparison of our proposed smartphone microscope with that of the existing smartphone microscopes that has fluorescence imaging capability (BF, bright-field, DF, dark-field, FL, fluorescence imaging).

References	Resolution (μm)	FoV (mm^2)	Modality	Optical configuration	Magnifying optical components
Sung et al., 2017 ¹	2	2×2	BF, FI	$3f$, finite-conjugate	Inkjet-printed lens
Sami et al., 2020 ²	3.9	19.86×14.79	FI	$3f$, finite-conjugate	Plano-convex lens, achromatic doublet lens
Dai et al., 2019 ³	2.76	1.6×1.6	BF, FI	$3f$, finite-conjugate	Polymer lens

Zhu et al., 2010 ⁴	20	81	FI	3 <i>f</i> , finite- conjugate	Plano-convex lens
Wei et al., 2013 ⁵	1.7	3 × 3	FI	3 <i>f</i> , finite- conjugate	-----
Long et al., 2020 ⁶	3.1	4.8 × 2.4	BF, FI	3 <i>f</i> , finite- conjugate	PDMS lens
Kheireddin e et al., 2018 ⁷	2	3.6 × 2.7	BF, DF, FI	3 <i>f</i> , finite- conjugate	Smartphone reverse aspheric camera lens
Liu et.al., 2021 ⁸	0.87	1.5 × 1.5	BF, FI	3 <i>f</i> , finite- conjugate	Smartphone reverse aspheric camera lens
Breslauer et al., 2009 ⁹	1.2	0.18	BF, FI	4 <i>f</i> , trans- illumination	Conventional microscope eyepiece and objective lens
ZHU et al., 2020 ¹⁰	0.57	0.5	FI	4 <i>f</i> , epi- illumination	Microscope objective lens, CCTV camera lens, mirrors, Smartphone reverse aspheric camera lens
Ours	1.21	4.53	BF, FI	4 <i>f</i> , trans- illumination	Achromatic lens, plano- convex lens, Smartphone reverse aspheric camera lens

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