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CBR Detail:

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(57) Abstract :
The present invention relates to a wearable intelligent device implemented as ultra-thin eyewear or a smart contact lens, integrating wafer-level cameras, micro-display, eye-tracking photodiodes, inertial and biosensors, a micro-LLM accelerator, a neuromorphic co-processor, and an additional micro-LLM accelerator. The device captures environmental and physiological data, processes event-driven perception and natural language reasoning locally, and projects context-aware overlays into the user's field of view. Power is supplied by a thin-film battery supplemented by energy harvesting. The components are integrated through a governance micro-kernel ensuring privacy, safety, and bias compliance. The device finds applications in healthcare, accessibility, industrial safety, education, training, navigation, tourism, personal productivity, military, defence, and emergency response.

No. of Pages : 19 No. of Claims : 18

FORM 2

THE PATENTS ACT, 1970

(39 OF 1970)

AND

THE PATENTS RULES, 2003

COMPLETE SPECIFICATION

(*See* section 10; rule 13)

1. TITLE OF THE INVENTION

CONTEXT AWARE AMBIENT INTELLIGENCE WEARABLE

2. APPLICANT

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3. PREAMBLE TO THE DESCRIPTION

The following specification particularly describes the invention and the manner in which it is to be performed.

FIELD OF THE INVENTION

The present invention relates to wearable intelligent devices, and more particularly to ultra-thin eyewear or smart contact lens systems that integrate environmental and physiological sensing, event-driven perception, and on-device language reasoning to provide real-time, context-aware augmented overlays for multiple application domains including healthcare, accessibility, industrial safety, education, navigation, personal productivity, and defence.

BACKGROUND OF THE INVENTION

Augmented reality (AR) eyewear and heads-up display (HUD) devices in the conventional art are predominantly dependent on smartphones or remote cloud servers for executing perception, natural language processing, and higher-order cognitive functions. Such dependency introduces latency, jitter, and connectivity failures which interrupt real-time operation. On degradation of network links, the systems are liable either to freeze or to revert to rudimentary overlay functions, thereby compromising critical applications such as hazard avoidance, precision assembly, or live captioning. Continuous uplink of raw audio and video streams to external servers further results in exposure of sensitive data, raising privacy risks and compliance difficulties in regulated environments including hospitals, workplaces and classrooms. Existing solutions rarely incorporate principles of data minimisation, with high-fidelity sensor streams being transmitted or stored without restriction, thereby increasing attack surface and violating least-privilege norms. Moreover, significant portions of the power budget are consumed by wireless radios and general-purpose processors rather than event-driven or sparse computation, which in turn results in reduced battery life, thermal discomfort and impracticality for extended all-day use.

The conventional art further approaches AR primarily as a rendering problem rather than a cognition problem. Most devices are stimulus-driven, awaiting explicit user commands before displaying prefabricated content. Robust intent inference mechanisms that combine gaze, voice, body motion, task history and scene semantics are generally absent. As a consequence, overlays

tend to be irrelevant, mistimed, or cognitively distracting. Spatial registration in prior systems suffers from drift, occlusion errors and poor re-localisation in dynamic or low-texture environments, causing instructional markers or safety boundaries to misalign. Pipelines for optical character recognition (OCR), speech recognition and translation are typically dependent on heterogeneous third-party cloud services, introducing unpredictable round-trip delays and inconsistent domain behaviour. Further, such systems do not reason about uncertainty or confidence, and thus present outputs with false precision, leading to user distrust and operational risks.

Security and trust in earlier systems are provided in a piecemeal manner. Encryption, where employed, is classical and session-level, leaving telemetry, model updates and plugin ecosystems susceptible to adversaries, including future quantum adversaries. Provenance of overlays, i.e., the underlying sensor data and model weights responsible for a particular output, remains opaque, thereby hindering auditing, incident reconstruction and compliance documentation. Bias checks and safety moderation, if implemented, are typically performed ex-post in the cloud rather than in-line at the point of decision, such that harmful or non-compliant content may already have been displayed to the user. Personalisation strategies rely on centralised profile stores that aggregate sensitive behaviour traces; model improvement is often undertaken on raw user data without differential privacy safeguards, creating long-term liabilities and discouraging deployment in regulated or high-stakes domains.

Computation placement in the prior art is static or rule-based. Offloading decisions generally fail to consider live network quality, latency budgets, confidentiality requirements or device energy state. This leads either to over-offloading, with corresponding privacy exposure and lag, or to under-offloading, with consequent missed deadlines and degraded perception. Core workloads such as simultaneous localisation and mapping (SLAM), semantic segmentation and language planning compete on monolithic system-on-chip (SoC) architectures, producing tail latencies and frame drops during workload bursts. Hardware–software co-design is minimal, with event-driven or

neuromorphic sensors rarely utilised, resulting in wasteful frame-based processing of redundant data rather than efficient sparse event handling.

Integration with third-party ecosystems in conventional systems is further brittle. Applications are generally accorded broad sensor access without context-aware policy controls, and audit logs lack verifiable cryptographic integrity, complicating safety certification and regulatory approval.

It is also observed that computing has progressed from centralised mainframes to cloud platforms and, more recently, to edge devices woven into daily life. Despite such progress, the user experience remains fragmented, power-hungry, and overly dependent on distant servers. Wearables and AR headsets gesture towards ambient computing but continue to rely on smartphones for compute and connectivity, thereby introducing latency, privacy risks and cognitive friction. Training, repair, and field operations increasingly demand hands-free guidance; accessibility contexts require instantaneous captioning or translation; and industrial as well as public safety environments require real-time hazard awareness without diverting attention to separate screens. Existing products are unable to simultaneously deliver immediacy, privacy, and ergonomic feasibility.

At the same time, pressures around trust and security have intensified. Users and regulators demand explainable overlays, auditable data flows, and resilience to emerging cryptographic threats. Advances in thin-film batteries, micro-displays, wafer-level cameras and energy-harvesting modules have made ultra-thin wearable devices mechanically plausible, while standardisation across wireless protocols such as BLE, Ultra-Wideband and 5G/6G has reduced integration risks. Market demand is correspondingly strong: enterprises seek safer and faster training and inspection methods; consumers seek unobtrusive assistance without surveillance; and accessibility communities demand independent, real-time support.

