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# AI-Driven WPF for Dental X-Ray Analysis

**AI-Powered Dental Diagnostics**

- Webapp Creation
- Advanced Visualization Techniques
- Dynamic Scaling
- Automated Data Structuring

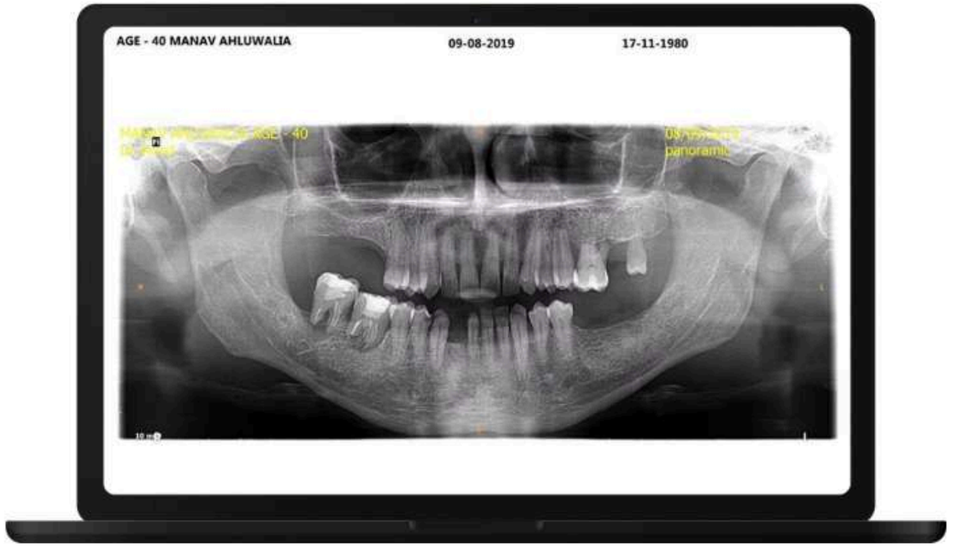
# Overview

**Dentist AI WPF** is an advanced **AI-powered dental X-ray analysis system** designed to assist dental professionals in detecting and visualizing oral health issues more efficiently. The solution enables users to upload X-ray images, analyze them for abnormalities, and highlight findings interactively. By integrating AI-driven analysis with a user-friendly **WPF-based desktop interface**, this system improves accuracy, speeds up diagnosis, and enhances visualization for better decision-making.

# Client

**NDA Protected** **US**

**Better Diagnostics** is an AI-driven healthcare technology company specializing in intelligent automation for dental diagnostics. With over 15 years of experience, their leadership team is committed to leveraging AI to enhance clinical workflows, improve accuracy, and make high-quality dental assessments more accessible worldwide.



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# Requirement

Dentists rely heavily on X-ray imaging to diagnose oral health issues, but manual analysis can be time-consuming and prone to **human error**.

The client required a **WPF-based desktop application** while offering improved image handling and visualization features.

The goal was to ensure an intuitive, efficient, and AI-powered diagnostic process that enhanced the accuracy of dental assessments.

The solution enables users to upload X-ray images, analyze them for abnormalities, and highlight findings interactively.

# Challenges

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Before implementing **Dentist AI WPF**, the client faced several challenges in their existing dental X-ray analysis practices:

## Manual X-ray Analysis

Dentists had to manually examine X-ray images, making it a time-consuming process prone to human error. Identifying and marking findings required significant effort, leading to inconsistencies in diagnosis.

## Inconsistent Visualization

The existing system lacked a standardized way to highlight and categorize findings. Important dental issues could be overlooked due to unclear or non-uniform visual indicators.

## UI and Workflow Inefficiencies

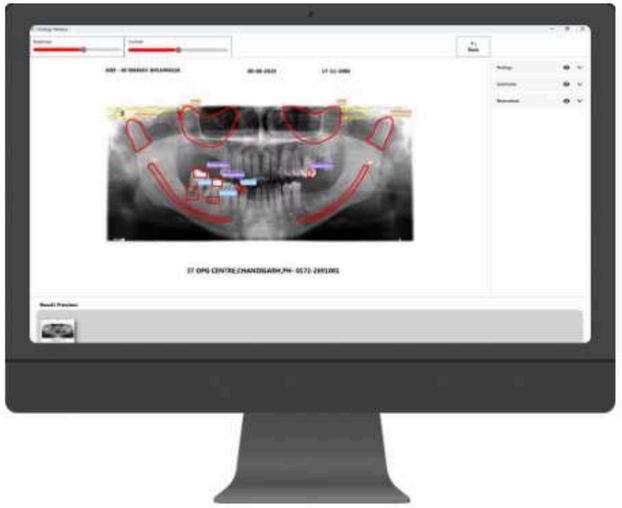
The previous web-based solution (built on Angular) did not fully meet usability expectations in a desktop environment. Navigating through multiple images and interacting with findings was not intuitive.

