Intelligent Art

Lindsay Covington

Sotheby's Institute of Art

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EXECUTIVE SUMMARY

This proposal outlines the development of software, composed of a network of machine learning algorithms, which aims to eliminate risk associated with investment in Post-War and Contemporary art.

While art funds employ specialists to inform decision-making, there still remains an unsettling level of volatility in the art market, especially in the Contemporary art sector. This program will inform art fund specialists on what to buy and sell based on a variety of factors. These factors, which the program include economic predictors, changes in political climate, art news, celebrity sales and social media trends. Sentiment analysis of articles will be used alongside data analysis of auction results and sales numbers provided by the Art Funds and Exchanges.

Obstacles associated with investing in art as opposed to traditional financial assets:

1. Subjectivity and lack of transparency in valuation process
2. Uncertain returns
3. Additional costs and illiquidity

This algorithm aims to minimize risk associated with the above issues. The goal is not only to maximize profit, but also to market this tool to convince apprehensive investors to purchase art. The various functions of the machine learning software are outlined below, as well as how they might be used by an Art Fund or Exchange to solve some of the inefficiencies.

Given the lack of restrictions in comparison with mutual funds and other investment vehicles, the art fund can take advantage of diverse investment strategies. This flexibility is key when using the technology to advise investment. Content of portfolios can be tailored to investors’ desired holding period, type of art, method of sale or expected returns.
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OVERVIEW

Mission Statement

Intelligent Art aims to provide art investment vehicles with the same level of data analytics leveraged by hedge funds and other traditional wealth management services. By using artificial intelligence, specifically machine learning, Intelligent Art will generate accurate, data-backed, and trustworthy predictions about the expected price trajectory of a piece of art over time.

Intelligent Art in the Current Landscape

The art world is notorious for its outlandish headlines. Celebrities are spotted at exclusive openings; dealers are jailed for fraud and tax evasion; taped bananas sell for hundreds of thousands of dollars; masterworks are subject to heists while even more elusive pieces suddenly appear at auction. These headlines are partially what make the art world what it is: colorful and mercurial, exciting and confounding. While it conjures plenty of buzz and intrigue, the nature of the market often makes modern and contemporary art an off-putting investment for investors not familiar or willing to keep up with its unpredictable trends.

Intelligent Art offers a solution to this, making investment in art an enjoyable experience for those averse to the risks associated with this asset class. While on paper there are many benefits to
diversifying one’s personal portfolio in this vertical, investors may be apprehensive to pool their money in art for a variety of reasons. Intelligent Art partners with Art Funds to assuage investors’ worries that their passive (but sizable) investment will yield strong returns down the line, as well as working with Art Exchanges to better tailor their offerings (pieces of art that assume the form of a Single Purpose Vehicle - SPVs)\(^1\) for their active investors.

**Target Consumer**

The potential users for Intelligent Art are twofold: the target subscribers are existing Art Exchanges and Art Funds (the primary consumer), whose investors are individuals buying into the shared portfolios with the aim of maximizing their eventual returns (the secondary beneficiary of the technology). The customer in this case is not the savvy collector looking to make a purchase for their collection or home. Intelligent Art is a machine-learning product used to hone the predictive capabilities of art-based financial services, not for use by individuals.

While it takes into account factors such as size, subject matter, medium, etc., the technology does not recommend investments based on aesthetic value, but rather on the factors that have shown to contribute to an artwork’s financial appreciation over time. Intelligent Art does not attempt to take on the role of an art advisor or specialist trusted to guide a client’s purchase -- it is a tool that aims to remove subjectivity and uncertainty from the process of choosing which art to buy, hold, and sell. This makes it an ideal and much-needed product for Funds and Exchanges which seek to maximize returns after their designated holding periods.

