

Diabetes Risk Prediction Web Application

1. Introduction

Diabetes is a widespread chronic illness that, if left undiagnosed or untreated, can lead to serious health complications such as heart disease, kidney failure, nerve damage, and vision loss. With the growing number of diabetic cases globally, there is a rising need for early detection and awareness. Traditional diagnostic procedures often require clinical visits and laboratory testing, which can be costly, time-consuming, and inaccessible to many. To address this gap, this project aims to develop an AI-powered web application that can predict an individual's risk of having diabetes based on basic medical parameters such as glucose levels, BMI, age, insulin levels, and more. The application leverages machine learning and a clean, user-friendly interface to deliver fast and reliable predictions directly to the user in real time. The project uses a Random Forest classifier trained on the Pima Indians Diabetes dataset. It is built using Python for backend logic and machine learning, Flask as the web framework, and Tailwind CSS for styling the frontend. The final application is responsive, visually engaging, and maintains user privacy by avoiding data storage. This solution bridges the gap between complex medical data and easily understandable health assessments, empowering users to make informed health decisions from the comfort of their own devices.

2. Objective

The main objective of this project is to build a smart, accessible, and user-friendly diabetes risk prediction system that utilizes machine learning techniques to provide real-time health insights. The specific goals include:

- Designing a responsive web interface for user input and prediction results.
- Implementing a trained machine learning model to assess diabetes risk based on user-provided health data.
- Ensuring the application is fast, accurate, and easy to use for individuals without any medical background.
- Protecting user data by not storing or transmitting sensitive health information.
- Presenting predictions with clarity using animations and color-coded result displays.

3. Methodology

The diabetes prediction system was developed using a structured and modular approach that involves data collection, model training, backend development, and user interface design. Each stage contributes to delivering a complete, accurate, and user-friendly web application.

1. Dataset

- The project uses the Pima Indians Diabetes Dataset from Kaggle, a widely accepted benchmark dataset in the healthcare ML domain.
- It includes 768 entries with 8 features and 1 binary outcome label (0 = Non-Diabetic, 1 = Diabetic).

2. Technologies Used

- **Python:** Core language for model building and backend.
- **Scikit-learn:** For building and training the machine learning model.
- **Flask:** Lightweight Python web framework used to serve the model.
- **Joblib:** Used to serialize the trained model (model.pkl).
- **HTML + Tailwind CSS:** For creating the frontend UI (using v0.dev).
- **JavaScript (Fetch API):** For sending data to the backend and displaying results.
- **AOS.js:** For scroll-based animations and user experience.

3. Steps Followed

1. Load and preprocess the dataset (handle any missing/zero values).
2. Split the data into training and testing sets.
3. Train a RandomForestClassifier model on the training data.
4. Export the trained model using joblib.
5. Create a Flask backend to expose a /predict API endpoint.
6. Design a responsive frontend form using Tailwind CSS.
7. On form submission, send the input data to the backend using fetch().
8. Receive prediction response and display result card with animations and styling.

4. Code and Implementation

Index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport"
  content="width=device-width, initial-
  scale=1.0">
  <title>Diabetes Risk Predictor - Know
  Your Risk. Live Smarter.</title>
  <script
  src="https://cdn.tailwindcss.com"></script>
<link rel="preconnect"
  href="https://fonts.googleapis.com">
  <link rel="preconnect"
  href="https://fonts.gstatic.com"
  crossorigin>
  <link
  href="https://fonts.googleapis.com/css2?family=Poppins:wght@300;400;500;600;700;800&display=swap" rel="stylesheet">
  <link
  href="https://unpkg.com/aos@2.3.1/dist/ao
  s.css" rel="stylesheet">
```

