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SYSTEM AND METHOD FOR PROVIDING SECURE BNPL FOR B2B

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TITLE: “SYSTEM AND METHOD FOR PROVIDING SECURE BNPL FOR B2B”

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TECHNICAL FIELD

[001] The present subject matter relates to a field of credit facility, more particularly, but not exclusively to a system and method for providing secure BNPL for B2B.

BACKGROUND

[002] Presently, there is a significant rise in businesses for bad actors/frauds who pretend to be either part of a real business or try to take over email addresses or hack elements of a company's infrastructure to apply for lines of credit. Further, in order to extend Buy Now Pay Later (BNPL) for Business-to-Business (B2B) may take months. Extending the BNPL for B2B goes through multiple cycles of verification and evaluation. Further, it is hard to gauge how reliably a business may pay off its loans and is hard to introduce the BNPL option for the B2B.

[003] Further, suppliers often do not receive payments until 30-60 days even after sending an invoice for services provided by them. This makes it difficult for small businesses/merchants, which often run with minimal working capital buffers, to manage cash and minimum liquidity thresholds needed to operate. Along with late fees, the small businesses/merchants face difficulty in identity verification. Currently all retail, manufacturing and marketplace businesses (B2B) have suffered revenue losses because of fraud, with an average of 3.5% of their annual sales lost from selling to fraudulent businesses. Thus, there is a need for providing secure BNPL method for B2B transactions.

[004] The information disclosed in this background of the disclosure section is only for enhancement of understanding of the general background of the invention and should not be taken as an acknowledgement or any form of suggestion that this information forms the prior art already known to a person skilled in the art.

BRIEF DESCRIPTION OF THE DRAWINGS

[005] The accompanying drawings, which are incorporated in and constitute a part of this disclosure, illustrate exemplary embodiments and, together with the description, serve to explain the disclosed principles. In the figures, the left-most digit(s) of a reference number identifies the figure in which the reference number first appears. The same numbers are used throughout the figures to reference like features and components. Some embodiments of device

or system and/or methods in accordance with embodiments of the present subject matter are now described, by way of example only, and with reference to the accompanying figures, in which:

[006] Figure 1 illustrates a sequence diagram for sharing digital ledger using federated blockchains for providing secure BNPL for B2B, in accordance with some embodiments of the present disclosure;

[007] Figure 2 illustrates a sequence diagram for uploading documents at the federated blockchain network for providing secure BNPL for B2B, in accordance with some embodiments of the present disclosure;

[008] Figures 3a-3c illustrate sequence diagrams for providing secure BNPL for B2B, in accordance with some embodiments of the present disclosure;

[009] Figure 4 disclosure an exemplary environment for providing secure BNPL for B2B, in accordance with some embodiments of the present disclosure; and

[010] Figure 5 illustrates a block diagram of an exemplary computer system for implementing embodiments consistent with the present disclosure.

[011] The figures depict embodiments of the disclosure for purposes of illustration only. One skilled in the art will readily recognize from the following description that alternative embodiments of the structures and methods illustrated herein may be employed without departing from the principles of the disclosure described herein.

DESCRIPTION OF THE DISCLOSURE

[012] In the present document, the word "exemplary" is used herein to mean "serving as an example, instance, or illustration." Any embodiment or implementation of the present subject matter described herein as "exemplary" is not necessarily to be construed as preferred or advantageous over other embodiments.

[013] While the disclosure is susceptible to various modifications and alternative forms, specific embodiment thereof has been shown by way of example in the drawings and will be

described in detail below. It should be understood, however that it is not intended to limit the disclosure to the particular forms disclosed, but on the contrary, the disclosure is to cover all modifications, equivalents, and alternative falling within the spirit and the scope of the disclosure.

[014] The terms “comprises”, “comprising”, or any other variations thereof, are intended to cover a non-exclusive inclusion, such that a setup, device, or method that comprises a list of components or steps does not include only those components or steps but may include other components or steps not expressly listed or inherent to such setup or device or method. In other words, one or more elements in a device or system or apparatus proceeded by “comprises… a” does not, without more constraints, preclude the existence of other elements or additional elements in the device, system, or apparatus.

[015] The terms "an embodiment", "embodiment", "embodiments", "the embodiment", "the embodiments", "one or more embodiments", "some embodiments", and "one embodiment" mean "one or more (but not all) embodiments of the invention(s)" unless expressly specified otherwise.

[016] The terms "including", "comprising", “having” and variations thereof mean "including but not limited to", unless expressly specified otherwise.