The key to Intelligent Art’s initial success is the technology’s adoption by both Art Funds and Exchanges. The reason for this lies in the structural distinction between the two investment platforms -- investors in an Art Exchange purchase “shares” of individual works of art, which are sold by the investors at an agreed-upon time that will hopefully maximize profit. The turnaround time for the purchase and sale of works through an Exchange is usually around a year, and the investment minimum is set very low. An Art Fund and its portfolios, on the other hand, typically have holding periods of three, five, or ten years (with the option of three, one-year extensions), and the minimum investment is around $500,000, as the portfolio is composed of several high-end artworks.\(^2\)

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1. Franklin Boyd (April 22, 2020).
The two-pronged use of Intelligent Art technology allows for the rapid collection of sales data from the daily purchase and trading of shares of art in the Exchange. Art Exchanges like Masterworks, for example, have a user-friendly online interface and a vast selection of contemporary art to choose from, making it easy to purchase shares of a piece and monitor its performance. Though partnership with Art Exchanges will not generate the highest profits, the sheer amount of data they generate is essential for the development of Intelligent Art’s algorithm in the first few months.

Art Funds, on the other hand, operate along a far more extended timeline. Once a portfolio has been agreed upon and capital has been raised (approximately 9 months), not much can be done to alter the course of the assets’ appreciation. Intelligent Art needs the algorithm to function with maximum accuracy to confidently advise Art Funds on their strategy. Data used from the Exchange’s activities, as well as data collected by the freelance miners to run through the model, will provide this degree of unprecedented precision to estimate the future value of art.

**Product Description**

The product is a machine learning platform which analyzes data about select artists and their oeuvres to identify trends and track correlation between career milestones and price-points. For the first iteration of this software, data will primarily be collected from these sources and sorted into clusters based on relevance and overall effect on valuation:

1. Social Media Following (Instagram Followers, Likes per post)
2. Institutional Representation
3. Gallery Representation
4. Solo / Group Shows
5. Awards / Fellowships
6. Auction results (Estimates, Sell rate, Buy-ins, Number of lots)
7. Press (Outlet, Content tone standardized using sentiment analysis algorithm)
8. Publications
9. Internal knowledge of private sale price-points

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10. Celebrity collection

Intense data collection and classification is at the core of this model. Each of the above ten clusters is given a designated ‘weight’ depending on its effect on the price of an artist’s work. Information will be entered into each of these clusters, tracking the artist’s progress starting from 2017-2020. Within each group, data is sub-categorized by ‘weight’ within the larger cluster. For example, a work acquired by the Brooklyn Museum may be given a “3” ranking, whereas entrance into the MoMA collection may be ranked “1” (due to the size of the institution, foot traffic, press, etc.). The numerical values assigned to events and achievements allow the algorithm to scan, sort, and interpret the information. Naturally, it will take constant trial and error to hone cause-and-effect, but this rapid development and improvement is the crux of machine learning. A regression will be run and compared against known price-points gathered since 2017 to confirm the software’s prediction.

Strategically, the first artists to run through this system are ones with limited variation in the works they produce. Below is a case study to demonstrate a rudimentary version of Intelligent Art’s data sorting.

Case Study 1 (primary market): Zanele Muholi

Photographer Zanele Muholi has risen astronomically in popularity in the past two years. Their photographs are mainly self-portraits taken in black-and-white, making them a perfect first case study; the algorithm does not need to account for medium, color, or subject when analyzing the contributing factors to the artwork’s commercial success. Intelligent Art’s founder also has industry knowledge of price-points for the artist from 2017-19, which will prove helpful when determining the accuracy of the initial regression.

