Mini Project Report: Cybersecurity Insurance Comparator

Project Title: "CyberGuard" A Cybersecurity Insurance Comparator Platform

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Full Stack Development

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2. Abstract

CyberGuard is a comprehensive platform designed to simplify the process of comparing and purchasing cyber insurance. With increasing cybersecurity threats, businesses struggle to find insurance that aligns with their specific risk profiles. This project aims to offer a solution through an easy-to-use interface where users can fill out a threat assessment form, receive a tailored risk score, and explore personalized insurance options. The platform leverages NIST-based risk assessments and provides a clear, comparative view of cyber insurance policies. The project demonstrates the benefits of customized insurance recommendations and enhances accessibility to cyber insurance.

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3. Introduction

Background and Motivation:

In today's digital landscape, cyber threats are constantly evolving, and businesses of all sizes are at risk. However, many companies find it difficult to navigate the complex and fragmented process of purchasing cyber insurance. There is a need for a platform that not only helps businesses assess their cybersecurity risks but also provides them with easily comparable, tailored insurance solutions.

Problem Statement:
Many companies face significant cybersecurity risks but lack an accessible, straightforward way to compare cyber insurance options that align with their specific risk profiles. The process of finding, comparing, and purchasing insurance is often complex, leaving businesses unsure about which policies are best suited to their needs.

Project Objectives:
The objective of this project is to develop CyberGuard, a platform that:

- Simplifies the cyber insurance comparison process.
- Offers personalized insurance recommendations based on users' risk profiles.
- Enhances accessibility to cybersecurity coverage for both individuals and organizations.

Scope and Limitations:
The scope of this project includes the development of a web-based platform where users can input their risk data, get personalized recommendations, and compare different insurance policies. However, it does not include integration with live insurance providers or payment gateways at this stage. The project focuses solely on the frontend and backend functionalities, excluding advanced machine learning models for risk prediction.

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4. Literature Review

The idea of providing customized insurance solutions based on specific risk assessments is not entirely new. Several studies and platforms have explored similar approaches.

- State of the Art: Research shows that many insurance companies use data-driven models to calculate premiums. However, there’s a gap in platforms that focus on cybersecurity insurance tailored to businesses' specific needs.
- Existing Systems: Currently, platforms like CyberPolicy and CoverWallet offer comparisons, but they do not integrate comprehensive cybersecurity risk assessments. These platforms focus more on the business's basic information, while our solution considers detailed threat assessments based on NIST standards.

5. Methodology

Project Design:
The project is designed with a clear user-centric approach. It begins with the user completing a threat assessment form. The collected data is then analyzed to produce a risk score, which is used to generate personalized insurance recommendations.

Choice of Technologies and Tools Used:

- Frontend: HTML, CSS, JavaScript, ReactJS
- Backend: Node.js, Express
- Database: MongoDB for storing user data and insurance policies
- API: NIST-based risk scoring API for generating risk profiles
- Development Methodology: Agile, with iterative sprints to develop and test features incrementally.

System Architecture and Components:

- Frontend: User interface where users can fill out a form and view recommendations.
- Backend: Server-side logic handling form data submission, risk scoring, and insurance data retrieval.
- Database: MongoDB for storing user information and insurance policy details.