[017] The present disclosure discloses a method and system for providing secure BNPL for B2B. Currently, there is significant rise in number frauds by hacking emails or pretending to be a part of real business in order to apply credits/loans. Further, risk of loaning/frauds becomes double when it comes to extending BNPL for B2B transactions. To overcome the above problems, the present disclosure provides a secure BNPL for the B2B using federated blockchains and Artificial intelligence (AI). The present disclosure provides shared digital ledger using federated blockchain. That is by using shared digital ledger, participants can see history and transfer of assets and therefore the present disclosure is able to identify fraudulent transactions easily. Further, the present disclosure provides secure BNPL using Deep Learning the present disclosure performs data pre-processing and feature engineering. Further, the present disclosure analyses business using machine learning models. Thereafter, the present disclosure performs BNPL amount prediction using neural networks and regression. Thus, the present disclosure prevents frauds and provides loaning for secure BNPL for B2B.

[018] Figure 1 illustrates a sequence diagram for sharing digital ledger using federated blockchains for providing secure BNPL for B2B, in accordance with some embodiments of the present disclosure. Initially, a business/merchant is registered on a federated blockchain network. In an embodiment, the federated blockchain (also known as consortium blockchain) requires pre-authorization of a user for access unlike public blockchain. The federated blockchain allows only participants and approvers to access it and thus, prevents bad actors/fraudulent or untrusted users from accessing the federated blockchain. Further, information related to the business/merchant is added on the federated blockchain network. The information includes, but is not limited to, transaction made, loan paid out information/data for the business/merchant and the like. Thereby, by adding this information on the federated blockchain network, participants can see history and transfer of their assets.

[019] Figure 2 illustrates a sequence diagram for uploading documents at the federated blockchain network for providing secure BNPL for B2B, in accordance with some embodiments of the present disclosure. In Figure 2, the business/merchant uploads documents on database and is approved by an approver indicating if the documents are legitimate. Further, the documents are stored on Interplanetary File System (IPFS). The IPFS is a file sharing system that can be leveraged to more efficiently store and share large files. Further, the IPFS returns a document hash, the document hash is a smart contract which is stored on the federated blockchain network. The document hash element supplies a hash value of the documents/file. The document hash is a smart contract utilized by seller and buyers during transactions and services. The smart contracts are executed on the federated blockchain network, which means that the terms are stored in a distributed database and cannot be changed. Transactions are also processed on the federated blockchain network, which automates payments. Thereby, the present disclosure uploads the business/merchant documents on the federated blockchain network and identifies theft using the federated blockchain network.

[020] Figures 3a-3c illustrate sequence diagrams for providing secure BNPL for B2B, in accordance with some embodiments of the present disclosure. Figure 3a shows procedure for data pre-processing and feature engineering for secure BNPL. Initially, a prediction system 401 (shown in Figure 4) extracts untampered data from a federated blockchain network 402 (shown in Figure 4). In an embodiment, the untampered data is the document that is uploaded at the

federated blockchain network (as shown in Figure 2). Upon extracting, the data is pre-processed for feature extraction. The features may include, but is not limited to, credit score, spending factor, Debt-to-income ratio, valuation of the business, loan purpose and the like. Further, the prediction system 401 calculates feature importance and feature selection using Extreme Gradient Boosting (XGBoost) ML model. Upon calculating, the prediction system 401 analyses the business/merchant using the ML as shown in Figure 3b. In Figure 3b, the extracted features are fed into an Ensemble Machine learning model to predict default probability of the business. Simultaneously, to analyse sustainability of the business domain, prediction system 401 performs web scraping and get sufficient data from trusted sources about the business domain. Further, the prediction system 401 utilises Latent Dirichlet Allocation algorithm to extract topics and sort the best relatable articles. Further, the prediction system 401 utilises Bidirectional Encoder Representations from Transformers (BERT) model to understand context of different business domains and use the model to analyse list of the articles and predict the sustainability of the business. BERT is an open-source machine learning framework for Natural Language Processing (NLP). In an embodiment, neural networks utilised by the prediction system 401 can be trained using existing business models and BNPL amounts. Thereafter, the neural networks can be used to determine loan amounts which can be given with the BNPL model. Figure 3c, shows prediction of the loan amount, the prediction system 401 utilises the predicted features and run the neural network which predicts eligibility and the loan amount which can be given with BNPL model. If the eligible amount is sufficient for the purpose of the business/merchant, the prediction system 401 enables BNPL for the eligible amount. However, if the eligible amount is not sufficient for the purpose of the business/merchant, the prediction system 401 run Regression model which calculates a higher eligible amount and partial down-payment. Further, the prediction system 401 enables the BNPL for the eligible amount and accept rest as the down-payment.

