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Preview of Abstract #17066

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MAIN INFORMATION

Abstract submitted

Title

Developing a novel computer-aided diagnostic technique based on deep learning and CT images for early HCC diagnosis

Preferred Presentation Format

Oral Presentation

Poster Presentation Format

-

Student Presentation Format

-

Topic

Artificial Intelligence & Machine Learning

Support programme applications

none

Authors

O. Lucidarme[1], V. Paradis[2], C. Guettier[3], I. Brocheriou[1], J. Shen[4], S. Poullot[4], V. K. LE[4], V. Vilgrain[2], M. Lewin-Zeitoun[3]; [1]Paris/FR, [2]Clichy/FR, [3]Villejuif Cedex/FR, [4]Valbonne/FR

BODY

studied a novel computer-aided diagnostic technique, based on deep learning (DL) to assist radiologists in improving the diagnosis accuracy on CT scans.

Methods or Background

The proposed DL model is a combination of a specifically designed convolutional 3D classifier and a state-of-the-art 3D detector (3D-RetinaUnet). It leverages the arterial and portal venous phases of CT scans as input and provides the locations of HCCs as output. The dataset is part of the Phenotyping Liver Cancer Registry (NCT04681274), which collects multiphase CT, and clinical data of liver cancer patients from multiple French sites (La Pitié-Salpêtrière, Beaujon and Paul Brousse).

Results or Findings

The training dataset is comprised of 705 CT scans with 1159 HCCs annotated by 3 expert radiologists. The test dataset consisted of 179 CT scans in which 181 HCCs were histopathologically confirmed, including 12 HCCs of small size (20 mm or less) and 42 of size between 20 and 30 mm. Our DL model reached a sensitivity of 75% for diagnosing HCCs between 10 and 20 mm, 88% for HCCs between 20 and 30 mm, and 98% for HCCs exceeding 30 mm in size with an average of 3 false positives per scan.

Conclusion

Our DL model could increase HCC diagnosis accuracy compared to state of the art (Sensitivity of 64% for diagnosing small HCCs). The next step is to refine our DL model further and augment the training dataset with more at-risk patients with small lesions.

Limitations

Lack of at-risk patients (benign patients) data and limited number of patients with early stage HCC for training and testing the algorithm.

Funding for this study

APHP and Median entered into a research collaboration agreement according to which Median technologies provides funding to APHP institution for this research project, gathered the CT scans and made the AI analysis

Has your study been approved by an ethics committee?

Yes

Ethics committee - additional information

IRB Number : CRM-1911-042-C

MULTICATEGORIES

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Imaging Technique

CT

Procedure

CAD, Computer Applications-Detection, diagnosis

Special Focus

Cancer, Cirrhosis

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