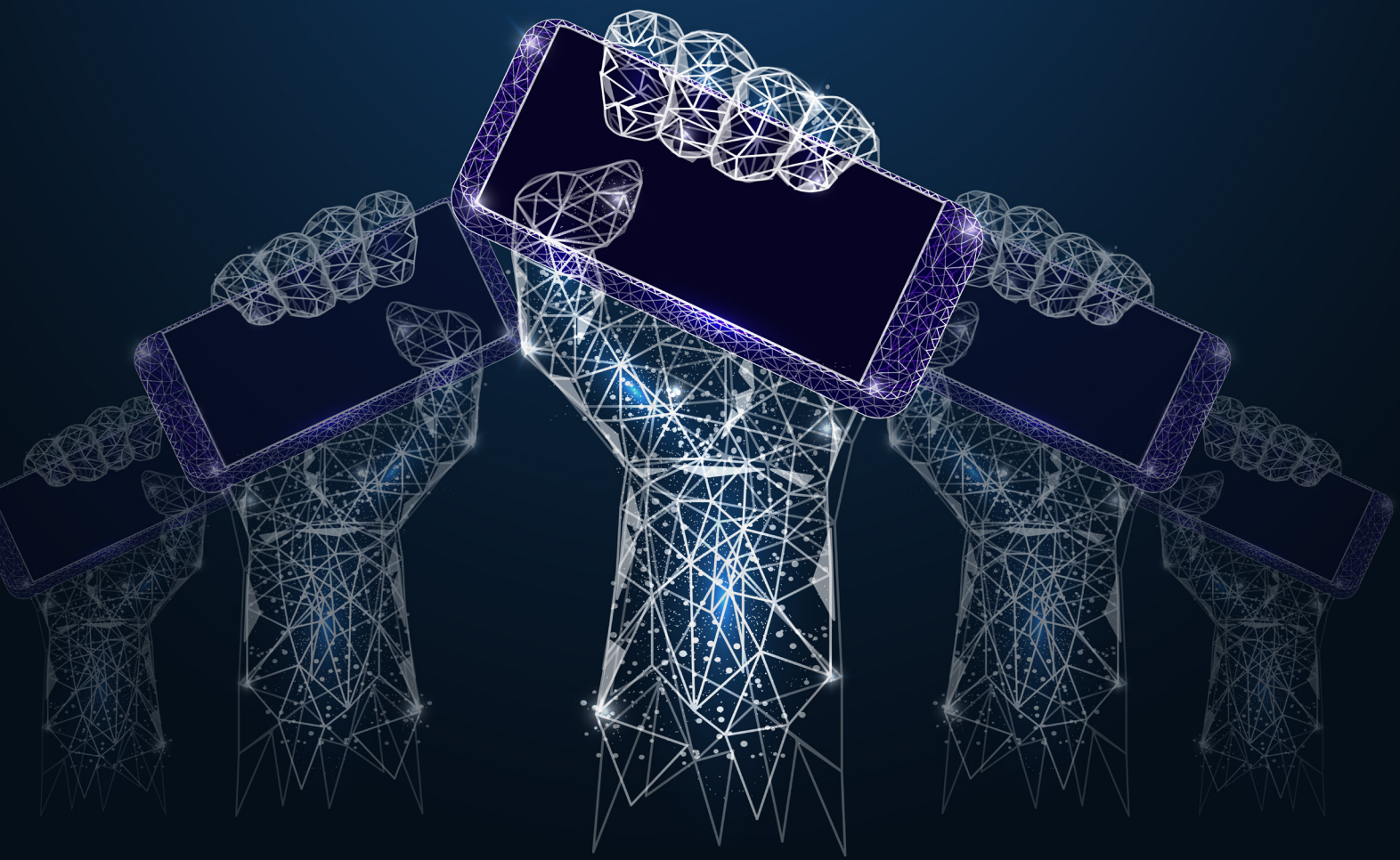
# MicroStimuli

## The New Digital Communication Revolution



fractal

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# Introduction

Today, digital communication is at the core of the formation, amplification, and change of behaviors, at scale.[1,2]

Since the launch of the smartphone in 2007, it has been the medium spearheading a new digital revolution.[3] The smartphone is the final mile of most digital interactions. This makes the smartphone the vital bridge between the information generated in the digital world and the desired behavior. Now, more than ever before, it is crucial to understand the interaction between humans and smartphones.[4]

Fractal Analytics launched this research to investigate why this new medium needs an understanding that is vastly different from past media like television. A fresh understanding of this new medium is going to enable effective digital transformation.

[1]Smartphones for large-scale behavior change interventions | IEEE Pervasive Computing (2013, July). Retrieved April 3, 2023, from https://ieeexplore.ieee.org/abstract/docu ment/6562720
[2]Han, M., & Lee, E. (2018, July). Effectiveness of mobile health application use to improve health behavior changes: A systematic review of randomized controlled trials. Healthcare informatics research. Retrieved April 4, 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6085201/
[3]Touchscreen iPhone launched by Apple
[4]Noble, S. M., Mende, M., Grewal, D., & Parasuraman, A. (2022). The Fifth Industrial Revolution: How Harmonious Human–Machine Collaboration is Triggering a Retail and Service [R]evolution. Journal of Retailing, 98(2), 199–208. https://doi.org/10.1016/j.jretai.2022.04.003

# Penetration of Smartphones

In 2023, there are approximately 6.84 billion smartphones in the world.[5] The global smartphone penetration rate was estimated at 67% in 2021.[6]

Given the sheer omnipresence of this medium, it can be utilized as an effective agent of behavior change.

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[5] Taylor, P. (2023, January 18). Smartphone subscriptions worldwide 2027. Statista. Retrieved March 30, 2023, from https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/

[6] Global smartphone penetration 2016-2021 | Statista. (2023, January 17). Statista. https://www.statista.com/statistics/203734/global-smartphone-penetration-per-capita-since-2005/

# Digital Advertising

First, it was print advertising, then television advertising which garnered the maximum advertising budgets.[7] The emergence of Internet advertising, followed by the launch of the smartphones, transformed the world of advertising.[8]

In 2023, digital advertising is valued at US $701.22 billion[9] and occupies about 58% of the global advertising market.[10,11]

Today, mobile has surpassed ad spend budgets of laptops and desktops.[9] Mobile, in 2023, is channeling 63% of the total digital ad spend, projected at US $442.30 billion.[9]

