Universal Mobile Device Adapter for Endoscopic Image Capture

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**Background & Unmet Need**

- Endoscopes are essential tools in medicine for minimally invasive viewing of anatomic structures, medical abnormalities, and surgical interventions.
- Generally, endoscopes come with a light source, camera cord, and computer processor, which are often stored together in a mobile tower.
- However, these large towers are often difficult to transport, and may cause difficulty in settings where endoscopes must be mobile, such as inpatient or emergency care.
- Moreover, health providers with limited resources, such as those in low- to middle-income countries, may not be able to afford these devices altogether.
- Mobile devices are ubiquitous and have built in high-resolution cameras and advanced processing capabilities.
- **Unmet Need:** Adapters allowing for use of mobile devices to record endoscopic images.

**Technology Overview**

- **The Technology:** Portable and universal adapters for capturing endoscopic images on any mobile device.
- A team at Weill Cornell Medicine and New York Presbyterian Hospital has created universal endoscope adapters which utilize the video capture and storage capabilities of any mobile device.
- One version is a phone adapter that allows attachment of a telescope for optical magnification; a second version allows for recording without a telescope; a third version uses an external camera with cord that plugs into laptops and tablets.
- Adapters can be easily attached to the back of any smartphone case or plugged into any laptop/tablet.
- **PoC Data:** Prototypes have been generated and tested using an iPhone and Microsoft Surface.
- Preliminary testing indicates that the adapters can capture high quality endoscopic images, and quality control studies are planned to confirm usability.

**Inventors:**
- Mark Lee
- Elliot Morse
- Anaïs Rameau
- Michelle Yu

**Patents:**
- Provisional Filed

**Publications:**
- N/A

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**Cornell Reference:**
- D-10249
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<table>
<thead>
<tr>
<th>Technology Applications</th>
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<tr>
<td>• Capturing endoscopic images in emergency settings where devices need to be promptly deployed</td>
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<td>• Capturing endoscopic images in inpatient settings wherein patients’ movement is restricted due to immobility or unstable medical condition</td>
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<tr>
<td>• Use in low-resource medical facilities, such as in low- to middle-income countries</td>
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<td>• Use in military or field hospital settings</td>
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<th>Technology Advantages</th>
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<tr>
<td>• Mobile phone adapter is universal for all smartphone brands and models that have a sufficient camera and does not need to be redesigned for future phone releases</td>
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<td>• Adapters work with tablets and laptops, enabling larger screens to be used to improve visualization of endoscopic images</td>
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Supporting Data / Figures

Figure 1: Top: Universal scope adapter with (A) and without (B) telescope for optical magnification. Bottom: External camera adapter for laptops and tablets.

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Figure 2: Side view of universal smartphone adapter connecting an iPhone SE to laryngoscope with (Left) or without (Right) the telescope attachment.

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Figure 2: Representative endoscopic images of the larynx captured using the universal smartphone adapter connecting an iPhone SE at 1080p 30 FPS to laryngoscope with (Left) or without (Middle) the telescope attachment. Footage from external camera adapter for laptops or tablets (Right).

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