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01. Overview

The Silkroad fashion platform, built based on data and blockchain technology, connects consumers directly to the manufacturers and distributors. It allows a number of fashion companies, service providers, designers, manufacturers, and distributors of fashion goods acting in different areas to record their core information into a blockchain, and to link them to ecosystems. In addition, it can make them to analyze fast fashion trends and to provide global marketplaces for a variety of emerging designers.
02. Background

The center of change, fashion ecosystem

Fashion trends in the world are changing now. As fashion consumption moves from offline to online, the purchasing system of finished products of existing offline retailers is collapsing. As a result of this change, exhibitions, runway collections, and showroom businesses that ran based on the existing wholesale business structure are shrinking and its role in the underlying offline system has been also reduced. As the world becomes interconnected, 940 million of online shoppers are expected to spend $1 trillion in e-commerce across borders by 2020.
03. Market’s problems

Personalized, individualized fashion needs, low price preference phenomenon

The decrease of general consumption as economic uncertainty increases is one of consumer shopping patterns. The fashion consumption also decreases, while consumers are demanding more customized and individualized fashion and prefer lower prices. This is an increasing trend, with off-price shoppers accounting for 75% of clothing consumption across all channels in the North American market.
The rapid increase in fashion trend speed

Arising from the development of various technologies such as the spread of SNS, real-time information sharing, expansion of data processing technology, commercialization of 3D printing technology, etc., the value chain of planning-order-manufacturing-distribution-sales is collapsing. The growth of IT has exerted a direct impact on the wholesale ordering method based on the existing six-month lead time, and the base of the designer's fashion industry has been changing. While fashion is changing at a rapid pace, fashion brands have shown their collections six times a year on average, and even luxury brands are in the trend of reducing lead times. The fast pace of change is causing the following problems such as plagiarism issue, the rapid product design cycles and direction issues that reflected consumer purchasing.
04. Solutions

Coping with a new era and changes by building a fashion ecosystem based on brands of designers

We suggest alternatives to the slow processes of manufacture and distribution based on wholesale. In order to overcome the limitation of fashion brand short lifecycle, we would like to cultivate designer brands based on customer feedback and in addition to reflecting the reasonable prices and rapid trends, we will build a fashion ecosystem based on various and unique designs.
04. Solution

1. Ecosystem creation

Silkroad connects such important links as fashion companies and service providers, designers, manufacturers, and distributors of fashion goods in an ecosystem by recording the key information about them in the blockchain.

By creating a compensation scheme called Silk Point (SLP) we encourage participation in the ecosystem for participants who record information about parts of fashion distribution. Participants can acquire Silk Coins (SLK) if they faithfully perform their roles such as demonstrate design prototypes, display purchase intention, discover designer talent, etc. The obtained Silk Coins (SLK) can be used as a means of publicity or returned in alternative ways.

Silk Coins are used for transactions between ecosystem participants and can also be used for sites operated by ecosystem participants. In addition, fashion blockchain records created through the Silk ecosystem can be used in design trend analysis and fashion manufacturing and distribution industries, and the profits generated provide additional income for the owner of the data.
2. Ecosystem building

The fashion digital platform ecosystem that Silkroad intends to create involves many ‘participants’ who run fashion-related businesses such as manufacturers, fashion companies, retailers, buyers, academies, and consumers. The Silk ecosystem encourages their participation in the ecosystem and introduces an ‘incentive’ called Silk Point to solve the problems of each service. Each step-by-step incentive structure is as follows from each stage perspective.

During the first stage, new designers, designers with experience in the fashion industry, academy designers, etc.. record their samples on the blockchain as their first interaction with the external ecosystem. This includes designer property information, design concept, material, and classification information, etc..

On the second stage, ecosystem participants evaluate registered design samples. It can be completed with buyers or general consumers’ preferences evaluation (such as ‘likes’), expert opinions and inquiries about design samples received in digital showrooms or auditions.
The third stage is for the product manufacturing, realized through the buyers and the retailer. At this stage, participants will discuss the details about design and material modifications, production costs and schedules.

On the fourth stage manufactured goods are delivered to wholesalers and consumers. Customer’s preferences, purchase history, review information, and so on are recorded at this stage. Like this, gathered information can be used for product direction improvement, additional production, etc., in order to react quickly to the new trends.
3. Incentive system

The Silk ecosystem implements a customized incentive system for numerous services and ecosystem participants. The incentive system allows to motivate participation in each service, and to record and validate participant’s credible data. Each step-by-step incentive structure is as follows from each stage perspective.

### 3.1. New Design Registration Phase

At this stage, designers prove their designer sample ownership, by submitting design intention, registering designer information, and so on. In the Silk ecosystem, the unique information about designs and designers is defined as core data, and we pay Silk Points (SKP) as compensation for it registration into the blockchain. During this process, buyers or retailers who already are collaborating with designers may receive incentives by supporting data registration.

### 3.2. Design Feedback Collection Phase

At the second stage, we can collect professional opinions and buyers feedback from fashion companies or retailers, and conduct QA for general consumers and fashion coordinators on a new design, and find out their preferences and feedback. We encourage platform participation by giving incentives to both evaluators participating in this process and designers responding to the evaluation. The data accumulated in this process can be distributed and utilized in trends analysis.
3.3. Design Production Phase

In the design production phase, a thorough task coordination is needed for product manufacturing. Variety of details such as style, color, kind of material, production schedule, manufacturing company, product unit price and so on require through coordination. The records of this process contributes to accumulating data in the system, and rewards will be offered for manufacturing process statistics.

3.4. Design Sales Phase

In the sales stage, products designed for retailers or consumers are produced and delivered. In this process, various opinions from wholesalers, salesmen and consumers are heard, analysis of problems is recorded, and statistics on product sales are collected. Incentives are provided to the participants to be shared with designers, fashion companies, retailers, and other buyers to help them improve their products or help them design the next product.
05. Business Model

Finding solutions by connecting numerous fashion infrastructures to one ecosystem.

How can you solve the problems of the fashion industry, where many services are all interconnected? Through the advancement and improvement of individual services? By strengthening government regulation and support? In fact, until now, the minor approaches that governments and business operators have tried for decades couldn’t tackle this issue.
05. Business Model

Eco-System

01) Silkroad Eco-System

- Designer
  - Designer brand
  - Digital showroom

- Buyer
  - Fashion Purchase Information

- Individual consumer
  - Fashion preference information

- Consumer
  - Data
  - Coin

- Wholesaler & Retailer
  - Fashion sales information

- Mobile App
  - Data
  - Mobile App
  - Advertisement

- Blockchain
  - Data

- Distributed Storage
  - Data

- Fashion Companies
  - Retail Market
  - Retail Stores

- Fashion Association
  - Research Institute
  - Design Academy

- Mining Pool

- Silk Ecosystem
05. Business Model

02) Silkroad Platform Service Flow

Silkroad’s sensitized service will allow customers around the world to be able to feel products without touching them. Silkroad will act as a window to extend our customers business abroad through our platform.

Silkroad Platform

<table>
<thead>
<tr>
<th>Contents</th>
<th>Marketing</th>
<th>Legal</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fashion show exclusive/joint</td>
<td>• Show Room for buyers consultation</td>
<td>• Intellectual property protection</td>
</tr>
<tr>
<td>• The newspaper column for PR (Multilingual Support - Compensation System)</td>
<td>• Media production support (costume related)</td>
<td>• Proof of profit distribution according to sales analysis</td>
</tr>
<tr>
<td>• Media Order (film/drama/dress) production</td>
<td>• Celebrity costume support</td>
<td>• Proof of production for investor protection</td>
</tr>
</tbody>
</table>
06. Platform Business Strategy

01) Business Promotion Strategy

Business Strategy: A market where everyone can Win-Win

Silkroad thinks that the owner of the service market is not the supplier but the user, the 'customer'. It is a common truth that users want to use and supply various items easily and cheaply. The answer lies in a fashion market platform, Fashion Crowdfunding Silkroad, where a variety of items 'suppliers' and numerous 'service users' can meet.