Accordingly, the prior art suffers from one or more limitations including: excessive latency and dependency on external backends; privacy and compliance risks; insufficient trust and provenance; poor intent understanding; unstable spatial anchoring; fragmented and weak security;

inefficient compute utilisation; and brittle ecosystem integration. These shortcomings collectively prevent conventional AR eyewear and HUD devices from delivering unobtrusive, trustworthy and dependable ambient intelligence suitable for continuous, day-long use.

OBJECTS OF THE INVENTION

The primary object of the present invention is to provide a wearable intelligent device in the form of ultra-thin eyewear or smart contact lens integrating multiple sensors, processors, and display modules.

Another object of the present invention is to enable **seamless scene capture** by means of a wafer-level camera integrated within the frame or lens without additional bulk.

One other object of the present invention is to provide a micro-display with optical waveguide for projecting augmented overlays directly into the user's field of view with features such as pupil swim correction, automatic brightness adjustment, and eye-safe projection.

Other object of the present invention is to incorporate eye-tracking photodiodes for detection of gaze direction and micro-saccades, thereby ensuring accurate alignment of overlays and context-aware display.

Another object of the present invention is to stabilise overlays during head or body motion through an inertial measurement unit comprising accelerometer, gyroscope, and magnetometer.

Yet another object of the present invention is to integrate biosensors such as heart rate or skin temperature sensors for deriving physiological parameters for adaptive overlay modification.

Another object to the present invention is to provide a micro-LLM accelerator configured for local natural language model processing, thereby enabling language-based interactions without reliance on external servers.

One other object to the present invention is to provide an additional micro-LLM accelerator specifically configured for reasoning and planning tasks.

Another object of the invention is to integrate a neuromorphic co-processor for event-driven sensory processing, improving efficiency of perception and response to dynamic real-world inputs.

One other object of the invention is to ensure efficient power management through a thin-film battery supplemented by photovoltaic or thermoelectric energy harvesting.

Yet another object of the invention is to enable governance through a micro-kernel configured to condition operation and coordination of outputs from the various processors and sensors.

Another object of the present invention is to provide a process for delivering augmented overlays involving steps of scene capture, gaze detection, orientation sensing, physiological input acquisition, event-driven sensory processing, language model processing, and projection of overlays aligned with real-world scenes.

One other object is to enable overlays including captions, navigation aids, hazard alerts, and instructions dynamically aligned with the user's environment and attention focus.

SUMMARY OF THE INVENTION

The present invention provides a wearable intelligent device implemented as ultra-thin eyewear or a smart contact lens. The device integrates wafer-level cameras, micro-display, eye-tracking photodiodes, inertial and biosensors, a micro-LLM accelerator, a neuromorphic co-processor, and an additional micro-LLM accelerator for reasoning and planning.

The wearable device captures environmental and physiological data, processes event-driven perception through the neuromorphic co-processor, executes natural language reasoning via the micro-LLM accelerator, and projects context-aware overlays into the user's field of view using the micro-display. The components are integrated through a governance micro-kernel that ensures privacy, safety, and bias compliance. Power is supplied by a thin-film battery, supplemented with photovoltaic and thermoelectric energy

harvesting, and managed through a dynamic voltage and frequency scaling scheme.

The device provides a compact, lightweight, and energy-efficient solution for continuous, real-time augmented intelligence at eye level. The invention finds application across multiple domains including healthcare, accessibility, industrial and workplace safety, education and training, navigation and tourism, personal productivity, military, defence, and emergency response, delivering contextual overlays while preserving user privacy and operational reliability.

BRIEF DESCRIPTION OF DRAWINGS

Fig 1: Detailed flow chart of the invention

Fig 2: The architecture and working principle of the invention

DETAILED DESCRIPTION OF INVENTION

The present invention relates to a compact wearable assembly implemented in the form of ultra-thin eyewear or a smart contact lens. The assembly comprises an optical waveguide integrated with a micro-LED projector, wafer-level RGB cameras, event-driven cameras, inward-facing eye-tracking photodiodes, an inertial measurement unit (IMU), beamforming microphones and optional biosensors configured to detect physiological parameters such as heart rate and skin temperature. The system architecture partitions processing across a neuromorphic coprocessor adapted for event-driven perception, a low-power neural processing unit (NPU) optimized for micro-LLM inference, and a secure control microcontroller unit (MCU) hosting a real-time operating system.

The connectivity in the present invention are facilitated through Bluetooth Low Energy (BLE), Ultra-Wideband (UWB) and optionally a 5G/6G eSIM module. A secure element is provided for storage of cryptographic keys and policy manifests. The device is powered by a thin-film battery supplemented with photovoltaic and thermoelectric energy harvesting. A power management integrated circuit (PMIC) supports dynamic voltage and frequency scaling to

optimize consumption. The optical train collimates and injects rendered overlays into the waveguide while maintaining pupil swim correction and automatic brightness control through ambient light sensing, thereby ensuring retinal safety and all-day visual comfort.

At startup, a secure boot chain measures and verifies firmware, models, and governance policies before enabling sensor activation. Once operational, the runtime initializes two cooperating inference stacks. The neuromorphic stack executes continuous, low-power perception functions such as motion detection, edge extraction, transient audio onset detection, and visual saliency mapping, generating asynchronous spiking events. A spike-to-token adapter aggregates these events into compact “context capsules” containing encoded scene geometry, candidate objects, recognized text snippets, speaker identifications, and acoustic cues, each annotated with timestamps and confidence values. In parallel, an uncertainty-aware simultaneous localization and mapping (SLAM) module fuses IMU data, gaze tracking, and visual features to maintain a low-drift world coordinate frame, generating surfaces and anchors for overlay placement. Raw sensor buffers are short-lived, retained only in ring buffers with overwriting after feature extraction to minimize data persistence.

