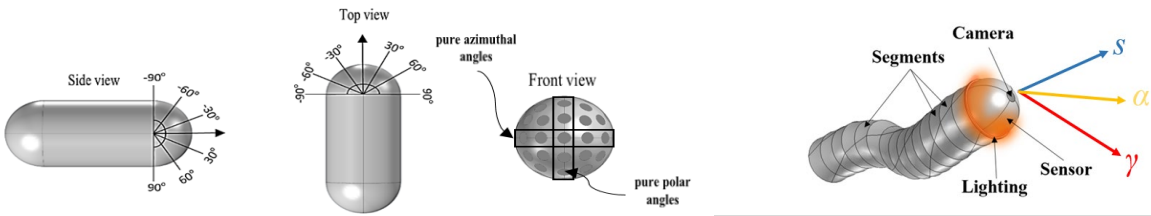


Capsule and Ordinary Endoscopy with pressure sensors for navigation and safety enhancement

MEDTECH: Diagnostics - Device

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|-------------------------------------|--|
| The Challenge | To reduce damage to internal organs while conducting capsule/ordinary endoscopy procedures. |
| The Solution | Internal sensing technology from the medical device produces signals that indicate the pressure from the ambient environment, including obstructions; the endoscopy device can be navigated accurately and safely through the internal cavity. |
| Key benefits | <ul style="list-style-type: none"> • Gives a strong indication of when it reaches changes in the path or an obstruction. • Provides a safety feature by monitoring the pressure between the device and the internal cavity. • Reduces operator error. • Improves ability to navigate. • Requires less data transmission, less computational effort and is not memory intensive for autonomous navigation system compared to the current suggested method (image processing). • Can be used for wireless capsule endoscopy or steerable wired endoscopy. • Can operate in dark areas or liquids. • Sensitivity to the pressure of the outer environment is changeable according to its stiffness. |
| Development Stage | Proof of Concept |
| Brief Description & Differentiation | <p>The figures below show the capsule with the figure on the left-hand side giving the best indication of where the pressure sensors are located on the dome of the capsule. The pressure sensors are distributed around the dome and the signals are interpolated to give an accurate indication of where the capsule is experiencing a compressive force. The right-hand figure shows an example of integrating the system into ordinary endoscopy.</p>  |
| Research Team | Faculty of Engineering, Department of Electrical and Computer Systems Engineering. |
| Intellectual Property | Australian Provisional Patent application filed. |
| Key Publications | <ul style="list-style-type: none"> • F. N. Alsunaydih, M. S. Arefin, J. Redoute and M. R. Yuce, "An Automatic Navigation and Pressure Monitoring for Guided Insertion Procedure," <i>2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)</i>, Berlin, Germany, 2019, pp. 3315-3318, doi: 10.1109/EMBC.2019.8857342. • F. N. Alsunaydih, M. S. Arefin, J. Redoute and M. R. Yuce, "A Navigation and Pressure Monitoring System toward Autonomous Wireless Capsule Endoscopy," in <i>IEEE Sensors Journal</i>, doi: 10.1109/JSEN.2020.2979513. |