

# Brodmann

2017 EIA

Machine & Deep Learning for Computer Vision  
Technology Innovation Award

F R O S T & S U L L I V A N

2017 BEST PRACTICES AWARD

EIA  
MACHINE & DEEP LEARNING FOR COMPUTER VISION  
TECHNOLOGY INNOVATION AWARD

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## Background and Company Performance

### *Industry Challenges*

Deep learning based artificial intelligence (AI), is the main building block of the fourth industrial revolution. However, massive computing power is necessary to realize the full potential of AI—especially for machine vision application. Currently, that type of computing power is mainly available from providers of powerful processors such as: NVIDIA, which is the market leader with its GPU chip, AMD, and Intel. While the processors from these three providers of cloud solutions for deep-learning deliver the computing power needed to run the most sophisticated AI algorithms, Frost & Sullivan points out that their physical size, power consumption, and heat generation are not suitable for all mobile devices and other applications where space and power supply are limited.

In the same way that Porsche designed race cars to be faster by remaining nimble instead of heavier with larger engines, Israeli startup Brodmann17 opted to build an AI that was light - yet fast.

### *Technology Attributes and Future Business Value of Brodmann17*

#### **Visionary Innovation**

Brodmann17, established in 2016, derived its unusual name from the neuroscientist Korbinain Brodmann, who divided the brain into more than 50 areas; the 17<sup>th</sup> ordered area is the primal visual cortex—the part of the brain in charge of processing visual information.

Brodmann17 developed a neural network with an algorithm architecture engineered towards object detection—much like human eyes. A neural network is a computer system modeled after the human brain and nervous system; it is the location of artificial intelligence. Brodmann17 avoided building a generic neural network and instead created object detection to include face recognition by cameras (from security to automatic door opening), robots that can do last mile deliveries, as well as autonomous cars identifying the numerous type of information and obstacles on the road.

From day one, Brodmann17 sought to develop its software-only solution to meet the strict standards of potential edge-device clients. The company has a network with object localization and detection accuracy that is on par or better with the industry's state of the art standards, while using only 5 percent of the computing and power resources needed by solutions of other vendors.

#### **Technological Leverage**

Frost & Sullivan notes that this excellent performance is due to the unique neural network algorithmic architecture designed to be lean—meaning, using as few resources as possible. Brodmann17's neural network can be used on standard, affordable processors that would lack the computing power to run with other solutions; including edge-devices such as advanced driver assistance systems, smartphones, video cameras in homes, surveillance cameras in commercial buildings, as well as last mile delivery and residential robots.

## Industry Impact

Due to the versatility of Brodmann17's software only solution, Frost & Sullivan feels that it is almost impossible to estimate the value of the markets that it can be applied. Currently, Brodmann17 collaborates with some of the world's largest consumer-electronics manufacturer. Targeting the market of billions of edge devices expected in 2020+ with AI vision.

Integrating Brodmann17's solution into a smartphone would lift many current design restrictions, while still delivering the ever-increasing performance expected by today's consumers. Design restrictions include, but are not limited to, weight, power consumption, and heat generation—all limiting the type of processor used on smartphones. Due to its lightness, Brodmann17's solution clearly meets end consumers' needs, as the processor will not drain users' battery, nor does the mobile device generate significant heat—e.g., becomes warm when held.

Frost & Sullivan expects that Brodmann17's solution will have a significant impact in the field of advanced driver-assistance and driver monitoring solutions. which includes all technologies that could lead to autonomous driving vehicles. The lightness of Brodmann17's solution will allow manufacturers to use smaller and more energy efficient processors, without losing any of the analytical capabilities needed for the vehicle to determine the distance to an object ahead of it on the road.

## Benefits that Impact Customers

The lightness of Brodmann17's neural network allows its customers to use the standard Advanced Risc Machine (ARM) processors, which are significantly less expensive and have much larger proliferation than NVIDIA's processor, without losing any of the performance user expect. Additionally, Brodmann17's solution uses less battery power than its other competitors, so there is more power to allocate to other features.

Because the Brodmann17 solution only uses 5% of the computing power of its competitors' solutions, the processors which run its algorithm do not heat up as quickly. For customers, this means it is no longer necessary to allocate resources to develop solutions for heat-reduction issues.

## Human Capital

Brodmann17's founders and executives lead the company with deep learning and machine vision experience—the rest of the research team are all have PhD's and MSc's, which demonstrates the complexity of the solution. At first glance, five years may seem insignificant, but this market is quite nascent, and Frost & Sullivan believes that Brodmann17 is best positioned with expertise-while others still focus on understanding machine vision and AI implications. Brodmann17 has already graduated from this stage and is focused on developing a more resource efficient neural network architecture.

## Application Diversity

In the next two to three years, Brodmann17 plans to build a set of products called 'detectors;' in essence, a detector with a pre-thought AI algorithm for a specific problem, not limited to a specific industry. For example, a vehicle manufacturer could purchase a detector that has already been taught how to differentiate between a pedestrian or a bicycle-rider, saving the vehicle manufacturer both time and money. Another detector could come ready to help end-users take better photos with their smartphones. The detector will be delivered in several versions; each one fine-tuned to run on a range of processors, so that an OEM can integrate the detector on the hardware of their choice (without losing performance).

Brodmann17 has an early advantage and has already begun collecting data and learning from its collaborative projects that will allow it to outpace its other competitors. The future development and broad application of detectors is but one exciting example, and Frost & Sullivan firmly believes that Brodmann17 will continue to lead in the age of the fourth industrial revolution.