<table>
<thead>
<tr>
<th>INSTITUTIONAL</th>
<th>GALLERY</th>
<th>PRESS</th>
<th>GROUP SHOWS</th>
<th>SOLO SHOWS</th>
<th>PUBLICATIONS</th>
<th>AWARDS</th>
<th>AUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Guggenheim Permanent</td>
<td>New York Times</td>
<td>ArtNet News</td>
<td>Aperture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tate Modern Museum Permanent</td>
<td>ArtNet News</td>
<td>ArtNet News</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Yancey Richardson</td>
<td>ArtNet News</td>
<td>Brooklyn Museum</td>
<td>Royal Photographic Society Fellowship</td>
<td>Phillips: above high estm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Yossi Milo</td>
<td>ArtNet News</td>
<td>ArtNet News</td>
<td>Atlanta Journal Constitution</td>
<td>ArtNet auctions: estimate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1

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MARKET ANALYSIS

Size and Demand

The size of the art market itself is immense, with millions of people worldwide interested in enriching their collections. At the high-end, art as an alternative asset class is not tied to economic trends as traditional investments tend to be. The first half of 2020 saw a drastic dip in art sales, especially at auction, due to Covid-19. North American and European auction sales contracted by approximately 50%, while Chinese numbers dropped by 80%, as it was the first-hit by the coronavirus. Nevertheless, a pivot towards online art purchasing due to a pause on in-person operations has caused a 146.1% spike in the average price of works sold through the Big Three houses during online-only auctions.

“While GDP has increased, the global equity market has accelerated, generating wealth for those who participate in the financial markets. Fueled by this wealth creation, the art market has also risen over the same period—and the estimated value of art held privately has increased as well.”

- UBS Art Intelligence Report, Fall 2020

Private art sales in the mid-range, despite a global pandemic, international economic difficulty and national political turmoil, have remained strong. The upper-echelons of the art market have contracted in terms of available offerings and smaller brick-and-mortar galleries have had to close. The first six months of the year may have signaled dire consequences for the art world, but it also forced antiquated methods of doing business to join the 21st century. As Evan Beard, head of art service at US Trust noted in the earlier edition of the 2020 Intelligence report, “there’s a lot of dry powder heading into next season [2020]” after the 2019 decline. Now, collectors and investors are reimagining how to spend this ‘dry powder’ in a post-pandemic world.

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5 Albert Goldstein and Julia Halperin, “The Innovators Issue,” Artnet News Intelligence Report Fall 2020, 2020, 84
6 Goldstein and Halperin, “The Innovators Issue,” 90
7 Ibid., 93.
This landscape -- rich with individuals who have generated significant income over the past six months, who are entering the art market in the midst of a tech Renaissance -- presents the perfect opportunity for Art Exchanges and Art Funds to revamp their ways of doing business. Many believe that Art Funds reached their peak in terms of prevalence and popularity between 2010-15. However the market still boasts an abundance of these art investment funds, with an estimated number of around 50 operating worldwide, about a third of which are Asian-based. As of 2017, the global art investment fund market totalled approximately $870 million. In the early 2010s, while Funds reached a new level of popularity, nascent Art Exchanges hit the art scene. Now, most of these Exchanges operate through digital platforms, including the popular Masterworks and Otis.

Each Fund and Exchange is structured differently, so it is imperative that Intelligent Art be able to customize the technology to individual needs. Much stricter legal compliance has also regenerated a wave of interest in these investment vehicles, as lack of regulation in the early 2010s led many unqualified advisors to mislead investors.

A current (though not comprehensive) list of Art Funds is as follows:

11 Franklin Boyd (April 15, 2020).
The Art Funds highlighted in green are those which reported high ROI the past year. The ones highlighted in dark grey are examples of smaller Funds specializing in specific market sectors. Cannonball deals in Warhol prints, while Merit Art creates portfolios centered around photography. These niche Funds are those that Intelligent Art aims to target as its first round of users.

A current (though not comprehensive) list of Art Exchanges is as follows:

<table>
<thead>
<tr>
<th>Artfintech.one</th>
<th>Look Lateral</th>
<th>Feral Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maecenas</td>
<td>ArtShare</td>
<td>Otis</td>
</tr>
<tr>
<td>Masterworks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Below is a breakdown of the structure of a sector-specific Fund and Exchange that would make ideal candidates for Intelligent Art’s first clients.