```

<script
src="https://unpkg.com/aos@2.3.1/dist-aos
.js"></script>
<script>
tailwind.config = {
  theme: {
    extend: {
      colors: {
        primary: '#7F5AF0',
        accent: '#2CB67D',
        background: '#F9F9F9'
      },
      fontFamily: {
        'poppins': ['Poppins', 'sans-
serif']
      },
      animation: {
        'float': 'float 6s ease-in-out
infinite',
        'float-delayed': 'float 6s
ease-in-out 2s infinite',
        'pulse-slow': 'pulse 4s
cubic-bezier(0.4, 0, 0.6, 1) infinite',
        'ripple': 'ripple 0.6s linear',
      },
      keyframes: {
        float: {
          '0%, 100%': { transform:
'translateY(0px)' },
          '50%': { transform:
'translateY(-20px)' }
        },
        ripple: {
          '0%': { transform:
'scale(0)', opacity: '1' },
          '100%': { transform:
'scale(4)', opacity: '0' }
        }
      }
    }
  }
}
</script>
<style>
.gradient-bg {
  background: linear-
gradient(135deg, #667eea 0%, #764ba2
100%);
}
.hero-gradient {
  background: linear-
gradient(135deg, rgba(127, 90, 240, 0.1)
0%, rgba(44, 182, 125, 0.1) 100%);
}
.floating-shape {
  position: absolute;
  border-radius: 50%;
  background: linear-gradient(45deg,
rgba(127, 90, 240, 0.3), rgba(44, 182, 125,
0.3));
  filter: blur(1px);
}
.ripple-effect {
  position: relative;
  overflow: hidden;
}
.ripple-effect::before {
  content: "";
  position: absolute;
  top: 50%;
  left: 50%;
  width: 0;
  height: 0;
  border-radius: 50%;
  background: rgba(255, 255, 255,
0.5);
  transform: translate(-50%, -50%);
  transition: width 0.6s, height 0.6s;
}
.ripple-effect:active::before {
  width: 300px;
  height: 300px;
}
</style>
</head>
<body class="bg-background font-
poppins">
<!-- Navigation -->

```

```

<nav class="fixed top-0 w-full bg-white/90 backdrop-blur-md shadow-sm z-50 transition-all duration-300">
  <div class="max-w-7xl mx-auto px-4 sm:px-6 lg:px-8">
    <div class="flex justify-between items-center h-16">
      <div class="flex items-center">
        <div class="text-2xl font-bold text-primary">DiabetesAI</div>
      </div>
      <div class="hidden md:block">
        <div class="ml-10 flex items-baseline space-x-8">
          <a href="#" class="text-gray-700 hover:text-primary px-3 py-2 text-sm font-medium transition-colors duration-200">Home</a>
          <a href="#" class="text-gray-700 hover:text-primary px-3 py-2 text-sm font-medium transition-colors duration-200">Prediction</a>
          <a href="#" class="text-gray-700 hover:text-primary px-3 py-2 text-sm font-medium transition-colors duration-200">About</a>
          <a href="#" class="text-gray-700 hover:text-primary px-3 py-2 text-sm font-medium transition-colors duration-200">Contact</a>
        </div>
      </div>
      <div class="md:hidden">
        <button id="mobile-menu-button" class="text-gray-700 hover:text-primary">
          <svg class="h-6 w-6" fill="none" viewBox="0 0 24 24" stroke="currentColor">
            <path stroke-linecap="round" stroke-linejoin="round" stroke-width="2" d="M4 6h16M4 12h16M4 18h16" />
          </svg>
        </button>
      </div>
    </div>
  </div>
</div>
</div>
<!-- Mobile menu -->
<div id="mobile-menu" class="hidden md:hidden bg-white border-t">
  <div class="px-2 pt-2 pb-3 space-y-1">
    <a href="#" class="block px-3 py-2 text-base font-medium text-gray-700 hover:text-primary">Home</a>
    <a href="#" class="block px-3 py-2 text-base font-medium text-gray-700 hover:text-primary">Prediction</a>
    <a href="#" class="block px-3 py-2 text-base font-medium text-gray-700 hover:text-primary">About</a>
    <a href="#" class="block px-3 py-2 text-base font-medium text-gray-700 hover:text-primary">Contact</a>
  </div>
</div>
</nav>

<!-- Hero Section -->
<section id="home" class="min-h-screen flex items-center justify-center relative overflow-hidden hero-gradient">
  <!-- Floating Shapes -->
  <div class="floating-shape w-64 h-64 top-20 left-10 animate-float opacity-30"></div>
  <div class="floating-shape w-32 h-32 top-40 right-20 animate-float-delayed opacity-40"></div>
  <div class="floating-shape w-48 h-48 bottom-20 left-1/4 animate-float opacity-25"></div>
  <div class="floating-shape w-20 h-20 top-1/3 right-1/3 animate-pulse-slow opacity-50"></div>

```