## Conclusion

Artificial intelligence (AI) is one of the main building blocks of the forth industrial revolution, an era where machines will go from simply performing tasks to thinking like humans. This type of processing requires massive computing power that typically limits application to products that could benefit from AI—e.g., mobile devices, vehicle sensors, and other applications where space and power supply are limited.

Brodmann17 offers a solution with industry-standard object recognition capabilities, while only utilizing 5 percent of the computing power and battery usage of its other competitors. With its early industry expertise in a nascent market, Brodmann17 is a trailblazer addressing direct problems-while others in the market are still grappling to understand AI and the positive implications it can have in the machine learning/deep learning market. With its technological understanding and application, Brodmann17 earns the 2017 Frost & Sullivan Technology Innovation Award.

## Significance of Technology Innovation

Ultimately, growth in any organization depends upon finding new ways to excite the market and upon maintaining a long-term commitment to innovation. At its core, technology innovation, or any other type of innovation, can only be sustained with leadership in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.



## Understanding Technology Innovation

Technology innovation begins with a spark of creativity that is systematically pursued, developed, and commercialized. This spark can result from a successful partnership, a productive in-house innovation group, or a bright-minded individual. Regardless of the source, the success of any new technology is ultimately determined by its innovativeness and its impact on the business as a whole.

## *Key Benchmarking Criteria*

For the Technology Innovation Award, Frost & Sullivan analysts independently evaluated two key factors—Technology Attributes and Future Business Value—according to the criteria identified below.

### **Technology Attributes**

- Criterion 1: Industry Impact
- Criterion 2: Product Impact
- Criterion 3: Scalability
- Criterion 4: Visionary Innovation
- Criterion 5: Application Diversity

### **Future Business Value**

- Criterion 1: Financial Performance
- Criterion 2: Customer Acquisition
- Criterion 3: Technology Licensing
- Criterion 4: Brand Loyalty
- Criterion 5: Human Capital

## Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analyst follows a 10-step process to evaluate Award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

| STEP  | OBJECTIVE   | KEY ACTIVITIES   | OUTPUT   |
|---|---|--|--|
| 1<br><b>Monitor, target, and screen</b>                 | Identify Award recipient candidates from around the globe                           | <ul style="list-style-type: none"> <li>• Conduct in-depth industry research</li> <li>• Identify emerging sectors</li> <li>• Scan multiple geographies</li> </ul>   | Pipeline of candidates who potentially meet all best-practice criteria                           |
| 2<br><b>Perform 360-degree research</b>                 | Perform comprehensive, 360-degree research on all candidates in the pipeline        | <ul style="list-style-type: none"> <li>• Interview thought leaders and industry practitioners</li> <li>• Assess candidates' fit with best-practice criteria</li> <li>• Rank all candidates</li> </ul>    | Matrix positioning of all candidates' performance relative to one another                        |
| 3<br><b>Invite thought leadership in best practices</b> | Perform in-depth examination of all candidates                                      | <ul style="list-style-type: none"> <li>• Confirm best-practice criteria</li> <li>• Examine eligibility of all candidates</li> <li>• Identify any information gaps</li> </ul>                             | Detailed profiles of all ranked candidates   |
| 4<br><b>Initiate research director review</b>           | Conduct an unbiased evaluation of all candidate profiles                            | <ul style="list-style-type: none"> <li>• Brainstorm ranking options</li> <li>• Invite multiple perspectives on candidates' performance</li> <li>• Update candidate profiles</li> </ul>                   | Final prioritization of all eligible candidates and companion best-practice positioning paper    |
| 5<br><b>Assemble panel of industry experts</b>          | Present findings to an expert panel of industry thought leaders                     | <ul style="list-style-type: none"> <li>• Share findings</li> <li>• Strengthen cases for candidate eligibility</li> <li>• Prioritize candidates</li> </ul>  | Refined list of prioritized Award candidates   |
| 6<br><b>Conduct global industry review</b>              | Build consensus on Award candidates' eligibility                                    | <ul style="list-style-type: none"> <li>• Hold global team meeting to review all candidates</li> <li>• Pressure-test fit with criteria</li> <li>• Confirm inclusion of all eligible candidates</li> </ul> | Final list of eligible Award candidates, representing success stories worldwide                  |
| 7<br><b>Perform quality check</b>                       | Develop official Award consideration materials                                      | <ul style="list-style-type: none"> <li>• Perform final performance benchmarking activities</li> <li>• Write nominations</li> <li>• Perform quality review</li> </ul>                                     | High-quality, accurate, and creative presentation of nominees' successes                         |
| 8<br><b>Reconnect with panel of industry experts</b>    | Finalize the selection of the best-practice Award recipient                         | <ul style="list-style-type: none"> <li>• Review analysis with panel</li> <li>• Build consensus</li> <li>• Select recipient</li> </ul>  | Decision on which company performs best against all best-practice criteria                       |
| 9<br><b>Communicate recognition</b>                     | Inform Award recipient of Award recognition   | <ul style="list-style-type: none"> <li>• Present Award to the CEO</li> <li>• Inspire the organization for continued success</li> <li>• Celebrate the recipient's performance</li> </ul>                  | Announcement of Award and plan for how recipient can use the Award to enhance the brand          |
| 10<br><b>Take strategic action</b>                      | Upon licensing, company is able to share Award news with stakeholders and customers | <ul style="list-style-type: none"> <li>• Coordinate media outreach</li> <li>• Design a marketing plan</li> <li>• Assess Award's role in future strategic planning</li> </ul>                             | Widespread awareness of recipient's Award status among investors, media personnel, and employees |

## The Intersection between 360-Degree Research and Best Practices Awards

### Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.

### 360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS



## About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages more than 50 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on six continents. To join our Growth Partnership, please visit <http://www.frost.com>.