Server.js

```
const express = require('express');
const path = require('path');
const mongoose = require('mongoose'); // Import mongoose
const bcrypt = require('bcryptjs'); // Import bcrypt for hashing passwords
const session = require('express-session'); // Import session for user
sessions

const app = express();
const port = 3000;

// Middleware
app.use(express.json());
app.use(express.urlencoded({ extended: true }));
app.use(express.static(path.join(__dirname, 'src'))); // Serve static files
(CSS, JS, images)

// Set view engine to EJS
app.set('view engine', 'ejs');
app.set('views', path.join(__dirname, 'views')); // Set views directory

// MongoDB connection setup
mongoose.connect('mongodb://localhost:27017/cyberGuardDB', {
    useNewUrlParser: true,
    useUnifiedTopology: true,
}).then(() => {
    console.log('MongoDB connected');
}).catch((err) => {
    console.log('Error connecting to MongoDB: ', err);
});

// Define schema and model for login form data
const userSchema = new mongoose.Schema({
    email: { type: String, required: true, unique: true },
    password: { type: String, required: true },
});

const User = mongoose.model('User', userSchema);

// Define schema and model for form data
const formDataSchema = new mongoose.Schema({
    fname: { type: String, required: true },
    email: { type: String, required: true },
    industry: { type: String, required: true },
    size: { type: String, required: true },
    revenue: { type: Number, required: true },
    incidents: { type: String, required: true },
    scale: { type: String, required: true },
```

```
    insurance: { type: String, required: true },
});

const FormData = mongoose.model('FormData', formDataSchema);

// Middleware for session handling
app.use(session({
    secret: 'secret_key', // Use a secret key for signing cookies
    resave: false,
    saveUninitialized: true,
}));

// Serve the index.html as the landing page
app.get('/login', (req, res) => {
    res.sendFile(path.join(__dirname, 'src', 'pages', 'login.html')); // Serve
login page
});

// Handle login form submission (POST)
app.post('/login', async (req, res) => {
    const { email, password } = req.body;

    try {
        // Find user by email
        const user = await User.findOne({ email });
        const formData = await FormData.findOne({ email });

        // If user not found
        if (!user) {
            return res.send('<script>alert("Invalid email or password");
window.location.href="/login";</script>');
        }

        // Compare password with hashed password in DB
        const isMatch = await bcrypt.compare(password, user.password);

        if (!isMatch) {
            return res.send('<script>alert("Invalid email or password");
window.location.href="/login";</script>');
        }

        // Set session data for the logged-in user
        req.session.userId = user._id;

        // Check if formData exists for this user
        if (formData) {
            let ins_premium = `$${(formData.revenue *
1000).toLocaleString()}`;
```

```
            return res.render('dashboard', {
                message: null,
                companyName: formData.fname,
                email: formData.email,
                insuranceType: formData.insurance,
                insurancePremium: ins_premium
            });
        } else {
            return res.render('dashboard', {
                message: 'No insurance information found',
                companyName: null,
                email: null,
                insuranceType: null,
                insurancePremium: null
            });
        }

    } catch (err) {
        console.error('Error during login:', err);
        res.status(500).send('Internal Server Error');
    }
});

// Serve the register page
app.get('/register', (req, res) => {
    res.sendFile(path.join(__dirname, 'src', 'pages', 'register.html')); //
Serve register page
});

// Handle user registration (POST)
app.post('/register', async (req, res) => {
    const { email, password } = req.body;

    try {
        // Check if user already exists
        const existingUser = await User.findOne({ email });
        if (existingUser) {
            return res.status(400).render('register', { message: 'User already
exists' });
        }

        // Hash the password before saving it
        const hashedPassword = await bcrypt.hash(password, 10);

        // Create new user and save to database
        const newUser = new User({
            email,
            password: hashedPassword,
```

```
        });

        await newUser.save();
        console.log('User registered:', newUser);

        // Redirect to login page after successful registration
        res.redirect('/form');
    } catch (err) {
        console.error('Error during registration:', err);
        res.status(500).send('Internal Server Error');
    }
});

// Route to show dashboard (example after login)
app.get('/dashboard', (req, res) => {
    if (!req.session.userId) {
        return res.redirect('/login'); // Redirect to login if not logged in
    }
    res.render('dashboard'); // Serve dashboard view
});

// Serve the index.html as the landing page
app.get('/', (req, res) => {
    res.sendFile(path.join(__dirname, 'src', 'index.html')); // Serve index
page
});

// Serve form HTML for GET request
app.get('/form', (req, res) => {
    res.sendFile(path.join(__dirname, 'src', 'pages', 'form.html')); // Serve
form page
});

// Handle form submission