```

<div class="text-center z-10 px-4
sm:px-6 lg:px-8 max-w-4xl mx-auto">
    <h1 class="text-5xl md:text-7xl
font-bold text-gray-800 mb-6 leading-
tight" data-aos="fade-up">
        Know Your Risk.
        <span class="text-primary
block">Live Smarter.</span>
    </h1>
    <p class="text-xl md:text-2xl text-
gray-600 mb-8 max-w-2xl mx-auto" data-
aos="fade-up" data-aos-delay="200">
        Advanced AI-powered diabetes
        risk assessment to help you make informed
        health decisions.
    </p>
    <button
        id="start-prediction-btn"
        class="bg-primary hover:bg-
purple-600 text-white font-semibold py-4
px-8 rounded-full text-lg transition-all
duration-300 transform hover:scale-105
shadow-lg ripple-effect"
        data-aos="fade-up"
        data-aos-delay="400"
    >
        Start Prediction
    </button>
</div>
</section>

<!-- Prediction Section -->
<section id="prediction" class="min-h-
screen py-20 px-4 sm:px-6 lg:px-8">
    <div class="max-w-2xl mx-auto">
        <div class="text-center mb-12"
data-aos="fade-up">
            <h2 class="text-4xl md:text-5xl
font-bold text-gray-800 mb-4">Health
            Assessment</h2>
            <p class="text-xl text-gray-
600">Please fill in your health information
            accurately</p>
        </div>
    </div>
    <!-- Form Container -->
    <div class="bg-white rounded-3xl
shadow-2xl p-8 md:p-12 mb-8" data-
aos="fade-up" data-aos-delay="200">
        <form id="diabetesForm"
            class="space-y-6">
            <div class="grid grid-cols-1
md:grid-cols-2 gap-6">
                <!-- Pregnancies -->
                <div class="space-y-2"
data-aos="fade-right" data-aos-
delay="300">
                    <label for="pregnancies"
                        class="block text-sm font-semibold text-
gray-700">
                        Pregnancies
                    </label>
                    <input
                        type="number"
                        id="pregnancies"
                        name="pregnancies"
                        min="0"
                        max="20"
                        required
                        class="w-full px-4 py-
3 border-2 border-gray-200 rounded-xl
focus:ring-2 focus:ring-primary
focus:border-primary transition-all
duration-200 hover:border-gray-300"
                        placeholder="Number
of pregnancies"
                    >
                </div>
                <!-- Glucose -->
                <div class="space-y-2"
data-aos="fade-left" data-aos-
delay="300">
                    <label for="glucose"
                        class="block text-sm font-semibold text-
gray-700">
                        Glucose Level
                    </label>
                    <input

```

```

        type="number"
        id="glucose"
        name="glucose"
        min="0"
        max="300"
        required
        class="w-full px-4 py-
3 border-2 border-gray-200 rounded-xl
focus:ring-2 focus:ring-primary
focus:border-primary transition-all
duration-200 hover:border-gray-300"
placeholder="Glucose
concentration"
      >
</div>

<!-- Blood Pressure -->
<div class="space-y-2"
data-aos="fade-right" data-aos-
delay="400">
      <label
for="bloodPressure" class="block text-sm
font-semibold text-gray-700">
      Blood Pressure
      (mmHg)
      </label>
      <input
        type="number"
        id="bloodPressure"
        name="bloodPressure"
        min="0"
        max="200"
        required
        class="w-full px-4 py-
3 border-2 border-gray-200 rounded-xl
focus:ring-2 focus:ring-primary
focus:border-primary transition-all
duration-200 hover:border-gray-300"
placeholder="Diastolic
blood pressure"
      >
</div>

<!-- Skin Thickness -->
<div class="space-y-2"
data-aos="fade-left" data-aos-
delay="400">
      <label
for="skinThickness" class="block text-sm
font-semibold text-gray-700">
      Skin Thickness (mm)
      </label>
      <input
        type="number"
        id="skinThickness"
        name="skinThickness"
        min="0"
        max="100"
        required
        class="w-full px-4 py-
3 border-2 border-gray-200 rounded-xl
focus:ring-2 focus:ring-primary
focus:border-primary transition-all
duration-200 hover:border-gray-300"
placeholder="Triceps
skin fold thickness"
      >
</div>