[021] Figure 4 illustrates an exemplary environment 400 for providing secure BNPL for B2B, in accordance with some embodiments of the present disclosure. The environment 400 includes the prediction system 401, and the federated blockchain network 402. The prediction system 401 interacts with the federated blockchain network 402 for providing secure BNPL for the B2B. The federated blockchain network 402 may be a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network. An asset can be tangible (a house, car, cash, land) or intangible (intellectual property, patents, copyrights,

branding). The prediction system 401 obtains data from the federated blockchain network 402 for analysing the business using machine learning and predict BNPL amount to provide to the business/merchant. Further, the prediction system 401 may include one or more processor 403, I/O interface 404, and a memory 405. In some embodiments, the memory 405 may be communicatively coupled to the one or more processors 403. The memory 405 stores instructions, executable by the one or more processors 403, which, on execution, may cause the prediction system 401 to predict the BNPL amount, as disclosed in the present disclosure. In an embodiment, the memory 405 may include one or more modules 406 and data 407. The one or more modules 406 may be configured to perform the steps of the present disclosure using the data 407, to provide secure BNPL for the B2B transactions. In an embodiment, each of the one or more modules 406 may be a hardware unit which may be present outside the memory 405 and coupled with the prediction system 401. The prediction system 401 may be implemented in a variety of computing systems, such as, a laptop computer, a desktop computer, a Personal Computer (PC), a notebook, a smartphone, a tablet, e-book readers, a server, a network server, a cloud-based server, and the like. In an embodiment, the prediction system 401 may be a dedicated server or may be a cloud-based server.

Computing System

[022] Figure 5 illustrates a block diagram of an exemplary computer system 500 for implementing embodiments consistent with the present disclosure. In an embodiment, the computer system 500 is used to implement the prediction system 401 for providing secure BNPL for the B2B. The computer system 500 may include a central processing unit (“CPU” or “processor”) 502. The processor 502 may include at least one data processor for executing processes in Virtual Storage Area Network. The processor 502 may include specialized processing units such as, integrated system (bus) controllers, memory management control units, floating point units, graphics processing units, digital signal processing units, etc.

[023] The processor 502 may be disposed in communication with one or more input/output (I/O) devices 509 and 510 via I/O interface 501. The I/O interface 501 may employ communication protocols/methods such as, without limitation, audio, analog, digital, monaural, RCA, stereo, IEEE-1394, serial bus, universal serial bus (USB), infrared, PS/2, BNC, coaxial, component, composite, digital visual interface (DVI), high-definition multimedia interface (HDMI), radio frequency (RF) antennas, S-Video, VGA, IEEE 802.n

/b/g/n/x, Bluetooth, cellular (e.g., code-division multiple access (CDMA), high-speed packet access (HSPA+), global system for mobile communications (GSM), long-term evolution (LTE), WiMax, or the like), etc.

[024] Using the I/O interface 501, the computer system 500 may communicate with one or more I/O devices 509 and 510. For example, the input devices 509 may be an antenna, keyboard, mouse, joystick, (infrared) remote control, camera, card reader, fax machine, dongle, biometric reader, microphone, touch screen, touchpad, trackball, stylus, scanner, storage device, transceiver, video device/source, etc. The output devices 410 may be a printer, fax machine, video display (e.g., cathode ray tube (CRT), liquid crystal display (LCD), light-emitting diode (LED), plasma, Plasma Display Panel (PDP), Organic light-emitting diode display (OLED) or the like), audio speaker, etc.

[025] In some embodiments, the computer system 500 may consist of the prediction system 401. The processor 502 may be disposed in communication with a communication network 511 via a network interface 503. The network interface 503 may communicate with the communication network 511. The network interface 303 may employ connection protocols including, without limitation, direct connect, Ethernet (e.g., twisted pair 10/100/1000 Base T), transmission control protocol/internet protocol (TCP/IP), token ring, IEEE 802.11a/b/g/n/x, etc. The communication network 511 may include, without limitation, a direct interconnection, local area network (LAN), wide area network (WAN), wireless network (e.g., using Wireless Application Protocol), the Internet, etc. Using the network interface 503 and the communication network 511, the computer system 500 may communicate with a federated blockchain network 512 to provide secure BNPL for the B2B. The network interface 503 may employ connection protocols include, but not limited to, direct connect, Ethernet (e.g., twisted pair 10/100/1000 Base T), transmission control protocol/internet protocol (TCP/IP), token ring, IEEE 802.11a/b/g/n/x, etc.

[026] The communication network 511 includes, but is not limited to, a direct interconnection, an e-commerce network, a peer to peer (P2P) network, local area network (LAN), wide area network (WAN), wireless network (e.g., using Wireless Application Protocol), the Internet, Wi-Fi, and such. The first network and the second network may either be a dedicated network or a shared network, which represents an association of the different types of networks that use

a variety of protocols, for example, Hypertext Transfer Protocol (HTTP), Transmission Control Protocol/Internet Protocol (TCP/IP), Wireless Application Protocol (WAP), etc., to communicate with each other. Further, the first network and the second network may include a variety of network devices, including routers, bridges, servers, computing devices, storage devices, etc.