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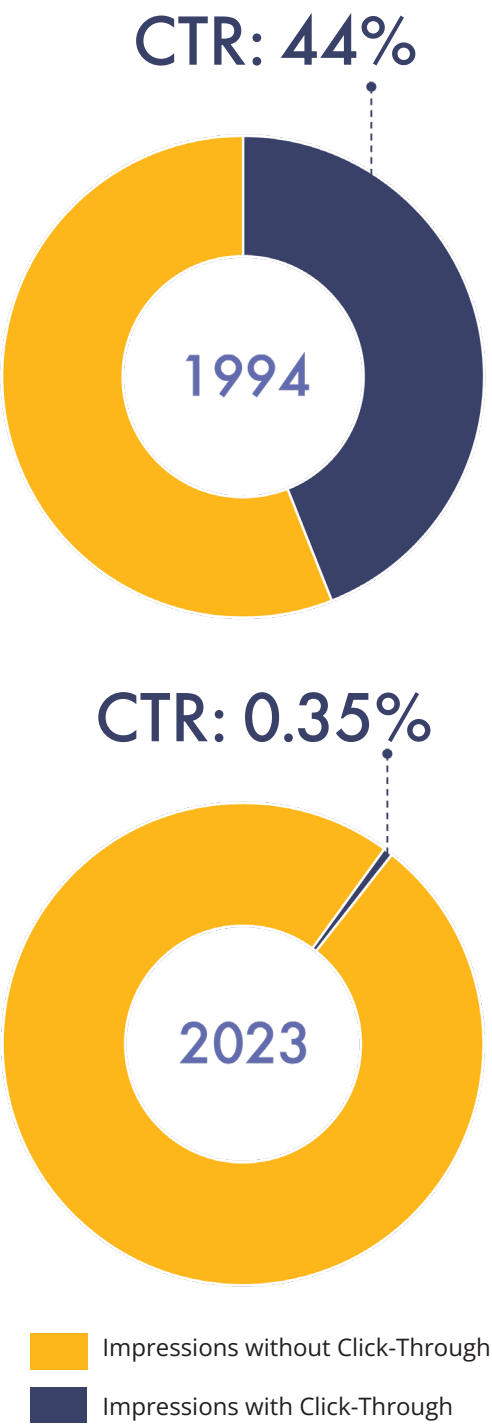
[7]Business Insider. (2020, November). Visualizing the evolution of Global Advertising Spend. Business Insider. Retrieved March 30, 2023, from https://markets.businessinsider.com/news/stocks/evolution-global-advertising-spend-1980-2020-1029789449
[8]Mehta, N. (2020, September 18). Evolution of Digital Advertising: Happy 25th Digital Advertising And Many More To Come. ADscholars. https://adscholars.com/blog/evolution-of-digital-advertising/
[9]Statista. (2023, March). Digital Advertising - Worldwide | Statista Market Forecast. Retrieved April 4, 2023, from https://www.statista.com/outlook/dmo/digital-advertising/worldwide#ad-spending
[10]Barnard, J. (2021, July 23). Ecommerce and online video to fuel 11% recovery in global adspend this year – Zenith. Zenith. https://bit.ly/3DSdpBG
[11]Kantar (2022) Media Trends and Predictions Report, Pathways to Growth

# The Achilles' Heel of Digital Advertising




The first ever digital advertisement was created by AT&T and released on HotWired.com in 1994. The Click-Through Rate (CTR) for this digital banner ad was 44%, i.e., half of the people who saw the ad, clicked on it.

Cut to 2023, the average CTR on display ads is a meagre 0.35%.[12] This means that the effectiveness of digital advertising has plummeted, shockingly, over a 100-fold, since 1994, despite the huge focus on search-engine optimization and hyper-personalization.

This growing inefficiency could undermine the very future of digital advertising.[13] It exacerbates the problem of sub-prime attention paid to digital advertising. And serves as a call-to-action for rectifying this lacuna in smartphone advertising.

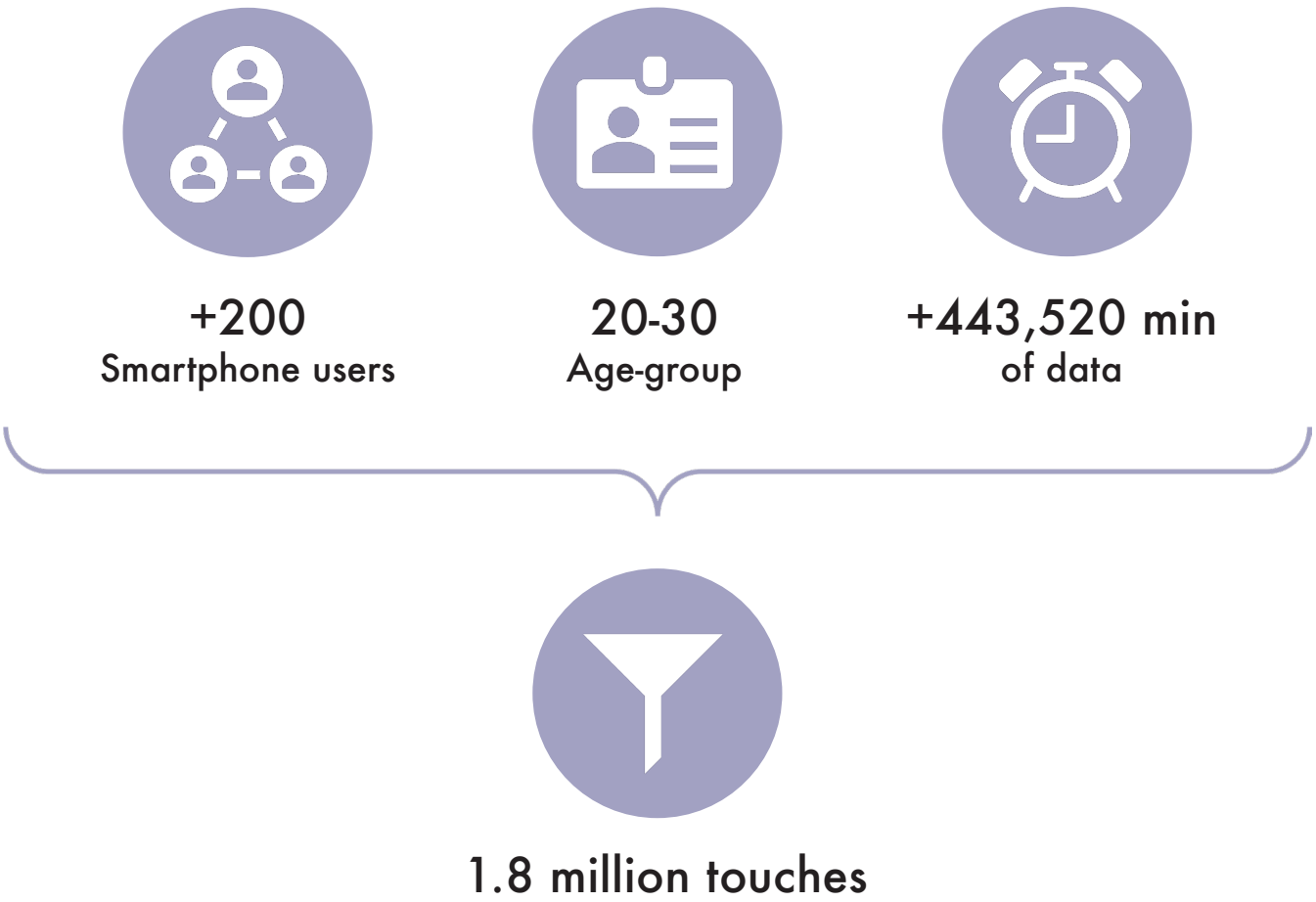
[12] McCormick, K. (2022, December 13). 2022 Google Ads Benchmarks for Every Industry. WordStream. https://www.wordstream.com/blog/ws/2022/05/18/search-advertising-benchmarks
[13] Hwang, T. (2020). Subprime attention crisis: Advertising and the time bomb at the heart of the internet. FSG Originals, Farrar, Straus and Giroux.

