### **Computer Vision Engineer with Mobile Web App Integration Experience**

**Project Description:**

We are seeking a talented Computer Vision Engineer with experience in mobile web app development to help integrate a **real-time human blurring feature** into our existing web application. The feature should allow users to selectively blur the entire body, just the face, or both, with high accuracy. This solution must be cloud-based, robust, and functional under diverse lighting conditions, including extremely poor and low-light scenarios, as this is the primary use case.

**Responsibilities:**

1. **Computer Vision Implementation:**
   * Develop a real-time blurring algorithm for human subjects (full body, face, or both).
   * Ensure high accuracy and reliability under varied lighting conditions.
   * Source and preprocess the required datasets for training and testing.
2. **Integration with Existing Web App:**
   * Fully integrate the CV feature into the existing web application (codebase provided upon hiring).
   * Ensure seamless performance on both desktop and mobile platforms.
3. **Cloud Deployment:**
   * Build a cloud-based solution that processes video in real time.
   * Optimize for scalability and efficiency.
4. **Testing and Validation:**
   * Implement rigorous testing protocols to ensure performance metrics are met.
   * Validate functionality in various scenarios, especially under low-light conditions.

**Requirements:**

* Proven experience in computer vision projects, especially in real-time video processing.
* Expertise in human detection and segmentation (e.g., full body and facial recognition).
* Proficiency in cloud computing platforms (AWS, Google Cloud, etc.).
* Experience integrating complex algorithms into mobile-friendly web applications.
* Familiarity with frontend-backend communication protocols (e.g., WebRTC, WebSockets, REST APIs).
* Ability to source and work with diverse datasets for model training.
* Strong focus on low-light performance optimization.

**Key Metrics for Project Completion:**

1. **Detection and Segmentation Accuracy:**
   * **Precision:** ≥95%.
   * **Recall:** ≥95%.
   * **IoU:** ≥0.85 for pixel-level segmentation masks.
2. **Real-Time Performance:**
   * **Frame Rate:** ≥30 FPS.
   * **Latency:** <100 ms per frame, with up to 5 individuals in the frame.
3. **Robustness:**
   * **False Positive Rate:** ≤5%.
   * **Miss Rate:** ≤5%.
   * Must perform consistently under:
     + Low light (luminance <5 lux).
     + High motion (motion blur).
     + Crowded scenarios (≥10 people in the frame).
     + Dynamic or complex backgrounds.
4. **Blurring Quality:**
   * Apply Gaussian or similar blur to completely remove identifiable features.
   * Ensure blurred areas cannot be reverse-engineered to protect privacy.
5. **Pose Estimation for Occlusion Handling:**
   * **Keypoint Detection Error:** <3% of image resolution for occluded individuals.
6. **Scalability and Resource Usage:**
   * Process at least 5 concurrent streams at 720p without exceeding 20% GPU utilization on a cloud server.
7. **User Controls:**
   * Seamlessly toggle between face-only, body-only, or full-body blur in real time.
8. **Comprehensive Testing:**
   * Validate against at least 50 real-world test cases with diverse scenarios, including poor lighting, high motion, and occlusions.

**Preferred Skills:**

* Knowledge of Next.js and Node.js frameworks (to facilitate smooth integration).
* Strong background in AI/ML model deployment in cloud environments.
* Previous experience working with low-light video enhancement techniques.

**Deliverables:**

1. Fully functioning real-time blurring feature integrated into our web app.
2. Documentation for the CV algorithm, dataset, and integration process.
3. Test reports verifying performance under different lighting conditions.