<table>
<thead>
<tr>
<th>Fine Art Invest Fund (FUND)</th>
<th>Otis (EXCHANGE)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Sector</strong></td>
<td>&quot;Culture Products&quot; and art : KAWS, Tracy Emin, Kehinde Wiley, Supreme Skateboards, Sneakers</td>
</tr>
<tr>
<td><strong>Investment Level</strong></td>
<td>$25k - $375k per asset</td>
</tr>
<tr>
<td>$100,000 minimum subscription</td>
<td>$50 - $100 per share prices</td>
</tr>
<tr>
<td>$18 million AUM (2014)</td>
<td></td>
</tr>
<tr>
<td><strong>Holding</strong></td>
<td>5 - 10 years With function to buy and sell shares</td>
</tr>
<tr>
<td>Open-ended since 2010</td>
<td></td>
</tr>
<tr>
<td>Quarterly redemptions</td>
<td></td>
</tr>
<tr>
<td><strong>Total Return</strong></td>
<td>Undisclosed</td>
</tr>
<tr>
<td>33% (2011)</td>
<td></td>
</tr>
</tbody>
</table>

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12Boyd (April 15, 2020).
13Boyd (April 22, 2020).
14Ibid.
Key Drivers

The key drivers that will determine the success of Intelligent Art include the maintenance of existing Art Funds, the continued curiosity of investors to pool funds in alternative asset classes, and the unanticipated push -- prompted by the pandemic -- for a technological overhaul of the traditionally lagging art world.

Capital tied in Art Funds totals almost $1 billion, and investment in new generations of funds within these existing vehicles has remained steady. Creation of new Funds is rare and not necessarily an indicator of how well Intelligent Art will perform in this niche. Rather, the number of existing and expanding Art Funds that the company can sign on as clients is a key success metric. Like the Funds, Intelligent Art will not see significant profit from this revenue stream for a few years, but when liquidation does occur the returns will be sizable.

The second driver affecting demand for Intelligent Art is whether investors in traditional assets will continue to explore other verticals: namely, fine art. The added security guaranteed by Intelligent Art will be useful in enticing individuals to invest in one Fund over another, but in such uncertain times it is difficult to predict where UHNWI will spend their money. Alternative asset classes generally react atypically to economic events, but this also contributes to the risk associated with investment. The art market feels booms and busts more acutely than other sectors, in part because the infrequent auction cycles determine the success or failure of an artist for half a year. This traditional model, as discussed, is rapidly changing, which means a greater need for predictive tools like Intelligent Art. The software will be critical in aiding Funds and Exchanges to back the art most likely to retain value in times of volatility (as indicated in the chart below, which compares art sales through 2019 in comparison to GDP growth).
Competitors

There are several businesses in the current landscape that use machine learning and artificial intelligence as predictive tools and methods of valuation. Intelligent Art, however, is unique in its approach to data collection and analysis, and the application of its findings within the structure of Funds and Exchanges.

Arthena: Founded in 2017 by Madeleine D’Angelo, Arthena has already made waves in the art market. Using an undisclosed but similar type of data collection strategy and algorithm, the technology predicts a piece’s risk and potential return on investment. Intelligent Art not only operates using similar technology (though reliant on different data sets), but is driven by a similar mission. As D’Angelo has stated, “when you’re looking at it from a non-mathematically-driven point of view, you can miss really great opportunities in the market.”

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IA Advantage: Despite entering the market a few years behind Arthena, Intelligent Art has a distinct advantage in the form of its cost structure. As a subscription service, Intelligent Art has almost infinite potential for scaling and growth, as well as exclusive access to the private data provided by the Funds and Exchanges using the technology. Arthena, on the other hand, operates as a stand-alone Fund, limiting investors’ options to the company’s own portfolios, which are recommended to customers based on their risk tolerance.