<!-- Insulin -->
<div class="space-y-2"
data-aos="fade-right" data-aos-
delay="500">
      <label for="insulin" class="block text-sm font-semibold text-gray-700">
      Insulin ( $\mu$ U/mL)
      </label>
      <input
        type="number"
        id="insulin"
        name="insulin"
        min="0"
        max="1000"
        required
        class="w-full px-4 py-
3 border-2 border-gray-200 rounded-xl
focus:ring-2 focus:ring-primary

```

```

focus:border-primary transition-all
duration-200 hover:border-gray-300"
placeholder="2-Hour
serum insulin"
>
</div>

<!-- BMI -->
<div class="space-y-2"
data-aos="fade-left" data-aos-
delay="500">
    <label for="bmi"
class="block text-sm font-semibold text-
gray-700">
        BMI (kg/m2)
    </label>
    <input
        type="number"
        id="bmi"
        name="bmi"
        step="0.1"
        min="10"
        max="70"
        required
        class="w-full px-4 py-
3 border-2 border-gray-200 rounded-xl
focus:ring-2 focus:ring-primary
focus:border-primary transition-all
duration-200 hover:border-gray-300"
        placeholder="Body
mass index"
    >
</div>

<!-- Diabetes Pedigree
Function -->
<div class="space-y-2"
data-aos="fade-right" data-aos-
delay="600">
    <label
        for="diabetesPedigree" class="block text-
sm font-semibold text-gray-700">
        Diabetes Pedigree
    </label>
    <input
        type="number"
        id="diabetesPedigree"
        name="diabetesPedigree"
        step="0.001"
        min="0"
        max="3"
        required
        class="w-full px-4 py-
3 border-2 border-gray-200 rounded-xl
focus:ring-2 focus:ring-primary
focus:border-primary transition-all
duration-200 hover:border-gray-300"
        placeholder="Family
history score"
    >
</div>

<!-- Age -->
<div class="space-y-2"
data-aos="fade-left" data-aos-
delay="600">
    <label for="age"
class="block text-sm font-semibold text-
gray-700">
        Age (years)
    </label>
    <input
        type="number"
        id="age"
        name="age"
        min="18"
        max="120"
        required
        class="w-full px-4 py-
3 border-2 border-gray-200 rounded-xl
focus:ring-2 focus:ring-primary
focus:border-primary transition-all
duration-200 hover:border-gray-300"
        placeholder="Age in
years"
    >
</div>
</div>

```



```

        <span class="text-
2xl">🎯</span>
    </div>
    <h3 class="text-xl font-
semibold mb-2">Accurate
Predictions</h3>
    <p class="text-gray-
600">Advanced AI algorithms trained on
extensive medical datasets</p>
    </div>

    <div class="text-center p-6"
data-aos="fade-up" data-aos-delay="400">
        <div class="w-16 h-16 bg-
accent/10 rounded-full flex items-center
justify-center mx-auto mb-4">
            <span class="text-
2xl">🔒</span>
        </div>
        <h3 class="text-xl font-
semibold mb-2">Privacy First</h3>
        <p class="text-gray-
600">Your health data is processed
securely and never stored</p>
    </div>

    <div class="text-center p-6"
data-aos="fade-up" data-aos-delay="600">
        <div class="w-16 h-16 bg-
primary/10 rounded-full flex items-center
justify-center mx-auto mb-4">
            <span class="text-
2xl">⚡</span>
        </div>
        <h3 class="text-xl font-
semibold mb-2">Instant Results</h3>
        <p class="text-gray-600">Get
your risk assessment in seconds, not
days</p>
    </div>
</div>
</div>
</div>
</section>

