Nairobi's OOH

Boldstreet OOH

Programmatic Out-of-Home Advertising Engine

DATA-DRIVEN PROGRAMMATIC CAMPAIGNS

WELCOME TO BOLDSTREET.

Digital out-of-home (DOOH) ad spend is booming (global DOOH hit ~$16.7B in 2023, ~37% of total OOH), and programmatic DOOH is growing even faster (programmatic DOOH was $1.2B in 2023 and is projected +55% in 2027).

Media agencies increasingly demand granular audience and performance data not just "impressions". Our platform delivers **unmatched breadth of OOH measurement and adtech features** for Nairobi, integrating first-party sensors with real-time bidding (RTB) on DSP/SSP exchanges. In short, we turn static signage into a **measurable, audience-driven, programmatic channel**.

Boldstreet OOH turns billboards and street screens into measurable, programmatic ad channels. Real-time audience signals, gaze & dwell metrics, RTB integration and blockchain-verified impressions for advertisers and agencies.

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DATA-DRIVEN PROGRAMMATIC CAMPAIGNS

Market Opportunity

AGENCY DEMAND.

DOOH Growth: Digital screens now account for a large and growing share of OOH (36.9% in 2023). U.S. OOH revenue grew 2.1% to $8.7B in 2023, with DOOH up ~10% (and 65% of top advertisers increasing DOOH spend). This trend is mirrored in Nairobi/East Africa.

Data-Driven Campaigns: Advertisers and agencies now treat OOH like digital media, seeking audience segmentation, attribution, and ROI. As Digiday notes, agencies use audience mapping and analytics to target specific OOH locations ("billboards indexing high on males 25–34… single, employed, one-car owner"). They expect DOOH to integrate with cross-channel funnels (walk-in rates, online conversions) and DCO tactics.

Nairobi's OOH

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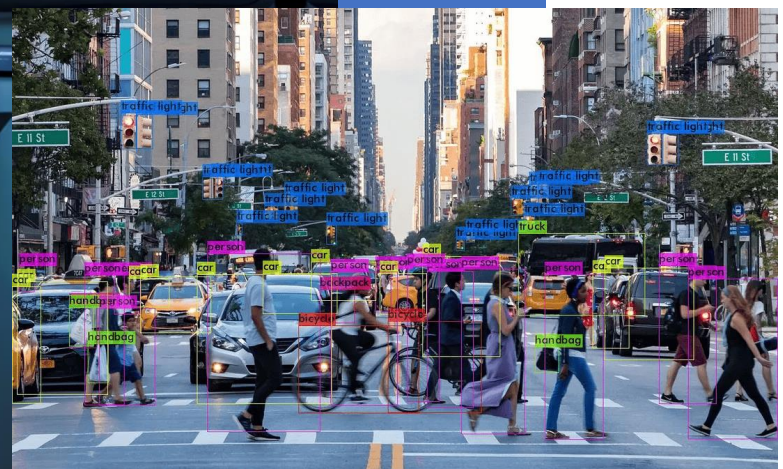

DATA-DRIVEN PROGRAMMATIC CAMPAIGNS

PLATFORM OVERVIEW.

End-to-End Integration: Our system acts as both an SSP (supply side) and DSP-capable unit for OOH. It ingests real-time sensor data (cameras, IoT, social feeds) and feeds audience/engagement signals into DSPs, while ingesting bid requests and triggering dynamic creative playback. In practice, we plug into major DSPs/SSPs so that OOH screens can transact programmatically like online media. In fact, our real-time data streams are "programmatic ready" we supply live audience counts and context signals that programmatic platforms consume for bidding and targeting.

Real-Time Bidding & DCO: Support for RTB/RTM means every ad slot can be auctioned on-demand. We implement Dynamic Creative Optimization (DCO) so that ads automatically adjust by time, weather, or detected audience. (For example, menu items change with weather or audience demographics.) We track DCO performance with specialized metrics (variant CTRs, engagement per creative, time-of-day lift) so agencies can optimize creative rotation.

Compliance & Privacy: All processing is anonymized and compliant. We focus on aggregate audience attributes and behavioral signals, not individual identification. Any personal data (e.g. device IDs or facial features) is hashed/anonymized before analysis, matching industry privacy standards.

We offer a holistic analytics and ad-serving platform that sits between OOH networks and programmatic buyers.

DATA-DRIVEN PROGRAMMATIC CAMPAIGNS

AUDIENCE & DEMOGRAPHIC ANALYTICS

Our platform's computer-vision engine collects in-situ audience profiles for every screen play

Rich Demographics: Age is broken into every year (0–100+) and gender detection includes Male, Female, and Non-binary categories. Unlike legacy solutions that only count broad age brackets, we give full granularity. We even infer broad ethnic or cultural indicators (e.g. African Black vs Cushitic vs Nilotic vs South Asian vs Other) from apparel and physical features. For context, competing systems typically only capture basic age/gender counts; we extend far beyond that.