ArtBNK: Using this platform, a subscription service with premium insight features, users are able to access relatively accurate valuations of works for sale at auction. It is a service dedicated to making valuation more transparent for any number of users -- collectors, advisors, wealth managers, etc. It also includes a feature that allows customers to upload images of their works for technology-based valuation, described as being “proprietary algorithms [that] compare all the primary indicators of value such as medium, size, date, subject, color and composition with all works by each artist in our database to identify similarities for analysis.”

IA Advantage: Like ArtBNK, a principal feature of Intelligent Art’s technology revolves around accurate and numerically-based valuations. However, as stated in the Target Consumer section, Intelligent Art is not designed to be accessed by individuals. The advantage of our technology, though similar to that of ArtBNK, is that it hinges on the large amount of data provided by the subscribing Exchanges and Funds. While Intelligent Art also employs a predictive algorithm, the unique customer base is what differentiates it from the competition and what will allow the projections and risk evaluations to be exponentially more accurate than other services.

ArtFacts: Essentially a list of prominent names listed in order of popularity, ArtFacts ranks different categories of artists and exhibitions based on certain success metrics. It is a useful tool for charting the trajectory of artists’ careers and seeing how they compare to their peers in the overall market. ArtFacts is a pioneer in ‘mapping’ the very murky art world in an intuitive and user-friendly fashion. As stated on their website, “Artfacts provide collectors, artists, gallerists and educators with insights, trends and clear analysis of the ever changing art world landscape.”

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18 https://artfacts.net/
IA Advantage: Intelligent Art will operate similarly in that ranks will be assigned to different artists and their works. Rather than simply providing an arbitrary chart of names and popularity insights on a subscription basis, Intelligent Art uses this kind of intuitive ranking and simplified list system to run through the machine learning formula in order to make predictions. It not only takes this type of “index” (think Mei-Moses) one step further, but then informs users, the Funds and Exchanges, on how to proceed in terms of the best investment strategies to maximize profits.

SWOT Analysis

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Adaptable software for companies with varying investment strategies</td>
<td>- Difficulty estimating accurate revenue streams for different sized Funds and Exchanges, as much of the revenue depends on the resale margins</td>
</tr>
<tr>
<td>- Unique subscription model allows immediate access for many art investment firms, and thus generates the necessary data to make the software more “intelligent”</td>
<td>- Sheer volume of data collection needed for accurate prediction over multiple categories of art</td>
</tr>
<tr>
<td>- Exponential accuracy of the technology after the first year, minimizing cost of marketing and data collection, and enticing a greater number consumers -- the product rapidly self-improves</td>
<td>- Proof of initial data points relies on inside knowledge of industry specialists</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>- New application of Artificial Intelligence to art investment across a variety of structure Funds and Exchanges</td>
<td>- Established online investment platforms specialized in specific categories of art using AI-based strategy</td>
</tr>
<tr>
<td>- Partnerships with indices and databases (like ArtNet), pooling an unprecedented amount of art data to minimize inefficiencies in the market</td>
<td>- Raising first round of investment without being able to demonstrate the full range of the technology</td>
</tr>
</tbody>
</table>

Table 5
BUSINESS MODEL

Revenue and Profit

Bootstrapping ($50,000) will generate the salary needed for the Head Data Scientist before the rollout of the beta product in Year 1 for the Angel investors. Intelligent Art aims to generate $600,000 in funds from (at least) two key investors over the first three years, granted in yearly installments: $150,000 in Year 1, $100,000 in Year 2, and $50,000 in Year 3. This start-up funding will go primarily towards hiring the necessary data scientists to produce and develop the MVP, as costs associated with marketing, rent, etc. will be minimal. Debt repayment will begin in Year 4. Each investor can expect $67,200 per year from Year 4 - Year 8, totaling $336,000 (equivalent to 12% ROI and adjusted yearly for inflation).

