

# Chapter 9

## Predictive Analytics Model for Breast Cancer Prognosis

**Shraddha Patel**

 <https://orcid.org/0009-0006-4958-4870>

*Amity University, Lucknow, India*

**Parul Verma**

 <https://orcid.org/0000-0002-1098-5822>

*Amity University, Lucknow, India*

### ABSTRACT

*Breast cancer remains a leading cause of mortality among women globally, necessitating the development of robust prognostic models to enhance patient outcomes and guide clinical decision-making. In this study, Our analysis incorporates critical cell details including Clump Thickness, Uniform Cell Size, Uniform Cell Shape, Marginal Adhesion, Single Epithelial Cell Size, Bare Nuclei, Bland Chromatin, Normal Nucleoli, and Mitoses. They are obtained through microscopic examination of stained breast tissue samples. Pathologists assess these features by evaluating the morphology and structure of cells under a microscope, quantifying each attribute to provide detailed cellular characteristics. The results indicate that machine learning models can provide significant insights into the factors influencing breast cancer prognosis. Among the models evaluated, the Decision Tree Classifier and SVC demonstrated superior performance in terms of accuracy and predictive power.*

DOI: 10.4018/979-8-3693-6308-9.ch009

## INTRODUCTION

Breast cancer is among the most prevalent cancers affecting women globally, representing about a quarter of all cancer cases diagnosed in women, as reported by the World Health Organization. The prognosis of breast cancer varies widely depending on several factors. Accurate prognostication is crucial for guiding treatment decisions, tailoring therapies to individual patients, and improving outcomes.

Over the past few decades, significant advancements have been made in identifying prognostic factors and developing models to predict patient outcomes. Traditional factors such as tumour size, lymph node involvement, and hormone receptor status remain important, but newer molecular markers and imaging techniques are providing additional insights. Furthermore, the advent of machine learning is opening new avenues for developing more accurate and personalized prognostic models.

This chapter aims to review the current state of breast cancer prognosis, evaluate recent advancements in prognostic factors and models, and discuss their clinical implications. By synthesizing the latest research, we hope to provide a comprehensive overview that can inform both clinical practices.

### Related Work

Breast cancer remains a basic wellbeing challenge around the world, requiring the improvement of successful prescient analytics models to upgrade forecast and treatment results. Later progressions in machine learning (ML) and profound learning (DL) have essentially contributed to this endeavor, giving effective devices for foreseeing cancer movement, repeat, and persistent survival.

Traditional machine learning methods such as Bolster Vector Machines (SVM), Choice Trees (DT), and k-Nearest Neighbors (k-NN) have been broadly utilized in breast cancer guess. For occurrence, Ahmad et al. (2013) investigated the adequacy of these strategies in foreseeing breast cancer repeat, emphasizing the significance of selecting and fine-tuning models for ideal execution. Also, Yoo, Kim, and Ahn (2016) illustrated the application of these ML models in clinical settings, utilizing real-world datasets to make strides demonstrative exactness and help in personalized treatment arranging. SVMs, in specific, have regularly been found to beat other classifiers in terms of exactness when foreseeing breast cancer results based on quiet information (Arora et al., 2014).

Comparative considers have moreover been significant in recognizing the most compelling models for breast cancer guess. Delen, Walker, and Kadam (2005) conducted a comprehensive comparison of three information mining procedures, highlighting the significance of selecting the suitable show based on the particular characteristics of the dataset and clinical prerequisites. Cruz and Wishart (2007)

16 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: [www.igi-global.com/chapter/predictive-analytics-model-for-breast-cancer-prognosis/368132](http://www.igi-global.com/chapter/predictive-analytics-model-for-breast-cancer-prognosis/368132)

## Related Content

---

### Listening to Images: Exploring Alternate Access to a Digital Collection

Kathleen C. Lonbom (2014). *Assistive Technologies: Concepts, Methodologies, Tools, and Applications* (pp. 1571-1579).

[www.irma-international.org/chapter/listening-to-images/80689](http://www.irma-international.org/chapter/listening-to-images/80689)

### Assistive Technologies for Children and Adolescents With Autism Spectrum Disorders

Leila Goosen (2022). *Assistive Technologies for Assessment and Recovery of Neurological Impairments* (pp. 1-24).

[www.irma-international.org/chapter/assistive-technologies-for-children-and-adolescents-with-autism-spectrum-disorders/288125](http://www.irma-international.org/chapter/assistive-technologies-for-children-and-adolescents-with-autism-spectrum-disorders/288125)

### Accessibility and Usability Issues

Eugene Monaco, Stephen Lackey, Edward Skawinski, Rebecca Stanley and Carol Day Young (2014). *Assistive Technologies: Concepts, Methodologies, Tools, and Applications* (pp. 884-904).

[www.irma-international.org/chapter/accessibility-and-usability-issues/80648](http://www.irma-international.org/chapter/accessibility-and-usability-issues/80648)

### Augmentative and Alternative Communication Devices: The Voices of Adult Users

Martine Smith and Janice Murray (2014). *Assistive Technologies: Concepts, Methodologies, Tools, and Applications* (pp. 991-1004).

[www.irma-international.org/chapter/augmentative-and-alternative-communication-devices/80655](http://www.irma-international.org/chapter/augmentative-and-alternative-communication-devices/80655)

### Empathetic Technology: Integrating Emotional Intelligence Into Assistive Devices for Aging Adults and Individuals With Disabilities

Durgansh Sharma (2025). *Assistive Technology Solutions for Aging Adults and Individuals With Disabilities* (pp. 73-88).

[www.irma-international.org/chapter/empathetic-technology/368126](http://www.irma-international.org/chapter/empathetic-technology/368126)