Ecosystem based Fashion Platform

“Asian Fashion Hub” to create fashion brands and lead fashion trends

Ecosystem composition

- Fashion show and collection management
- On-line and off-line promotion marketing
- Linking inductive programming and business
- Global business consulting
- Establish O2O system for buyer and supplier ecosystem

Empowerment

- Educating young designers and fostering fashion manpower
- Support overseas advancement and connect buyers
- Overseas expansion opportunity for designer, distribution consulting
- K-collection expansion to global emerging market

Service provision

- Enhance customer-oriented service
- Fashion brand promotion and marketing
- Establishing reliability through interactive communication
- Establishment of seminar information community

Technical implementation

- Implementation of transaction system through block chain system
- Providing customized data through artificial intelligence system
- Construction of BtoCtoB trading system
## 06. Platform Business Strategy

### 02) Step-by-step business strategy

<table>
<thead>
<tr>
<th>Step 1: Build the infrastructure</th>
<th>Phase 2: Growth Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development, investment, research</td>
<td>Development and marketing</td>
</tr>
<tr>
<td></td>
<td>Brand establishment</td>
</tr>
</tbody>
</table>

- **Step 1: Build the infrastructure**
  - Ecosystem creation
    - Total sales reach 1 billion KRW
  - • Attracting corporate investment
  - • Promote Silkroad and secure supplier (designer)
  - • Domestic distribution network configuration
  - • Building Block Chain System
  - • B2B, B2C trading system construction
  - • Opened Silkroad Platform Service

- **Phase 2: Growth Development**
  - Customer base expansion
    - Total sales reach 10 billion KRW
  - • Aggressive sales and marketing activities
  - • Desire to enter overseas and connect buyers
  - • Promotion of strategic alliance with Korean fashion association and overseas association
  - • Realization of blockchain main net system
  - • Personalized data using artificial intelligence (individual, distributor, foreign buyer)

<table>
<thead>
<tr>
<th>Step 3: Stabilization</th>
<th>Step 4: Sustainable development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution network expansion</td>
<td>Sales expansion</td>
</tr>
<tr>
<td>Total sales reach 30 billion KRW</td>
<td>Total sales reach 100 billion KRW</td>
</tr>
</tbody>
</table>

- **Step 3: Stabilization**
  - • Expansion of retail stores by opening fashion shops
  - • Discovering new brands and launching customers
  - • Expansion and diversification of foreign investment
  - • K-collection held in global emerging market
  - • Grant designers overseas opportunities
  - • Establishment of designer incubation system

- **Step 4: Sustainable development**
  - Sales expansion
    - • The Second Establishment (Establishment of Production Plant)
    - • Global system construction
    - • Stabilization of Asian market
    - • European market entry
    - • Establish foundation as a global fashion company

Some parts may change due to internal circumstances during the project.
The Silkroad platform is a strategy to reduce service costs and lower the prices to gain competitive advantage. Since service prices are different from product prices, we are connecting products and services based on the manufacturing companies service industrialization, especially the product-service integration (PSS) strategy.

<table>
<thead>
<tr>
<th>Estimated profits and loss</th>
<th>2019 Projected</th>
<th>2020 Projected</th>
<th>2021 Projected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales amount</td>
<td>13,103,680</td>
<td>24,254,800</td>
<td>45,278,640</td>
</tr>
<tr>
<td>Sales commission income</td>
<td>23,184</td>
<td>66,240</td>
<td>139,932</td>
</tr>
<tr>
<td>Transaction fee income</td>
<td>389,000</td>
<td>543,000</td>
<td>748,000</td>
</tr>
<tr>
<td>Investment commission income</td>
<td>875,000</td>
<td>1,750,000</td>
<td>3,500,000</td>
</tr>
<tr>
<td>Monthly service fee</td>
<td>500</td>
<td>1,000</td>
<td>900</td>
</tr>
<tr>
<td>Ad Revenue</td>
<td>10,000</td>
<td>30,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Sales cost</td>
<td>11,805,996</td>
<td>21,864,560</td>
<td>40,839,808</td>
</tr>
<tr>
<td>Gross profit on sales</td>
<td>1,297,684</td>
<td>2,390,240</td>
<td>4,438,832</td>
</tr>
<tr>
<td>SG&amp;A expenses</td>
<td>1,330,000</td>
<td>1,900,000</td>
<td>2,320,000</td>
</tr>
<tr>
<td>EBITDA</td>
<td>(32,316)</td>
<td>490,240</td>
<td>2,118,832</td>
</tr>
</tbody>
</table>

Estimated profit or loss may differ from actual profit or loss.
06. Platform Business Strategy

04) Main Platform Services

- Develop fashion crowdfunding process
- Provide PC and Mobile version
- Exclusive service for general user, buyer, designer, etc.
- Enhanced contents quality (product guide, video)
- Compensatory content comment participation
- Supporters (fandom) formation
- Manage function such as order management, shipping management, purchase etc.
- AI Service and product search function
- Customer management and purchase order management on blockchain
06. Platform Business Strategy

05) Differentiation Strategy

In addition to the “crowdfunding platform”, we plan to provide O2O online and offline services such as creating jobs through the cultivation of new designers, supporting designer activities through offline events, digital showrooms for overseas and domestic buyers, and matching systems for connecting retailers and buyers.

In addition, we plan to enhance personalized service through the AI coordinator application so that it can serve as a personal shopper.

Silkroad differentiation strategies are as follows.

1) Fashion crowdfunding platform

We support the launch of a designer brand by building a service that can fund a potential designer. By overcoming the limitations of the existing crowdfunding platform, we establish a crowdfunding platform specialized in fashion, so we can look at designer samples through digital showroom and organize funding through investing or reward model for the desired designer. Even if buyer matching is difficult, we provide our customers with an environment that allows them to serve as a designer brand by directly appealing their designs to consumers.
2) Support Design Academy graduation exhibition

Graduation exhibitions are held as individual showcases for graduates from various fashion design colleges and academies. However, it is difficult to overcome regional limitations in relation to PR and expert groups. The platform supports various fashion companies and buyers in the global environment to find academy fashion personnel who want new designers. We offer a variety of support activities, such as providing tickets for audition participation in order of preference, as well as providing a digital showroom for graduate work.

3) Audition for new designers

We are able to find new talented designers who are not yet equipped with a brand marketing capability, so that they can connect with buyers and launch brands. Through the audition-type contest program, we provide job support for fashion professionals, and general consumers can participate in preference voting. In this process, we provide a system for promoting designers and identifying potential designers. This enables various designers to participate not only in the domestic but also in the global environment, enabling communication and connection with new designers, buyers and consumers.
4) Digital showroom

In the Americas, Europe, and China, showroom business has had a great impact on the market due to the distribution characteristics of the structure of the hall sales-editing shop. Showroom Business is expected to play a role with the development of online technology, although it is possible to introduce multiple brands in various countries without exclusive contracts and always see products in a format where distribution and manufacturing work separately. In the silk ecosystem, multiple brands from a wider variety of countries can be experienced and cost-effective display and communication will be possible, enabling the company to act as an Omni Channel with off-showrooms.

5) Retailer, buyer matching system

You can search for emerging designers according to various matching conditions, and experience designers’ design samples through digital virtual showrooms. By searching the database of various designers in the global environment, buyers can search for designers that meet their requirements and proceed with QA. Buyers can also push content whenever a designer sample of the desired conditions is launched. It serves as a program to help designers grow into brands by exposing them to retailers and fashion company stakeholders.
Machine learning AI and professional stylists provide AI services that advise on style coordination. We analyze customer’s overall style coordination to advise on what clothes to wear according to the weather, and recommend suitable products. It is easy to refer to, because it recognizes through the camera how well the clothes fit together and shows it numerically. You can also match your clothes with other items in the clothing store by linking a mobile phone app. This artificial intelligence coordinator application makes more effective fashion proposals.
01) Blockchain

1. Trusted data processing

Trusted data refers to a system in which data must not be deleted or forged, and the access control policies must be applied properly. In particular, Silkroad deals with investment information, so such sensitive information as the subject of investment, stakes, and a time of investment should be stored safely, as well as it should only be accessible by authorized persons.

