**🎮 Project Plan / Product Requirement Document (PRD) 🎮**

**🚀 Project Title: AI-Driven Real-Time Deepfake Detection System (Browser Extension Sidebar)**

**🔥 Project Summary:**

The **AI-Driven Real-Time Deepfake Detection System** is a browser extension/sidebar tool that enables users to quickly and securely identify whether an image or video is real or fake using deep learning models. By allowing drag-and-drop functionality from any online platform or application, this tool provides a seamless and intuitive user experience. 🎯👾

**🎯 Objectives:**

* Build a user-friendly browser extension that supports drag-and-drop image/video input. 🖼️📹
* Integrate deep learning-based models to analyze and detect deepfake media in real-time. 🤖💻
* Provide clear, immediate feedback on the authenticity of the media. ✅
* Ensure cross-platform compatibility with major browsers and operating systems. 🌐
* Address privacy and security concerns during media analysis. 🔒🛡️

**🔑 Key Features:**

1. **Drag-and-Drop Support:**  
   Users can drag and drop images/videos from any website or desktop app into the sidebar. 🖱️📂
2. **Real-Time Detection:**  
   Immediate analysis and result display (Fake or Real with confidence score). ⚡🔍
3. **Media Type Support:**
   * Static Images (JPEG, PNG, WebP, etc.) 🖼️
   * Videos (MP4, AVI, WebM, etc.) 🎬
4. **Intuitive UI/UX:**  
   Sidebar-based interaction.  
   Progress bar and visual indicators for detection.  
   Accessible design and language options. 🌈
5. **Privacy Control:**  
   All processing can be done locally or through encrypted cloud APIs. 🔐☁️  
   User consent and data protection mechanisms.
6. **Use Case-Based Enhancements:**  
   Context-aware suggestions (e.g., “High risk – potential dating scam detected.”). 💔👀
7. **Logs and Reporting:**  
   History of scans.  
   Option to report suspicious media to external authorities/platforms. 📊🚨

**🎮 Use Cases & Applications:**

* **Communication Platforms:** WhatsApp Web, Messenger, Instagram, Telegram. 📱💬
* **Dating/Matrimony Sites:** Tinder, Bumble, Bharat Matrimony. 💕💍
* **Social Media Platforms:** Twitter, Facebook, LinkedIn, Reddit. 🌐
* **News & Journalism:** Detect fake media in misinformation/disinformation. 📰❌
* **E-commerce Sites:** Confirm authenticity of user-uploaded reviews/images. 🛒🛑
* **Online Learning Platforms:** Verifying instructor/lecture media. 📚🎓
* **Corporate Communication Tools:** Slack, Teams, Zoom chat. 💼📈
* **Forensics and Law Enforcement:** Detect forged or tampered digital media. ⚖️👮
* **Online Forums and Communities:** Discord, Quora, Stack Overflow. 💬👾

**💻 Technical Requirements:**

* **Frontend:** HTML, CSS, JavaScript, React (for sidebar) 🌐
* **Backend:** Python (FastAPI or Flask), TensorFlow / PyTorch for deepfake detection. 🐍🤖
* **Models:** Pre-trained models (XceptionNet, MesoNet, EfficientNet variants) 📊
* **APIs:** Custom REST APIs for model invocation and result handling. 🔗
* **Browser Compatibility:** Chrome, Firefox, Edge (support for extensions). 🌍
* **Security:** TLS/SSL encryption, sandboxing for media files. 🔒
* **Storage:** Local cache for temporary media, encrypted history log. 💾

**🔑 Authentication and Access Control:**

* **User Login:** OAuth 2.0-based authentication with Google, GitHub, or email. 🔑📧
* **RBAC:**
  + **Basic users:** Drag-and-drop detection and history logs. 📝
  + **Advanced users:** Reporting tools and context-aware alerts. 🛠️
  + **Admins:** Full moderation, analytics, and disputed result handling. 🧑‍💼⚙️
* **Session Management:** Auto logout after inactivity, secure cookie storage. 🍪
* **Audit Trails:** Logs of user actions and detection events. 📜

**📅 Updated Milestones & Timeline (5 Weeks):**

* **Week 1:** Planning & Setup 🚀
  + Finalize tech stack and architecture.
  + Design wireframes and UI mockups.
  + Setup Git repo and project structure.
  + Create browser extension base and backend skeleton.
* **Week 2:** Core Development - Images 🎯
  + Implement drag-and-drop UI.
  + Integrate deepfake image detection model.
  + Real-time result display with confidence score.
* **Week 3:** Video Support & Authentication 🎥
  + Add video detection (short videos only).
  + Set up OAuth-based login.
  + Implement RBAC and history logs.
* **Week 4:** UI Enhancements & Privacy 🎨
  + Improve sidebar visuals (progress bar, themes).
  + Add context-aware alerts.
  + Implement privacy controls and encrypted local processing.
* **Week 5:** Testing & Finalization 🛠️
  + Full system testing (UX, compatibility, speed).
  + Optimize detection pipelines.
  + Package and publish extension for browser dev mode.
  + Create documentation and demo materials.

**📊 KPIs (Key Performance Indicators):**

* **Detection Accuracy:** Target > 90% 📈
* **Average Detection Time:** <5s for images, <15s for videos ⏱️
* **User Adoption & Retention Rate** 🚀
* **Scan Success vs. False Positive Ratio** ✅❌

**⚠️ Risk Management:**

* **Dataset bias:** Train on diverse datasets. 📚
* **Browser issues:** Ensure cross-browser testing. 🌐
* **Privacy risks:** Prefer local-only analysis with encryption. 🔐

**🚀 Future Enhancements:**

* Mobile app with live camera support 📱
* Integration with moderation APIs (Meta, Google, etc.) 🌍
* Community-based feedback for disputed results. 💬
* Real-time audio manipulation detection 🎙️

**🤝 Team Roles:**

* **Team Lead:** Sharlet Alex
* **Developers:** Nithin S, Rajesh M
* **Frontend Developer:** Sandesh K
* **Documentation & Presentation:** Akshata

**🎯 Conclusion:**

This AI-powered deepfake detection sidebar extension will serve as a powerful tool to combat misinformation, fraud, and identity manipulation across the web. Its real-time performance, intuitive UX, and privacy-first approach make it suitable for individuals, professionals, and security experts alike. 🚀🛡️