Capsule Endoscopy Position Estimation Method Using RF Phase

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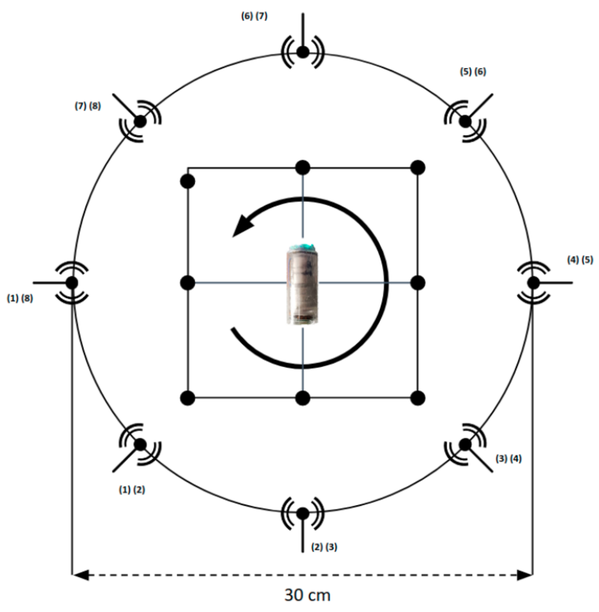
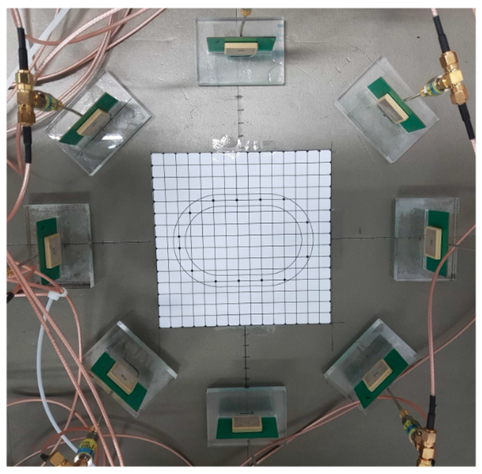
Abstract

This study proposes a method for estimating the position and rotation of the motorized capsule endoscope in real-time using the RF phase generated by the capsule endoscope in order to accurately determine the location of the lesion. The antenna uses a signal in the 900Mhz band, and the position and rotation is estimated through the phase difference of 8 antennas. We acquired samples from the 9 points inside the antenna array and interpolated the data at intervals of 1cm to acquire a local-specific phase pattern map. As a result, the mean error between the estimated data and measured data was less than 2cm for the x and y axes, respectively, and less than 15° for the degree.