For reliable data implementation, we have adopted the blockchain as the main data storage system. Since the blockchain is not able to be falsified by the nature of the algorithm, data is stored in various nodes in a distributed manner. Therefore, it is relatively safe from accidental data loss and the access control through private key can effectively prevent access attempts without the access rights.

2. Fast and reliable system

When trying to utilize a blockchain as a data storage system, it requires fast and stable data processing. The meaning of “the system is fast” is defined by two following factors: the transaction amount per second (TPS: transaction processing speed) and the block generation time expressed in bandwidth and seconds. The block generation time refers to the time required to reach a confirmation that the block would not be canceled after stable block generation. The shorter this time, the more stable the system can be. Stability is determined by the block creation cycle and the confirmation count.
Bandwidth is a very important factor in evaluating the performance of a blockchain and measuring whether a system is actually usable. For reference, Visa maintains an average of 24,000 TPS to handle transactions occurring around the world.

Silkroad processes data such as item suggestion and investment, stake trading, users’ purchase history and rating, community activity, etc. in the system, and since it stores data on the blockchain it requires the satisfactory transaction processing capability.

In the early days, Bitcoin block size was 1MByte and had a fast processing speed. However, as the level of awareness and number of participants rapidly grew, and transaction volume increased and accumulated over time, the processing speed has declined due to the increase in the burden in accordance with the TPS limitation and the management of transaction information. As a result, the TPS problem was caused by the lack of scalability.

In order to solve this problem, Segwit, which, by separating the witness data that occupied a lot of space in Bitcoin, allows much more transactions to be stored in each block, has been proposed. However, if the volume of transactions increases explosively, it is evaluated that it can reach the limit again. Currently, the bandwidth of the Bitcoin is about 7 transactions per second, which is inappropriate for the system of Silkroad even considering system improvement.

### Performance comparison of main blockchain networks

<table>
<thead>
<tr>
<th>Consensus</th>
<th>Bandwidth (TPS)</th>
<th>Block creation cycle</th>
<th>Confirmation count</th>
<th>Confirmation time (sec)</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>EOS (White Paper)</td>
<td>DPOS</td>
<td>1,000,000</td>
<td>3</td>
<td>15</td>
<td>45</td>
</tr>
<tr>
<td>BitShares / Steemit</td>
<td>DPOS</td>
<td>100,000</td>
<td>3</td>
<td>15</td>
<td>45</td>
</tr>
<tr>
<td>NEO</td>
<td>dBFT</td>
<td>10,000</td>
<td>15-20</td>
<td>1</td>
<td>15-20</td>
</tr>
<tr>
<td>Ethereum</td>
<td>POW</td>
<td>15</td>
<td>14</td>
<td>12</td>
<td>180</td>
</tr>
<tr>
<td>Bitcoin</td>
<td>POW</td>
<td>7</td>
<td>600</td>
<td>6</td>
<td>3600</td>
</tr>
</tbody>
</table>
Ethereum, which has obtained a lot of users with its smart contract concept, has a bandwidth of only 15 TPS. The nodes storage that exceeds 300 GByte is also a burden factor to the system. Considering the current block accumulation trend, Ethereum block size will exceed 1TByte within 1 year, which will increase the burden of maintaining the node. In order to use Ethereum, one needs to build a dedicated network by forking. However, even if a dedicated network is established, Ethereum TPS is about 15 transactions which is only 2 times more than that of the Bitcoin, which is also not sufficient to operate the Silk Coin.

In case of Ripple, only individuals authorized to participate in the private network can use the private blockchain and only participants permitted by administrators can enter the network. Therefore, it is possible to solve the anonymity problem, if the existing operating entity can verify user identity upon permitting entry. As a result, the processing speed of the existing blockchain is slow because the verification process is performed separately. Hence, if the verification process was simplified, the transaction processing speed would become faster. However, the problem is that it is possible to manipulate the Ripple ledger at will through a private network which only authorized persons can participate in. Also, according to the policy of Ripple, when you make the transaction, XRP used to pay the fee will be incinerated. Consequently, as Ripple supply is getting reduced it’s value increases and the fees increase as a result. This policy can lead to a decrease in users as the price rises. Ripple describes this as the beneficiaries of the transaction cost, but it seems to need improvement.

There are NEM, RaiBlocks, and other cryptocurrencies with fast transaction processing speed, but there are many similar problems to the above.
3. Efficient Processing of Large Binary Data

If the binary data can be stored in the blockchain, the consistency of the binary data can be guaranteed. Since it is impossible to forge and falsify data and there is little fear of loss, it is true that storing large-capacity binary data such as image files, multimedia data, and 3D data in a block has a lot of advantages in comparison with the conventional centralized data storage system. The blockchain is basically a system for storing data, so it is theoretically possible to store binary data. However, if large binary data is stored in a block, the size of the block itself becomes suddenly large, which causes a load on the system and makes it difficult to maintain the node. Therefore, it is impossible to store large binary data in an existing blockchain. In fact, the argument is gaining power that the blockchain is an inadequate system for handling large amounts of data and cannot be an alternative to the current storage method. (see https://www.computing.co.uk/ctg/news/3018000/blockchains-are-the-wrong-solution-to-data-security-problems-says-maidsafe)

Nevertheless, operating a separate central storage device in a distributed system is not only incompatible with the network operating philosophy, but also be responsible for again the cost and security issues associated with operating a central storage device that the blockchain has solved. Therefore, there is a need for a system capable of efficiently processing large-capacity binary data within a blockchain.

4. Minimize arbitrary intervention

Minimizing arbitrary intervention means that the authority to insert, delete, and view data can be achieved through minimal intervention in accordance with established rules. Most of the blockchain systems control the arbitrary intervention of data at an appropriate level. Blockchains adopting the agreement algorithm affiliated with PoS including DPoS have a disadvantage of concentrating authority to a small number, but if it is possible to monitor a small number of collusion, arbitrary data can be transformed, but it can be recognized as difficult in reality. However, Silkroad tries to minimize the arbitrary intervention of parts that cannot be provided by blockchains such as the recommendation of investment items. Therefore, we seek to ensure maximum reliability for systems recommended by Silkroad on this part by using artificial intelligence and making a public of the learning data and model as transparent as possible.
5. Fair and environmentally friendly systems

One of the most essential values in running Silkroad is the social contribution and environment-friendly operation. While social contribution is a difficult goal to achieve by the system itself, the operation of environmental-friendly systems can be solved within the system. The most problematic thing is the Proof of Work, which is an algorithm for the consensus of blockchains. Since it is designed to get compensation through the activity of mining that is not related to the efficiency of the system, the energy used for mining is wasted energy. In order to compensate for this, there has been an attempt to use the computing power of mining more efficiently than to simply obtain a hash value, but this has not fundamentally solved the mining problem. Even though the Proof of Stake and Proof of Authority presented by another algorithm other than mining accomplished the goal of being environmentally friendly, but the basic ideas of the system which would like to be operated by a democratic and fair procedure were not reflected, because the authority is concentrated on the minority. The Silkroad requires a fair and environmentally friendly system.

However, these systems were not designed to efficiently store large-scale multimedia data. And, fair and eco-friendly values, the values that the Silk coin pursues, were not taken into account. Since the DPoS agreement algorithm allows to give authority to finish the block to only 20 or 21 persons in minority, not only the problem of the delegation procedure but also the problem of concentration of authority on delegated nodes of a small number cannot be considered as a fair consensus algorithm.
(1) Implementation of fast data processing
For fast data processing, the processing speed of each node must be ensured. Silkroad maximizes node performance through native multi-threaded server implementations used in online game servers. The development language officially supported by the Silkroad implementation is C++, which is designed to facilitate thread optimization, multi-core processing, and maximum hardware performance compared with other languages using VMs.

However, since optimizing the performance of each node has a limitation in optimizing the performance of the entire network, Silkroad tries to enhance the data processing speed by improving the network configuration method and the blockchain algorithm.