# Fractal Analytics' Pioneering Research

## Objective

To understand the nature of interactions of users on their smartphones across various apps, in a day.

# Research Methodology



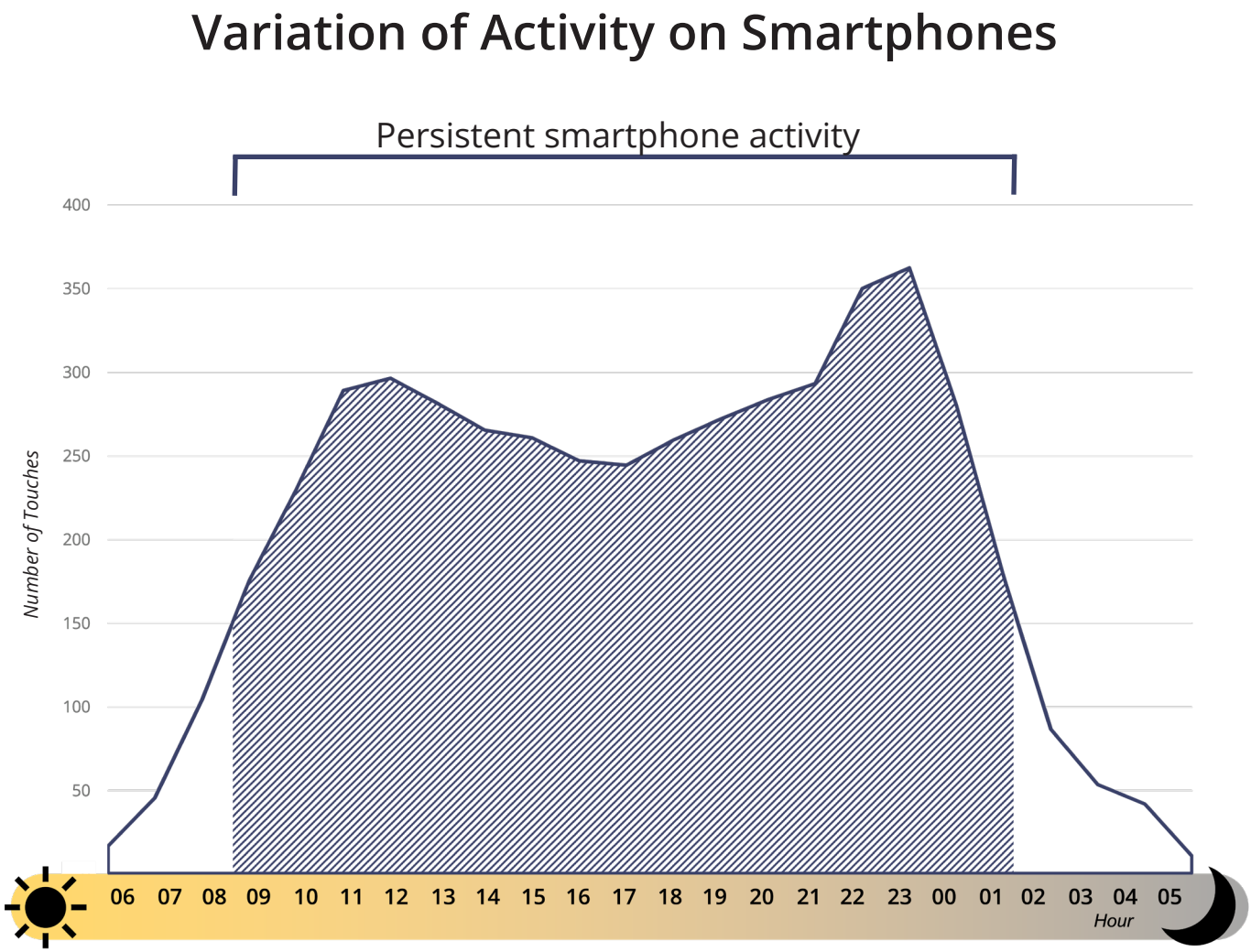

This empirical research was conducted non-intrusively through a context-immersed app-based approach.

The research attracted over 200 smartphone users from Fractal Analytics and Xavier Institute of Management, Bhubaneswar (XIMB), India. The participants in the research were in the 20-30 age group.

High-fidelity data of over 443,520 minutes and 1.8 million touches from 44 participants were analyzed.