Visual Attributes: We detect attributes like glasses/sunglasses, facial hair (beard/mustache), and various headwear (cap, hijab, helmet). Clothing style (formal, casual, traditional), dominant garment colors (red, blue, etc.), and branded logos on clothing, vehicles or accessories are recognized. These features allow inference of lifestyle or affluence (e.g. luxury vs budget).

Group Dynamics: Camera and lidar inputs count people and classify into groups (solo, duo, small/large group, adult with child) and mobility (e.g. wheelchair or using crutches). This level of granularity distinguishing a single walker vs. a family group is unique in OOH analytics.

Engagement Signals: Advanced gaze tracking and posture analysis identify who is actually looking at the screen. We measure direct vs. peripheral glances and head orientation (16 angular sectors) to see if a passerby looked at the billboard. We time viewers' dwell time in each sector (0–5s, 5–10s, up to 90+ seconds) to gauge interest. These attention metrics go far beyond simple passersby counts

DATA-DRIVEN PROGRAMMATIC CAMPAIGNS

BEHAVIORAL & EMOTIONAL METRICS

- Emotion Detection → 98% Happy + Excited 😄
- Smile Intensity Index → Very High (0.92)
- Gesture Recognition → Fist pump ✊ + Raised knee (victory/celebration pose)
- Engagement Cue → Jump with loud expression = high arousal emotion ⚡
- Blink Rate → Very low (hyper-focused, high energy)
- Gaze Fixation → Eyes wide open, facing forward → maximum audience connection 👀
- Engagement Heatmap → Facial expression + fist raised dominate attention
- Surprise Recovery Time → Longer (holds the emotional burst longer)
- Smile Duration → 4.5 seconds—extended joyful expression

Engagement & Emotions: Facial-expression recognition captures positive/neutral/negative states (happy, neutral, angry, surprised, disgusted, sad). We even detect micro-expressions and gestures: smile intensity, brow raises, nods, thumbs-up, pointing at the ad, or selfie/video poses. Combined with blink rate and gaze fixation duration, this yields an engagement heatmap in front of the screen. Such behavioral data feeds engagement rate metrics (e.g. "watchers" who actually looked at the ad vs. total impressions).

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Emotion Classification: Beyond broad mood, we capture subtle cues like pupillary dilation, micro-surprise onset, or even mouth movements to infer "interest" or "confusion". For example, if a viewer frowns at a digital ad, that can be tagged as "boredom/negative response." This depth of insight (e.g. measuring "surprise recovery time" or "smile duration" in ms) is unprecedented in OOH.

- Emotion Detection → 95% Happy 😄
- Smile Intensity Index → High (0.87 on scale 0–1)
- Gesture Recognition → Arms spread wide 🙌 (positive body expression)
- Engagement Cue → Jumping = high excitement level 🚀
- Blink Rate → Low (indicating focus on the action)
- Gaze Fixation → Not on the camera (immersed in action = authentic joy)
- Engagement Heatmap → Upper body & raised hands attract highest visual attention
- Surprise Recovery Time → Fast, transitioning into joyful state (dynamic motion)
- Smile Duration → 3.2 seconds sustained happiness

We turn anonymous on-screen viewers into an interaction dataset

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TRAFFIC & VEHICLE ANALYTICS

Vehicle Counting & Typing: We count every passing vehicle and categorize it (sedan, SUV, minibus "matatu", city bus, heavy truck, motorcycle, bicycle, tuk-tuk, etc.). Speeds are tracked in bins (0–5 km/h up to 60+ km/h) to distinguish slow drivers vs. highway traffic. Peak vs. off-peak counts are computed. This allows precise impression estimates: for instance, if 100,000 vehicles pass daily and average occupancy is 1.5, we compute ~150,000 impressions/day. We also detect license plates (yes/no, readable/unreadable) for law enforcement integration or further analytics.

Pedestrian Flow: Sidewalk foot traffic is monitored via cameras and pressure sensors. We produce origin-destination and preferred walking-path heatmaps (e.g. from parking to mall entrances tying OOH exposure to journey patterns). Queues at bus stops or crosswalks are measured via radar to see if waiting crowds could view the screen.

Contextual CPM/ROI: By correlating traffic counts with bidding data, we compute vehicles/minute and adjust programmatic bid-floor prices dynamically. For example, our AI can raise bids during predicted traffic surges or lower them when pedestrian traffic thins.