Most traditional blockchains are implemented in a pure P2P method. Pure P2P network has no central control, and it has a merit that it cannot control the data exclusively because the network is maintained by the voluntary participation of the nodes, but it has a disadvantage in that it slows down due to the process of finding the peer and the propagation speed of participation of the new node. When a new node enters a P2P network, the new node must know the list of P2P members in advance. If the list of existing members is not known in advance, the new node would wander in the wider Internet sea to find other nodes, which represents a huge waste of message costs. What more dangerous is that there is no guarantee that a new node will find an existing node in a short time. Therefore, no one knows when the new node will start. In reality, it is almost impossible to implement a resource discovery algorithm to find an existing node by entering a new node into the network.

Silkroad solves this problem by running a centralized server.
Silkroad maintains a list of each node on a centralized server. And it checks the operation status of the nodes. Therefore, if a new node wants to enter, it should need to know only the communication protocol that can connect to the Silkroad server without knowing the list of existing nodes. Since the Silkroad provides only a list of active nodes, each node can act as a node quickly omitting the query process of the state of another peer. If you are running a central server, it does not take much time to notify other peers of their existence even if it is a new node. This is because the server does the propagation. In this case, even though a new node is connected to many peers in a short time, it can serve as a node. Therefore, it is possible to efficiently allocate resources when considering the whole network, and to eliminate P2P inefficiency.

There is also a network topology that removes the centralized server through the normal peer-to-peer network and the super peer-to-peer network by operating the super peer, which is a higher concept than general peers. It is investigated theoretically possible to combine the advantages of pure P2P and hybrid P2P to eliminate the inefficiency of P2P and to manage the decentralized network. However, the method is not uniform and the complexity of network configuration increases, it is a reality that it operates in a similar way to either Pure P2P or Hybrid P2P in a situation where the control over super peers is not complete. So if you can simplify the network configuration and operate the central server fairly and transparently while maintaining extremely efficient, you can achieve the goal with Hybrid P2P. The Super Peer is also introduced into the Silkroad, but the Super Peer is operated from a slightly different perspective of storage and contribution, not from the viewpoint of network management. This will be described in detail later.

The following table summarizes the methods and advantages and disadvantages of each network configuration.
<table>
<thead>
<tr>
<th>Type</th>
<th>Concept</th>
<th>Characteristic</th>
</tr>
</thead>
</table>
| Hybrid P2P   | Operate P2P networks and centralized servers | ① Very fast routing (one peer is looking for another peer) and searching  
② Search on data in P2P network is guaranteed. |
| Pure P2P     | Operate only P2P networks                    | ① Search for dynamically connected peers  
② Almost impossible to shut down the entire network  
③ As the network grows, the cost is closer to zero. |
| Super Peer P2P | Operate two networks of normal P2P network and a super P2P network | ① All advantages of Hybrid and Pure P2P  
② Network complexity increases and methodology is not established.  
③ In the worst case, all the disadvantages of Hybrid P2P and Pure P2P are exposed. |

The adoption of Hybrid P2P to improve the network throughput speed means that the block of the blockchain, cannot be faded. The central server only keeps a generation cycle can be made faster in the blockchain on average. In Ethereum, it was confirmed that the generation cycle of the block was set at about 12 seconds, which could be propagated to all nodes through various tests. However, if the central server always keeps up-to-date information about the latest transactions and each node knows whether their information is not up-to-date, not only is the propagation rate much faster, but you can also see the fact that the data has propagated to all nodes. Due to the operation of the central server, the guarantee of data integrity and the prevention of loss, which is the advantage list of peers and grasps the activity and performance information of each peer so that the network can operate optimally and just does a role to help the transactions on the network spread quickly, but actually, the place where data is stored that is a block of each node. In other words, each node can process data a little faster with the help of a central server, but generally, the basic data storage method of the blockchain that performs hashing and encryption and adds to the block is the same. Therefore, when the data is falsified and tampered, it can easily detect the forgery through checking the change of the hash value. Since the data is distributed and stored in each node, the whole network can securely store the data even if the data is lost at some nodes. Therefore, even if the central server is operated, distributed processing and data democratization, obtaining consistency of data and loss prevention of data can be enjoyed as the value pursued by the pure P2P blockchain.
(2) Processing Large Data

An ideal storage system should be allowed for accessibility from anywhere and should always be on availability, tolerant to data loss, and capable of providing unlimited performance and capacity for many clients, as well as there should be not required the management. The existing blockchain replicates data so that all nodes have the same data, thereby ensuring data consistency and tolerance to data loss. On the other hand, as the data size increases and the burden of the node increases, it makes the network itself not be able to operate anymore. Therefore, it cannot provide unlimited performance and capacity.

Silkroad does not store data in blocks. In Silkroad, after logical virtual storage is constructed based on the storage provided by each node, then the encrypted file is stored in the logical virtual storage, and the block stores the location and the hash value of the file. Clients that want to access data first check the permissions in the block-chaining system. If the client has the correct authority, it receives the file’s location, hash value, and encryption key, downloads the file, checks the consistency of the file with the hash value, and decodes it to use the file. The procedure for uploading and downloading files is as follows.

**File upload (save)**

- The system configures logical virtual storage on the network based on the storage provided by each node separately from the blockchain.
- Uploaded files are compressed, encrypted and stored in the virtual storage.
- The file is not stored in only one place but is stored in a plurality of storage spaces in anticipation of leaving some nodes.
- The block stores the file storage location, encryption key, and hash value.

**File Download (Read)**

- The user who wants to read the file confirms the right to read the file in the blockchain network.
- If the file authority is verified, the user obtains the file location, hash value, and encryption key on the virtual disk.
- The user downloads the file and confirms the consistency of the file with the hash value.
- Decrypts and decompresses the file and uses the file.
Silkroad virtual disk system is high-availability, block-level storage systems that consist of a collection of network-connected servers that collectively manage a pool of physical disks, and that provide a large abstract container, called a collection of virtual disks for clients. All authorized clients in the network can be globally accessible. The consistency of the file can be verified through the hash value stored in the block so that the forgery and falsification of the file is essentially blocked. Files are encrypted, securely distributed and saved, and files are stored on multiple nodes, so that even if some nodes leave, the files would be not lost. The virtual disk manager manages a certain number of files so that they can always exist on the network by distributively storing the storage held by the leaving node in another active node. This allows us to configure the most ideal storage in a blockchain network and store large files such as image files, video files, sound files, and 3D files through a blockchain to operate the file system without extra cost and management.

(3) Fair and environmentally friendly systems
Silkroad’s data storage system enables saving of large amounts of data. Seeing logically, when voluntary storage providers are sufficient, they can store almost unlimited data, and the storage of data does not cause system performance degradation. Therefore, the storage contribution of the node participants becomes the core of the data system operation, and the system is designed so that the data system can be operated stably by demand and supply by paying a proper price in terms of using the data. Basically, Silkroad is going to give a reward to super peers who are providing data storage with the right to sign and add new blocks. And Silkroad will charge a commission to the entity that uploads the data and the entity that reads the data. By regulating the demand and supply of data storage as a reward and a fee, Silkroad allows providing stable file storage on the system. This consensus algorithm is called a Proof of Contribution and can solve the trade-off between fair and environmentally friendly systems.
This is an environmentally friendly system in that it is a fair system and does not waste computational power that is not related to the efficiency of the network in the sense that the operator of the node contributing much to the network receives more compensation.

(4) Minimization of arbitrary intervention
Democratic and decentralized systems are one of the core philosophies of Silkroad. The introduction of the block chain is an implementation method of this philosophy, and the introduction of a central server is not contrary to this philosophy as described above. Furthermore, Silkroad has introduced artificial intelligence to many parts in order to eliminate human error or human bios and to provide a fair system even in human intervention. The introduction of artificial intelligence minimizes the control of arbitrary data by recommending investment items, recommendation of fashion suitable for oneself, recommendation from purely data point of view by excluding marketing purpose or other intention, as well as it will also help you find more efficient and suitable items. The artificial intelligence of the Silkroad provides a number of other functions for user convenience as well as minimizing arbitrary intervention, which will be explained in a new chapter.
(1) Search for similar images to protect intellectual property rights
Silkroad analyzes the similarity between existing released items and newly registered items to protect intellectual property rights.
Conventional image retrieval or classification was performed based on the text attached to the image. This method has two problems. First, all images should be tagged as text. The other is that it is impossible to analyze the items missing text, and only the formalized items such as price, brand, and color can be analyzed. As the use of digital images exponentially grows, image retrieval taxonomy by text has reached its limit. Therefore, a fashion item in which a visual element is important should be able to be analyzed with the image itself, not the text attached to the image, and the artificial intelligence for image recognition is required for this. The basic method of image recognition is to automatically recognize the area of a product in a given image and to extract each element (color, shape, pattern, pattern, etc.) in the area. And then it is a system to recommend a similar image group through clustering technique after going through the classification process.

