

# Classifying gastric cancer carcinoma stages with deep semantic features and GLCM texture features

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**Abstract**—Gastric cancer is one of the leading health issues that contributes to cancer related deaths. The tricky thing about cancer is that it often goes undetected until at higher stages, which makes treatment less effective. The significant death rate from gastric cancer highlights the importance of a precise and prompt diagnosis. This paper aims to tackle this problem by proposing an approach to classify the early and advanced stages of gastric cancer. This importance of this study stems from its two-pronged strategy, which provides a deeper understanding of stomach cancer stages using texture analysis and deep learning. We take advantage of the strengths of deep learning features, Gray Level Co-occurrence Matrix (GLCM) features, and machine learning algorithm to create a diagnostic tool that is more precise and accurate. Medical images from gastric cancer dataset showing early and advanced stages of gastric cancers carcinoma are included to develop this model. Our method combines the effectiveness of texture features extracted from GLCM combined with deep semantic features and classify the stages with machine learning model. We carefully evaluated Machine learning classifiers namely Support Vector Machine (SVM), Decision Tree (DT), and K-nearest neighbour (KNN) to classify the early and advanced stages. Each classifier was evaluated with different performance measures. The Support Vector Machine (SVM) classifier demonstrated the best performance with an accuracy of 96.93%. This highlights the potential of SVM for diagnosing different cancer stages, which could have positive implications, for clinical practice.

**Keyword**— Classification, deep semantic features, Gastric Cancer, GLCM (Gray Level Co-occurrence Matrix), Texture Features, Machine Learning, Support Vector Machine (SVM)



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