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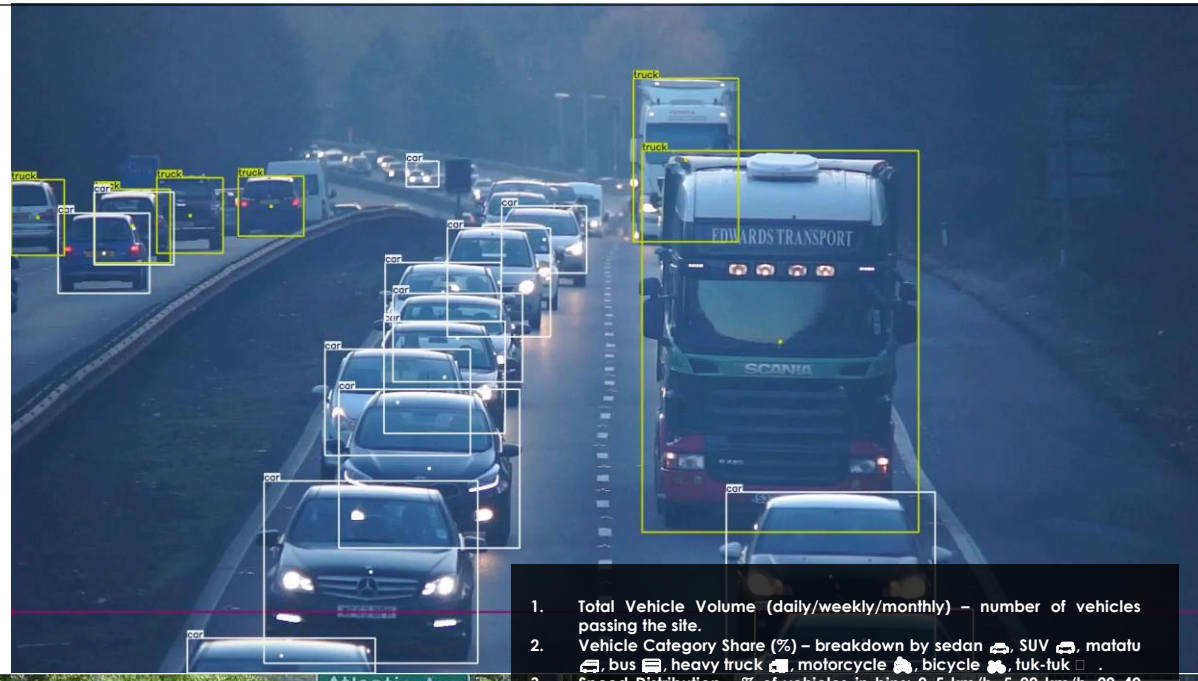
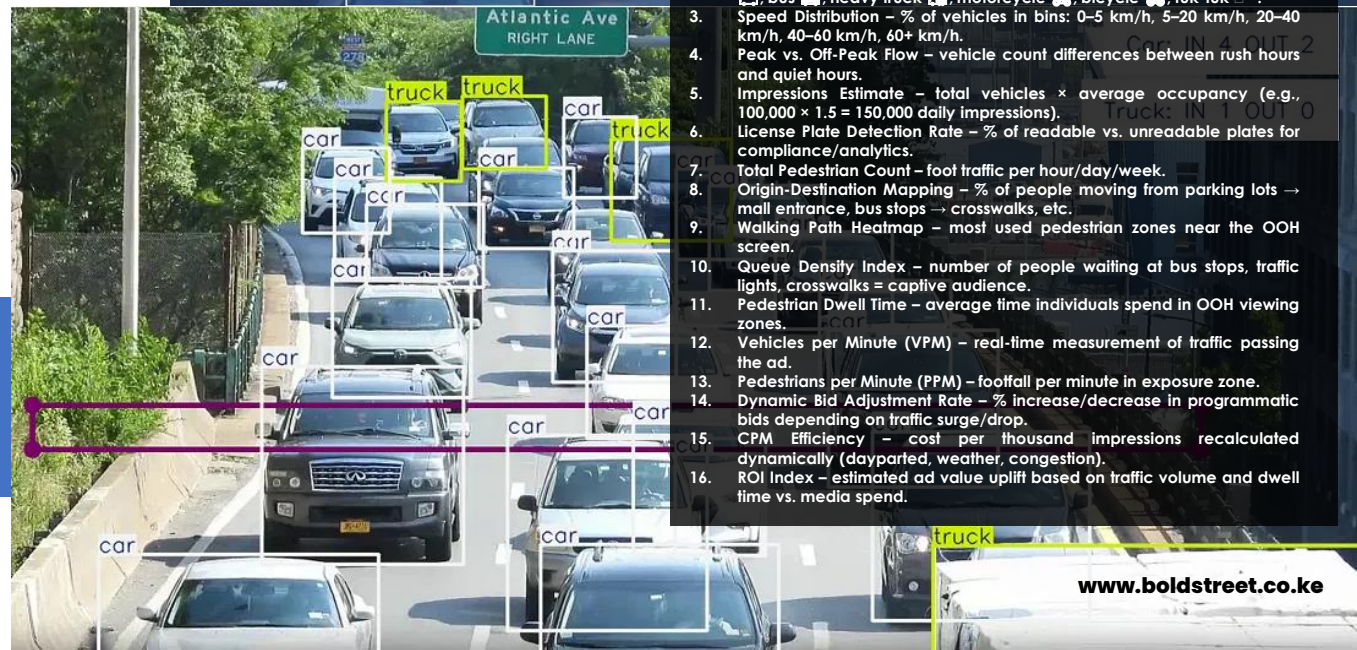
In built-up areas, vehicles are key "audience" as well