1. Object detection
Object Detection refers to performing classification and localization on all categories existed in an image when an input image is given. Since the number of objects existing according to the input image is not constant and it changes from 0 to N, it is known as a task with a high degree of difficulty. Since the goal of the model is to create a model that detects with a bounding box can find out where the object belonging to a certain class is contained in a given image, it is much complicated than a model that classifies whether or not the object of a specific class is included. When a digital image is subjected to object detection, you can see which item is in which position.
Object detection on Silkroads requires a more sophisticated detection model than a general box detection model. This is because it is used in Dress Fitting Room Service as well as the similar image search.

In the case of Dress Fitting Room Service, you can not use a box-shaped image because it requires only objects such as shirts and necklaces in the user-created design image. Therefore, it is necessary to create a model that divides the object into a 'pixel segment (Instance Segmentation)' making out where the object corresponding to a certain class of the given image is included in which position. This is a more difficult problem because it requires more precise location detection than object detection, which displays the location of objects in a box shape. The problem of segmenting into pixels unit is that the performance level is relatively low compared to other problems since the class classification of all pixels must be performed, and the processing time per image of the classification model is very long. However, it is best to assume a segmentation problem and develop a partitioning model to solve the problem, in which it is most important to obtain a sophisticated recognition result of the location of an object.

The existing object detection technologies like CNN, R-CNN, Fast R-CNN, YOLO, and SSD technology cannot obtain data up to the pixel unit. Therefore, By using Mask R-CNN[1] technology to detect objects up to the pixel unit, you can detect the object to the pixel unit. This is an enhanced model of the existing Faster R-CNN, in other words, which is an improved version of Faster R-CNN considering that it has shown a good performance in regard to object detection.

Figure 1. Mask R-CNN Fully Convolutional Network (FCN)
Mask R-CNN is used to create Mask by placing FCN on top of CNN Feature. By placing branches of Faster R-CNN, it is used to output a binary mask that determines if a given pixel is part of the object. The branch is placed on top of the CNN Based Feature Map as an FCN, just like the previous layer. The input is to be the CNN Feature Map, and the output is called a binary mask with a matrix made of 1, 0 (if the pixel is contained in the object, it is 1, not zero).

Figure 2. Mask R-CNN Fully Convolutional Network (FCN)
In order to create an image made by pixel unit, a more sophisticated alignment is required than the box shape, so that the area of the selected feature map is more precisely aligned with the original image area by passing the RoIAlign filter instead of the RoIPool of the existing Faster R-CNN. If you want to create a feature map to apply the original image to RoIAlign, you have to proceed as follows.

Assume that there is an image of 128×128 size, the size of the feature map is 25×25, and that a feature corresponding to the area consists of 15×15 pixels on the upper left of the original image is desired.

Given that pixels of each Feature Map are mapped to a ratio of 25/128 to the original image, if we select 15 pixels from the original, we will select 15 * 25/128, in other words, it's 2.93 pixels. In RoIPool, we drop the below decimal point and select 2 pixels in this 2.93 pixels, which causes some decimal error (misalignment). However, RoIAlign uses 2D bilinear interpolation to determine exactly what the figure called 2.93 means. Once the masks are created, the Mask R-CNN merges with the classification and bounding boxes generated from the Faster R-CNN to show the exact pixel unit partition as shown below.

Figure 3. Instance Segmentation
By using feature amount extraction and learning technology like Mask R-CNN, it is recognized in a pixel unit of objects occurred in a design and it is used for the search technology of similar image, the image annotation technology, and the Design Fitting Room Server.


2. The similar image searching

If we let consider the image similarity with the existing image recognition method, it shows the result like 'white car', 'yellow car' for the input query image because it is considered only the precision of the class-level. Therefore, it is not suitable for the characteristic of the Silkroad which is supposed to extract the object area in pixel units because the existing image recognition method could not extract the area of the object precisely. If you use the DeepRank model utilizing artificial neural networks appeared after then, you would use for this way when you can build the Similarly Model or identify similar images for the query images. However, if you use this method, it leads to increase the time complexity due to learning the Similarly Model, and it is not suitable to use the input data because the data type called Triplet Dataset needs to be newly processed.

Similar image retrieval (Image Similarity) is performed for each detected object like this. It can extract how much the similar shape has or how much the similarity is between the two images through comparing the extracted feature (detection of region of interest) by searching, identifying, reading, and recognizing the pattern of the image. It is possible to determine whether the items in the images are the sameness or not according to the degree of proximity of the similarity.

In the case of the similar image retrieval using DeepRank, which is an existing image recognition method (Image Classification), and it is not possible to extract only the accurate object region because it is considered only the class-level precision. And it is not suitable for use in comparing a number of images because the time complexity arises in constructing the Similarly model. In other words, it is not suitable to measure the feature map in pixel units generated by object detection.
Therefore, in Silkroad, we use the method of measuring the distance between two images by using the feature map extracted through the object detection. In order to compare the similarity between images, the distance between the matrix representing two images is measured. Manhattan Distance (L1 Distance) and Euclidean Distance (L2 Distance) are widely used for this work. We use the Euclidean Distance method, which calculates a more intuitive and understandable distance.

Euclidean Distance is a formula for finding the shortest distance between two points in an n-dimensional space. If let’s say that there are two points in two dimensions consisting of x-axis and y-axis and you want to calculate the distance between these two points, it is done easily by using Pythagorean definition. However, since it is not easy to measure the distance of two points in multi-dimensional coordinates, a way that applies to this calculation after you generalized the number of dimensions is the Euclidean distance formula. That is, the Euclidean distance formula is represented as an n-dimensional for the number of dimensions in the distance measurement method using the Pythagorean theorem. When the two points P and Q have coordinates of P = (p1, p2, p3, ...... pn) and Q (q1, q2, q3 ... qn), the Euclidean Distance formula for calculating the distance between two points is as follows:

\[ L_2 = \sqrt{(p_1-q_1)^2 + (p_2-q_2)^2 + \cdots + (p_n-q_n)^2} = \sqrt{\sum_{i=1}^{n}(p_i-q_i)^2} \]

Figure 4. Euclidean Distance

The Euclidean distance obtained here can be slightly modified to normalize it to have a value between 0 and 1.

\[ Normalized \ L = \frac{1}{1 + L_2} \]

Figure 5. Euclidean Distance
Using the Euclidean Distance, the normalized distance value converges to 0 when the Euclidean distance is farther, and converges to 1 in the opposite case. This makes it easy to compare the degree of similarity of Feature Map between two images. If a certain value is determined as a threshold value among the real numbers between 0 and 1 and the similarity of the image is determined based on the threshold value to extract a similar image, you can check the similarity between the product that was released on the market and the item you want to register, and it is possible to eliminate the risks that may arise due to the intellectual property rights problem in advance by using this way.

(2) Virtual Dress Fitting Room Service
One of the barriers to online product purchasing is the problem of returning unsatisfactory or inappropriate products, and more than 30% of actual online product sales are returned, which is costly and time-consuming. According to Walker Sands's 2015 report [1], it was reported statistics that 35% of customers would use more of their online product purchases if they were able to experience the product virtually, rather than simply viewing the image. These statistics suggest that consumers are more likely to buy if they are satisfied with the online product they are buying, and that the provider does not have to provide delivery incentives for returns. That is, as the buyers can 'experience' the online product individually, thereby reducing the cost and time spent on the return of the online product.

In order to solve the above problem, Silkroad provides a design fitting room service that converts design products to 3D and enables to wear the products to the avatar (individual body).