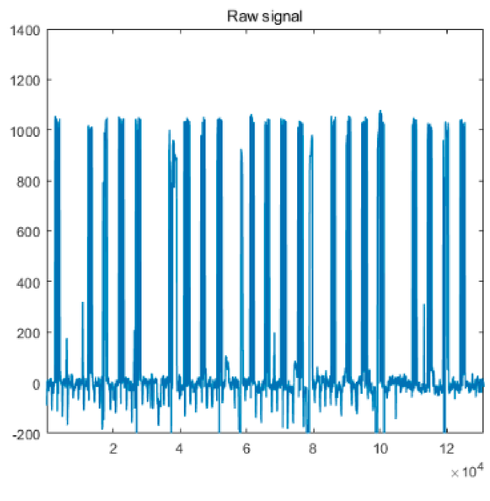
Methology

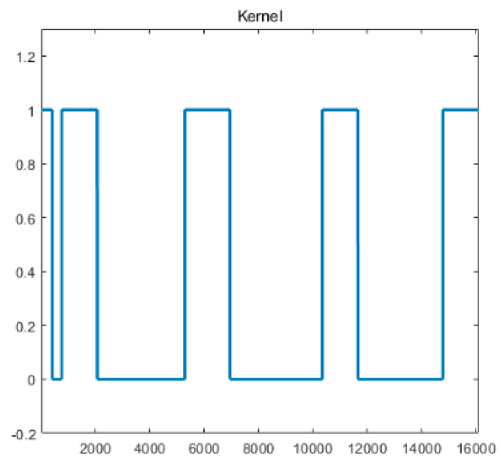
- Antenna array placement

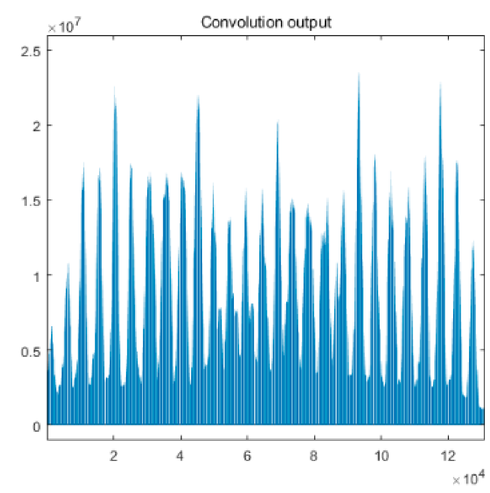


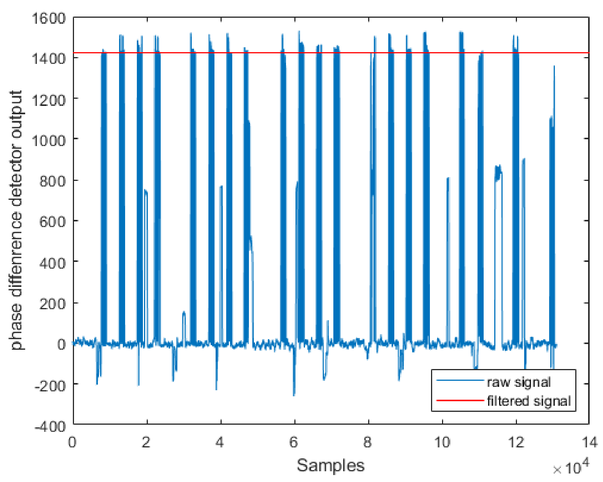


- Acquisition of the location-specific patterns

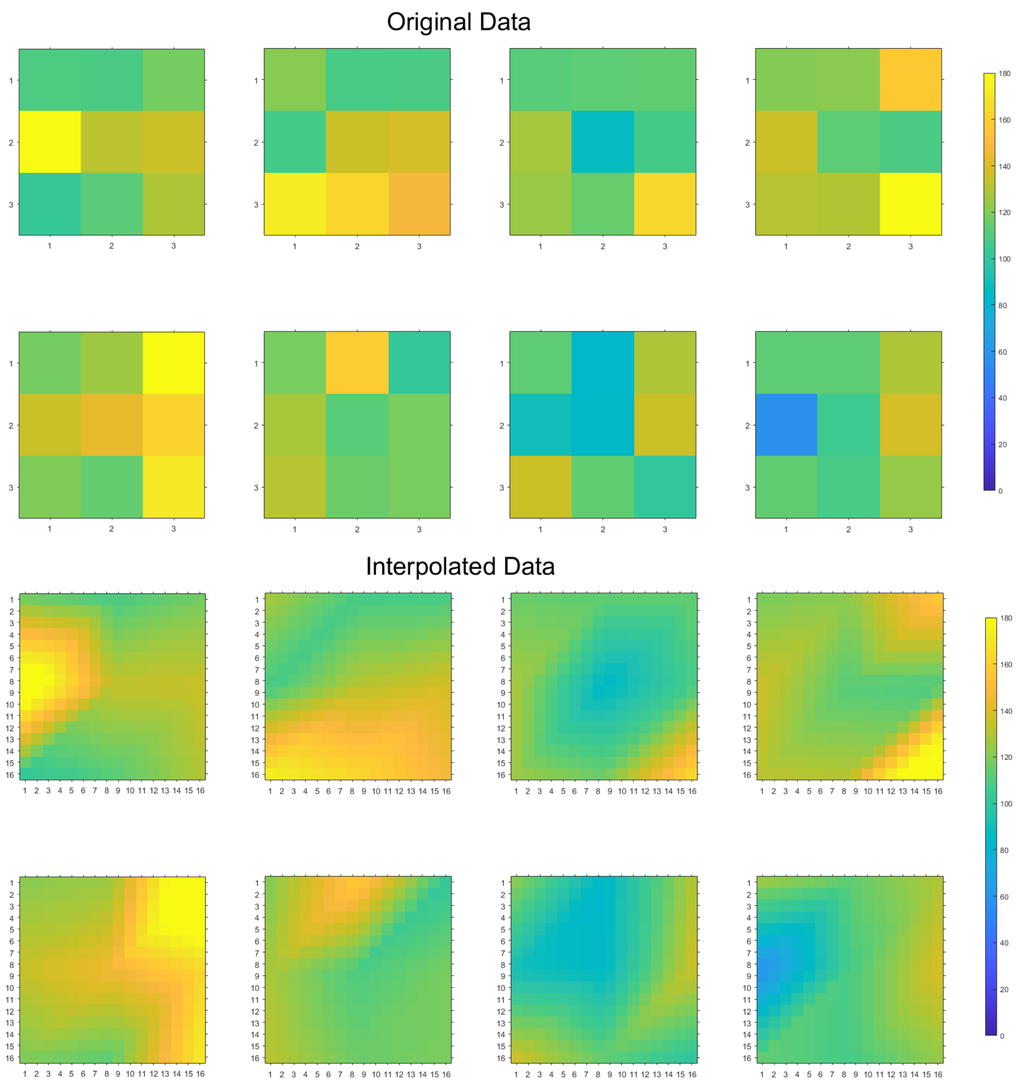




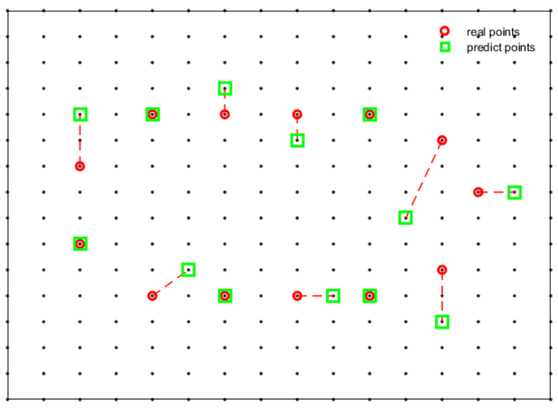


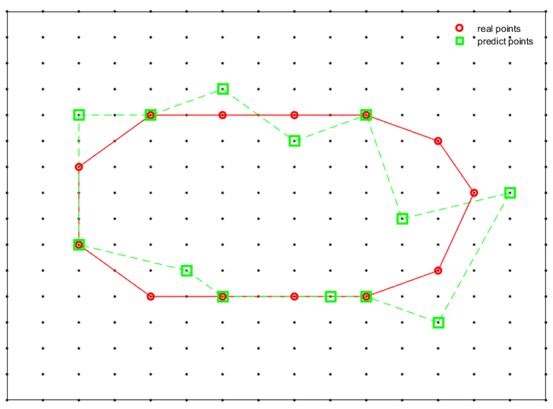


- Missing data interpolation



Result





Acknowledgments

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