The language reasoning stack hosts a task-specialized micro-LLM with adapter layers for personalization. On arrival of a context capsule, a lightweight planner constructs a structured prompt comprising recent anchors, user intent signals such as gaze dwell and voice command fragments, safety constraints, and historical memory keys. The micro-LLM generates an action plan, such as presenting a torque sequence, captioning a speaker, or issuing a hazard warning. When additional perception is required, the model issues evidence requests. Attention maps generated by the micro-LLM dynamically gate neuromorphic modules, selectively enhancing resolution or enabling optical character recognition or diarization only for relevant regions, thereby conserving energy. The compositor renders overlays as Z-aligned decals with opacity modulated by tracking confidence and hazard priority. User interaction is enabled through eye gestures and micro-voice

commands for accept or dismiss operations, and through haptic micro-pulses for silent alerts. A rationale stub, such as “low confidence: occlusion,” may be displayed inline whenever uncertainty thresholds are exceeded.

A hybrid offloading controller governs compute placement at sub-task granularity. Latency-sensitive and private tasks are executed on-device, whereas tasks requiring heavy mapping or translation may be offloaded to a local edge gateway. Resource-intensive tasks, such as large-context synthesis or model refresh, may be shifted to the cloud. The controller optimizes across multiple objectives including latency, energy, confidentiality label, task criticality, and link reliability. Optimization is achieved through reinforcement learning driven by on-device telemetry comprising signal strength, round-trip jitter, and battery slope. Intermediate features are encrypted and labelled with usage constraints. During poor network conditions, the controller prefetches minimal maps, defaults to coarse overlays and prioritizes safety-critical alerts. A local scene cache and vector memory minimize repeated queries, while a content-aware compressor reduces bandwidth consumption without degrading semantic fidelity.

Personalization and fleet-level adaptation occur without exporting raw egocentric data. On-device adapters for the micro-LLM and perception heads are fine-tuned using differential privacy with per-feature clipping and controlled noise injection. Periodic contributions to federated aggregation are made in the form of encrypted, noised gradients and sparse task statistics. Updated adapters are returned only after signing and attestation before activation. A governance micro-kernel executes inline audits comprising calibrated uncertainty, out-of-distribution detection, and bias probing, conditioning whether outputs are shown, attenuated, or require user confirmation. A redaction stage enforces capture-time masking of sensitive elements such as faces, screens, or zones, before any higher-level processing. Each overlay is associated with a compact provenance capsule containing identifiers such as model hash, policy version, and salient decision factors, stored in an append-only ledger for local or policy-controlled export.

End-to-end security and reliability are achieved through quantum-resistant cryptographic protocols applied to control channels, model updates and provenance exports. Runtime state measurement and attestation are required before updates are accepted. Watchdog mechanisms monitor system integrity, thermal thresholds, sensor anomalies, and model execution stalls, reverting to safe mode that restricts functionality to hazard alerts if failures occur. Power management employs event-driven duty cycling, dynamic voltage and frequency scaling, and sensor fusion to maintain milliwatt-class always-on operation. Optical and mechanical tolerances self-calibrate using gaze micro-saccades and fiducial markers to maintain overlay stability within sub-degree drift under dynamic conditions.

The system architecture is modular, allowing regional customization of radio modules, sensor exclusion for privacy-sensitive deployments, and domain-specific model packs. This modularity enables deployment across multiple domains including accessibility, industrial training, navigation, and healthcare workflows, while maintaining consistent latency, privacy, and trust guarantees.

The invention combines low-power hardware accelerators with neuromorphic and language-processing cores, along with biosensing and governance modules, to provide privacy-preserving, energy-efficient, and domain-adaptive augmented intelligence. A detailed description of the key components are as under:

1. **Wafer-Level Cameras**: The invention comprises wafer-level, ultra-compact, high-resolution cameras mounted at the front of the wearable frame. These cameras are adapted to capture the external environment in real time, including objects, persons, signs, and text. The captured input facilitates scene understanding, spatial mapping, and overlay alignment. By virtue of wafer-level construction, the cameras are thin, consume less power, and can be seamlessly integrated into the frame without adding bulk.
2. **Eye-Tracking Photodiodes**: Inward-facing photodiodes are provided for high-precision detection of eye movements. The sensors monitor gaze

direction and micro-saccades of the wearer to determine user attention. This enables context-relevant overlays, for example, translation of text at the specific gaze target. Furthermore, by gating system operations only to gaze-relevant regions, energy efficiency is achieved.

3. **Inertial and Bio-Sensors**: The assembly includes an inertial measurement unit (IMU) comprising accelerometer, gyroscope, and magnetometer elements to measure head orientation and movement. This ensures stability of overlays during walking, turning, or rapid head motion. Bio-sensors for heart rate and skin temperature monitoring are further provided to deliver physiological data. Such data enables health monitoring, adaptive context adjustment, fatigue detection, and stress alerts.

4. **Micro-Display**: A micro-display embedded within the frame projects overlays into the user's field of view via an optical waveguide. The display generates captions, navigation arrows, hazard alerts, or task instructions aligned with the real-world scene. It is configured for eye-safe brightness, pupil swim correction, and clear visibility across varied lighting conditions to ensure retinal safety and user comfort.

5. **Micro-LLM Accelerator**: The device incorporates a low-power artificial intelligence accelerator optimized for executing micro language models. This unit processes natural language queries, speech translation, text summarization, and conversational outputs directly on-device, thereby minimizing latency, preserving privacy, and eliminating dependence on cloud transmission.

6. **Neuromorphic Co-Processor**: The invention further includes a neuromorphic processor designed for event-driven operation, mimicking biological neuron activity. It processes sensory input from cameras, audio channels, and inertial sensors only upon the occurrence of events such as motion, sound onset, or sudden gaze shifts. This event-driven approach reduces energy consumption significantly while maintaining continuous environmental awareness.

7. **Additional Micro-LLM Accelerator**: In certain embodiments, an additional on-board micro-LLM accelerator is included. This unit is dedicated to reasoning and planning tasks, thereby separating low-level perception from higher-level natural language reasoning for efficiency and reliability.