## Multi-Image Handling Limitations

The earlier system struggled with managing multiple X-ray images efficiently. Dentists needed a seamless way to upload, compare, and analyze several images without disrupting workflow.

# Project Goals

Following are the project goals that have been achieved throughout -



## WPF-based UI

Develop a **WPF-based UI** that closely replicates the Angular web interface.

## Accurate Alignment

Ensure that **drawings align accurately** with X-ray images.

## Comparison Feature

Implement a **comparison popup** to differentiate between original and processed images.

## Enhanced Visibility

Enhance finding visibility through **color-coded text and highlighting**.

## Multiple Images Uploads

Enable **multiple image uploads** and seamless drawing generation.

# Solution

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## Technology Stack

Microsoft WPF

XAML

Microsoft .NET

## Duration & Resources

**Time Taken: 10 months**

**Resources: 4 Specialists**

To ensure seamless execution, our team began with an in-depth study of the **existing Angular-based web interface**, analyzing its workflow and identifying key pain points. The solution successfully **integrated AI-driven image processing with an intuitive desktop interface**, providing dental professionals with a **powerful and efficient diagnostic tool**. A **structured development approach** was adopted, focusing on:

### UI Consistency

We recreated the interface within WPF to mirror the web version's layout and flow, ensuring a seamless user transition with no compromise in usability.

### Dynamic Scaling & Drawing Accuracy

To maintain precise alignment of AI-generated drawings on X-ray images, we implemented dynamic scaling logic that adjusted overlays in real time, regardless of zoom level or image resolution.

### Enhanced Visualization

Using color-coded highlights and annotations, we improved the clarity of diagnostic findings. Users could interact with layers, zoom into details, and compare original vs processed views with ease.

### Multi-Image Handling

We enabled smooth upload and navigation across multiple X-rays, supporting workflows where side-by-side comparison and multi-image analysis were critical.

### Optimized Performance

The desktop app was fine-tuned for responsiveness and fast image rendering, ensuring smooth operation even with large, high-resolution X-rays.

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# Project Outcomes

Following are the outcomes we achieved -

## 90%

### Accurate Drawing Placement

Dynamic scaling ensures drawings align correctly with X-ray images, enhancing diagnostic precision.

## 100%

### UI Enhancement Success

The WPF-based UI closely mirrors the Angular web application, ensuring a seamless transition.

## 85%

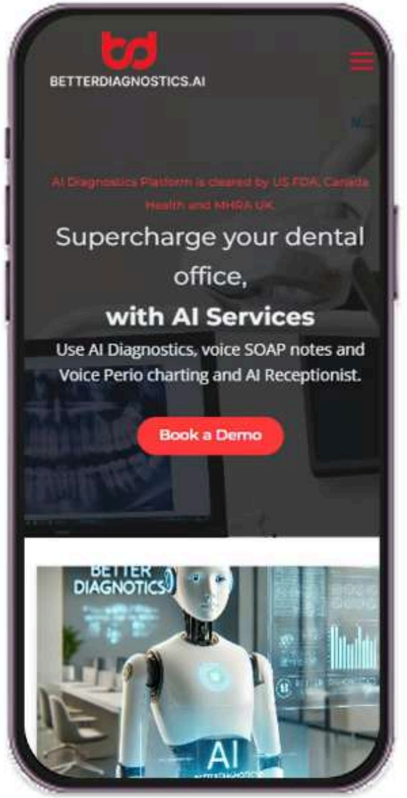
### Improved Readability and Visualization

Color-coded text and highlighting make findings more visible and actionable.

## 70%

### Multiple-Image Support

Users can now upload and analyze multiple images simultaneously, improving workflow efficiency.



# Client Testimonial

> ***"Since we started using the new system, reviewing dental X-rays has become a lot faster and more accurate. The AI catches things we used to miss, and everything is much clearer on-screen. It's made our day-to-day workflow easier and really helped us stay focused on patient care."***