[027] In some embodiments, the processor 502 may be disposed in communication with a memory 505 (e.g., RAM, ROM, etc. not shown in **Figure 5**) via a storage interface 504. The storage interface 504 may connect to memory 505 including, without limitation, memory drives, removable disc drives, etc., employing connection protocols such as, serial advanced technology attachment (SATA), Integrated Drive Electronics (IDE), IEEE-1394, Universal Serial Bus (USB), fibre channel, Small Computer Systems Interface (SCSI), etc. The memory drives may further include a drum, magnetic disc drive, magneto-optical drive, optical drive, Redundant Array of Independent Discs (RAID), solid-state memory devices, solid-state drives, etc.

[028] The memory 505 may store a collection of program or database components, including, without limitation, user interface 506, an operating system 507, web browser 508 etc. In some embodiments, computer system 500 may store user/application data, such as, the data, variables, records, etc., as described in this disclosure. Such databases may be implemented as fault-tolerant, relational, scalable, secure databases such as Oracle ® or Sybase®.

[029] The operating system 507 may facilitate resource management and operation of the computer system 500. Examples of operating systems include, without limitation, APPLE MACINTOSH® OS X, UNIX®, UNIX-like system distributions (E.G., BERKELEY SOFTWARE DISTRIBUTION™ (BSD), FREEBSD™, NETBSD™, OPENBSD™, etc.), LINUX DISTRIBUTIONS™ (E.G., RED HAT™, UBUNTU™, KUBUNTU™, etc.), IBM™ OS/2, MICROSOFT™ WINDOWS™ (XP™, VISTA™/7/8, 10 etc.), APPLE® IOS™, GOOGLE® ANDROID™, BLACKBERRY® OS, or the like.

[030] In some embodiments, the computer system 500 may implement a web browser 508 stored program component. The web browser 508 may be a hypertext viewing application, such as Microsoft Internet Explorer, Google Chrome, Mozilla Firefox, Apple Safari, etc. Secure web browsing may be provided using Hypertext Transport Protocol Secure (HTTPS),

Secure Sockets Layer (SSL), Transport Layer Security (TLS), etc. Web browsers 508 may utilize facilities such as AJAX, DHTML, Adobe Flash, JavaScript, Java, Application Programming Interfaces (APIs), etc. In some embodiments, the computer system 500 may implement a mail server stored program component. The mail server may be an Internet mail server such as Microsoft Exchange, or the like. The mail server may utilize facilities such as ASP, ActiveX, ANSI C++/C#, Microsoft .NET, Common Gateway Interface (CGI) scripts, Java, JavaScript, PERL, PHP, Python, WebObjects, etc. The mail server may utilize communication protocols such as Internet Message Access Protocol (IMAP), Messaging Application Programming Interface (MAPI), Microsoft Exchange, Post Office Protocol (POP), Simple Mail Transfer Protocol (SMTP), or the like. In some embodiments, the computer system 500 may implement a mail client stored program component. The mail client may be a mail viewing application, such as Apple Mail, Microsoft Entourage, Microsoft Outlook, Mozilla Thunderbird, etc.

[031] Embodiments of the present disclosure discloses a prediction system and method for providing secure BNPL for the B2B.

[032] Embodiment of the present disclosure increases chance of repayment and does not affect the sustainability of the business/merchant.

[033] Embodiments of the present disclosure can untap market and small businesses with good sustainability model and help business/merchant to increase sales volume.

[034] Embodiment of the present disclosure provides shared digital ledger and help to reduce fraud and increase visibility and transparency of the business.

[035] Embodiment of the present disclosure easily identifies fraudulent transactions using the federated blockchain network.

[036] Furthermore, one or more computer-readable storage media may be utilized in implementing embodiments consistent with the present disclosure. A computer-readable storage medium refers to any type of physical memory on which information or data readable by a processor may be stored. Thus, a computer-readable storage medium may store instructions for execution by one or more processors, including instructions for causing the

processor(s) to perform steps or stages consistent with the embodiments described herein. The term “computer-readable medium” should be understood to include tangible items and exclude carrier waves and transient signals, i.e., be non-transitory. Examples include Random Access Memory (RAM), Read-Only Memory (ROM), volatile memory, non-volatile memory, hard drives, Compact Disc (CD) ROMs, DVDs, flash drives, disks, and any other known physical storage media.
media.