System Integration

The aforesaid components are tightly integrated to operate as a unified wearable intelligence system. The wafer-level cameras and bio-sensors capture contextual inputs. The neuromorphic co-processor extracts salient features from event-driven data streams. The micro-LLM accelerator interprets the features into meaningful actions, responses, or guidance. Governance modules perform inline safety, privacy, and bias checks. The micro-display projects context-aware overlays aligned with the real world. This closed-loop cycle operates continuously in real time while maintaining compact form factor, low weight, and energy efficiency.

The system thereby functions as an AI-powered extension of the human senses, capturing environmental and physiological data, reasoning locally on-device, and delivering overlays directly into the user's field of view.

Applications of the Invention

The invention is applicable across multiple domains, including but not limited to the following:

1. **Healthcare and Accessibility**
    - Real-time captioning for hearing-impaired users.
    - Scene description and navigation cues for visually impaired individuals.
    - Continuous vital monitoring with proactive alerts for fatigue or stress.
    - Remote telemedicine support with medical instructions projected into the caregiver's or patient's view.
2. **Industrial and Workplace Safety**
    - Hands-free, stepwise instructions for maintenance, repair, or assembly.

- Hazard detection and instant alerts for machinery, chemicals, or unsafe conditions.
- Worker monitoring for stress, fatigue, or posture anomalies to prevent accidents.
- Automatic redaction of sensitive zones in captured streams for compliance.

3. **Education and Training**
   - Immersive learning with AR-based contextual overlays.
   - Real-time language translation and summarization for global learners.
   - On-site vocational training with AR manuals and simulations.
4. **Navigation and Tourism**
   - Turn-by-turn navigation with projected arrows.
   - Instant translation of foreign text and signage.
   - Historical and cultural insights projected during tours.
5. **Personal Productivity**
   - Real-time transcription and meeting summarization.
   - Adaptive reminders and contextual task lists.
   - Private, unobtrusive assistant for scheduling, calls, and note-taking.
6. **Military, Defence, and Emergency Response**
   - Enhanced situational awareness in high-risk environments.
   - Secure communication overlays for coordinated missions.
   - Real-time mapping and alerts during disaster response.

The present invention thus provides a multi-domain wearable assistant that merges sensing, event-driven AI perception, language reasoning, and real-time overlays into a lightweight form factor. It enhances safety, accessibility, productivity, and decision-making while minimizing power consumption and ensuring privacy and trustworthiness.

We claim:

1. A wearable intelligent device comprising:

a. a wafer-level camera disposed on a front surface of a frame or lens for capturing external scenes;

b. a micro-display configured to project overlays into a user's field of view through an optical waveguide;

c. an inward-facing eye-tracking photodiode configured to detect gaze direction and micro-saccades of the user;

d. an inertial measurement unit comprising accelerometer, gyroscope and magnetometer sensors, and a biosensor selected from heart rate sensor or skin temperature sensor;

e. a micro-LLM accelerator configured for natural language model processing;

f. a neuromorphic co-processor configured for event-driven perception; and

g. an additional micro-LLM accelerator configured for reasoning and planning;

wherein the aforesaid components are integrated within an ultra-thin eyewear or smart contact lens assembly.

2. The wearable intelligent device as claimed in claim 1, wherein the wafer-level camera is an ultra-compact, high-resolution module adapted for seamless integration into the frame without additional bulk.

3. The wearable intelligent device as claimed in claim 1, wherein the micro-display provides pupil swim correction, automatic brightness adjustment and eye-safe projection.

4. The wearable intelligent device as claimed in claim 1, wherein the eye-tracking photodiode determines attention focus of the user for alignment of overlays.

5. The wearable intelligent device as claimed in claim 1, wherein the inertial measurement unit stabilises overlays during head motion.

6. The wearable intelligent device as claimed in claim 1, wherein the biosensor provides physiological inputs including heart rate or skin temperature.

7. The wearable intelligent device as claimed in claim 1, wherein the neuromorphic co-processor processes sensory input on an event-driven basis.
8. The wearable intelligent device as claimed in claim 1, wherein the micro-LLM accelerator executes natural language processing locally without reliance on external servers.
9. The wearable intelligent device as claimed in claim 1, wherein the components are powered by a thin-film battery supplemented by photovoltaic or thermoelectric energy harvesting.
10. The wearable intelligent device as claimed in claim 1, wherein the components are integrated through a governance micro-kernel adapted to condition operation of outputs.
11. A process for providing augmented overlays through a wearable intelligent device as claimed in claim 1, the process comprising:

a. capturing external environmental data using the wafer-level camera;
b. detecting gaze and micro-saccades of a user using the eye-tracking photodiode;
c. sensing head orientation using the inertial measurement unit and obtaining physiological parameters using the biosensor;
d. processing event-driven sensory input using the neuromorphic co-processor;
e. processing language-related data using the micro-LLM accelerator; and
f. projecting overlays aligned with the external scene into the user's field of view by means of the micro-display.

12. The process as claimed in claim 11, wherein the wafer-level camera captures objects, persons, text and signs for scene understanding and overlay alignment.
13. The process as claimed in claim 11, wherein the eye-tracking photodiode determines user attention focus for context-relevant overlay display.
14. The process as claimed in claim 11, wherein the inertial measurement unit stabilises overlays during walking, turning or movement of the user.

15. The process as claimed in claim 11, wherein the biosensor provides physiological parameters including heart rate or skin temperature for adaptive overlay modification.
16. The process as claimed in claim 11, wherein the neuromorphic co-processor processes event-based sensory changes selected from motion events, sound onset or gaze shifts.
17. The process as claimed in claim 11, wherein the micro-LLM accelerator processes natural language inputs locally to provide outputs without reliance on cloud resources.
18. The process as claimed in claim 11, wherein the micro-display projects overlays including captions, navigation arrows, hazard alerts or instructions aligned to real-world scenes.