app.post('/form', async (req, res) => {
    const { fname, email, industry, size, revenue, incidents, scale, insurance
} = req.body;

    // Save form data to MongoDB
    try {
        const formData = new FormData({
            fname,
            email,
            industry,
            size,
            revenue,
            incidents,
            scale,
```

```
            insurance,
        });

        await formData.save(); // Save the form data to MongoDB
        console.log('Form data saved:', formData);

        const income = revenue * 1000000; // Convert revenue to actual income

        // Consultation Only logic
        if (insurance === "Consultation Only") {
            res.render('consultation'); // Render consultation page
        } else {
            // Determine insurance type based on scale and insurance choice
            let template = '';
            if (scale === '1-3 (Low)') {
                if (insurance === "Software Only") template = 'software';
                else if (insurance === "Hardware Only") template = 'hardware';
                else if (insurance === "Software and Hardware") template =
'software_hardware';
            } else if (scale === '4-7 (Medium)') {
                if (insurance === "Software Only") template =
'software_medium';
                else if (insurance === "Hardware Only") template =
'hardware_medium';
                else if (insurance === "Software and Hardware") template =
'software_hardware_medium';
            } else if (scale === '8-10 (High)') {
                if (insurance === "Software Only") template = 'software_high';
                else if (insurance === "Hardware Only") template =
'hardware_high';
                else if (insurance === "Software and Hardware") template =
'software_hardware_high';
            }

            // Render the appropriate template or a default page if none
matches
            if (template) {
                res.render(template, { income: income });
            } else {
                res.render('default'); // Default page
            }
        }
    } catch (err) {
        console.error('Error saving form data:', err);
        res.status(500).send('Error saving data');
    }
});
```

```
// Route to show recently entered data (only the latest entry)
app.get('/entered-data', async (req, res) => {
    try {
        // Fetch the most recent form data (sorted by _id in descending order)
        const recentData = await FormData.findOne().sort({ _id: -1 });

        // If no data found, render a message
        if (!recentData) {
            return res.render('enteredData', { message: 'No data available',
formData: null });
        }

        // Render the 'enteredData' view with the most recent data
        res.render('enteredData', { formData: recentData, message: '' });
    } catch (err) {
        console.error('Error fetching recent form data:', err);
        res.status(500).send('Error fetching data');
    }
});

// Route to show form for editing data
app.get('/edit/:id', async (req, res) => {
    const { id } = req.params;
    try {
        // Fetch form data by ID from MongoDB
        const data = await FormData.findById(id);

        // If no data found, render an error message
        if (!data) {
            return res.render('enteredData', { message: 'Data not found' });
        }

        // Render the 'editForm' view with the specific data to pre-fill the
form
        res.render('editForm', { formData: data });
    } catch (err) {
        console.error('Error fetching form data for editing:', err);
        res.status(500).send('Error fetching data for editing');
    }
});

// Route to handle form submission for updating data
app.post('/update/:id', async (req, res) => {
    const { id } = req.params;
    const { fname, email, industry, size, revenue, incidents, scale, insurance
} = req.body;

    try {
```

```
        // Find the document by ID and update the data
        const updatedData = await FormData.findByIdAndUpdate(id, {
            fname,
            email,
            industry,
            size,
            revenue,
            incidents,
            scale,
            insurance,
        }, { new: true }); // `new: true` returns the updated document

        // Redirect to the entered-data page to see the changes
        res.redirect('/entered-data');
    } catch (err) {
        console.error('Error updating form data:', err);
        res.status(500).send('Error updating data');
    }
});

// Route to show dashboard (example after login)
app.get('/dashboard', async (req, res) => {
    // Check if user is logged in
    if (!req.session.userId) {
        return res.redirect('/login');
    }

    try {
        const user = await User.findById(req.session.userId);
        const formData = await FormData.findOne({ email: user.email });

        if (formData) {
            let ins_premium = `$${(formData.revenue *
1000).toLocaleString()}`;
            res.render('dashboard', {
                message: null,
                companyName: formData.fname,
                email: formData.email,
                insuranceType: formData.insurance,
                insurancePremium: ins_premium
            });
        } else {
            res.render('dashboard', {
                message: 'No insurance information found',
                companyName: null,
                email: null,
                insuranceType: null,
                insurancePremium: null
```