When investing in fashion items made by fashion designers, consumers do not simply look at only the fragmentary image of the product, but instead try to apply the product converted as a 3D image directly to the avatar. Therefore, it enables users to do investment reliably through the fit of the product fitted to the feeling of actually wearing the product according to the various avatars bodies configuration.
In a virtual dressing room simulation, the physical structure does not need to be applied when moving, so it is regarded as a static object. A dress or apparel item is considered to be dynamic because a virtual 3D costume object needs to show naturally to the display when tracking the user’s position, orientation or movement. In the case of the existing virtual fitting, since the augmented reality (VR) is used, the physical structure in which the equipment to scan the user and the augmented reality device should be applied. As it takes up physical space, which can cause problems with location and cost, it cannot be used online, and there are problems that must be used in actual stores.

It is too complicated to track the user’s motion, location, and direction. We solve this through image processing. The image processing technology is required in order to provide Design Fitting Room Service. Image processing technology refers to all types of information processing that input and output are images. Most image processing techniques refer to the image as a two-dimensional signal and apply a target signal processing technique to it.

If you would like to reconstruct into 3D images with 2D single images (design) uploaded by fashion designers, we use the example based 3D reconstruction from single 2D image proposed by Tal Hassner [2] et al. and we have restricted the reconstruction process for objects that have a shape similar to a single class (eg, hand, person). The depth of an object is estimated by searching a pixel intensity pattern similar to an object using a database of an object including a single class that can be mapped from the exterior to the depth of each object.

![Figure 6. 2D Single Image Deep Search](image_url)
After that, we need to use a virtual dress-up system using the image transformation technique proposed by Kim Nari et. al.[3] in order to try to dress up the avatar with the 3D reconstructed design. In the preprocessing process, it goes through the process to extract the design rebuilt in 3D and the alpha map image of the avatar by using the SoftScissor tool proposed by JueWang et.al.[4], and then if extracting the design and the alpha map of the avatar, it goes through the process to separate the boundaries of the image.

![Figure 7. Alpha map extraction](image)

Next, if you try to store the mapped information between the design and the avatar using the skeleton structure, it is mapping in a form suitable for the design and the avatar by moving the coordinates of each joint.

Through this first transformation phase, you can get a roughly modified design result similar to the avatar's body shape. However, the boundary between the clothes and the model does not fit well, which can be shown as an unnatural result. In order to solve this problem, you have to go through a second transformation phase using the boundary information of clothes and model.

In the second transformation phase, if you want to fit the boundary shape of the design and the avatar properly, you need to find out to match each point of the design mesh to which point on the boundary of the avatar by using the boundary information and skeletal structure information obtained from the alpha map. Then, when it comes to the boundary points of clothes and model, you have to make the points that are found to be matched to each other as a set of matching points, and for this set of matching points, you have to check whether the matching points have been found properly. And then you remove it if there are the mismatched points, and you have to find the optimized fitting results like that way.
By running the Design Fitting Room service, which is completed through the above techniques, it is possible to reduce the consumption of cost and time of the consumers and suppliers occurring in the online product sales on the Silkroad, and the consumers will be able to maintain a reliable investment by putting the designed product on the avatar.

(3) Recommendation

Artificial intelligence is used extensively in the recommendation system of specific information by learning from the data itself and calculating the optimum value to derive the prediction or the best result. The fashion field, which is aiming for a new creation, is accompanied by technological limitations to think of new things with only the past information. In order to solve these problems, technology for recommending customized contents is developed by analyzing personal taste or interest of users. Artificial intelligence technology for users of Silkroad platform applies deep-learning technology to fashion items to offer more rational and scientific products to investors (buyers, consumers, etc.).

Silkroad’s artificial intelligence engine learns and reflects itself by searching online (portal, SNS, news, etc.). Using the individual NEEDS set by the investor as the base data, the personalized artificial intelligence service can obtain the optimized result through the new algorithm.

Silkroad AI aims to increase the convenience of consumers through the formation of a virtuous cycle structure that increases the diversity of creative contents of producers, the scale of investment, and the user satisfaction. And because of the automated personalized contents service of Silk coin artificial intelligence, it is going to contribute to increasing the convenience of consumers.

The recommended algorithm technology of the Silkroad uses various models and techniques such as the analysis using CNN, RNN, and reinforcement learning. One noteworthy technique is image tag technology.

Image tag technology is a technique to convert images to text. Image caption input system is designed based on the deep learning algorithm with CNN + LSTM.

$$\theta^* = \arg \max_{\theta} \sum (I, S) \log p(S|I; \theta)$$

$$\log p(S|I) = \sum_{t=0}^{N} \log p(S_t|I, S_0, \ldots, S_{t-1})$$

Mathematization
Given a high probability value when a picture is given as an input, a caption is generated. 'I' denotes the input of the image, and 'st' denotes the t-th word of the sentence S. The input of the image means CNN's feature map and object information extracted through object detection. In addition, LSTM of each decoding area is used to predict vocabulary and generate words. In addition, the Merge layer is configured for accurate image caption to temporarily store the object information. In this area, more precise sentence generation is possible by taking into consideration all of the object information entered as input in the encoding area. The main object used in the subject of the sentence first comes in as input, but this role is that it doesn't make lose its contextual meaning even if placed in the final structure of the sentence.

The feature vector of the input has divided the image into regions by Deep CNN, and each region is recognized according to the edge of a specific object that can be detected. LSTM is the first input to generate words representing each object, and the system arranges the words with appropriate captions in the image and it is evaluated as performance index BLEU (Bilingual Evaluation Understudy) / METEOR. Through these techniques, each element can be extracted and classified in numerous images, and user-customized information can be provided through the clustering technique.
07. Tech Part

04) Fashion Trend Forecast

The problem with predicting fashion trends is the lack of existing data and the constantly changing world. We must balance the knowledge we already know and the areas we have not yet investigated. In other words, in an ever-changing environment, it becomes important to analyze the trends in real time, and to designate how to set the weight of trade-off relations with on-line execution and non-surveyed areas that can reflect them immediately. In order to solve this problem, we adopt the multi-armed bandit algorithm, which is a core concept of reinforcement learning, to predict trends.

1. Multi-armed Bandit Algorithm

- A set of environmental conditions, \( S \);
- Behavior set, \( A \);
- A set of rewards (\( \subseteq \mathbb{R} \))
- At each point in time, the agent ‘t’ has its own state and \( st \in S \), and possible actions \( A(st) \).
- The agent takes an action \( a \in A(st) \) and receives a new state \( st+1 \) and reward \( rt+1 \) from the environment.
- When the terminal state exists, the accumulated rewards value \( R \) is maximized, and the closer to the end state, the less the exploration and the much focusing on the exploitation.

\[
R = r_0 + r_1 + \cdots + r_n = \sum_{t=1}^{n} r_t
\]

- If there is no exit status, multiply the discount rate \( \gamma \) to see how much future rewards are worth to the present.

\[
R = \sum_{t=1}^{n} \gamma^t r_t
\]

2. Evolution of Multi-armed Bandit Algorithm

- epsilon-Greedy: Some of the users are sent with the known best plan in the past to utilize it, and the others are re-branched to perform the traditional A/B testing to see if there is a new optimal solution.
- Softmax: Algorithm that gives weighed values more to users on the better side of performance based on the performance so far.
- Softmax + Temperature + Annealing: A method of lowering the expedition rate by gradually lowering the "temperature" over time.
- UCB1: In addition to what has been known up to now, as well as calculating together how much experimentation has resulted in what is known (ie, how certain it is), the way to do more exploration on the less obvious side.
- Customized Multi-Armed Bandit: Customized Multi-Armed Bandit algorithm is applied to the recommendation system as the algorithm is modified for the fashion service of Silk coin.