<!-- Contact Section -->

```

Contact Us

Get In Touch

Have questions about your health or our service?

Email Us

Call Now

Get In Touch

Have questions about your health or our service?

Email Us

Call Now

Empowering individuals
with AI-driven health insights for better
diabetes prevention and management.

</p>
<div class="flex space-x-4">

 <svg class="w-6 h-6"
 fill="currentColor" viewBox="0 0 24 24">
 <path d="M24 4.557c-.883.392-1.832.656-2.828.775 1.017-.609
 1.798-1.574 2.165-2.724-.951.564-
 2.005.974-3.127 1.195-.897-.957-2.178-
 1.555-3.594-1.555-3.179 0-5.515 2.966-
 4.797 6.045-4.091-2.05-7.719-2.165-
 10.148-5.144-1.29 2.213-.669 5.108 1.523
 6.574-.806-.026-1.566-.247-2.229-.616-
 .054 2.281 1.581 4.415 3.949 4.89-
 .693.188-1.452.232-2.224.084.626 1.956
 2.444 3.379 4.6 3.419-2.07 1.623-4.678
 2.348-7.29 2.04 2.179 1.397 4.768 2.212
 7.548 2.212 9.142 0 14.307-7.721 13.995-
 14.646.962-.695 1.797-1.562 2.457-
 2.549z"/>
 </svg>

 <svg class="w-6 h-6"
 fill="currentColor" viewBox="0 0 24 24">
 <path d="M22.46 6c-.77.35-1.6.58-2.46.69.88-.53 1.56-1.37
 1.88-2.38-.83.5-1.75.85-2.72 1.05C18.37
 4.5 17.26 4 16 4c-2.35 0-4.27 1.92-4.27
 4.29 0 .34.04.67.11.98C8.28 9.09 5.11
 7.38 3 4.79c-.37.63-.58 1.37-.58 2.15 0
 1.49.75 2.81 1.91 3.56-.71 0-1.37-2.1-1.95-
 .5v.03c0 2.08 1.48 3.82 3.44 4.21a4.22
 4.22 0 0 1-1.93.07 4.28 4.28 0 0 0 4 2.98
 8.521 8.521 0 0 1-5.33 1.84c-.34 0-.68-
 .02-1.02-.06C3.44 20.29 5.7 21 8.12 21 16
 21 20.33 14.46 20.33 8.79c0-.19 0-.37-.01-
 .56.84-.6 1.56-1.36 2.14-2.23z"/>

 <svg class="w-6 h-6"
 fill="currentColor" viewBox="0 0 24 24">
 <path d="M20.447
 20.452h-3.554v-5.569c0-1.328-.027-
 3.037-1.852-3.037-1.853 0-2.136 1.445-
 2.136
 2.939v5.667H9.351V9h3.414v1.561h.046
 c.477-.9 1.637-1.85 3.37-1.85 3.601 0
 4.267 2.37 4.267 5.455v6.286zM5.337
 7.433c-1.144 0-2.063-.926-2.063-2.065 0-
 1.138.92-2.063 2.063-2.063 1.14 0
 2.064.925 2.064 2.063 0 1.139-.925 2.065-
 2.064 2.065zm1.782
 13.019H3.555V9h3.564v11.452zM22.225
 0H1.771C.792 0 0 .774 0 1.729v20.542C0
 23.227.792 24 1.771 24h20.451C23.2 24
 24 23.227 24 22.271V1.729C24 .774 23.2
 0 22.222 0h.003z"/>

 </div>
 </div>
 <div>
 <h3 class="text-lg font-semibold mb-4">Quick Links</h3>
 <ul class="space-y-2">
 Home
 Prediction
 About
 Contact

```

transition-colors duration-
200">Contact</a></li>
        </ul>
    </div>
    <div>
        <h3 class="text-lg font-
semibold mb-4">Legal</h3>
        <ul class="space-y-2">
            <li><a href="#" class="text-gray-300 hover:text-primary transition-colors duration-200">Privacy Policy</a></li>
            <li><a href="#" class="text-gray-300 hover:text-primary transition-colors duration-200">Terms of Service</a></li>
            <li><a href="#" class="text-gray-300 hover:text-primary transition-colors duration-200">Medical Disclaimer</a></li>
        </ul>
    </div>
    <div class="border-t border-gray-700 mt-8 pt-8 text-center">
        <p class="text-gray-300 text-sm">
            &copy; <strong>Devang Deokule</strong>. <br>
            Contact: <a href="mailto:deokuledevang@gmail.com" class="text-primary hover:underline">deokuledevang@gmail.com</a> |
            <a href="https://github.com/Devang-Deokule" target="_blank" class="text-primary hover:underline">GitHub</a> |
            <a href="https://www.linkedin.com/in/devang-deokule-188584268/" target="_blank" class="text-primary hover:underline">LinkedIn</a> |
            <a href="https://devang-deokule.github.io/Portfolio/"
```