# Key Research Findings

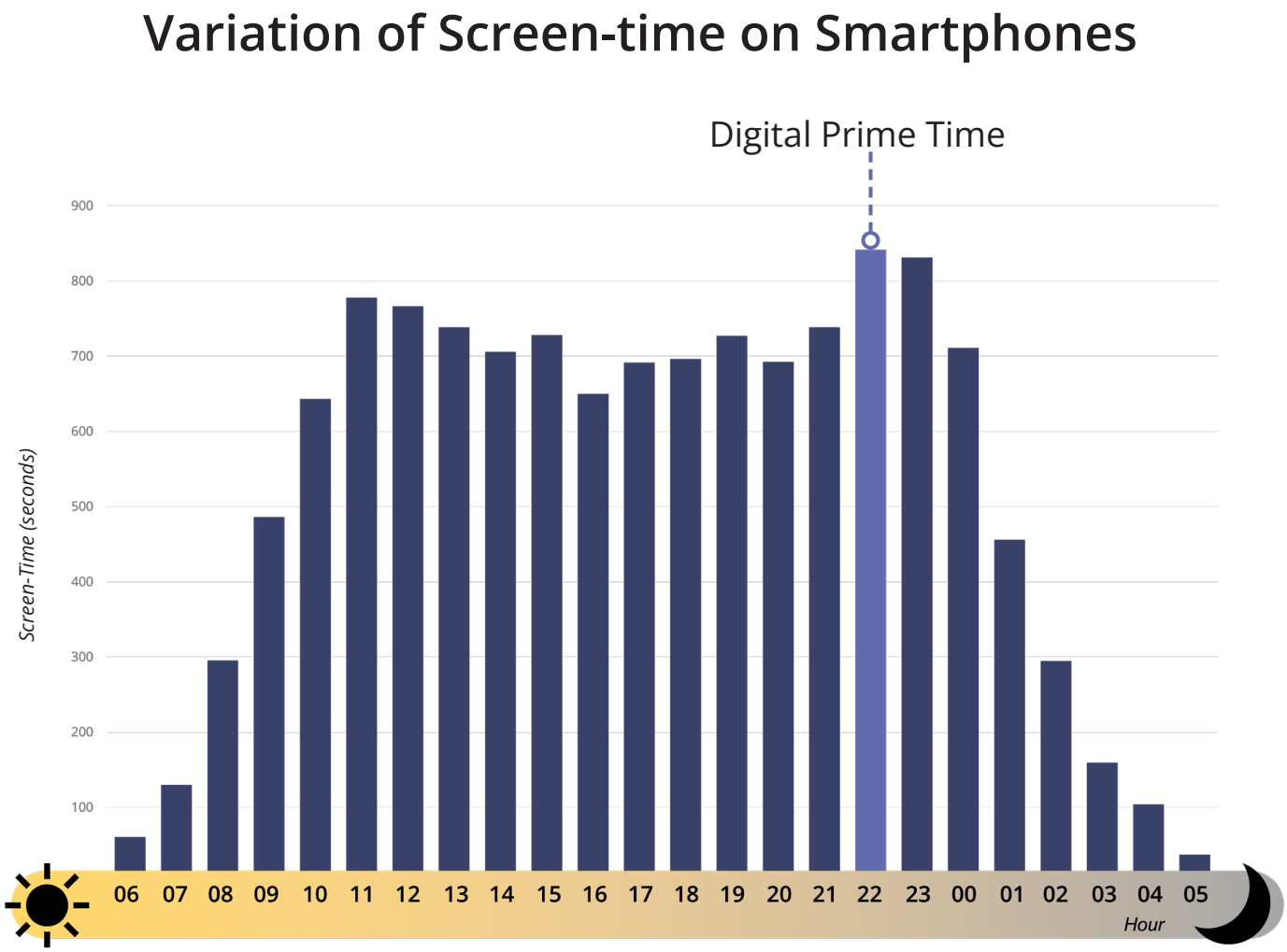
# Smartphones–
# The Always-with-you Medium



Smartphones are the ultimate always-on, always-with-you, medium. Excluding sleeping hours, smartphone activity is persistent across the day.

Unlike any of the past mediums of communication, it creates an opportunity not only to reach, but also to continuously engage with users.

# When is the Digital Prime Time?



Among the youth, the prime time for television broadcasting is between 8:30 pm to 9:30 pm.[14] This represents a critical window for advertisers to capture the unfettered attention of the largest TV-viewing audience.

Contrastingly, on the smartphones, the Prime Time lies between 10:00 pm and 11:00 pm, as evidenced by the highest active usage of the smartphone during this hour.

[14]What Young India Watches. (2018). Broadcast Audience Research Council India. Retrieved April 4, 2023, from https://www.barcindia.co.in/newsletter/what-young-india-watches.pdf

# Growth in Smartphone Usage


In 2016, a study found that people spent, on average, 2 hours and 25 minutes, per day, on their devices.[15]

This research shows that, in 2023, users spend 3 hours and 36 minutes per day. This is a ~50% increase in time spent on smartphones over the past 6 years.

[15]Winnick, M., & Zolna, R. (2016). Putting a Finger on Our Phone Obsession. dscout.com. Retrieved March 22, 2023, from https://dscout.com/people-nerds/mobile-touches

# Measuring Smartphone Activity

In the television medium, the remote control is used to change the channels, and so the context of the content. In the smartphone medium, the context shifting is achieved with every touch of the screen.

In 2016, the average number of touches, on a smartphone screen, was 2617 times in a day.[15] This research found that, in 2023, people touched their smartphones 4513 times. This is an astonishing 72% surge in the number of touches over the past 6 years!

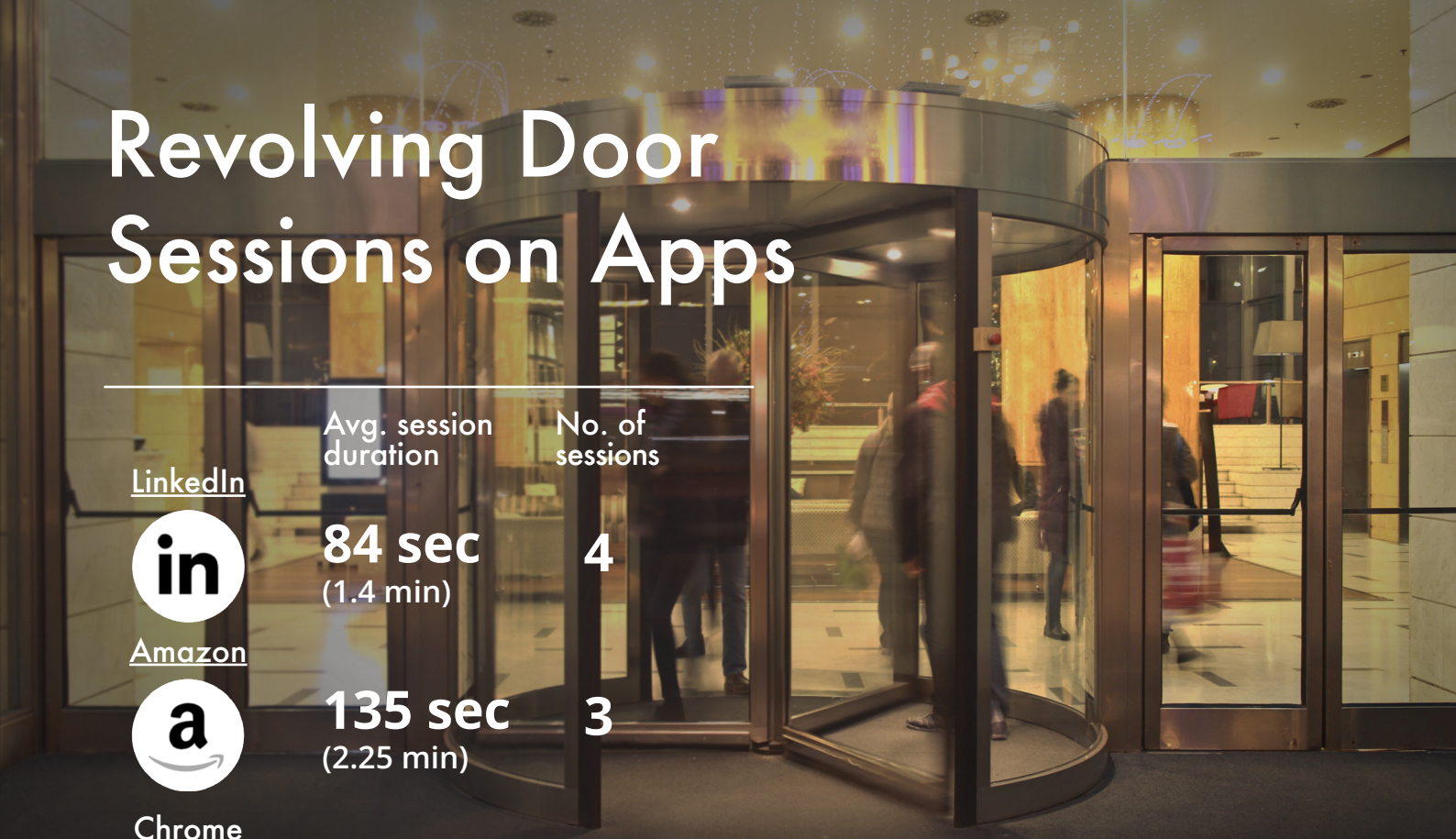
# How is usage split across various apps?