Intelligent Art employs two different pricing models: one tailored to the needs of a Fund and the other to those of an Art Exchange.

Art Exchange custom pricing:

As Art Exchanges operate on a fluid, short-term model where shares at a lower price point are constantly being bought and sold, Intelligent Art has adapted its pricing structure accordingly. Working on a subscription basis, IA will charge each fund a monthly fee of $1,000 to use the software to adjust their pricing and inventory on a daily basis. For any initial purchase of shares in an artwork by the Exchange’s investors, Intelligent Art will charge a 2% transaction fee. Finally, 2% of any final sale of art (which does not happen as frequently with Exchanges, as this requires pooling all shareholders) will go to Intelligent Art. The software expects to generate approximately a 22% rate of return on investment from the time of initial purchase to final sale - well above traditional financial investments.

Art Fund custom pricing:

The pricing model for an Art Fund is slightly different, as Funds typically operate over a much longer time period and do not rely on intermediate transactions between time of initial investment and portfolio liquidation. The holding period of a Fund’s portfolio varies, but in recent years, 3-5 year options have been favored over 10+ year portfolios. Intelligent Art will charge a $50,000 consulting fee (per portfolio) to help the Fund strategize using the software’s predictions within the investment parameters. Depending on the

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19Brendan Burns (February 10, 2020).
Fund’s structure, yearly mark to market portfolio valuations will be conducted to keep investors informed of the progress. Intelligent Art will be retained with a $10,000 yearly subscription until the date of liquidation, at which point 1% of the anticipated 20% return will go to Intelligent Art.

## FINANCIALS

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COST</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Scientist</td>
<td>$130,000.00</td>
<td>$130,000.00</td>
<td>$200,000.00</td>
</tr>
<tr>
<td>Freelance Data Miners</td>
<td>$150,000.00</td>
<td>$100,000.00</td>
<td>$50,000.00</td>
</tr>
<tr>
<td>Subscription to Data Collection Service</td>
<td>$30,000.00</td>
<td>$30,000.00</td>
<td>$30,000.00</td>
</tr>
<tr>
<td>Art Market Consultant</td>
<td>$60,000.00</td>
<td>$20,000.00</td>
<td>$20,000.00</td>
</tr>
<tr>
<td>Meeting Space</td>
<td>$1,200.00</td>
<td>$1,200.00</td>
<td>$1,200.00</td>
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<tr>
<td><strong>TOTAL COST</strong></td>
<td><strong>$341,200.00</strong></td>
<td><strong>$281,200.00</strong></td>
<td><strong>$301,200.00</strong></td>
</tr>
<tr>
<td><strong>REVENUE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Art Exchange</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly Subscription</td>
<td>$60,000.00</td>
<td>$90,000.00</td>
<td>$102,000.00</td>
</tr>
<tr>
<td>Initial Share Sale Fee</td>
<td>$60,000.00</td>
<td>$90,000.00</td>
<td>$102,000.00</td>
</tr>
<tr>
<td>Final Sale Profit</td>
<td>$13,000.00</td>
<td>$19,500.00</td>
<td>$22,100.00</td>
</tr>
<tr>
<td>Art Fund (3 year portfolio)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Consulting Fee</td>
<td>$100,000.00</td>
<td>$100,000.00</td>
<td>$100,000.00</td>
</tr>
<tr>
<td>Yearly Subscription</td>
<td>$20,000.00</td>
<td>$40,000.00</td>
<td>$60,000.00</td>
</tr>
<tr>
<td>Final Sale Profit (1st year Funds)</td>
<td></td>
<td></td>
<td>$400,000.00</td>
</tr>
<tr>
<td><strong>TOTAL REVENUE</strong></td>
<td><strong>$253,000.00</strong></td>
<td><strong>$339,500.00</strong></td>
<td><strong>$786,100.00</strong></td>
</tr>
<tr>
<td><strong>GROSS PROFIT</strong></td>
<td>-$88,200.00</td>
<td>$58,300.00</td>
<td>$484,900.00</td>
</tr>
<tr>
<td><strong>FINANCING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investor 1</td>
<td>$150,000.00</td>
<td>$100,000.00</td>
<td>$50,000.00</td>
</tr>
<tr>
<td>Investor 2</td>
<td>$150,000.00</td>
<td>$100,000.00</td>
<td>$50,000.00</td>
</tr>
<tr>
<td><strong>NET GROSS PROFITS</strong></td>
<td><strong>$211,800.00</strong></td>
<td><strong>$258,300.00</strong></td>
<td><strong>$584,900.00</strong></td>
</tr>
</tbody>
</table>

