# Chapter 7
# Endometrial Cancer Detection Using Pipeline Biopsies Through Machine Learning Techniques

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## ABSTRACT

*Endometrial carcinoma (EC) is a common uterine cancer that leads to morbidity and death linked to cancer. Advanced EC diagnosis exhibits a subpar treatment response and requires a lot of time and money. Data scientists and oncologists focused on computational biology due to its explosive expansion and computer-aided cancer surveillance systems. Machine learning offers prospects for drug discovery, early cancer diagnosis, and efficient treatment. It may be pertinent to use ML techniques in EC diagnosis, treatments, and prognosis. Analysis of ML utility in EC may spur research in EC and help oncologists, molecular biologists, biomedical engineers, and bioinformaticians advance collaborative research in EC. It also leads to customised treatment and the growing trend of using ML approaches in cancer prediction and monitoring. An overview of EC, its risk factors, and diagnostic techniques are covered in this study. It concludes a thorough investigation of the prospective ML modalities for patient screening, diagnosis, prognosis, and the deep learning models, which gave the good accuracy.*

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# 1. INTRODUCTION

There are currently no clinically established EC screening methods; instead, the usual diagnostic procedure for EC is endometrial biopsy with dilatation and curettage. Women with atypical endometrial hyperplasia (AEH), a precancerous kind of endometrial lesion, or stage 1A EC without muscle penetration should receive progestin treatment. The majority of women with EC have good results with surgery alone; however, high-grade, recurring, and metastatic EC are linked to worse outcomes. Therefore, rather than just presenting symptoms, routine screening, early identification, and accurate prediction of recurrence or survival after oncotherapeutic regimens may increase the survival of EC patients. This review discusses machine learning (ML)-based approaches and methods that could help in EC prognostication and prediction (Kurman et al., 2014).

In oncology, ML methods (algorithms) have developed to improve the accuracy of predictions of cancer susceptibility, recurrence, and survival. A variety of statistical, probabilistic, and optimization techniques are combined in the discipline of machine learning (ML), a branch of artificial intelligence (AI), to help computers "learn" from the samples they have previously seen and spot intricate patterns in large, noisy, or complex datasets. AI makes it possible for machines to carry out "cognitive" tasks for people, like language understanding, reasoning, and problem-solving (Lee et al., 2017). Without the need for explicit instructions, computers can find patterns in datasets that are available and draw conclusions from the data by employing an appropriate AI system. At the moment, AI has primarily been used in healthcare for image identification jobs.

## 1.1. Context

Endometrial cancer (EC) has become a tedious task to detect and as discovering techniques to find it out helps the women and also the economy, this project will help patients to detect endometrial cancer in its early stages and get treated at the right time (Fader et al., 2009).

The surgical and pathological staging of EC is determined using the International Federation of Gynecology and Obstetrics (FIGO) staging system. The majority of EC patients receive an early diagnosis (80% in stage I), and they have the highest 5-year survival rate of all gynaecological tumours (95%). A good prognosis can be shown in those with early detection or EC that is less risky. There are few available prognostic or therapeutic options for people with higher stage EC who have experienced recurrence, with 5-year survival rates for these patients ranging from 47% to 58% for stage III EC patients and 15% to 17% for stage IV EC patients. Costly screening and a high rate of misdiagnosis are the main causes of high illness rates.There are generally