| | Avg. app usage per day |
|---|---|
| LinkedIn | **320 sec** (5 min) |
| Amazon | **396 sec** (7 min) |
| Chrome | **930 sec** (15 min) |
| Netflix | **1170 sec** (19 min) |
| YouTube | **1207 sec** (20 min) |
| Facebook | **1667 sec** (28 min) |
| WhatsApp | **3051 sec** (51 min) |
| Instagram | **4331 sec** (72 min) |

This research focused on LinkedIn, Amazon, Chrome, Netflix, YouTube, WhatsApp, and Instagram, among all other apps used by the participants of the study.

It was found that, E-commerce apps like Amazon are browsed for an average of 396 seconds (7 minutes), while Netflix and YouTube, are watched for around 1207 seconds (20 minutes) per day.

By contrast, WhatsApp is browsed for 3051 seconds (51 minutes), and Instagram is browsed for 4331 seconds (72 minutes) daily.



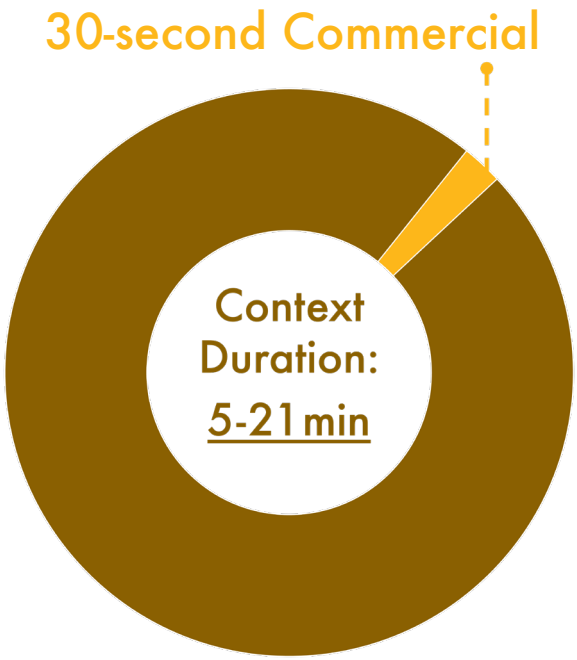
# Revolving Door Sessions on Apps

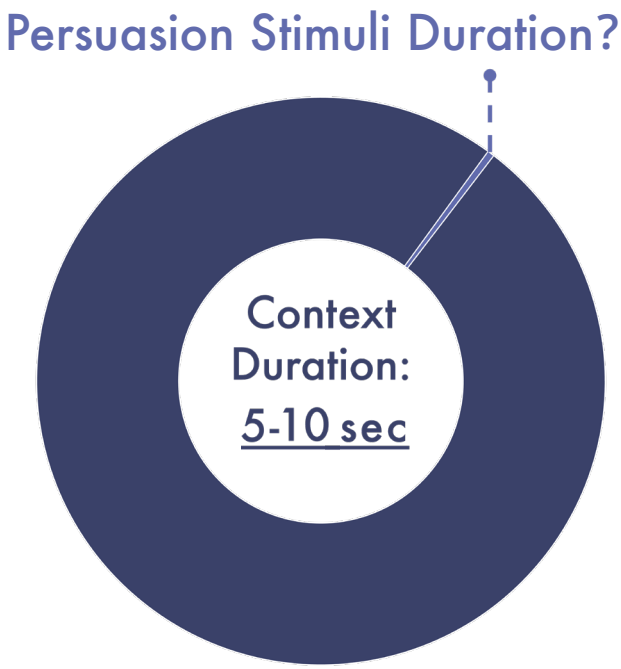
| | Avg. session duration | No. of sessions |
|---|---|---|
| LinkedIn | 84 sec (1.4 min) | 4 |
| Amazon | 135 sec (2.25 min) | 3 |
| Chrome | 104 sec (1.73 min) | 9 |
| Netflix | 283 sec (4.71 min) | 4 |
| YouTube | 231 sec (3.85 min) | 5 |
| Facebook | 176 sec (2.93 min) | 9 |
| WhatsApp | 83 sec (1.38 min) | 35 |
| Instagram | 197 sec (3.28 min) | 22 |

Although, at first glance, it looks like people are spending a lot of time on apps, upon closer investigation, it is observed that this time is distributed across several sessions of smaller durations throughout the day.

In a day, Netflix and YouTube are opened 4 and 5 times, respectively. Apps like WhatsApp and Instagram have more sessions, 35 and 22 times, respectively.

