E-Poster

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Diagnosis of Carpal Tunnel Syndrome Using Deep Learning With Comparative Guidance

Topic: Diagnosis

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BACKGROUND

This study aims to develop a deep learning model for a robust diagnosis of Carpal Tunnel Syndrome(CTS) based on comparative classification leveraging the ultrasound images of the thenar and hypothenar muscles.

METHODS

We recruited 152 participants, both patients with varying severities of CTS and healthy individuals. The enrolled patients underwent ultrasonography, which provided ultrasound image data of the thenar and hypothenar muscles from the median and ulnar nerves. These images were used to train a deep learning model. We compared the performance of our model with previous comparative methods using echo-intensity ratio or machine learning, and non-comparative methods based on deep learning. During the training process, comparative guidance based on cosine similarity was used so that the model learns to automatically identify the abnormal differences in echotexture between the ultrasound images of the thenar and hypothenar muscles.

RESULTS

The proposed deep learning model with comparative guidance showed the highest performance. The comparison of Receiver operating characteristic (ROC) curves between models demonstrated that the Comparative guidance was effective in autonomously identifying complex features within the CTS dataset.

CONCLUSION

The proposed deep learning model with comparative guidance was shown to be effective in automaically identifying important features for CTS diagnosis from the ultrasound images. The proposed comparative approach proved robust to traditional ultrasound issues like varying cut-off values and anatomical differences.

Statement of Disclosures

None of the authors have potential conflicts of interest to be disclosed.

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