[037] The described operations may be implemented as a method, system or article of manufacture using standard programming and/or engineering techniques to produce software, firmware, hardware, or any combination thereof. The described operations may be implemented as code maintained in a “non-transitory computer readable medium,” where a processor may read and execute the code from the computer readable medium. The processor is at least one of a microprocessor and a processor capable of processing and executing the queries. A non-transitory computer readable medium may include media such as magnetic storage medium (e.g., hard disk drives, floppy disks, tape, etc.), optical storage (CD-ROMs, DVDs, optical disks, etc.), volatile and non-volatile memory devices (e.g., EEPROMs, ROMs, PROMs, RAMs, DRAMs, SRAMs, Flash Memory, firmware, programmable logic, etc.), etc. Further, non-transitory computer-readable media may include all computer-readable media except for a transitory. The code implementing the described operations may further be implemented in hardware logic (e.g., an integrated circuit chip, Programmable Gate Array (PGA), Application Specific Integrated Circuit (ASIC), etc.).

[038] The illustrated steps are set out to explain the exemplary embodiments shown, and it should be anticipated that ongoing technological development will change the manner in which particular functions are performed. These examples are presented herein for purposes of illustration, and not limitation. Further, the boundaries of the functional building blocks have been arbitrarily defined herein for the convenience of the description. Alternative boundaries can be defined so long as the specified functions and relationships thereof are appropriately performed. Alternatives (including equivalents, extensions, variations, deviations, etc., of those described herein) will be apparent to persons skilled in the relevant art(s) based on the teachings contained herein. Such alternatives fall within the scope and spirit of the disclosed embodiments. Also, the words "comprising," "having," "containing," and "including," and

other similar forms are intended to be equivalent in meaning and be open ended in that an item or items following any one of these words is not meant to be an exhaustive listing of such item or items or meant to be limited to only the listed item or items. It must also be noted that as used herein and in the appended claims, the singular forms “a,” “an,” and “the” include plural references unless the context clearly dictates otherwise.

[039] Furthermore, one or more computer-readable storage media may be utilized in implementing embodiments consistent with the present disclosure. A computer readable storage medium refers to any type of physical memory on which information or data readable by a processor may be stored. Thus, a computer readable storage medium may store instructions for execution by one or more processors, including instructions for causing the processor(s) to perform steps or stages consistent with the embodiments described herein. The term “computer readable medium” should be understood to include tangible items and exclude carrier waves and transient signals, i.e., are non-transitory. Examples include random access memory (RAM), read-only memory (ROM), volatile memory, non-volatile memory, hard drives, CD ROMs, DVDs, flash drives, disks, and any other known physical storage media.

[040] Finally, the language used in the specification has been principally selected for readability and instructional purposes, and it may not have been selected to delineate or circumscribe the inventive subject matter. Accordingly, the disclosure of the embodiments of the disclosure is intended to be illustrative, but not limiting, of the scope of the disclosure.

[041] With respect to the use of substantially any plural and/or singular terms herein, those having skill in the art can translate from the plural to the singular and/or from the singular to the plural as is appropriate to the context and/or application. The various singular/plural permutations may be expressly set forth herein for sake of clarity.

SYSTEM AND METHOD FOR PROVIDING SECURE BNPL FOR B2B

ABSTRACT

The present disclosure provides a method and prediction system for providing secure BNPL for B2B using federated blockchain and AI. The prediction system provides shared digital ledger using federated blockchain i.e., by using shared digital ledger, participants can see history and transfer of assets and identify fraudulent transactions easily. Further, the prediction system provides secure BNPL using Deep Learning. The prediction system performs data pre-processing and feature engineering. Further, the prediction system analyses business using machine learning models. Thereafter, the prediction system performs BNPL amount prediction using neural networks and regression. Thus, the present disclosure prevents frauds and provides loaning for secure BNPL for B2B.

Figures 3a-3c

1/7

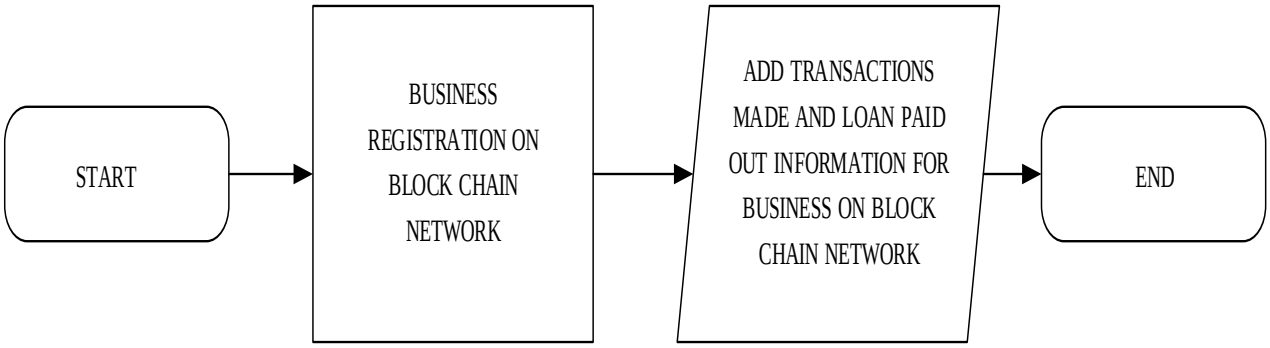
START
BUSINESS REGISTRATION ON BLOCK CHAIN NETWORK
ADD TRANSACTIONS MADE AND LOAN PAID OUT INFORMATION FOR BUSINESS ON BLOCK CHAIN NETWORK
END