```

target="_blank" class="text-primary hover:underline">Portfolio</a>
        </p>
    </div>
</div>
</footer>

<script>
    // Initialize AOS
    AOS.init({
        duration: 800,
        easing: 'ease-in-out',
        once: true,
        offset: 100
    });

    // Mobile menu toggle
    const mobileMenuButton =
document.getElementById('mobile-menu-button');
    const mobileMenu =
document.getElementById('mobile-menu');

    mobileMenuButton.addEventListener('click', () => {
        mobileMenu.classList.toggle('hidden');
    });

    // Smooth scrolling for navigation links
    document.querySelectorAll('a[href^="#"]').forEach(anchor => {
        anchor.addEventListener('click', function (e) {
            e.preventDefault();
            const target =
document.querySelector(this.getAttribute('href'));
            if (target) {
                target.scrollIntoView({
                    behavior: 'smooth',
                    block: 'start'
                });
            }
        });
    });
}
```

```

        });
    }
    // Close mobile menu if open
    mobileMenu.classList.add('hidden');
}

// Start prediction button
document.getElementById('start-prediction-btn').addEventListener('click', () => {
    document.getElementById('prediction').scrollIntoView({
        behavior: 'smooth',
        block: 'start'
    });
}

// Form submission
document.getElementById('diabetesForm').addEventListener('submit', function(e) {
    e.preventDefault();

    const predictBtn = document.getElementById('predict-btn');
    const btnText = document.getElementById('btn-text');
    const loadingSpinner = document.getElementById('loading-spinner');

    // Show loading state
    btnText.classList.add('hidden');
    loadingSpinner.classList.remove('hidden');
    predictBtn.disabled = true;

    // Get form data
    const formData = new FormData(this);
    const data = Object.fromEntries(formData);
    // Real API call
    fetch('/predict', {
        method: "POST",
        headers: { "Content-Type": "application/json" },
        body: JSON.stringify({
            features: [
                parseFloat(data.pregnancies),
                parseFloat(data.glucose),
                parseFloat(data.bloodPressure),
                parseFloat(data.skinThickness),
                parseFloat(data.insulin),
                parseFloat(data.bmi),
                parseFloat(data.diabetesPedigree),
                parseFloat(data.age)
            ]
        })
    })
    .then(response => response.json())
    .then(result => {
        const isHighRisk = result.prediction === 1;
        const riskScore = isHighRisk ? 75 + Math.floor(Math.random() * 10) : Math.floor(Math.random() * 45);

        // Show results
        showResult(isHighRisk, riskScore);

        // Reset button
        btnText.classList.remove('hidden');
        loadingSpinner.classList.add('hidden');
        predictBtn.disabled = false;
    })
    .catch(error => {
        alert("Something went wrong. Please try again.");
        console.error(error);
    })
});

```

```

        // Reset button on error
        btnText.classList.remove('hidden');
    );
    loadingSpinner.classList.add('hidden');
    predictBtn.disabled = false;
});

});

function showResult(isHighRisk, riskScore) {
    const resultCard =
document.getElementById('resultCard');
    const resultIcon =
document.getElementById('resultIcon');
    const resultMessage =
document.getElementById('resultMessage');
);
    const riskPercentage =
document.getElementById('riskPercentage');
);
    const riskBar =
document.getElementById('riskBar');