![Multi-armed bandit strategy performance (SLKRod bandit)](http://math.arizona.edu/~gabitov/teaching/181/math_485/Final_Report/Multi_Arm_Bandit_final_report.pdf)

Source:

http://math.arizona.edu/~gabitov/teaching/181/math_485/Final_Report/Multi_Arm_Bandit_final_report.pdf

Therefore, the automated personalized content service of Silk coin’s artificial intelligence will contribute to increase diversity of contents and increase convenience of consumers.
07. Tech Part

05) Conclusion

The fashion industry is an absolutely large in scale and rapidly growing industry. Since the industry is moving online, online business in the fashion industry has unlimited potential. The nature of the fashion industry can be a good business opportunity to build a vibrant ecosystem if it can provide a platform for collecting and communicating each segmented activity in one place. The entities to participate in Silk Coin are designers, investors, producers, and consumers. The Silk Coin provides additional services such as marketing, legal advice, etc., to help the ecosystem and system run smoothly by building a cycle of planning, investment, production, logistics, and sales through the platform.

In order to construct this system, a reliable data system is required. If you want to establish a system such as the fast and stable transaction, the prevention of arbitrary intervention, environment-friendly and fair system, it cannot be solved by existing technology. Therefore, the system can be built through technical methodology suggested by Silk Coin. To this end, Silk Coin builds a system through hybrid P2P network including super peer, virtual distributed storage, agreement algorithm of Proof of Contribution, artificial intelligence through deep learning, and 3D visioning.
08. Silkroad Token Model

Silkroad is designed for online investment, reward and offline merchants. In particular, the company aims to maintain a level of tradeable variation until market stabilization in order to control deflation caused by the sudden rise in the value of SLK coins in each cycle, such as season-off for each season.

1) Method of obtaining SLK
(1) SLK coins can be purchased through cryptocurrency exchange.
(2) SLK coins can be obtained as compensation for activities and marketing contributions within the silkroad platform.
- Fashion brands offer different rates of initial investment based on user participation for fashion items posted on the silkroad platform and activities such as cheering/post/SNS sharing/ multimedia content production.
- Users will be divided into investors, content creators, and response users, who will acquire SLK coins according to the impact of their activities in each area.
(3) When profit is allocated for investment in fashion items, distribution is acquired through SLK.

2) How to use SLK coin
(1) Users who want to see and wear a sample of designs (online) fashion designers can invest in crowdfunding. (However, the trade will not take place until the investment conditions are met by the designer.)
(2) (Online) fashion items offer a price for the volume sold during a season, and users can invest in the items they want to secure their stakes.
(3) It can be used in showrooms made in silkroad and in clothing stores across the country that are traded for affiliates.
(4) When a buyer negotiate with a fashion brand to make a trade deal, the buyer uses the money as a SLK coin.

3) SLK Coin Inflation
The SLK Coin will begin with 10 percent inflation in the first year after the initial token sale and will lower the inflation rate for five years to 30 percent from the previous year. Then '28 will be fixed at 0.5% inflation.

The SLK coins used in real-life transactions are expected to stabilize inflation at a faster pace than other codes. This implies that, within at least five to 10 years after initial token sales, the entire volume of tokens operating within the platform does not exceed customer demand growth, resulting in new tokens being issued without the platform being issued to reward user activity.
4) Silkroad Escrow Policy

The Silkroad Platform will provide escrow policies to raise trust between investors and fashion brand companies and establish a stable trading environment so that the necessary funds for each sector and each item can be appropriately distributed and consumed. Minimize the loss rate of investors through investment return measures.

A guide will be provided for fashion brands that can think about investment items and ratios, and professionals and costs can be created through channels such as corporate consulting.

The escrow policy has the effect of minimizing the risk even when security problems arise due to the separation of funds by sector into independent wallets.

(1) Escrow policy for compensatory investments
The escrow policy in which an investor receives compensation for clothing and the fashion brand produces the corresponding volume automatically generates independent Wallet according to the items and order in which the investment is allocated according to each item established by the fashion brand to be produced.

If the process fails to start or is interrupted by an issue, the transaction will be cancelled in the order and the investment will be returned to the Wallet in SLK Coin.

Example of using escrow Wallet by area for compensatory investment
(2) Escrow policy for profitable investments
The items necessary for a fashion item to realize profits in the market are made from Wallet and the SLK Coin can be moved from Wallet to be used as a fund for each necessary step in the same process as the reward type.

These activities of the fashion brand can be checked by investors from time to time, and cheering is possible.

The same escrow policy applies equally to the investment and delivery of buyers and fashion brands, creating a foundation on which both companies can trust and trade.
5) Customer and fashion brand rating standards

A user with an activity log is defined as a user and the rating system is operated as follows:

(1) Investors and Users Rating System

A user with an activity log is defined as a user and the rating system is operated as follows:

<table>
<thead>
<tr>
<th>Rating</th>
<th>Rating ratio (Full User Contrast)</th>
<th>Investors (based on transaction and transaction amount)</th>
<th>General user (Number of contents)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Compensated type</td>
<td>Profitable type</td>
</tr>
<tr>
<td>A Class</td>
<td>Top 5%</td>
<td>More than 50</td>
<td>More than 50,000</td>
</tr>
<tr>
<td>B Class</td>
<td>15%</td>
<td>More than 25</td>
<td>More than 25,000</td>
</tr>
<tr>
<td>C Class</td>
<td>30%</td>
<td>More than 15</td>
<td>More than 20,000</td>
</tr>
<tr>
<td>D Class</td>
<td>60%</td>
<td>Less than 5</td>
<td>Less than 10,000</td>
</tr>
</tbody>
</table>

Period: First quarter (4 months), unit: KRW 1000

(2) Fashion brand rating system

<table>
<thead>
<tr>
<th>Rating</th>
<th>Rating ratio (Overall Brand Contrast)</th>
<th>Transaction type</th>
<th>Compensated type (Based on transactions)</th>
<th>Profitable type (Based on investment amount)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Class</td>
<td>Top 10%</td>
<td></td>
<td>More than 1,000</td>
<td>More than 50,000</td>
</tr>
<tr>
<td>B Class</td>
<td>20%</td>
<td></td>
<td>500</td>
<td>More than 25,000</td>
</tr>
<tr>
<td>C Class</td>
<td>70%</td>
<td></td>
<td>Less than 100</td>
<td>Less than 10,000</td>
</tr>
</tbody>
</table>

6) Profit Model of Silk Coins Through Platform Business

(1) Mass purchasing to distribute fashion income of investors

In the case of a profitable investment, the fashion brand has a legal obligation to distribute profits to investors, and the form of distribution can only be paid out with a SLK coin. As a result, the brand has to buy large amounts of coins at stable market prices, so the platform will provide it and generate revenues accordingly.
(2) Profit with high-quality, high-efficiency production lines

In order to maintain high quality in the production of fashion items, it is recommended to produce at the platform designated factory, and the platform will invest directly in the production and processing process to generate profit.

(3) Transit fee

The platform, in cooperation with our non-base, on-off-line distribution channel, supports distribution in various forms such as pre-planned or entry points and generates revenue by generating fees from the revenue of fashion items.

(4) Marketing commission

The same level of marketing as that of large fashion brands is created through joint marketing rather than a single brand, and marketing costs are created by fashion brands paying commissions jointly to generate agency commission income.

(5) Revenue from direct investments

Silkroad continues to invest in fashion items of potential fashion brands and generates profits in the same manner as other investors.

(6) Transaction fee

All transactions on the Silkroad platform are subject to commissions, and the commission policy is based on the number of users, the total transaction volume, and the amount of money, thereby generating revenue.
09. Roadmap

A number of project, business, sales, technology providers and basic service providers and investors will join the Silkroad platform in 2018.

07 2018
- Startups meet with developers to start building distributed applications and web platforms.
- White papers are available in both English and Korean.

08 2018
- Define backend structure and initial development of Silkroad platform
- Initial development of UI design and application and web site platform
- Team Building (block chain developers, front-end developers, back-end developers, sales and marketing staff, iOS and Android developers)

09 2018
- 1st pre-sales service for 6 weeks (10% of total issued) early completion date of 10-10 days in 2018.