Table 6

This projected cost and revenue analysis is based on a fair salary for an experienced data scientist, as well as the average hourly wage for freelance data miners ($50/hr), three of which will be hired during Year 1, two during Year 2, and one in Year 3. A WeWork space in New York city charges $10/hr for a large conference room, which the team will use twice monthly. Once the structure of the algorithm and data
collection is in place, a browser-based data labelling service, such as Alegion, will be used to maximize efficiency.

While it is difficult to standardize revenue given the range of Funds and Exchanges currently operating, the projections are based on signing ten Exchanges in Year 1, five more in Year 2, and two additional in Year 3. The fees and profits are based on the assumption that each Exchange manages 20 artworks valued at $50,000 per piece (appreciating in value at a yearly rate of 25%), one of which will sell in its entirety by the end of Year 1. In terms of Funds, Intelligent Art aims to sign on two per year with an average portfolio value of $100 million. While it is unlikely that a portfolio will mature by Year 3 of operation, this chart gives an idea of profit growth Intelligent Art will see in the long-term.

Diagram 3
Diagrams 4 - 6

Cost Breakdown
Year 1
- Meeting Space: 0.4%
- Consultant: 17.6%
- Data Scientist: 36.1%
- Freelance Data Miners: 44.0%

Cost Breakdown
Year 2
- Subscription: 10.7%
- Meeting Space: 0.4%
- Consultant: 7.1%
- Data Scientist: 46.2%
- Freelance Data Miners: 35.6%

Cost Breakdown
Year 3
- Subscription: 10.0%
- Meeting Space: 0.4%
- Consultant: 6.6%
- Data Scientist: 46.4%
- Freelance Data Miners: 16.6%
MARKETING

Objectives and Strategy

It is imperative when marketing Intelligent Art to draft a strategy that emphasizes discretion and professionalism.

The first marketing objective is to round up a group of Exchanges and Funds to pitch to. These, as mentioned, should be as specialized as possible in their portfolio offerings. The more narrow the selection of art (drawings, secondary market prints, landscape photography, small figurative painting, etc.), the more accurate the results of the algorithm will be, as Intelligent Art will have a more limited data set to sort. Finding this initial set of potential clients involves networking and reliance on industry connections. Traditional marketing channels, especially any form of paid advertising, are inappropriate and ineffective for this product. While challenging to sign these early adopters, alumni through Sotheby’s as well as the founder’s personal network from university and the gallery world offers the company a strong starting point.

The second marketing objective is to create a demo template that demonstrates how the technology works. For Intelligent Art’s first clients, this will be a generalized demo showing how the algorithm functions and how data is run through the model to accurately track an artist’s price point over time. The goal, however, is to eventually be able to collect enough data to confidently tailor the template to each request, and thus be able to show how the technology would operate with each individual Fund or Exchange’s portfolio.

Image 3
Once the initial round of customers have subscribed to the software, the rest of the marketing plan will fall into place with ease. Intelligent Art relies on proof of accuracy and word-of-mouth within the industry. The first phase of data collection courtesy of the 1st year Exchanges and Funds will increase the accuracy of the algorithm exponentially, allowing the possibility to scale to much broader portfolios and guarantee returns on a greater range of works. Success speaks for itself, particularly in the world of luxury good investment. This wave of algorithm development following analysis from the first few rounds of sales will give Intelligent Art the backing it needs to expand and a proven track-record of precision that will inspire confidence in the next rounds of subscribers.