Dated this 22nd day of September 2025

Sudarshana Bandyopadhyay

Regn. No.: IN/PA 2802

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APPLICATION NO._____

ABSTRACT

CONTEXT AWARE AMBIENT INTELLIGENCE WEARABLE

The present invention relates to a wearable intelligent device implemented as ultra-thin eyewear or a smart contact lens, integrating wafer-level cameras, micro-display, eye-tracking photodiodes, inertial and biosensors, a micro-LLM accelerator, a neuromorphic co-processor, and an additional micro-LLM accelerator. The device captures environmental and physiological data, processes event-driven perception and natural language reasoning locally, and projects context-aware overlays into the user's field of view. Power is supplied by a thin-film battery supplemented by energy harvesting. The components are integrated through a governance micro-kernel ensuring privacy, safety, and bias compliance. The device finds applications in healthcare, accessibility, industrial safety, education, training, navigation, tourism, personal productivity, military, defence, and emergency response.

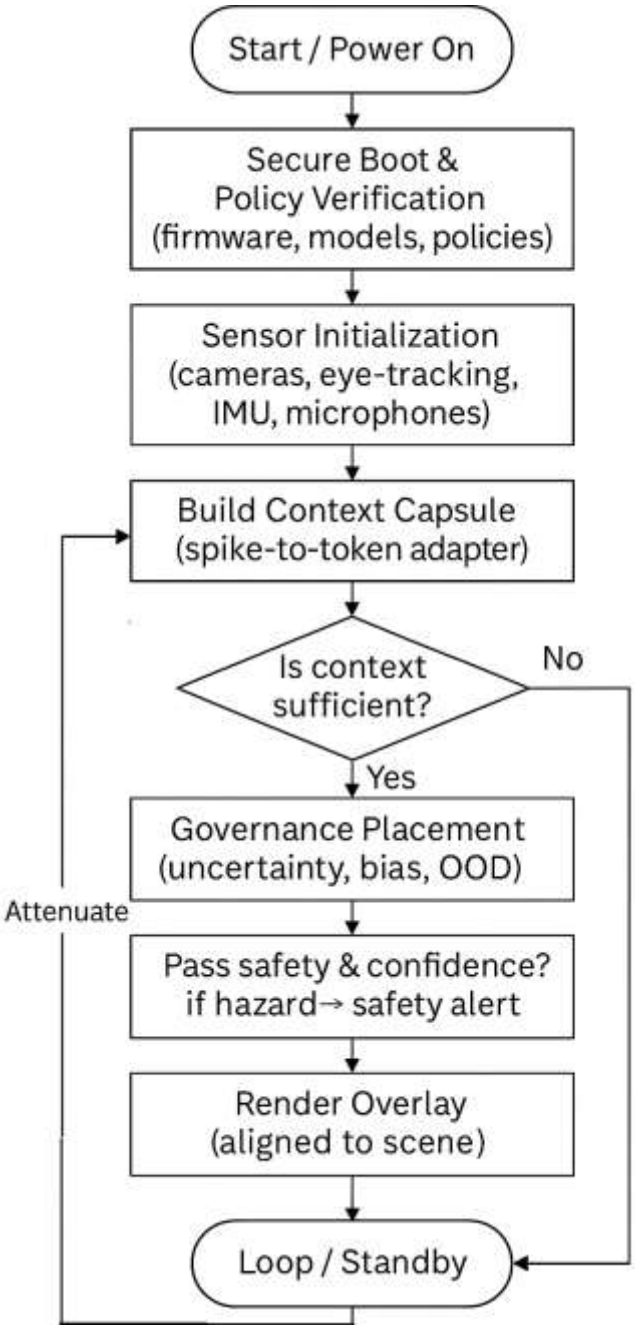
Fig 2

Applicant Name: SRJX RESEARCH AND INNOVATION LAB LLP

Total No. of Sheets: 2

Appl No. -

Sheet 1 of 2



Detailed Flowchart

Figure 1

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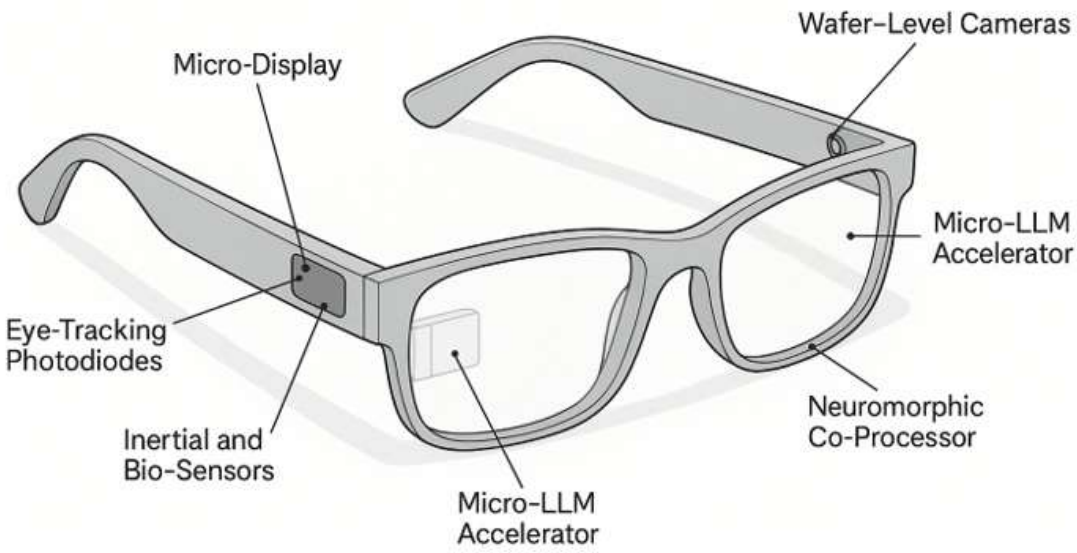
Applicant Name: SRJX RESEARCH AND INNOVATION LAB LLP