1. Total Vehicle Volume (daily/weekly/monthly) – number of vehicles passing the site.
2. Vehicle Category Share (%) – breakdown by sedan, SUV, matatu, bus, heavy truck, motorcycle, bicycle, tuk-tuk .
3. Speed Distribution – % of vehicles in bins: 0–5 km/h, 5–20 km/h, 20–40 km/h, 40–60 km/h, 60+ km/h.
4. Peak vs. Off-Peak Flow – vehicle count differences between rush hours and quiet hours.
5. Impressions Estimate – total vehicles × average occupancy (e.g., 100,000 × 1.5 = 150,000 daily impressions).
6. License Plate Detection Rate – % of readable vs. unreadable plates for compliance/analytics.
7. Total Pedestrian Count – foot traffic per hour/day/week.
8. Origin-Destination Mapping – % of people moving from parking lots → mall entrance, bus stops → crosswalks, etc.
9. Walking Path Heatmap – most used pedestrian zones near the OOH screen.
10. Queue Density Index – number of people waiting at bus stops, traffic lights, crosswalks = captive audience.
11. Pedestrian Dwell Time – average time individuals spend in OOH viewing zones.
12. Vehicles per Minute (VPM) – real-time measurement of traffic passing the ad.
13. Pedestrians per Minute (PPM) – footfall per minute in exposure zone.
14. Dynamic Bid Adjustment Rate – % increase/decrease in programmatic bids depending on traffic surge/drop.
15. CPM Efficiency – cost per thousand impressions recalculated dynamically (dayparted, weather, congestion).
16. ROI Index – estimated ad value uplift based on traffic volume and dwell time vs. media spend.

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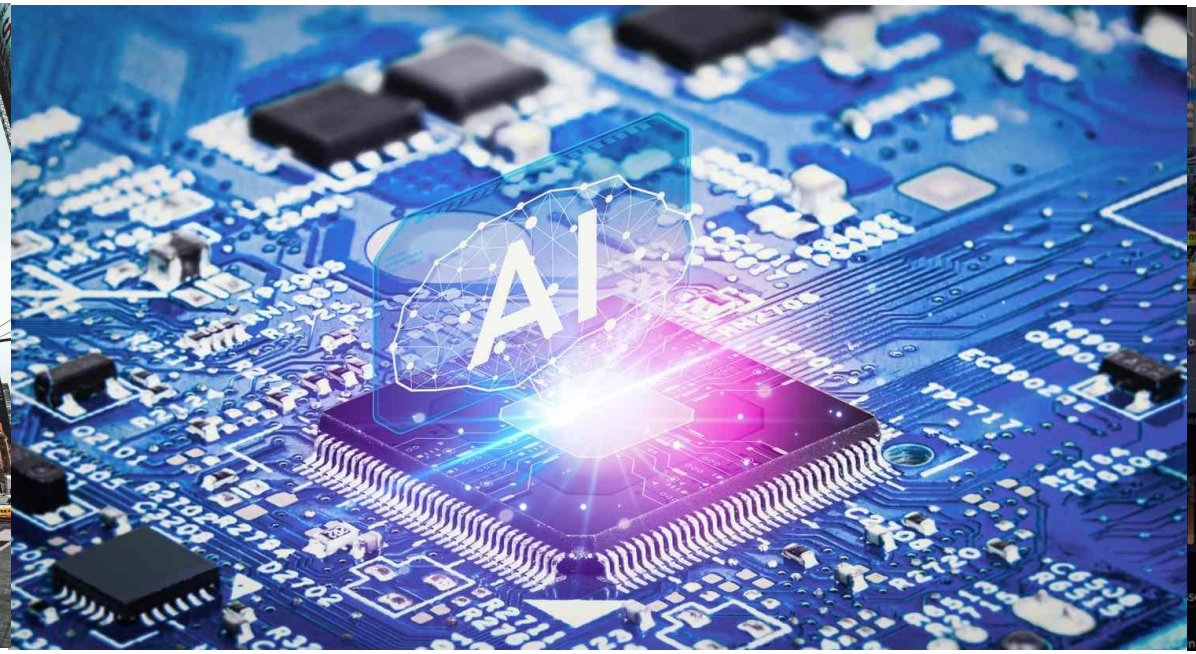

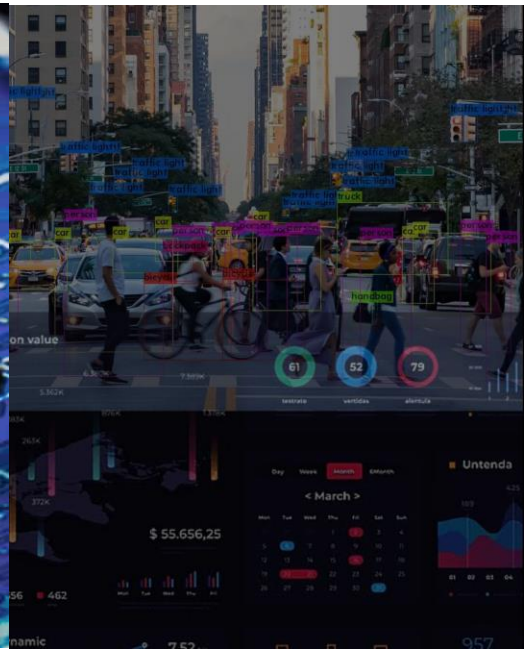

ENVIRONMENTAL & CONTEXTUAL DATA

We continuously sense the environment around each screen

Ambient Conditions: Light sensors measure illumination (lux), distinguishing day/night modes. Weather inputs (clear, cloudy, rain, storm) and local conditions (temperature, humidity, wind, UV index, road wetness) are tracked. For example, an ad network in Kenya might deliver different creatives when it's sunny vs. when it's raining. We log air quality and noise levels too, to analyze if busy/interrupted scenes affect engagement.