11 2018
- Start developing Silkroad platform

12 2018
- Start community beta testing
  - Scheduled to be listed on the exchange
  - Contact from crowdfunding company

05 2019
- Start the Silkroad service and conduct marketing
- Initiate industry promotion to develop partnerships with major fashion industries
- Attracting corporate investment
- Promote Silkroad and secure supplier (designer)
- Composition of domestic distribution network
- Building a block chain system
- BtoB and BtoC transaction system establishment
- On-off line store addition

~2020
- Additional development of platform for February and large-scale update for Silkroad V.2 launch.
- Overseas expansion plan
10. Token Sales

In 2018, a number of project, business, sales, technology providers, and basic service providers and investors will participate in the Silkroad Platform.

01) Token Sale Supply

<table>
<thead>
<tr>
<th>Rotation</th>
<th>Issued Price</th>
<th>Quantity</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>The first pre-sale</td>
<td>1ETH=50,000 SLK</td>
<td>1,500,000,000 (10% of total issue volume)</td>
<td>2018-09-03~2018-10-22 (End 2018-10-10)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Issued Coins</th>
<th>15,000,000,000 SLK</th>
</tr>
</thead>
<tbody>
<tr>
<td>How to pay (purchase)</td>
<td>Ethereum(ETH)</td>
</tr>
<tr>
<td>Coin issue price</td>
<td>The first : 1ETH=50,000 SLK</td>
</tr>
<tr>
<td>Min Exchange Quantity</td>
<td>1 ETH</td>
</tr>
<tr>
<td>Hard cap</td>
<td>60,000 ETH</td>
</tr>
<tr>
<td>Soft cap</td>
<td>18,000 ETH</td>
</tr>
</tbody>
</table>

The above schedule and ratio may be changed according to company policy. If softcap (18,000 ETH) is not reached, the coins sold will be refunded. If hardcap is achieved, any ICO participation application made after that point will be rejected and the participating Ethereum (ETH) will be returned to the Participant.

Token distribution

- Marketing: 30%
- Team rewards: 10%
- Social contribution: 10%
- Social Mining: 25%
- Presales: 10%
- Private Sale: 15%

Cost distribution

- Development cost: 40%
- Operating expenses: 20%
- Marketing expenses: 20%
- Partnership / Consulting: 10%
- Legal advice: 5%
- Reserve expenses: 5%
- Operating expenses: 20%
- Marketing expenses: 20%

SILKROAD
02) Token distribution
The issue of the silk coin represents 25% of the total initial volume. Of the remaining 75 percent tokens, 30% will be used, including the activation of the silkroad and partnerships, and 25% will be allocated to compensation (social mining) for all activities of designers and users used within the Silkroad platform.

03) Participation procedure and method
Silkroad coins are made through ethereum Smart Contact. Accordingly, participants send the ethereum deposited in their electronic wallet to purchase the SLK coin and As a result, the SLK coin is acquired through automatic transmission to the above electronic wallet. Further details on the purchase procedure and methods of SLK coins are provided to participants through the website, etc.

04) Plan of use of SLK coin sales
The sales of SLK coins (ethereum) acquired from participants through the sale is intended to be used for the following purposes:

<table>
<thead>
<tr>
<th>purpose</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform research and development</td>
<td>Silkroad platforms require a variety of technological evolution throughout the fashion industry. The main items of platform research/development currently planned by the silkroad are as follows: 1) A continuous study/development of the &quot;formative solution&quot; of the product item image uploaded by customers 2) Machine development algorithms of various structured and unstructured data generated within the customer community 3) Improving the platform's continuous UI/UX to match rapidly changing customer characteristics</td>
</tr>
<tr>
<td>Server management, operations</td>
<td>As hardware and security technologies evolve, architectures should be modified flexibly to provide the best performance and service to customers using the platform. Implementing and managing the ecosystem of the silkroad through the development of mainnet</td>
</tr>
<tr>
<td>Partnering</td>
<td>In order to ensure stable growth and decentralization of the silkroad, attracting key partners in the early days of platform launching and securing customers are key. Therefore, various domestic and foreign partner companies are planning to participate in the platform actively.</td>
</tr>
<tr>
<td>Marketing and Operational Funds</td>
<td>In order to quickly establish the silkroad platform, various users of other platforms such as 'Instagram', 'Youtube', and 'blog' must be newly secured and established. In addition, efforts to foster fashion designers and create jobs should be made to expand the strategic business through offline content production.</td>
</tr>
<tr>
<td>O2O Service</td>
<td>It is planning to expand infrastructure of fashion companies by establishing showrooms, hosting designer fashion shows, and offline support centers.</td>
</tr>
</tbody>
</table>
05) Policy and caution

ICO Participants should be fully aware of the following and decide to purchase tokens.

1) Risk and uncertainty
The white paper is a description of the business plan and vision, and is not a guarantee of business contents. ICO participants should be fully aware that actual business progress may differ depending on the business environment and progress.

2) ICO participation restrictions
Participants in countries where ICOs are prohibited cannot participate in the ICO. ICO Participants have legal responsibility for their participation in the ICO.

3) Language
The original language of the white paper is written in both Korean and English. In the case of white paper in other languages except for two languages, there is a possibility of misinterpretation or omission in the translation process. For the prudent participation of ICO, the final confirmation of the original white paper written in Korean and English is recommended.

4) Description of SLK coin
SLK coins cannot be used for purposes other than those described in white papers. A SLK coin is not a security, and a SLK coin holder is not given any kind of dividend or voting rights.

5) Cancellation and refund
Participants cannot request cancellation or refund of purchased SLK coin.

06) Risks to be considered by participants

Silk Coin participants should be aware that the following risk factors exist in relation to the development of the Silkroad platform, the construction and operation of the ecosystem, and decide whether to purchase silk coins.

1) Risks related to blockchain technology and industry
   Government policies and regulations for blockchain technology and related projects are not yet clear, and all or some of the construction and operation of the Silkroad platform and ecosystem may be limited or prohibited depending on the content and scope of government policies and regulations.

2) Risk related to ICO participation
   Participation in the ICO may be prohibited or subsequently banned in accordance with the participants' national policy.
11. Team

LEADER

Gihong, Yang
CEO, CO FOUNDER

Sang Hyun, Eom
COO

Do Jin, Lee
Project Leader

PLANNING DEPT

Ji yu, Kim
GENERAL MANAGER, PLANNING DEPT

Allen, Jung
TEAM LEADER, PLANNING DEPT
Corporate alliance, BIZ model planning, business promotion, organization management

Emily, Ju
PLANNING DEPT
Silkroad platform website planning, On-line business Strategy planning
DESIGN DEPT

Jinyoung. Youm
CHIEF, DESIGN DEPT

SangWoong. Lee
TEAM LEADER, DESIGN DEPT

Serena Min
DESIGNER

Hyukin Kwon
TEAM LEADER, PUBLISHER

Sujin Lee
PUBLISHER
MARKETING DEPT

Younghun, Choi
Head of Marketing
Establish marketing strategy

Bora Kim
MARKETER
Corporate promotion and operation management, Perform marketing business in China

Minhee Kim
MARKETER
Domestic online marketing (SNS) Channel charge

Polina, Gozdetckaia
MARKETER
Overseas Online Marketing (SNS) Channel charge

DEVELOPMENT DEPT

Jake H. Kim
CTO

Taekyoung, Lee
Director
Block Chain Development

SeongJin Kim
Director
Financial security expert
Jack. Eom  
TEAM LEADER, DEVELOPER  
FRONT, JAVA

Kwangjae. Choi  
DEVELOPER  
FRONT, JAVA

Min Young Kim  
DEVELOPER  
Data Scientist, AI  
Silkroad Product Data Collection

Seonghyun. Kang  
DEVELOPER  
Data Scientist, AI  
Pattern analysis development

Jihoon Yoo  
DEVELOPER  
Data Scientist, AI  
Pattern analysis development

Total TEAM personnel status (2018-10-22)

<table>
<thead>
<tr>
<th>Assigned task</th>
<th>Number of persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>2</td>
</tr>
<tr>
<td>Planning</td>
<td>4</td>
</tr>
<tr>
<td>Design</td>
<td>5</td>
</tr>
<tr>
<td>Development</td>
<td>8</td>
</tr>
<tr>
<td>Marketing</td>
<td>4</td>
</tr>
<tr>
<td>General management</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

In the future, the team workforce may change as needed.  
We plan to hire additional personnel.