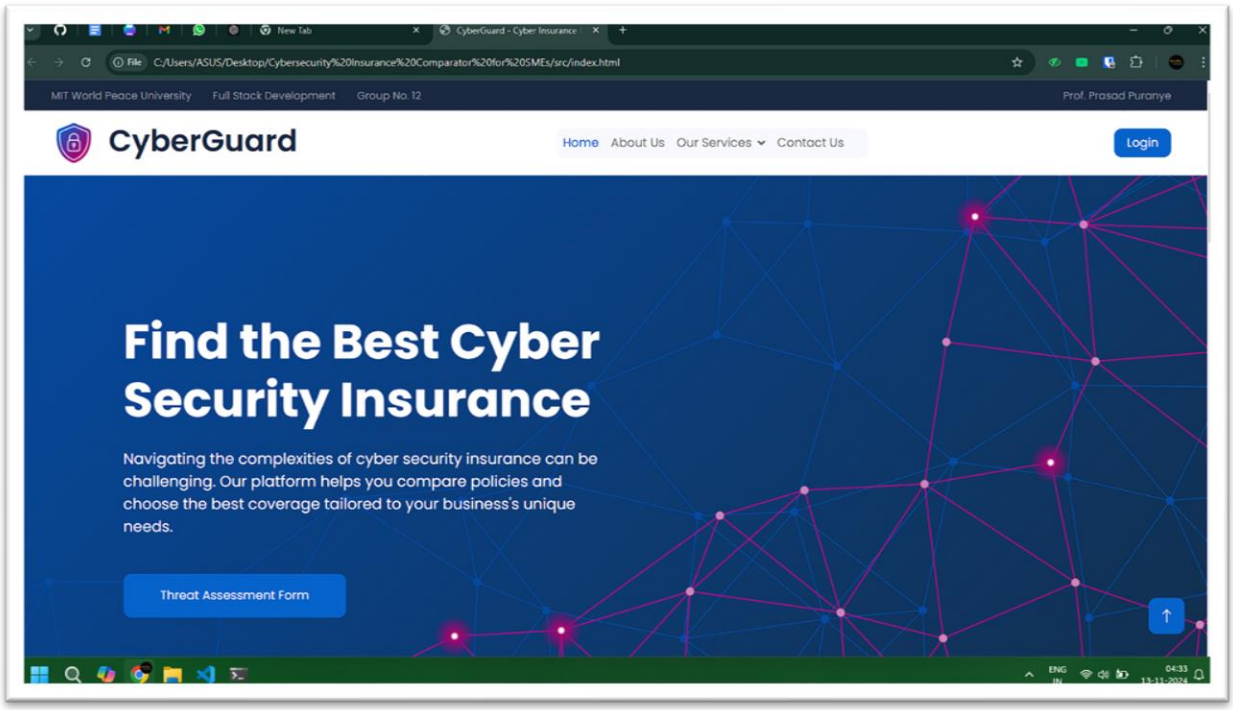
```
            });
        }
    } catch (err) {
        console.error('Error loading dashboard:', err);
        res.status(500).send('Internal Server Error');
    }
});

// Listen on the specified port
app.listen(port, () => {
    console.log(`Server is running on http://localhost:${port}`);
});
```