Temporal/Calendar: Every second-stamped log is tagged with time of day, day of week, date, and holiday flags. We even integrate with local event calendars (sporting events, festivals near the screen) – so ads can tie into "if a concert is nearby, push related creatives."

Location Awareness: GPS modules on screens know their precise coordinates (with accuracy meter). We define geo-fences and "hotspot" zones (e.g. Thika Road, Ngong Road, major malls in Nairobi). Our platform alerts if a viewer strays outside a geo-fence. Distance-to-hotspot is computed in real-time to target ads to audiences heading toward high-value areas. We also track proximity to competitor billboards and adjust campaign strategies accordingly.

DATA-DRIVEN PROGRAMMATIC CAMPAIGNS

AD-PERFORMANCE & ROI METRICS

Real-Time Impressions: We use the above footfall and vehicle data to produce live impression counts per play, using industry-standard "opportunities to see" models. Unique reach and frequency are derived from repeat-viewer detection.

Engagement Rates: Interactive events (QR scans, screen taps, mobile app actions) are tracked to compute real engagement rates. For example, number of QR code engagements divided by total impressions gives a % engagement. We also capture "eye-contact impressions" – how many people actually looked at the screen (vs. just walked by).

Programmatic Metrics: Full integration with ad servers yields metrics like slot fill rate, RTB bid count, win rate, and programmatic spend/revenue (per campaign/KSh). We calculate CPC (cost per contact), CPM, CPA, ROI, customer acquisition cost, LTV, and ad fatigue indices (when the same audience sees the ad too often). Campaign A/B tests (Creative A vs B) are logged for performance lift, and daypart or weather-impact lifts can be analyzed.

Cross-Channel Attribution: By linking with mobile location data and customer touchpoints, we estimate downstream conversions: walk-in rates at stores, website visits, app downloads, etc. Attribution models (first-touch, last-touch) and multi-touch sequences map the consumer path. We can feed data into third-party DMPs/CRM to compute "lift" in sales or store traffic due to the DOOH exposure.

Reporting & Dashboards: All metrics are visualized in dashboards and exported via API. Heatmaps of gaze/contact density and time series charts of footfall vs ad impressions provide intuitive views.

630 KPIs

Our analytics close the loop between audience data and campaign KPIs

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"(In short, we move beyond traditional DOOH metrics like gross impressions to a rich set of KPIs familiar to digital advertisers – enabling precise media planning and ROI calculation.)

DATA-DRIVEN PROGRAMMATIC CAMPAIGNS

SECURITY, SAFETY & MAINTENANCE ALERTS.

Structural & Crime Alerts: Computer vision continuously watches for threats: vandalism (graffiti or damage in progress), fire/smoke near the billboard, or crowds gathering (risk of surge or protest). Intrusion detection flags unauthorized access after hours. If the display tilts or its panels crack (via inclinometer or camera), maintenance is alerted.

Our system also safeguards the hardware and public safety

Power & Sensor Health: We log electricity outages (to the second) and track backup battery levels. Temperature and humidity inside the housing are monitored to prevent overheating/condensation. Network and sensor health checks (ping latencies, API response times, calibration errors) auto-generate maintenance tickets.

Alerting: All anomalies (social or environmental) trigger alerts to relevant authorities – e.g. detecting a traffic accident nearby, an air quality spike, or anomalous crowding can automatically notify relevant agencies.

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DATA-DRIVEN PROGRAMMATIC CAMPAIGNS

PSYCHOGRAPHICS & BRAND-AFFINITY SIGNALS

We push the boundaries of audience insight through behavior analysis:

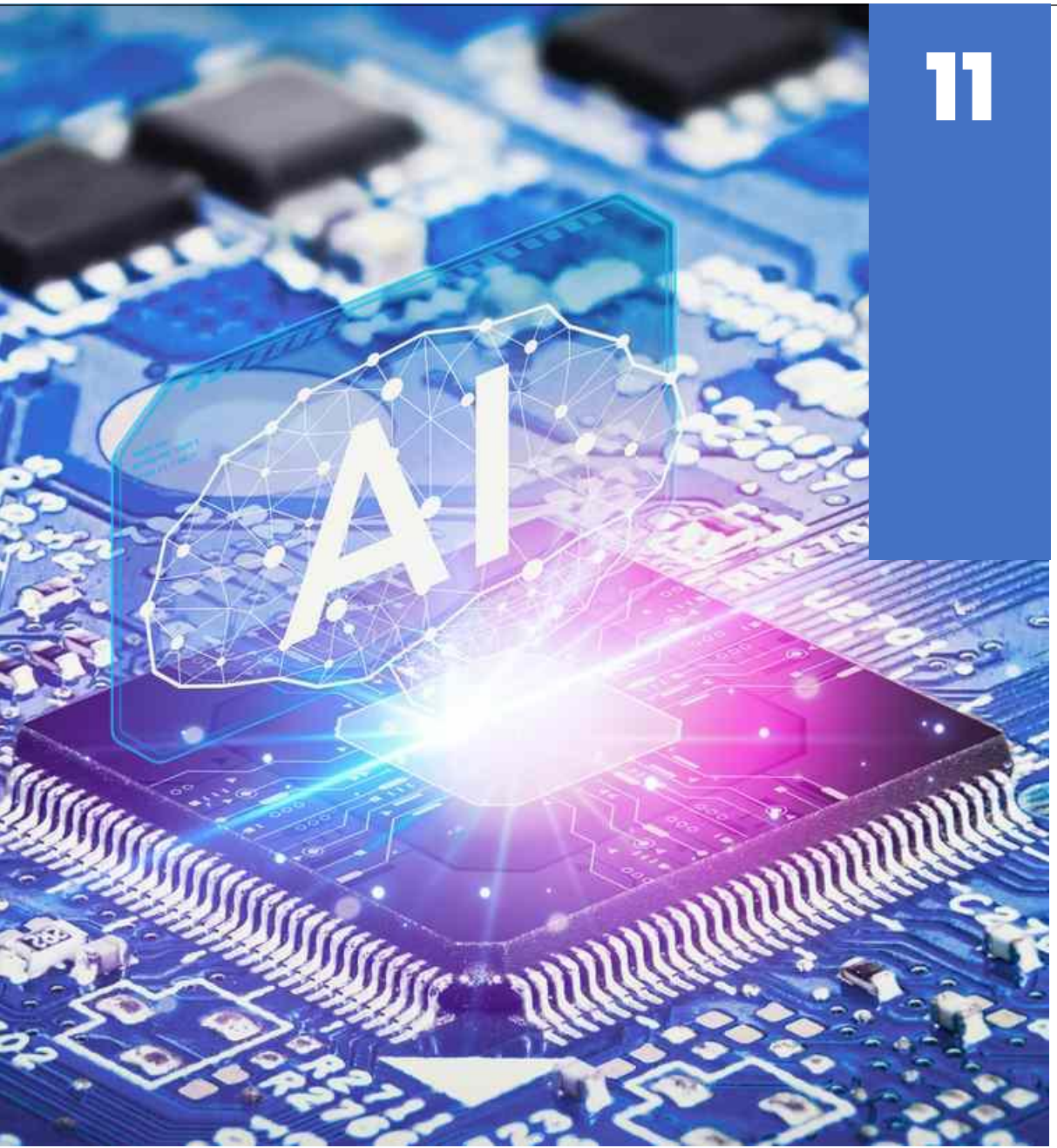
Brand Logos & Interests: Our CV can spot prominent logos on apparel, vehicles, bags, or accessories. If 10% of passersby wear Brand X apparel, we report that affinity. We even recognize emerging interests (e.g. sports gear vs tech gadgets from clothing or devices).

Posture & Intent: By analyzing body language, we infer purchase intent: leaning in toward the screen, or reaching for a phone suggests engagement. Sustained posture or gestures (pointing at ad, thumbs-up) increase our "interest" score.

Peer Influence: When people watch ads in groups, we track "social contagion" – e.g. if one person takes a selfie with an ad, others often mimic. Our analytics measure how group members influence each other's engagement.

Sentiment & Social Signals: If we have an audio mic (with permission), we can pick up excited exclamations ("Wow!") or laughter around the ad, boosting positive sentiment metrics. Simultaneously, we monitor geo-tagged social media mentions (hashtags, tweets, Instagram posts) in the vicinity – a spike in brand mentions after an ad run is flagged as "social lift."

Surveys & Recall Tests: After viewing, users near the display can optionally be prompted (e.g. via app or kiosk) to rate or recall the ad. These micro-surveys feed our calculated Net Promoter Score proxy for OOH.



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PREDICTIVE AI & OPTIMIZATION

Audience Forecasting: Based on historical sensor data, we predict pedestrian and vehicular traffic for the next hour/day. This helps media buyers plan buys or schedule high-impact content (e.g. schedule luxury ads when predicted audience suits demographics).

Creative Performance Forecast: Our models predict which creative (A vs. B) will perform best in upcoming slots, taking into account weather, daypart, and local events. We also estimate when ads will start to fatigue (drop in engagement), so buyers can proactively swap content.

Campaign ROI Modeling: By analyzing past campaign data, we forecast ROI by time of day, location, and spend. Our AI suggests optimal budget allocations per screen to maximize total reach and conversions. For instance, if a local event is starting at 6pm, our system may boost bids and switch to event-themed ads.