# Context Duration in Smartphones



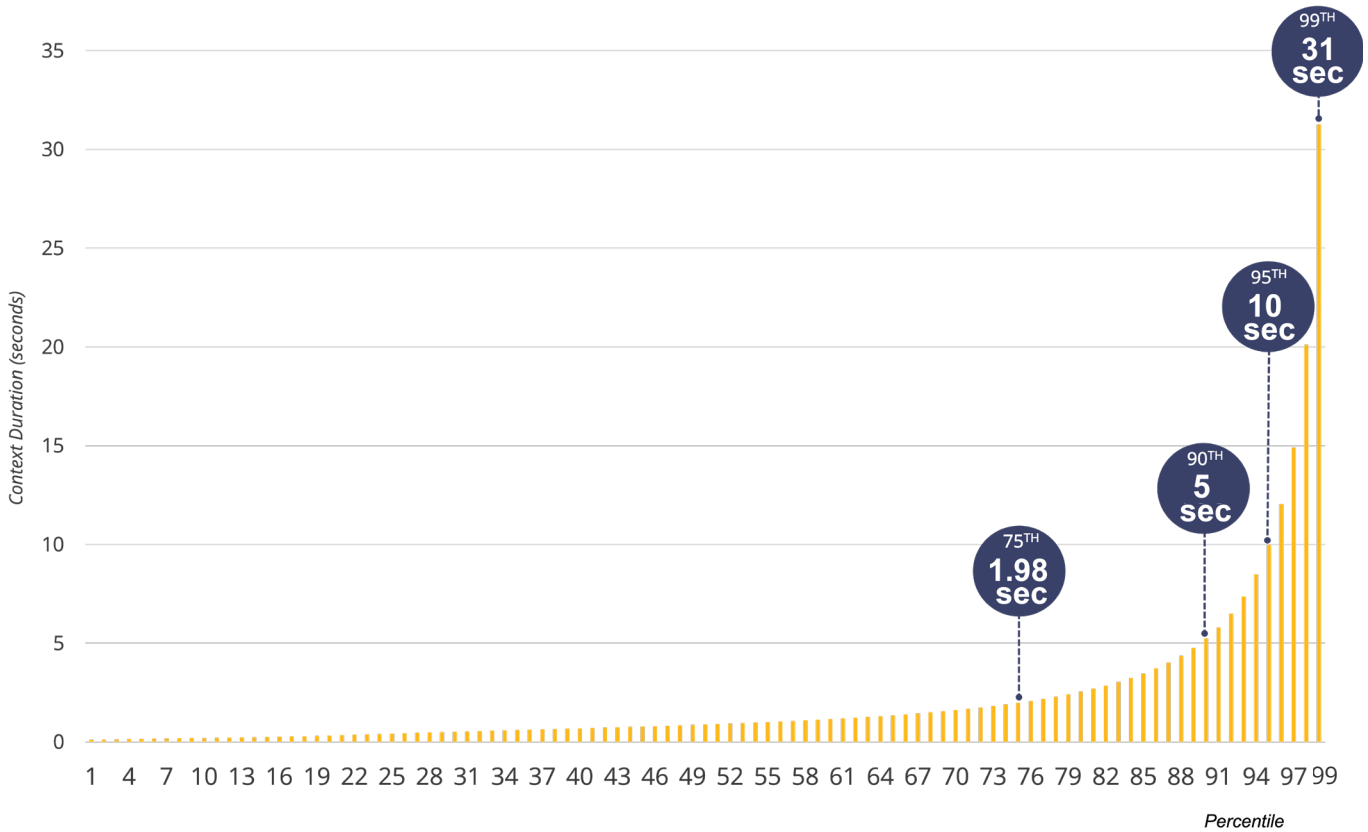

Context duration is the duration for which the viewer engages with a particular content. Studies show the context duration for television is 5-21 minutes (90-95% of viewing sessions).[16] In this context duration, there is adequate time for the 30-second commercials.

The context duration in smartphones is the time between two consecutive touches. This research found that the duration between two touches on smartphones is less than 5 seconds for 90% of all interactions, and less than 10 seconds for 95% of all interactions. Any persuasion stimuli built for the smartphones should be a subset of this extremely short context duration.

[16]Watching Television Over An IP Network, Cha et. al. Conference Paper October 2008

# Does Long, Uninterrupted Viewing Occur on Smartphones?

## Percentile Distribution of Context Duration




Most of the interactions on the smartphones during the day are of short durations. Only at the last percentile, context durations are longer than 31 seconds. Hence, long, uninterrupted viewing on smartphones is not the norm.

# The Need for MicroStimuli on Smartphones

The key finding of this research is that the time between the vast majority of touches, i.e., context duration of the smartphone medium, is a mere 5–10 seconds. Any persuasion stimuli developed for the smartphones should be a subset of this context duration.

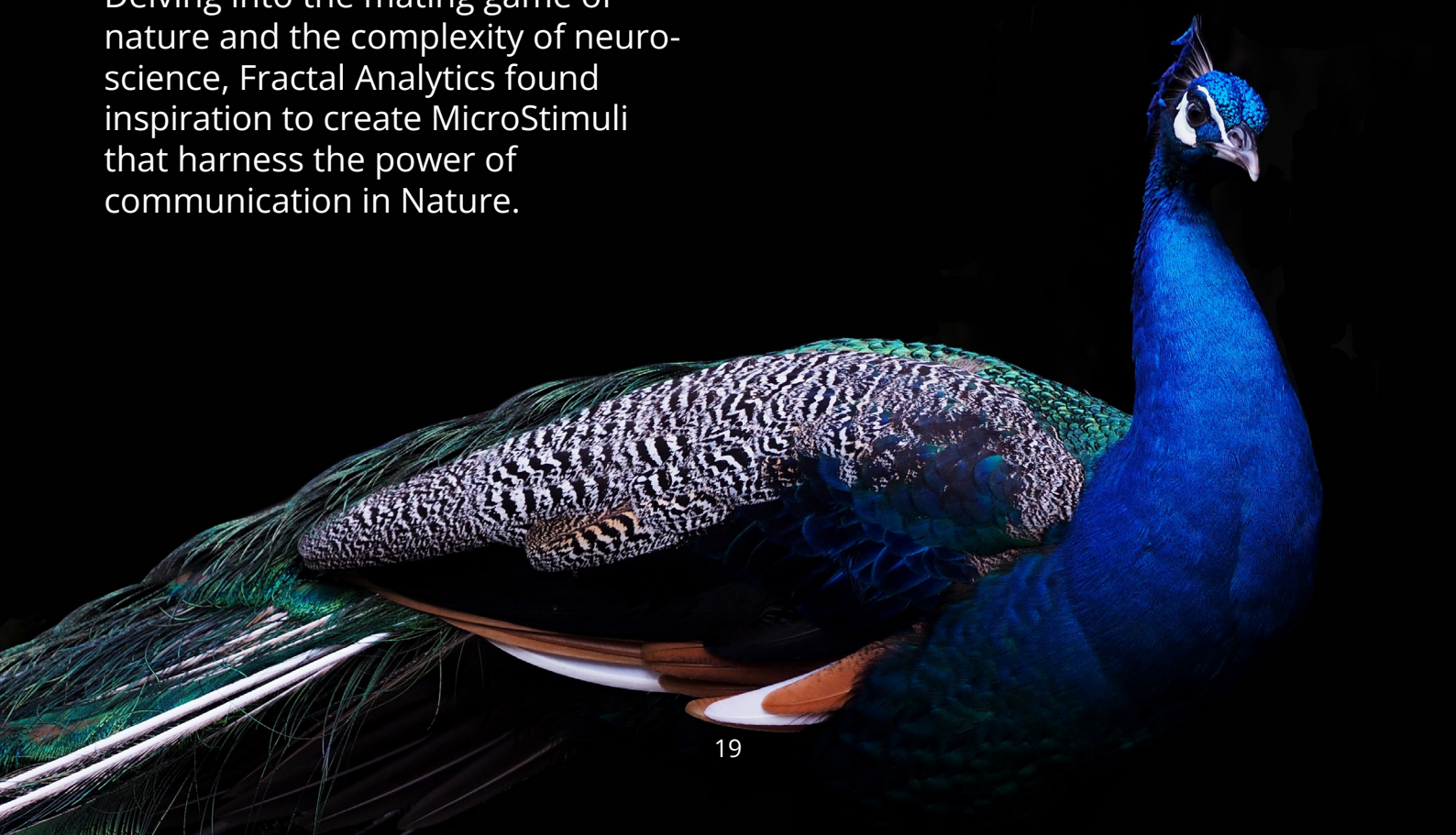
So, MicroStimuli, stimuli that work in milliseconds, is ideal for the smartphone medium. Much like the Yellow Lines[17], developed by FinalMile Consulting, on the railway tracks in Mumbai which helped reduce trespassing deaths, there must be MicroStimuli for smartphones.