Total No. of Sheets: 2

Appl No. -

Figure 2 of 2



Detailed Architecture

Figure 2

Sudarshana Bandyopadhyay
Regn No.: IN/PA 2802
Agent for the Applicants

FORM 5
THE PATENTS ACT, 1970
(39 of 1970)
&
THE PATENTS RULES, 2003

Declaration as to Inventorship
[*See* section 10(6) and rule 13(6)]

1. **NAME OF APPLICANT**: SRJX RESEARCH AND INNOVATION LAB LLP,

hereby declare that the true and first inventor(s) of the invention disclosed in the complete specification filed in pursuance of our application numbered _____ dated 22 September 2025 are:

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Dated this 22nd day of September 2025

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Name of the signatory:

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Name: Sudarshana Bandyopadhyay
Date: 22-Sep-2025 22:46:41
Reason: Patent Efiling

Dated this 22nd day of September 2025

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To,
The Controller of Patents,
The Patent Office
At Kolkata

UDYAM REGISTRATION CERTIFICATE

UDYAM REGISTRATION NUMBER	**UDYAM-OD-07-0095836**
NAME OF ENTERPRISE	**SRJX RESEARCH AND INNOVATION LAB LLP**

TYPE OF ENTERPRISE *

SNo.	Classification Year	Enterprise Type	Classification Date
1	2025-26	Micro	16/08/2025

MAJOR ACTIVITY — **SERVICES**

SOCIAL CATEGORY OF ENTREPRENEUR — **GENERAL**

NAME OF UNIT(S)

S.No.	Name of Unit(s)
1	SRJX RESEARCH AND INNOVATION LAB LLP

OFFICAL ADDRESS OF ENTERPRISE

Flat/Door/Block No.	PLOT NO-3E/474	Name of Premises/ Building	SECTOR-9
Village/Town	CDA CUTTACK	Block	NA
Road/Street/Lane	Avinab Bidanasi	City	Cuttack Sadar
State	ODISHA	District	CUTTACK , Pin 753014
Mobile	9090255155	Email:	soumyajena1989@gmail.com

DATE OF INCORPORATION / REGISTRATION OF ENTERPRISE	**05/05/2025**
DATE OF COMMENCEMENT OF PRODUCTION/BUSINESS	**05/05/2025**

NATIONAL INDUSTRY CLASSIFICATION CODE(S)

SNo.	NIC 2 Digit	NIC 4 Digit	NIC 5 Digit	Activity
1	72 - Scientific research and development	7210 - Research and experimental development on natural sciences and engineering	72100 - Research and experimental development on natural sciences and engineering	Services

DATE OF UDYAM REGISTRATION	**16/08/2025**

* **In case of graduation (upward/reverse) of status of an enterprise, the benefit of the Government Schemes will be availed as per the provisions of Notification No. S.O. 2119(E) dated 26.06.2020 issued by the M/o MSME.**

For any assistance, you may contact:

1. District Industries Centre: CUTTACK (ODISHA)

2. MSME-DFO: CUTTACK (ODISHA)

Udyam Registration Number : UDYAM-OD-07-0095836

Type of Enterprise	MICRO	**Major Activity**	Services
Type of Organisation	Limited Liability Partnership	**Name of Enterprise**	SRJX RESEARCH AND INNOVATION LAB LLP
Owner Name	SRJX RESEARCH AND INNOVATION LAB LLP	**PAN**	AFPFS4480L
Do you have GSTIN	No	**Mobile No.**	9090255155
Email Id	soumyajena1989@gmail.com	**Social Category**	General
Gender	Male	**Specially Abled(DIVYANG)**	No
Date of Incorporation	05/05/2025	**Date of Commencement of Production/Business**	05/05/2025

Bank Details

Bank Name	IFS Code	Bank Account Number
Punjab national bank	PUNB0787800	7878002100002490

Employment Details

Male	Female	Other	Total
3	2	0	5

Investment in Plant and Machinery OR Equipment (in Rs.)

S.No.	Financial Year	Enterprise Type	Written Down Value (WDV)	Exclusion of cost of Pollution Control, Research & Development and Industrial Safety Devices	Net Investment in Plant and Machinery OR Equipment[(A)-(B)]	Total Turnover (A)	Export Turnover (B)	Net Turnover [(A)-(B)]	Is ITR Filled?	ITR Type
1	2023-24	Micro	0.00	0.00	0.00	0.00	0.00	0.00	No	NA

Unit(s) Details

SN	Unit Name	Flat	Building	Village/Town	Block	Road	City	Pin	State	District
1	SRJX RESEARCH AND INNOVATION LAB LLP	PLOT NO-3E/474	SECTOR-9	CDA CUTTACK	NA	Avinab Bidanasi	Cuttack Sadar	753014	ODISHA	CUTTACK

Official address of Enterprise

Flat/Door/Block No.	PLOT NO-3E/474	**Name of Premises/ Building**	SECTOR-9
Village/Town	CDA CUTTACK	**Block**	NA
Road/Street/Lane	Avinab Bidanasi	**City**	Cuttack Sadar
State	ODISHA	**District**	CUTTACK , **Pin :** 753014
Mobile	9090255155	**Email:**	soumyajena1989@gmail.com
Latitude	20.5021859203546	**Longitude:**	85.88860428847029

National Industry Classification Code(S)

SNo.	Nic 2 Digit	Nic 4 Digit	Nic 5 Digit	Activity
1	72 - Scientific research and development	7210 - Research and experimental development on natural sciences and engineering	72100 - Research and experimental development on natural sciences and engineering	Services

Are you interested to get registered on Government e-Market (GeM) Portal	No
Are you interested to get registered on TReDS Portals(one or more)	No
Are you interested to get registered on National Career Service(NCS) Portal	No
Are you interested to get registered on NSIC B2B Portal	No
Are you interested in availing Free .IN Domain and a business email ID	N/A
Are you interested in getting registered on Skill India Digital Portal	No
District Industries Centre	CUTTACK (ODISHA)
MSME-DFO	CUTTACK (ODISHA)
Date of Udyam Registration	16/08/2025
Date of Printing	16/08/2025

IEC Details	
IEC Number	
IEC Status	Inactive
IEC Registration Date	
IEC Modification Date	