Maintenance & Operations: We predict sensor downtime and power issues before they occur, scheduling maintenance windows during off-peak hours. We even forecast blockchain transaction costs and network usage for the ledger that secures our data logs.

We use machine learning to forecast and optimize campaigns.

COMPETITIVE DIFFERENTIATORS

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360° Measurement

We combine the best of all worlds: detailed viewership analytics and seamless programmatic DSP/SSP connectivity.

Real-Time Programmatic Integration

Our real-time pipelines (sensors → analytics → bid requests → ad play → performance feedback) blur the line between outdoor and online media. We empower agencies to fully leverage that by ensuring bids can be targeted by audience and context data.

Granularity & Custom Metrics

We support everything from demographic slices to keystroke on a QWERTY (e.g. brand-logo counts on clothing, eye-tracking heatmaps, real-time social media sentiment). Our platform is fully extensible – if you need a new metric (say, "audience smile intensity"), we can add it in software without new hardware.

Local Expertise

We understand Nairobi/East Africa specifics. Our "hotspot" geofences (Thika Road, Ngong Road, Two Rivers Mall, etc.) are preconfigured, and we ingest local data (weather patterns, event schedules). This local tuning means our predictive models and demographic baselines are more accurate in the regional context.

For Media Buyers:
Gain confidence in OOH investments through detailed KPIs (audience profiles, engagement, ROI). Target ads dynamically by actual nearby audience traits and environmental context.

For Campaign Managers:
Leverage RTB and DCO to deploy the right creative at the right moment. Monitor campaign performance live and adjust on the fly.

For Brands:
Connect OOH exposure to downstream outcomes (store visits, online actions) and prove incremental lift.

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SUMMARY & NEXT STEPS

Our comprehensive OOH measurement platform turns every digital billboard into a data-rich advertising channel. We marry computer vision, sensor data, AI forecasting, and programmatic adtech into one end-to-end system. This empowers media agencies in Nairobi to plan and buy OOH media with the same precision as digital channels, backed by deep analytics and real-time optimization.

Nairobi's OOH

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6-MONTH DELIVERY PLAN

Site Assessments & Technical Readiness (Weeks 0–6)

Objective: Validate physical, power, comms and audience conditions for prioritized screens in Nairobi and produce a technical build-plan per site.

Licensing, Permits & Stakeholder Alignment (Weeks 1–10, parallel)

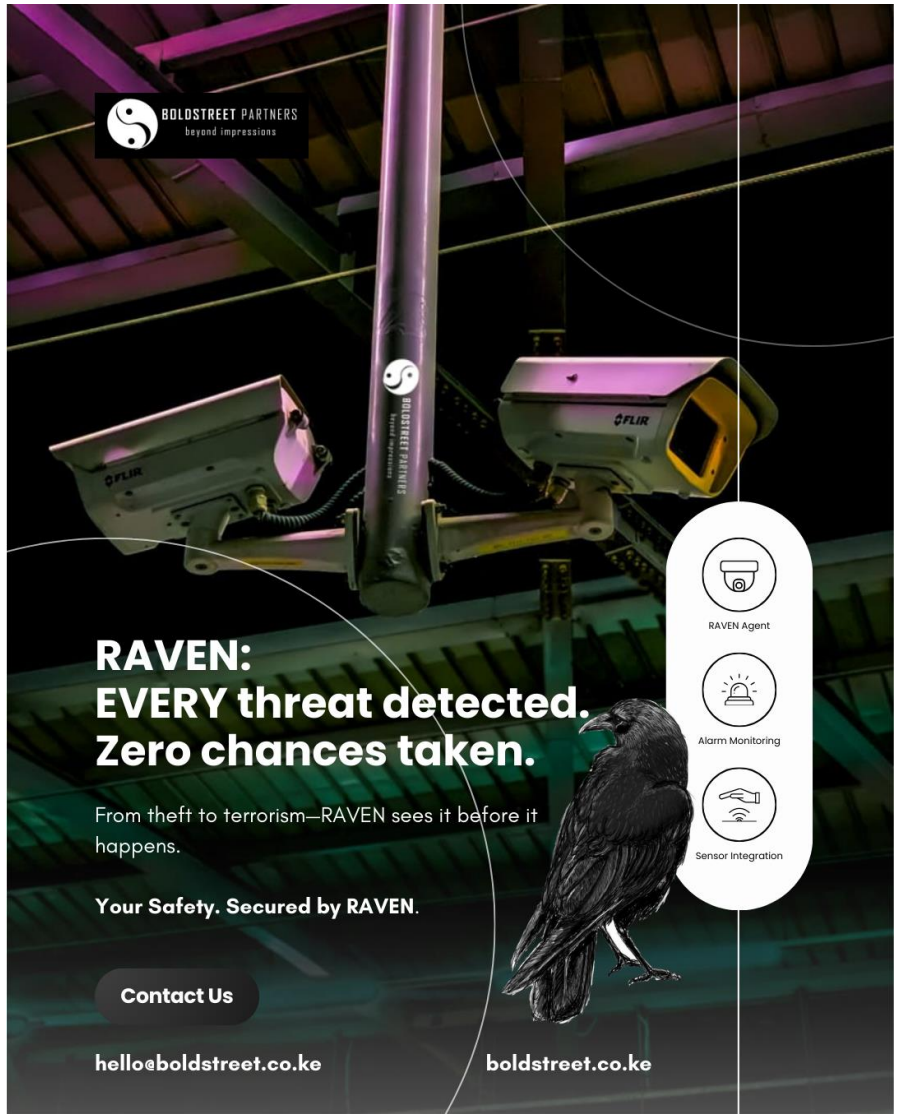
Objective: Secure all regulatory, municipal and commercial approvals and formal commercial agreements needed to legally operate and transact programmatic inventory.