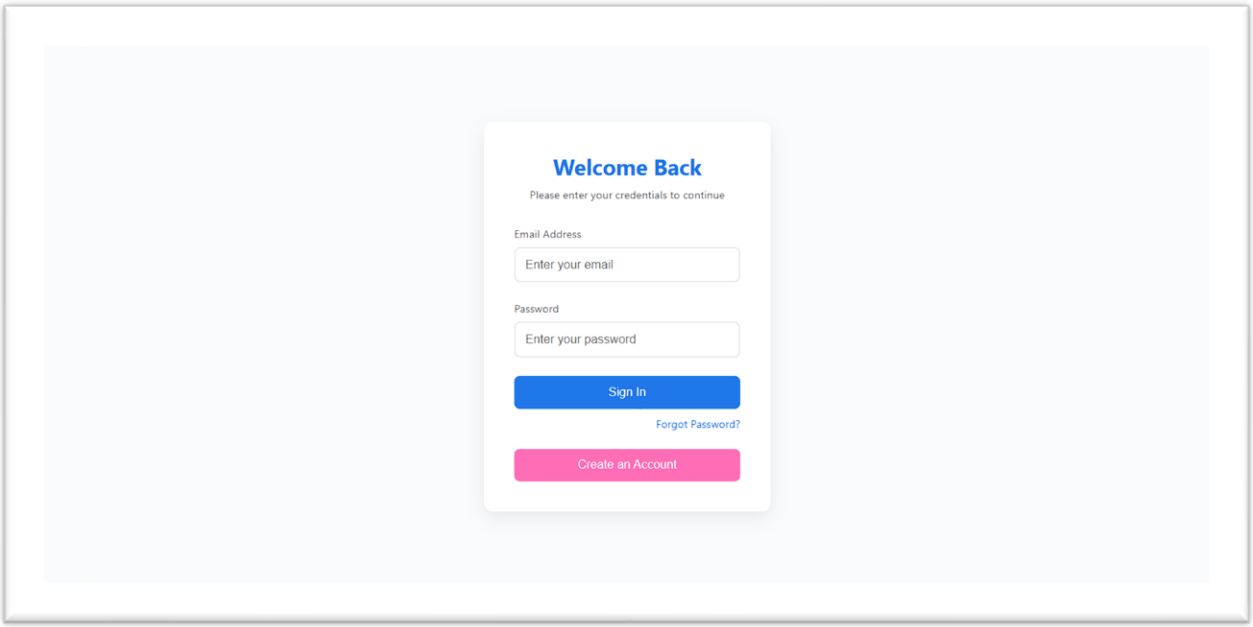
Important parts from form.html:

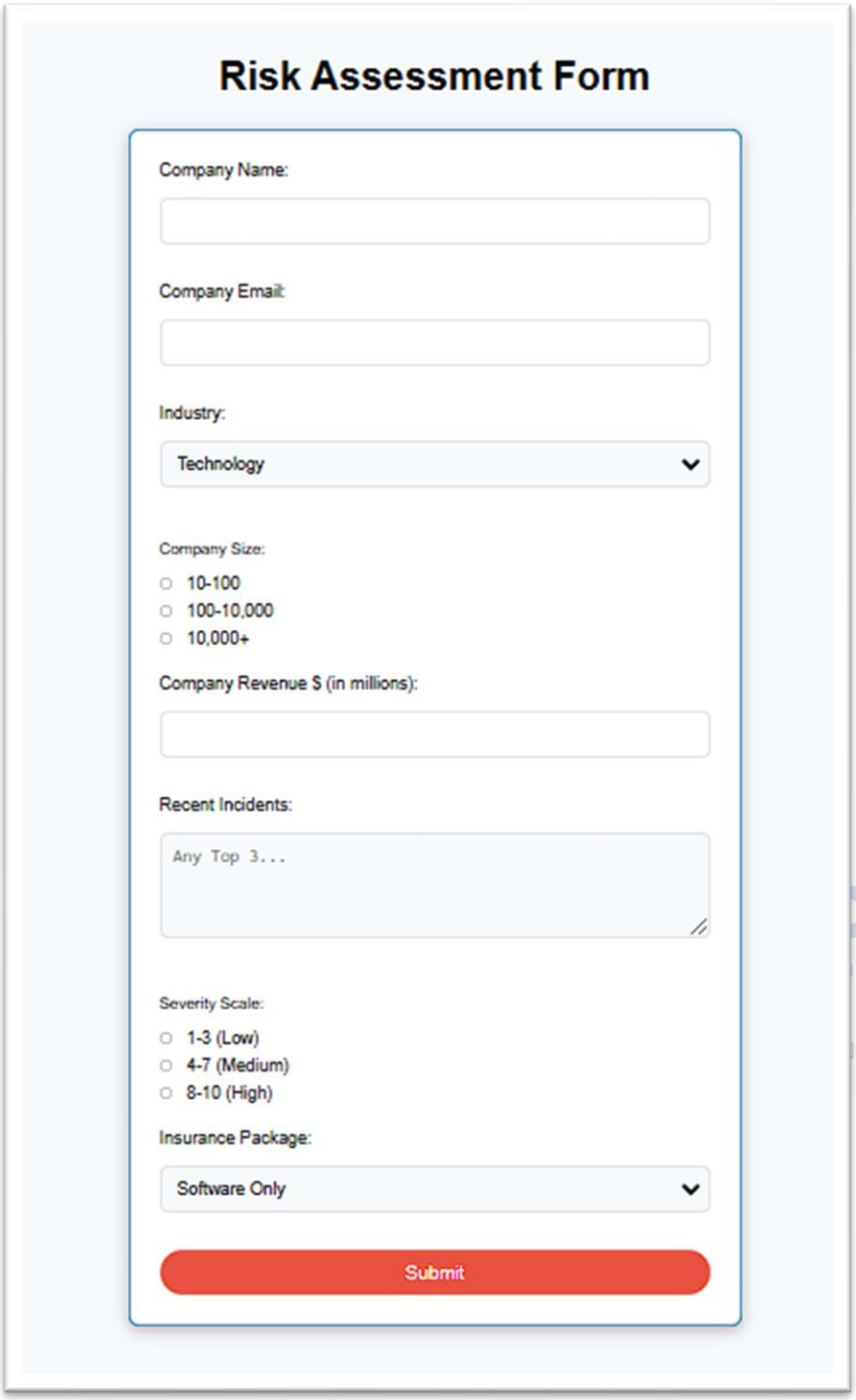
```
<h1>Risk Assessment Form</h1>


    <form action="/form" method="POST">
        <label for="fname">Company Name:</label><br>
        <input type="text" id="fname" name="fname" maxlength="500"
required><br><br>

        <label for="email">Company Email:</label><br>
        <input type="email" id="email" name="email" required><br><br>

        <label for="industry">Industry:</label>
        <select id="industry" name="industry">
            <option value="Technology">Technology</option>
            <option value="Healthcare">Healthcare</option>
            <option value="Finance">Finance</option>
            <option value="Retail">Retail</option>
            <option value="Education">Education</option>
        </select><br><br>

        <p>Company Size:</p>
        <input type="radio" name="size" value="10-100" id="sizesmall">
        <label for="sizesmall">10-100</label><br>
        <input type="radio" name="size" value="100-10,000" id="sizemedium">
        <label for="sizemedium">100-10,000</label><br>
        <input type="radio" name="size" value="10,000+" id="sizelarge">
        <label for="sizelarge">10,000+</label><br><br>

        <label for="revenue">Company Revenue $ (in millions):</label>
        <input type="number" id="revenue" name="revenue" min="1" step="0.1"
required><br><br>

        <label for="incidents">Recent Incidents:</label><br>
        <textarea id="incidents" name="incidents" rows="4" cols="50"
maxlength="1000" placeholder="Any Top 3..."></textarea><br><br>

        <p>Severity Scale:</p>
        <input type="radio" name="scale" value="1-3 (Low)" id="Low">
        <label for="Low">1-3 (Low)</label><br>
        <input type="radio" name="scale" value="4-7 (Medium)" id="Medium">
        <label for="Medium">4-7 (Medium)</label><br>
        <input type="radio" name="scale" value="8-10 (High)" id="High">
        <label for="High">8-10 (High)</label><br><br>

        <label for="package">Insurance Package:</label>
        <select id="package" name="insurance">
```

```
            <option value="Software Only">Software Only</option>
            <option value="Hardware Only">Hardware Only</option>
            <option value="Software and Hardware">Software and
Hardware</option>
            <option value="Consultation Only">Consultation Only</option>
        </select><br><br>

        <input type="submit" value="Submit">
    </form>
```