    // Show result card
    resultCard.classList.remove('hidden', 'translate-y-4');
    resultCard.classList.add('translate-y-0');

    if (isHighRisk) {
        // High risk styling
        resultCard.classList.remove('border-accent');
        resultCard.classList.add('border-red-500');
        resultIcon.textContent = '⚠';
        resultMessage.textContent =
'High Diabetes Risk Detected';
        resultMessage.classList.remove('text-accent');
        resultMessage.classList.add('text-red-600');
    }

    riskBar.classList.remove('bg-accent');
    riskBar.classList.add('bg-red-500');
} else {
    // Low risk styling
    resultCard.classList.remove('border-red-500');
    resultCard.classList.add('border-accent');
    resultIcon.textContent = '✓';
    resultMessage.textContent =
'Low Diabetes Risk';
    resultMessage.classList.remove('text-red-600');
    resultMessage.classList.add('text-accent');
    riskBar.classList.remove('bg-red-500');
    riskBar.classList.add('bg-accent');
}

riskPercentage.textContent = `Risk Score: ${riskScore}%`;

// Animate progress bar
setTimeout(() => {
    riskBar.style.width =
`${riskScore}%`;
}, 100);

// Scroll to result
setTimeout(() => {
    resultCard.scrollIntoView({
        behavior: 'smooth',
        block: 'center'
    });
}, 300);

// Add scroll effect to navbar
window.addEventListener('scroll', () => {

```

```
const nav = document.querySelector('nav');
if (window.scrollY > 100) {
    nav.classList.add('bg-white/95');
    nav.classList.remove('bg-white/90');
} else {
    nav.classList.add('bg-white/90');
```

```
nav.classList.remove('bg-white/95');
}
});
</script>
</body>
</html>
```

app.py

```
from flask import Flask, request, jsonify, render_template
import joblib
import numpy as np
from flask_cors import CORS

app = Flask(__name__)
CORS(app)

model = joblib.load("model.pkl")

@app.route('/')
def home():
    return render_template('index.html')

@app.route('/predict', methods=['POST'])
def predict():
    data = request.get_json()
    features = data.get("features")

    if not features or len(features) != 8:
        return jsonify({"error": "Invalid input"}), 400

    input_array = np.array(features).reshape(1, -1)
    prediction = model.predict(input_array)[0]

    return jsonify({"prediction": int(prediction)})