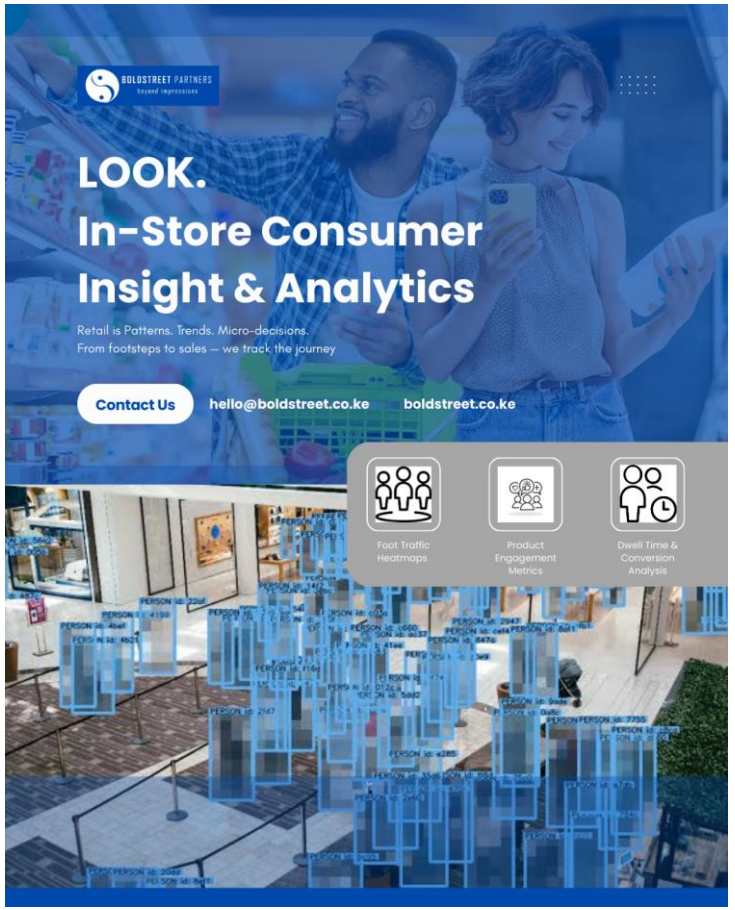
Deployment, Integration & Go-Live (Weeks 6–24)

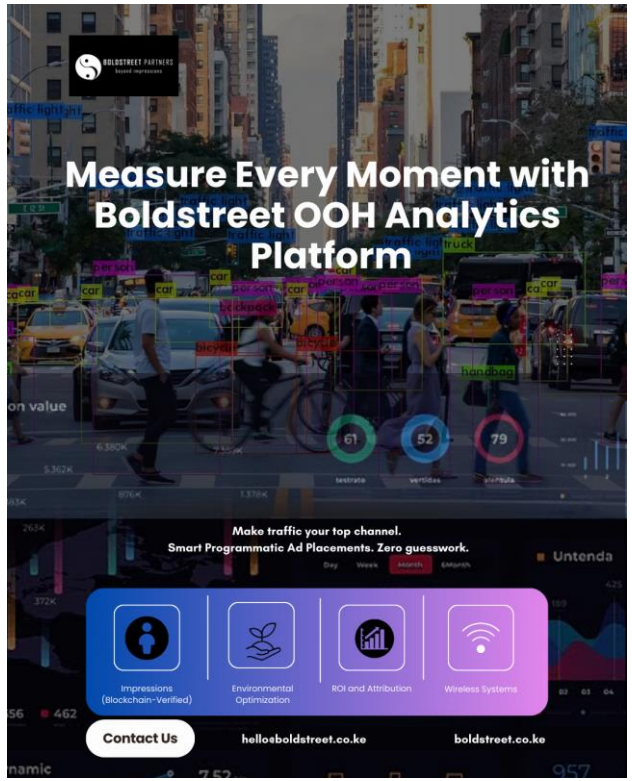
Objective: Full hardware & software deployment, SSP/DSP programmatic integration, pilot campaigns, agency onboarding and handover — delivered within 6 months.

Let’s discuss how our platform can plug into your existing systems and take your Out-of-home strategy from billboard to big data.

hello@boldstreet.co.ke







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