Figure 1

2/7

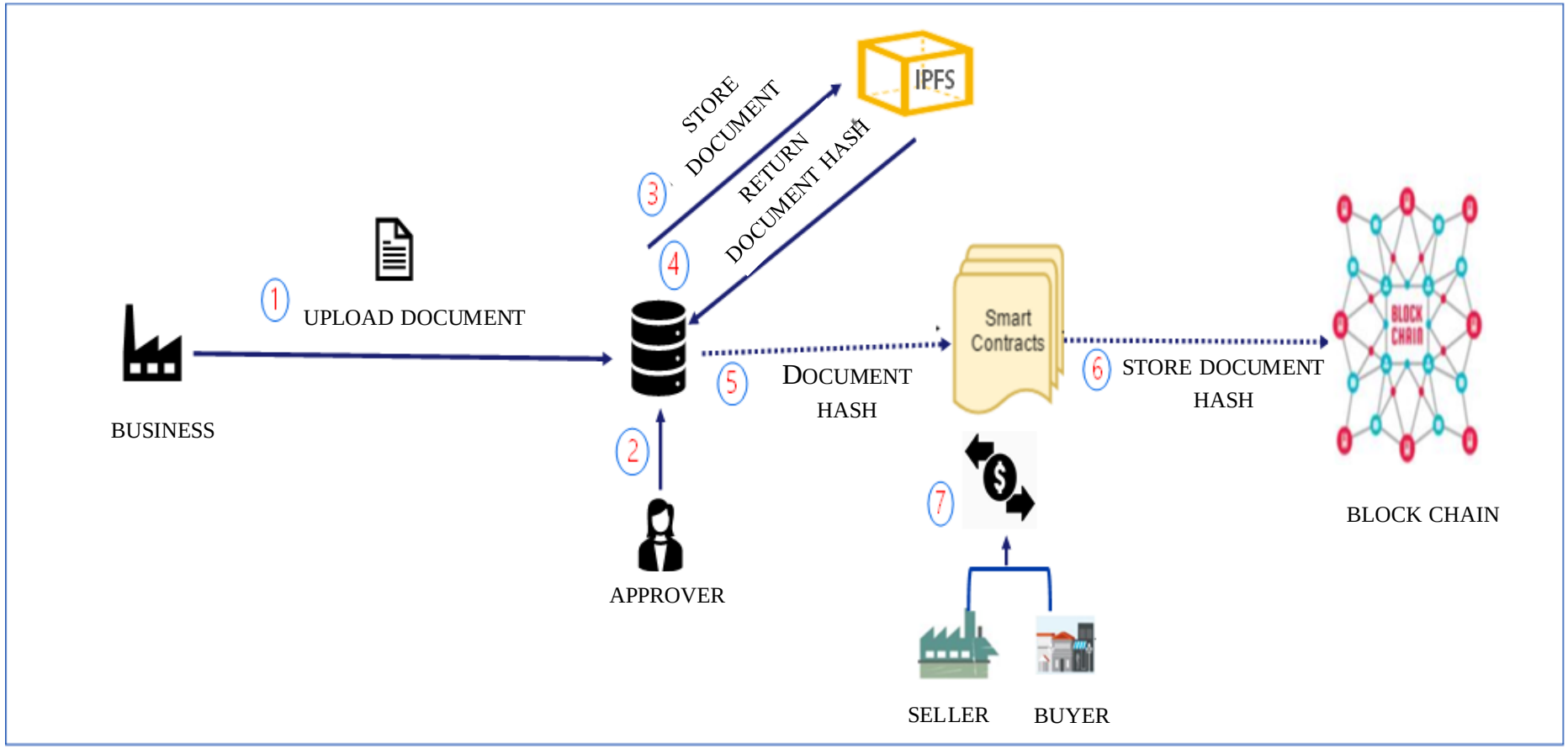

Figure 2

16

3/7

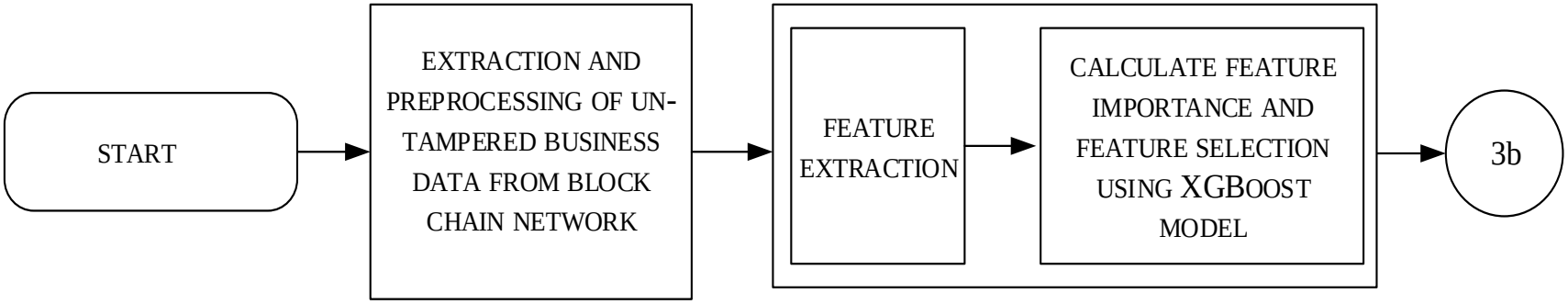
START
EXTRACTION AND PREPROCESSING OF UN-TAMPERED BUSINESS DATA FROM BLOCK CHAIN NETWORK
FEATURE EXTRACTION
CALCULATE FEATURE IMPORTANCE AND FEATURE SELECTION USING XGBOOST MODEL
3b