if __name__ == "__main__":
    app.run(debug=True)
```

train_and_save_model.py

```
import pandas as pd
import joblib
from sklearn.ensemble import RandomForestClassifier
from sklearn.model_selection import train_test_split
# Load dataset
df = pd.read_csv("diabetes.csv")
X = df.drop("Outcome", axis=1)
y = df["Outcome"]
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
model = RandomForestClassifier()
model.fit(X_train, y_train)
joblib.dump(model, "model.pkl")
print("✅ Model trained and saved as model.pkl")
```

diabetes.csv

<https://www.kaggle.com/datasets/uciml/pima-indians-diabetes-database?resource=download>

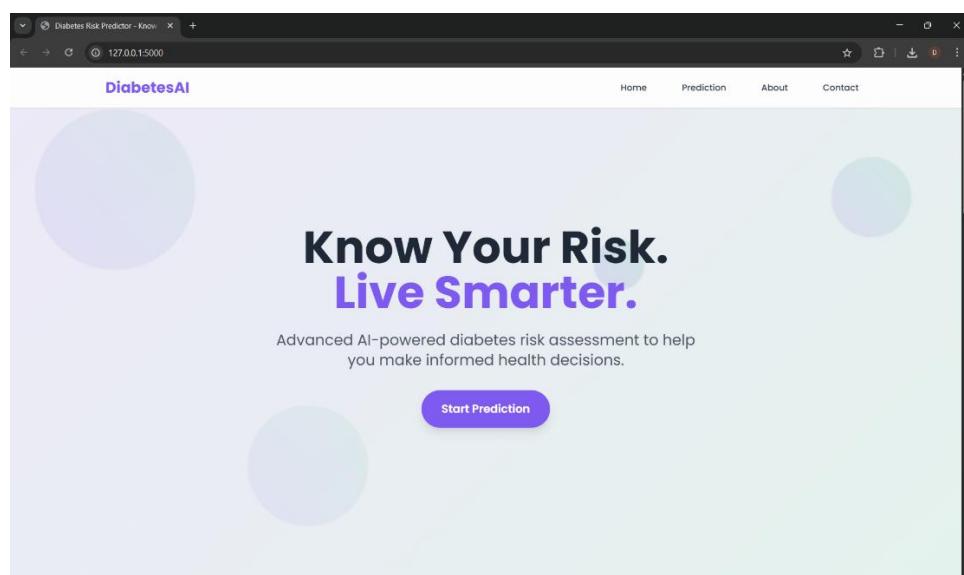
5. Result and Observation

The system was tested with various input combinations, both manually and using known samples from the dataset. It provided accurate predictions based on the model's training, displayed with animated UI feedback.

The result card clearly displays:

- A warning emoji (⚠) for high risk
- A check mark (✅) for low risk
- Risk percentage bar
- Custom messages like “Low Diabetes Risk” or “High Diabetes Risk Detected”

AOS-powered transitions smoothly animate form, result, and contact sections.



DiabetesAI

Home Prediction About Contact

Health Assessment

Please fill in your health information accurately

Pregnancies

Glucose Level (mg/dL)

Blood Pressure (mmHg)

Skin Thickness (mm)

Insulin (μ u/mL)

BMI (kg/m^2)

Diabetes Pedigree Function

Age (years)

Predict Now

DiabetesAI

Home Prediction About Contact

About DiabetesAI

Our advanced machine learning algorithm analyzes multiple health factors to provide accurate diabetes risk assessment.



Accurate Predictions
Advanced AI algorithms trained on extensive medical datasets



Privacy First
Your health data is processed securely and never stored



Instant Results
Get your risk assessment in seconds, not days

Get In Touch

Have questions about your health or our service?

[Email Us](#) [Call Now](#)

DiabetesAI

Home Prediction About Contact

Get In Touch

Have questions about your health or our service?

[Email Us](#) [Call Now](#)

DiabetesAI
Empowering individuals with AI-driven health insights for better diabetes prevention and management.

[!\[\]\(caad9971c9f37465858c1343282466d2_img.jpg\)](#) [!\[\]\(22973120bf101f89a6223b1945bba743_img.jpg\)](#) [!\[\]\(d3b2a086f943554efcbc97c08a3b1909_img.jpg\)](#)

Quick Links <ul style="list-style-type: none"> Home Prediction About Contact 	Legal <ul style="list-style-type: none"> Privacy Policy Terms of Service Medical Disclaimer
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The image displays two screenshots of a web-based diabetes risk predictor application. Both screenshots show a clean, modern interface with a white background and a purple header bar.

Screenshot 1 (Top): High Diabetes Risk Detected

This screenshot shows a user input form with the following data:

Parameter	Value
Pregnancies	6
Blood Pressure (mmHg)	80
Insulin (μ U/ml)	180
Diabetes Pedigree Function	0.72
Glucose Level (mg/dl)	165
Skin Thickness (mm)	32
BMI (kg/m^2)	35.4
Age (years)	55

A purple "Predict Now" button is located below the form. To the right, a red-bordered box displays the prediction result:

Prediction Result
High Diabetes Risk Detected
 Risk Score: 77%
Please consult with a healthcare professional for proper medical advice and diagnosis.

Screenshot 2 (Bottom): Low Diabetes Risk

This screenshot shows a user input form with the following data:

Parameter	Value
Pregnancies	1
Blood Pressure (mmHg)	85
Insulin (μ U/ml)	85
Diabetes Pedigree Function	0.2
Glucose Level (mg/dl)	90
Skin Thickness (mm)	20
BMI (kg/m^2)	22.0
Age (years)	25

A purple "Predict Now" button is located below the form. To the right, a green-bordered box displays the prediction result:

Prediction Result
Low Diabetes Risk
 Risk Score: 35%
Please consult with a healthcare professional for proper medical advice and diagnosis.

6. Conclusion

This project successfully demonstrates the application of machine learning and modern web technologies to solve a real-world healthcare problem — early detection of diabetes. By combining a trained Random Forest classifier with a responsive, animated frontend, the system provides users with a fast, accurate, and intuitive way to assess their health.

The frontend offers a clean and professional user experience, while the backend ensures privacy by not storing user data. Users can access the application from any device and receive predictions in real time.

This system lays the foundation for further development in digital health tools. With minimal resources and open-source technologies, impactful solutions like this can be built to serve society and raise awareness in critical areas like diabetes management.