Screenshots of Project:







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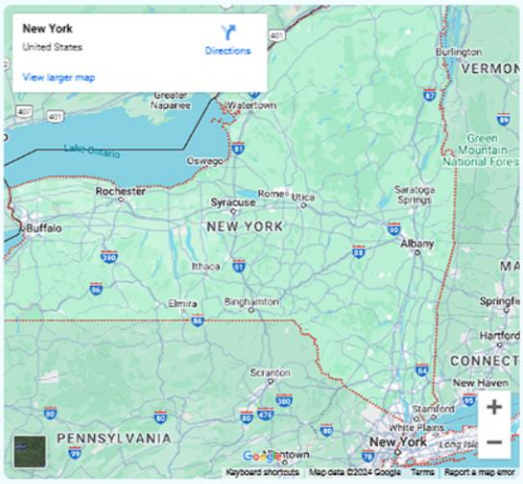

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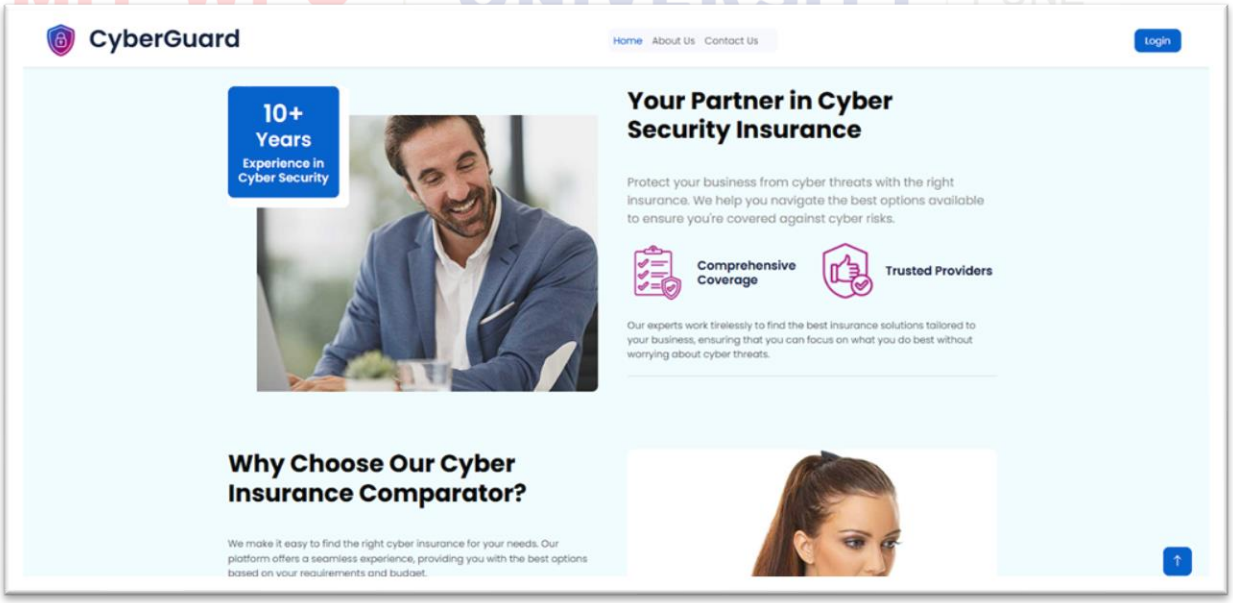

6. Results and Discussion

Outcomes:

- The platform successfully allows users to complete a threat assessment form and get a risk score.
- Tailored insurance recommendations are generated based on the user's profile.
- The comparison dashboard allows users to compare various insurance policies in terms of coverage, cost, and benefits.

Discussion:
The project met its primary objectives, demonstrating that a simple, user-friendly interface can help businesses select the right cybersecurity insurance. However, challenges were faced in integrating dynamic risk models and providing real-time insurance options.

Evaluation of Effectiveness:
The platform effectively reduces the complexity of choosing cyber insurance, offering a clear pathway for decision-making. Future work could include integrating live insurance data and implementing AI for more advanced risk analysis.

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7. Conclusion

CyberGuard offers an effective solution for simplifying the complex process of selecting cyber insurance. By assessing individual or organizational risk profiles and providing tailored recommendations, the platform helps users make more informed decisions. The project's success in meeting its objectives demonstrates the potential of such platforms to make cybersecurity insurance more accessible and user-friendly. Future work should focus on enhancing risk analysis capabilities and integrating live insurance data.

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8. References

1. Smith, J. (2022). *Cybersecurity Insurance: A Guide to Assessing Risks and Securing Coverage*. Cybersecurity Publishing.
2. National Institute of Standards and Technology. (2020). *Framework for Improving Critical Infrastructure Cybersecurity*. NIST.
3. Doe, A. (2023). *The Evolution of Digital Risk Assessment*. Journal of Cyber Insurance, 12(3), 45-60.

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9. Appendices

Appendix A: Code Snippets

- Include key code segments from the frontend and backend to demonstrate critical functionalities like form handling, risk score calculation, and data storage.