OPERATIONS AND DEVELOPMENT

Staff

Founder and Director of Sales: Founder Lindsay Covington has 5+ years of experience working in blue-chip and mid-sized contemporary and secondary market art galleries. This inside knowledge of sales strategy, pricing, and key players is essential in the establishment of the MVP, to provide data points not available to the public and to verify the accuracy of early runs of the algorithm. This position is key for communicating goals and expectations to the data scientist, and interpreting results of the beta product to market appropriately to clients.

Head Data Scientist: The role of the head data scientist is crucial for the structural development of the algorithm as well as to strategize its growth. Finding the best method for building this software, from rudimentary mark-and-sort algorithm to more complex regressions is the backbone of Intelligent Art. In terms of compensation, a data scientist with this kind of architecture experience and leadership ability for guidance of freelance data miners is close to $150,000 post-tax.

Freelance Data Miners: It is important at the start of building the company to rely on individuals experienced in data collection to kickstart what is filtered into the algorithm. A subscription data labelling service will be used down the line for sentiment analysis of articles and scanning of data points from indices. However, communication about goals and what to use or disregard in terms of information is key for the building blocks of the machine learning software, and the best way to ensure targets are met accurately is to employ freelance workers able to discern the nuances in data. They will work closely with the head data scientists to understand how the moving parts connect.
**Art Market Consultant:** The art market consultant will work on a full-time basis for the first year with the Sales Director to pool industry knowledge and make sure that the algorithm reflects the true and tangible trends of the art market. These two specialists will also have to communicate to the data miners what kind of information should be more carefully considered rather than other in terms of relevance to an artist’s career development.

**Communication**

All staff will work primarily from home, with half-hour zoom check-ins between the Sales Director, Head Data Scientist and Market Consultant occurring bi-weekly. The lead Data Scientist and freelance workers are expected to be in daily contact. Budgeting for the workspace accounts for fortnightly, three-hour meetings booked in a New York City WeWork conference room -- a space and time for strategy and planning, and constant reworking as part of the Agile model of technology development and teambuilding structure.

**Development and Scaling: Benchmarks**

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<th>Year 0</th>
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<td><strong>Technical</strong></td>
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| Team | - Keep on freelance data miners as needed  
|      | - Twice-yearly consultation from art market specialist to help determine accuracy and guide next priorities from inside perspective |
| Financial | - See fig. X for anticipated revenue |

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| **Technical** | - 6+ Agile iterations of software  
|      | - 15+ new market sectors  
|      | - Strategize in which clusters to increase data collection, should be exponential in the original clusters |
| **Commercial** | - Anticipated two Exchanges and two Funds to sign-on  
|      | - Explore contracts with other wealth management services |
| **Team** | - Hire assistant data scientist  
|      | - Keep on freelance data miners as needed  
|      | - Twice-yearly consultation from art market specialist to help determine accuracy and guide next priorities from inside perspective |
| **Financial** | - See fig. X for anticipated revenue |
13. Ha, Anthony. “Arthena Uses Data Science to Find the Best Investments in Art.”
   https://techcrunch.com/2017/03/17/arthena-y-combinator/.
   CNBC, June 1, 2015.
   https://www.eurekahedge.com/Research/News/105/January-2012-alternative-investments-
   Artvest-The-Truth-About-Art-Funds.
20. Schneider, Tim. “A.I. Has the Potential to Change the Art Business-Forever. Here’s How It
   Bloomberg, November 27, 2017.
22. Schwartz, Shelly. “Wealthy Investors Dabble in Art Investment Funds.” CNBC. CNBC,
    June 15, 2015.
