

Machine Learning Classification Of Liver Cancer Based On Computerized Tomography Scan Image Using Probabilistic Neural Network Model Algorithm

Rifaldy FAJAR^{*1}, Maria ROSALIA¹, Nana INDRI¹

¹Computational Biology Laboratory, Yogyakarta State University, INDONESIA

Background : The most common type of liver cancer is Hepatocellular carcinoma (HCC), which begins in the main type of liver cell (hepatocyte). Hepatocellular carcinoma occurs most often in people with chronic liver diseases, such as cirrhosis caused by hepatitis B or hepatitis C infection. Examinations carried out to determine the presence of HCC are by measuring the level of Alpha-Fetoprotein in the blood, radiographic diagnoses such as ultrasound examination, CT-Scan, and MRI, as well as performing a liver biopsy. HCC is often not identified because the symptoms of HCC are masked by the underlying disease. So we need a method to make it easier to identify HCC disease through CT-Scan images. In this study, an alternative machine learning algorithm is used, namely the Probabilistic Neural Network that works to classify HCC.

Methods : The method used in this study is Probabilistic Neural Network to identify HCC disease. The steps taken to identify HCC disease are starting with pre-processing using Gaussian filtering to improve image quality by reducing noise in the image, then segmentation using thresholding, morphology operators and find contour which aims to get image segmentation in the heart, as well as to feature extraction using a gray level co-occurrence matrix to analyze the texture of the image as input for the identification process. The image data used in this study were obtained from The Cancer Imaging Archive (TCIA) and Radiopedia.org.

Results : The test results obtained indicate that the proposed method is able to identify HCC disease with an accuracy obtained of 94%. The use of the gray level co-occurrence matrix method for the feature extraction process works well for recognizing objects so that they can identify HCC and normal categories.

Conclusions : The Probabilistic Neural Network method can identify HCC disease quite well based on the accuracy obtained exceeding 90%.

Corresponding Author : Rifaldy FAJAR (rifaldyfajar251@gmail.com)