"**FORM 1** THE PATENTS ACT 1970 (39 of 1970) and THE PATENTS RULES, 2003 **APPLICATION FOR GRANT OF PATENT** (See section 7, 54 and 135 and sub-rule (1) of rule 20)			(FOR OFFICE USE ONLY)		
			Application No.		
			Filing date:		
			Amount of Fee paid:		
			CBR No:		
			Signature:		
1. APPLICANT'S REFERENCE / IDENTIFICATION NO. (AS ALLOTTED BY OFFICE)					
2. TYPE OF APPLICATION [Please tick (✓) at the appropriate category]					
Ordinary (✓)		Convention ( )		PCT-NP ( )	
Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )
3A. APPLICANT(S)					
Name in Full		Nationality	Country of Residence	Address of the Applicant	
SRJX RESEARCH AND INNOVATION LAB LLP		Indian	India	SRJX RESEARCH AND INNOVATION LAB LLP, Plot No - 3E/474, Sector-9, CDA, Post- Markat Nagar, Cuttack-753014, Odisha, India	
3B. CATEGORY OF APPLICANT [Please tick (✓) at the appropriate category]					
Natural Person ( )		Other than Natural Person			
		Small Entity (✓)	Startup ( )	Others ()	
4. INVENTOR(S) [Please tick (✓) at the appropriate category]					
Are all the inventor(s) same as the applicant(s) named above?		Yes ( )	No (✓)		

If "No", furnish the details of the inventor(s)

Name in Full	Nationality	Country of Residence	Address of the Inventor
DR SOUMYA RANJAN JENA	Indian	India	Plot No - 3E/474, Sector-9, CDA, Post-Markat Nagar, Cuttack-753014, Odisha, India
MR SANJOY SAHA	Indian	India	63/1, Thakur Para Road, P.O.- Naihati, North 24 Parganas, West Bengal-743165, India
DR SOHIT AGARWAL	Indian	India	D 388, Sarvanand Marg, Malviya Nagar, Jaipur-302017, Rajasthan, India

5. TITLE OF THE INVENTION

CONTEXT AWARE AMBIENT INTELLIGENCE WEARABLE

6. AUTHORISED REGISTERED PATENT AGENT(S)	IN/PA No.	2802
	Name	Sudarshana Bandyopadhyay
	Mobile No.	9748818235
7. ADDRESS FOR SERVICE OF APPLICANT IN INDIA	Name	**SUDARSHANA BANDYOPADHYAY**
	Postal Address	Ground Floor, S-456, LGF, Greater Kailash – II, New Delhi – 110048, India
	Telephone No.	NA
	Mobile No.	97488 18235
	Fax No.	NA
	E-mail ID	bandyopadhyay.sudarshana@gmail.com

8. IN CASE OF APPLICATION CLAIMING PRIORITY OF APPLICATION FILED IN CONVENTION COUNTRY, PARTICULARS OF CONVENTION APPLICATION

Country	Application Number	Filing date	Name of the applicant	Title of the invention	IPC (as classified in the convention country)

N.A.					

9. IN CASE OF PCT NATIONAL PHASE APPLICATION, PARTICULARS OF INTERNATIONAL APPLICATION FILED UNDER PATENT CO-OPERATION TREATY (PCT)	
International application number	International filing date

10. IN CASE OF DIVISIONAL APPLICATION FILED UNDER SECTION 16, PARTICULARS OF ORIGINAL (FIRST) APPLICATION	
Original (first) application No.	Date of filing of original (first) application
N.A.	

11. IN CASE OF PATENT OF ADDITION FILED UNDER SECTION 54, PARTICULARS OF MAIN	
Main application/patent No.	Date of filing of main application
N.A.	N.A.

12. DECLARATIONS

(i) Declaration by the inventor(s)

(**In case the applicant is an assignee**: the inventor(s) may sign herein below or the applicant may upload the assignment or enclose the assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period).

We, the above-named inventor(s) is/are the true & first inventor(s) for this Invention and declare that the applicant(s) herein is/are my/our assignee or legal representative.

(a) Date:
(b) Signature:
(c) Name: **Dr Soumya Ranjan Jena**

(a) Date
(b) Signature(s):
(c) Name: **Mr Sanjoy Saha**

(a) Date:
(b) Signature:
(c) Name: **Dr Sohit Agarwal**

(ii) Declaration by the applicant(s) in the convention country

(In case the applicant in India is different than the applicant in the convention country: the applicant in the convention country may sign herein below or applicant in India may upload the assignment from the applicant in the convention country or enclose the said assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period)

I/We, the applicant(s) in the convention country declare that the applicant(s) herein is/are my/our assignee or legal representative. – **N.A.**

(a) Date

(b) Signature(s)

(c) Name(s) of the signatory

(iii) Declaration by the applicant

We the applicant hereby declare that: -

[✓] We are in possession of the above-mentioned invention.

[✓] The complete specification relating to the invention is filed with this application.

[**x**] The invention as disclosed in the specification uses the biological material from India and the necessary permission from the competent authority shall be submitted by me/us before the grant of patent to me/us.

[✓] There is no lawful ground of objection(s) to the grant of the Patent to us.

[**x**] We are the true & first inventor(s).

[✓] We are the assignee or legal representative of true & first inventor(s).

[**x**] The application or each of the applications, particulars of which are given in Paragraph-8, was the first application in convention country in respect of my invention(s).

[**x**] We claim the priority from the above mentioned application(s) filed in convention country/countries and state that no application for protection in respect of the invention had been made in a convention country before that date by us or by any person from which I derive the title.

[**x**] Our application in India is based on international application under Patent Cooperation Treaty (PCT) as mentioned in Paragraph-9.

[**x**] The application is divided out of my /our application particulars of which is given in Paragraph-10 and pray that this application may be treated as deemed to have been filed on DD/MM/YYYY under section 16 of the Act.

[**x**] The said invention is an improvement in or modification of the invention particulars of which are given in Paragraph-11.

13. FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION

(a) Form 2

Item	*Details*	*Fee*	*Remarks*
Complete/ provisional specification	No. of pages: 13	1600	Including Form 2, description,
No. of Claim(s)	No. of Claims = 18 No. of Pages = 3	-	Claim pages
Abstract	1		Abstract page
No. of Drawing(s)	No. of drawings = 2 and No. of pages = 2		Drawing sheets

In case of a complete specification, if the applicant desires to adopt the drawings filed with his provisional specification as the drawings or part of the drawings for the complete specification under rule 13(4), the number of such pages filed with the provisional specification are required to be mentioned here.

b. Form 3: Statement and Undertaking
c. Form 5: Declaration as to inventorship
d. Power of Attorney
e. Form 28
f. Form 9

Total fee ₹ 6660/- is being paid online through electronic portal

We hereby declare that to the best of our knowledge, information and belief the fact and matters stated herein are correct and we request that a patent may be granted to us for the said invention.

Dated this 22nd day of September 2025.

Signature:

Name: Sudarshana Bandyopadhyay
(Regn No: IN/PA 2802)
Agent for the Applicant
Phn no.: 97488 18235
email: bandyopadhyay.sudarshana@gmail.com

To,
The Controller of Patents
The Patent Office,
at Kolkata

FORM 28

THE PATENTS ACT,

1970 (39 of 1970)

AND

THE PATENTS RULES, 2003

TO BE SUBMITTED BY A SMALL ENTITY /STARTUP/EDUCATIONAL INSTITUTION

[See rules 2 (fa), 2(fb), 2(ca) and 7]

1	Name, address and nationality.	We, SRJX RESEARCH AND INNOVATION LAB LLP, of the address Plot No - 3E/474, Sector-9, CDA, Post- Markat Nagar, Cuttack-753014, Odisha, India, applicant in respect of the patent application no. _____ dated 22 September 2025 hereby declare that we are a micro entity in accordance with rule 2(fa) and submit the following document as a proof :
2	Documents to be submitted	
	i. For claiming the status of a **micro** entity:	
	A. For an Indian applicant: Evidence of registration under the Micro, Small and Medium Enterprises Act, 2006 (27 of 2006).	
3	To be signed by the applicant(s) / patentee (s) / authorised registered patent agent.	The information provided herein is correct to the best of my/our knowledge and belief. Dated this 22nd day of September 2025
4	Name of the natural person who has signed.	Signature: Sudarshana

Signature Not Verified

Digitally Signed.
Name: Sudarshana Bandyopadhyay
Date: 22-Sep-2025 22:54:16
Reason: Patent Efiling

	Designation and official seal, if any, of the person who has signed.	Sudarshana Bandyopadhyay Regn. No.: IN/PA 2802 Agent for the applicant Phn No. 9748818235 Email: bandyopadhyay.sudarshana@gmail.com To The Controller of Patents, The Patent Office, At Kolkata

FORM 9

THE PATENTS ACT, 1970

(39 of 1970)

&

THE PATENTS RULES, 2003

REQUEST FOR PUBLICATION

[See Section 11A(2); Rule 24A]

We, SRJX RESEARCH AND INNOVATION LAB LLP, of the address Plot No - 3E/474, Sector-9, CDA, Post- Markat Nagar, Cuttack-753014, Odisha, India, hereby request for an early publication of our Patent Application No. _____ filed on 22 September 2025 under Section 11A(2) of the Act.

Dated this 22nd day of September 2025

Sudarshana Bandyopadhyay
Regn No.: IN/PA 2802
Agent for the Applicants
Email: bandyopadhyay.sudarshana@gmail.com
Phn No: 9748818235

FORM 9

THE PATENTS ACT, 1970

(39 of 1970)

&

THE PATENTS RULES, 2003

REQUEST FOR PUBLICATION

[See Section 11A(2); Rule 24A]

We, SRJX RESEARCH AND INNOVATION LAB LLP, of the address Plot No - 3E/474, Sector-9, CDA, Post- Markat Nagar, Cuttack-753014, Odisha, India, hereby request for an early publication of our Patent Application No. _____ filed on 22 September 2025 under Section 11A(2) of the Act.

Dated this 22nd day of September 2025

Sudarshana Bandyopadhyay
Regn No.: IN/PA 2802
Agent for the Applicants
Email: bandyopadhyay.sudarshana@gmail.com
Phn No: 9748818235

FORM 3

THE PATENTS ACT,

1970 (39 of 1970)

and

THE PATENTS RULES,
2003

STATEMENT AND UNDERTAKING UNDER SECTION 8

(See section 8; Rule 12)

1. Name of the applicant(s).	We, SRJX RESEARCH AND INNOVATION LAB LLP, Plot No - 3E/474, Sector-9, CDA, Post-Markat Nagar, Cuttack-753014, Odisha, India hereby declare:
2. Name, address and nationality of the joint applicant.	(i) that we have not made any application for the same/substantially the same invention outside India Or (ii) that we who have made this application No date 22nd September 2025 alone/~~jointly~~ ~~with~~ ....., made for the same/ substantially same invention, application(s) for patent in the other countries, the particulars of which are given below:

Name of the country	Date of application	Application No.	Status of the application	Date of publication	Date of grant
N.A.					

3. Name and address of the assignee	(iii) that the rights in the application(s) have been assigned to SRJX RESEARCH AND INNOVATION LAB LLP, Plot No - 3E/474, Sector-9, CDA, Post-Markat Nagar, Cuttack-753014, Odisha, India

	that we undertake that upto the date of grant of the patent by the Controller, we would keep him informed in writing the details regarding corresponding applications for patents filed outside India within six months from the date of filing of such application. Dated this 22nd day of September 2025
4. To be signed by the applicant or his authorized registered patent agent.	 Signature. .....
5. Name of the natural person who has signed.	Sudarshana Bandyopadhyay Regn. No.: IN/PA 2802 Agent for the applicant Phn No. 9748818235 Email: bandyopadhyay.sudarshana@gmail.com
	To The Controller of Patents, The Patent Office, at Kolkata
Note.- Strike out whichever is not applicable;	