[17]'Mumbai's trains - essential, but sometimes lethal' FinalMile Consulting, Impact Stories, Railway Safety (2011). Retrieved April 18, 2023, from https://www.thefinalmile.com/railway-safety

# MicroStimuli: The Norm of Nature

In the realm of biology, Nobel laureate Nikolaas Tinbergen unearthed Supernormal Stimuli, demonstrating how they can trigger fixed action patterns in milliseconds. This revelation presents a paradigm-shifting prospect: if nature can achieve such swift and potent reactions, so too can stimuli on smartphones.

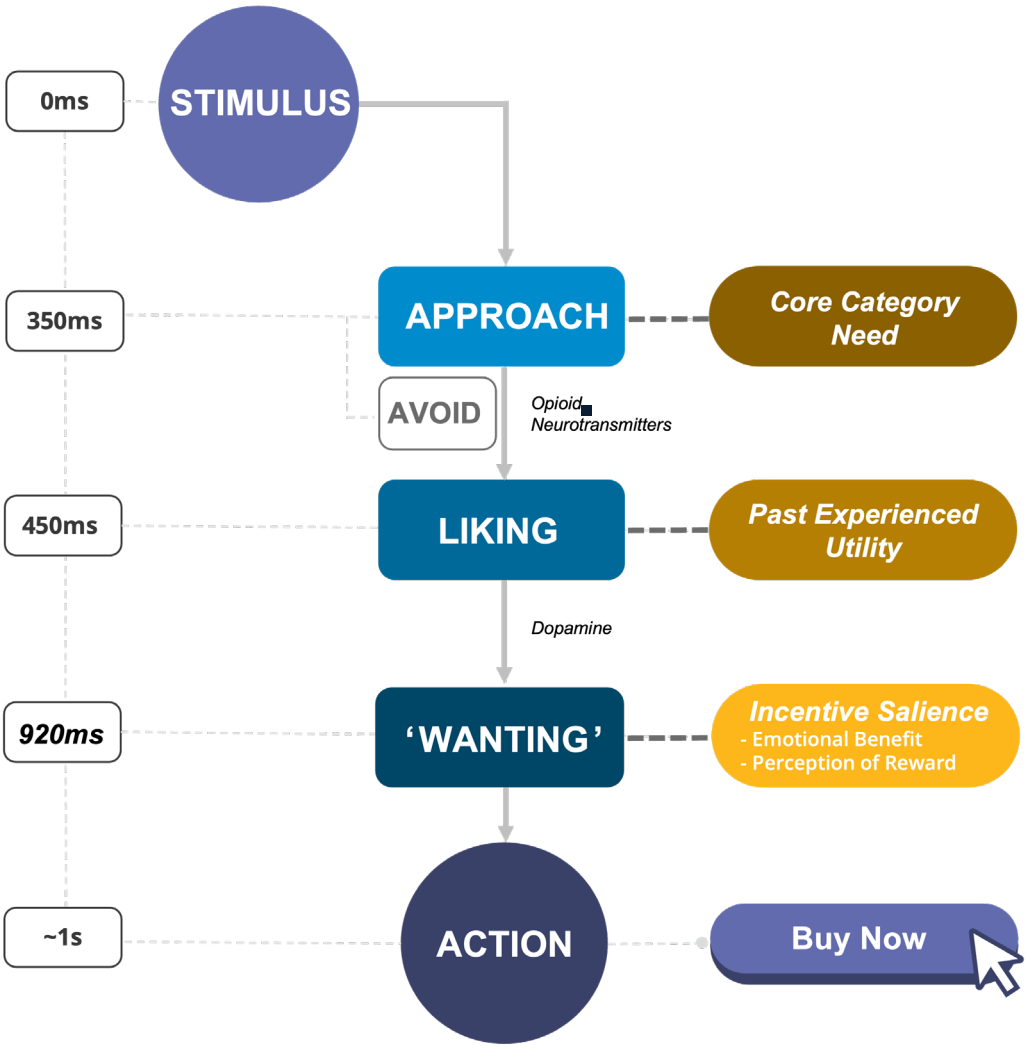
Delving into the mating game of nature and the complexity of neuro-science, Fractal Analytics found inspiration to create MicroStimuli that harness the power of communication in Nature.



# How to create MicroStimuli

Fractal Analytics has identified 3 business problems where MicroStimuli can make a significant impact. These are: (i) improving CTRs on E-commerce, (ii) reducing cart abandonment and (iii) bridging the Information-Behavior gap.

# E-Purchase Framework




The final mile of an E-purchase decision is the click-action on the product tile. For routinely purchased consumer products, this decision can happen in merely 920ms.

This decision-making can be broken down into three cognitive stages. First, an Approach toward the product is evoked with the Core Category Need. Next, a Liking response is generated by invoking Past Experienced Utility. And, finally, a 'Wanting' response is generated by playing up the emotional benefit of the product and creating a perception of price reward.

# Cart Conversion Framework

A 2022 study reported that the average cart abandonment rate across all sectors in E-commerce is 79.53%. Even for groceries and essentials, it is 52.36% while for consumer electronics it is 73.28%.[18] The MicroStimuli constructed to mitigate the cart abandonment problem would be a combination of elements that can create:

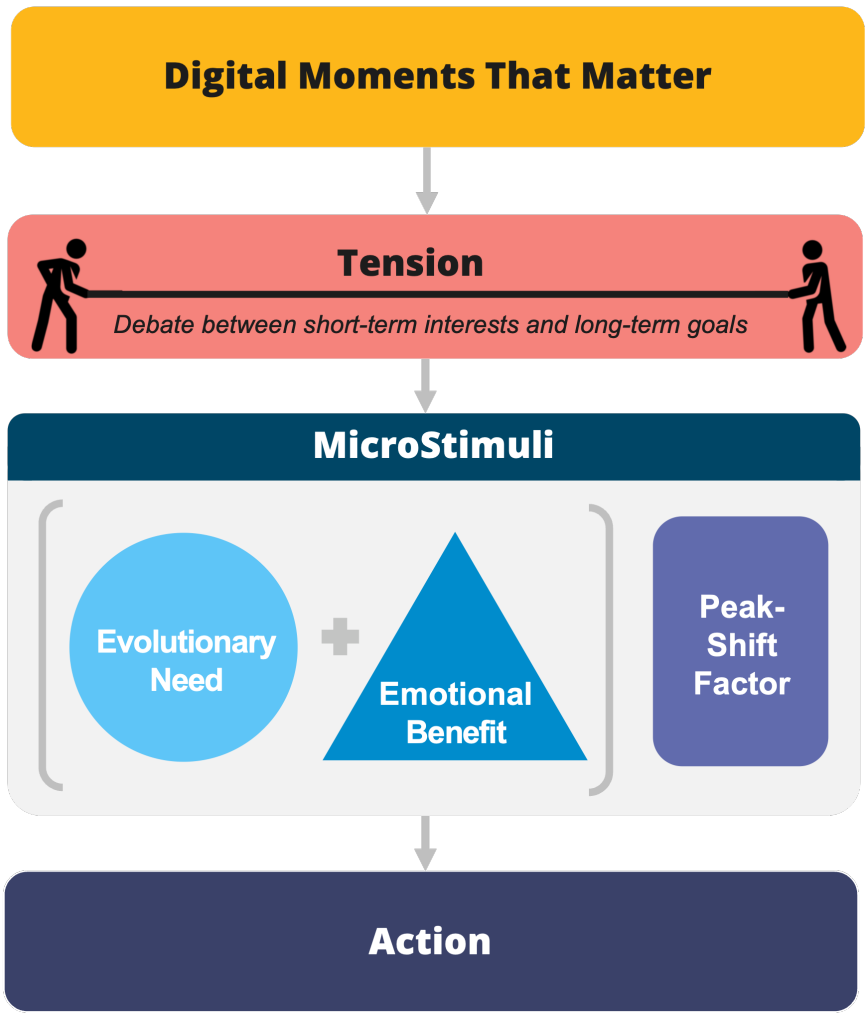
Endowment Effect: Shift from retail space to personal space

Temporal Discounting: Give short term rewards and create urgency

Emotional Benefit of Consumption

[18] Ward, B. (2023, February 6). What is cart abandonment? SaleCycle. Retrieved April 16, 2023, from http://www.salecycle.com/blog/strategies/what-is-cart-abandonment

# E-Action Framework

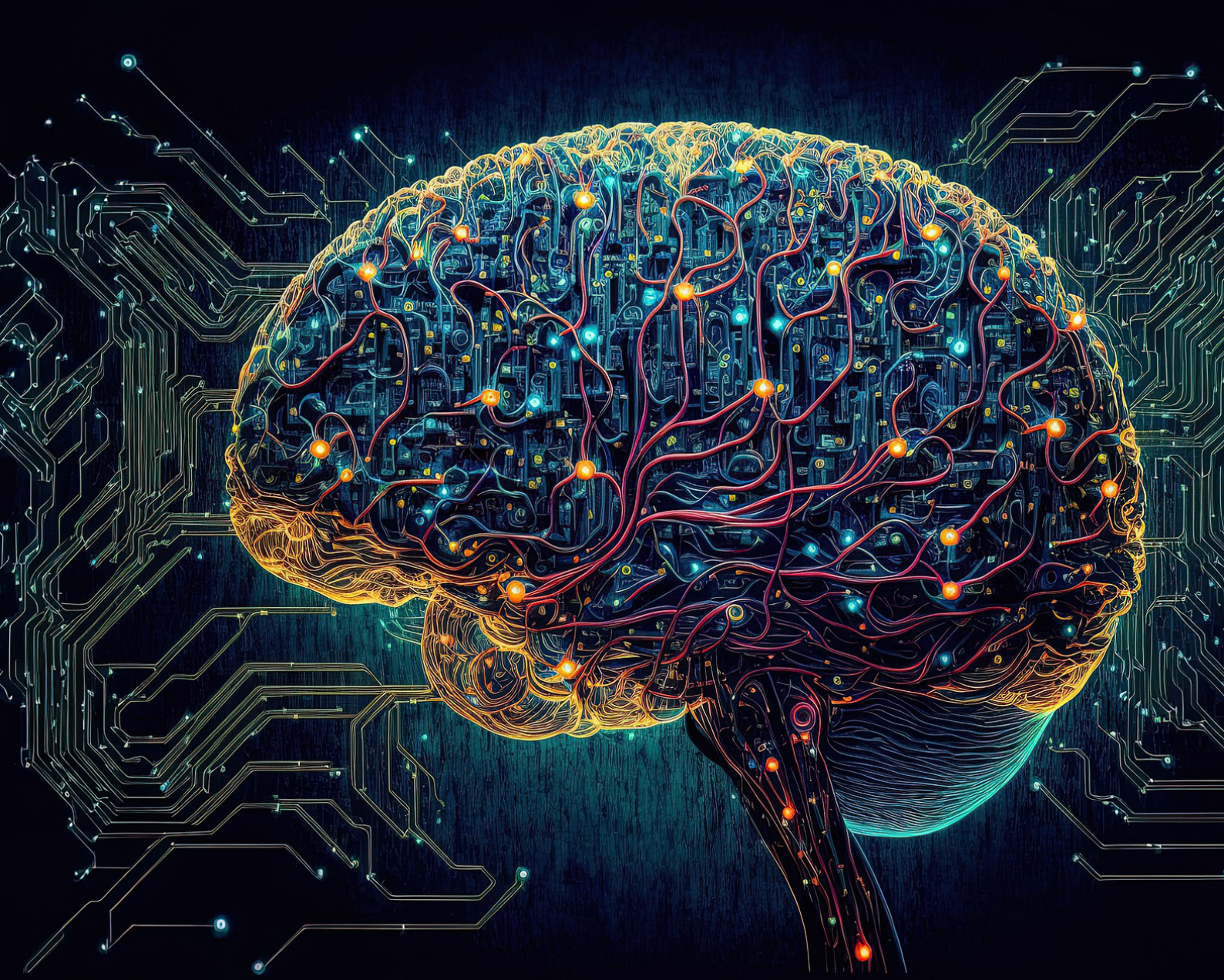



Smartphone, an always-on, always-with-you medium, can be used across the day to induce several positive behaviors. Behaviors such as increasing medical adherence, physical exercise and product usage.

Digital and neurophysiological signals can be used to identify specific digital moments that matter for an action.

But various behavioral barriers exist in these moments due to a tension between short-term interests and a person's long-term goals.

The MicroStimuli generated by peak-shifting the evolutionary trigger and the emotional benefit of the product can resolve this internal tension and drive action.



# About Cerebral

The Cerebral team at Fractal Analytics takes learning from fields of neuro-science and artificial intelligence to power every human decision.

The core belief of the Cerebral team is that the more we understand the inscrutable algorithms between our ears, better will be the technology we develop for our machines.


Fractal Analytics helps global Fortune 100 companies power every human decision in the enterprise by bringing analytics and AI to the decision.

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