Figure 3a

4/7

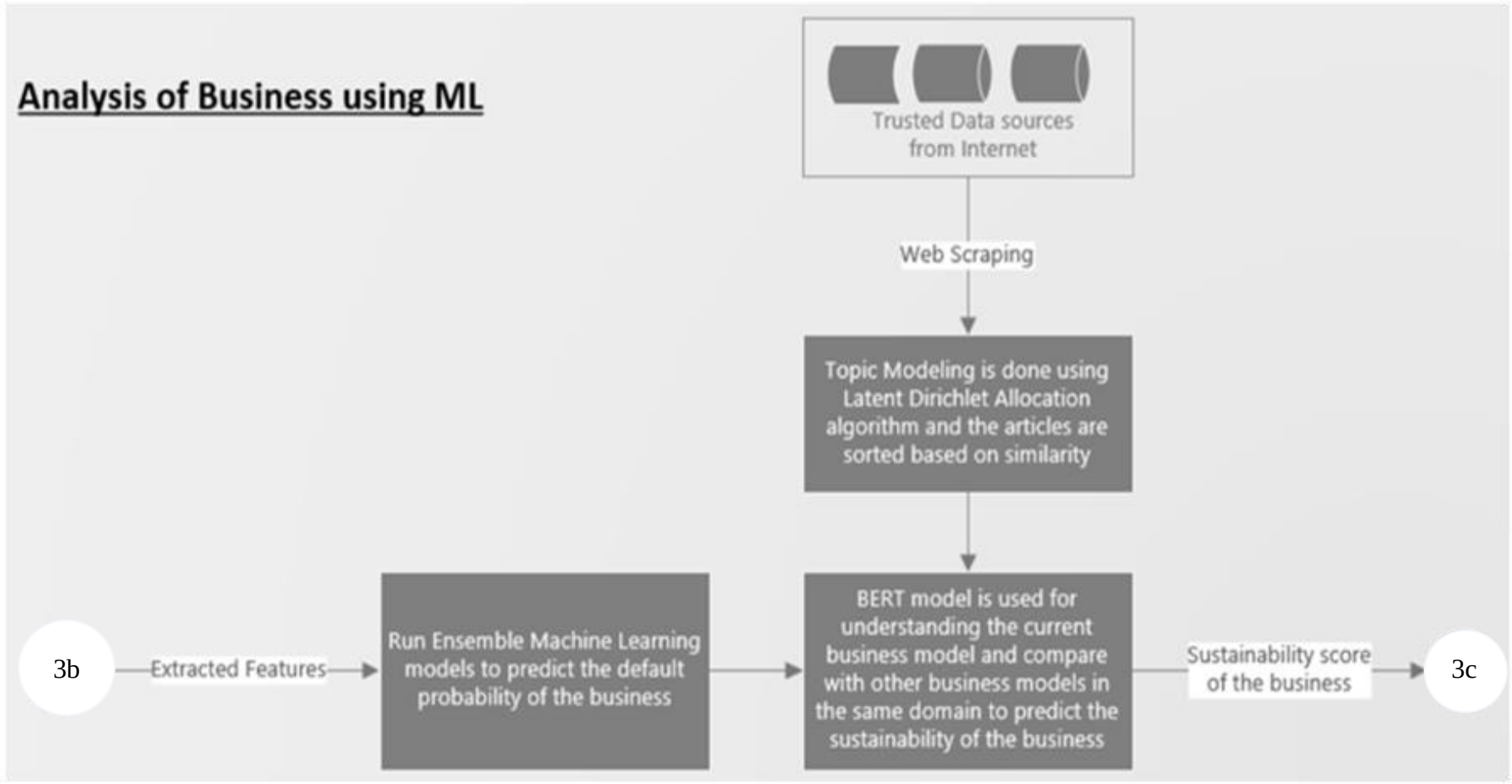

Figure 3b

18

5/7

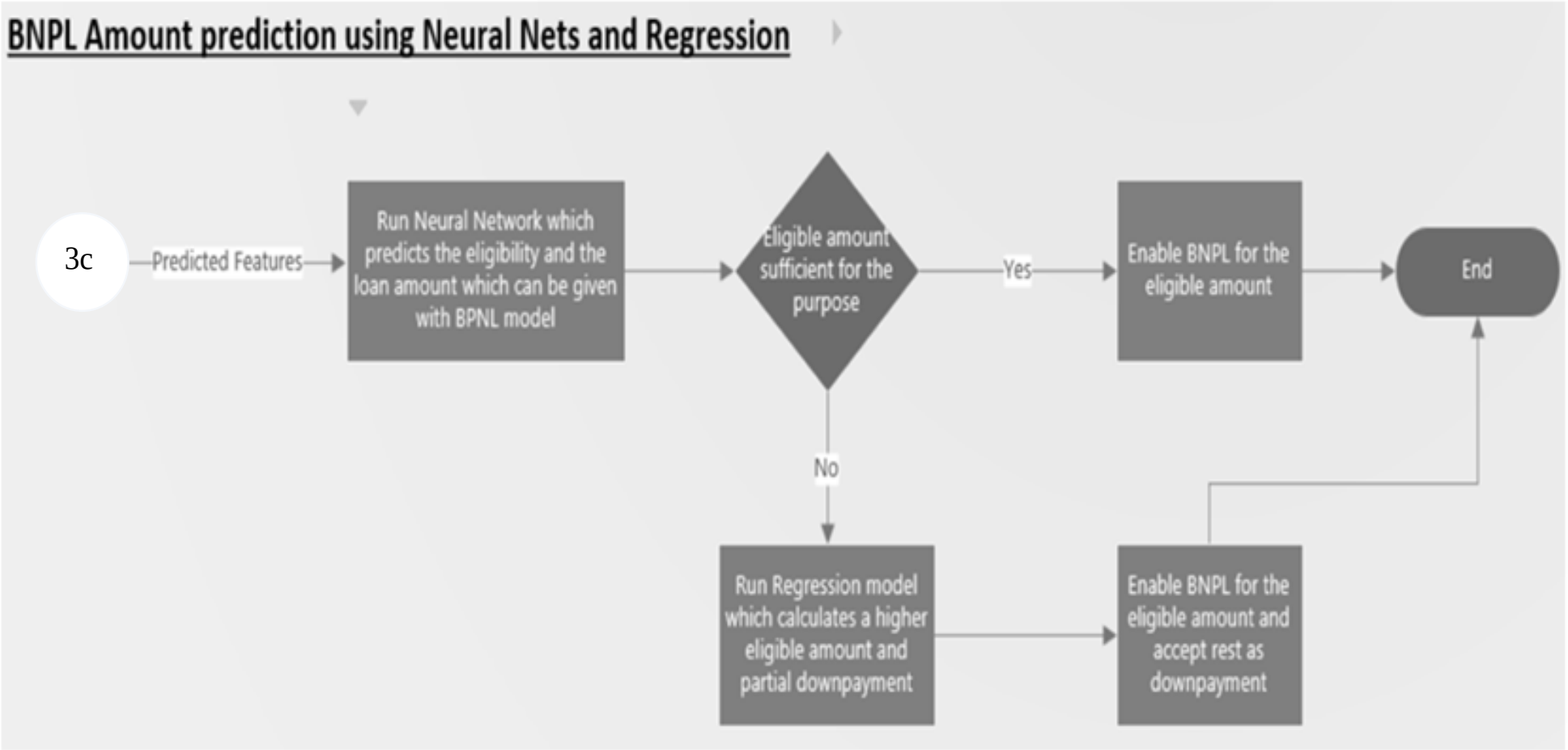
BNPL Amount prediction using Neural Nets and Regression
3c
Predicted Features
Run Neural Network which predicts the eligibility and the loan amount which can be given with BPNL model
Eligible amount sufficient for the purpose
Yes
Enable BNPL for the eligible amount
End
No
Run Regression model which calculates a higher eligible amount and partial downpayment
Enable BNPL for the eligible amount and accept rest as downpayment

Figure 3c

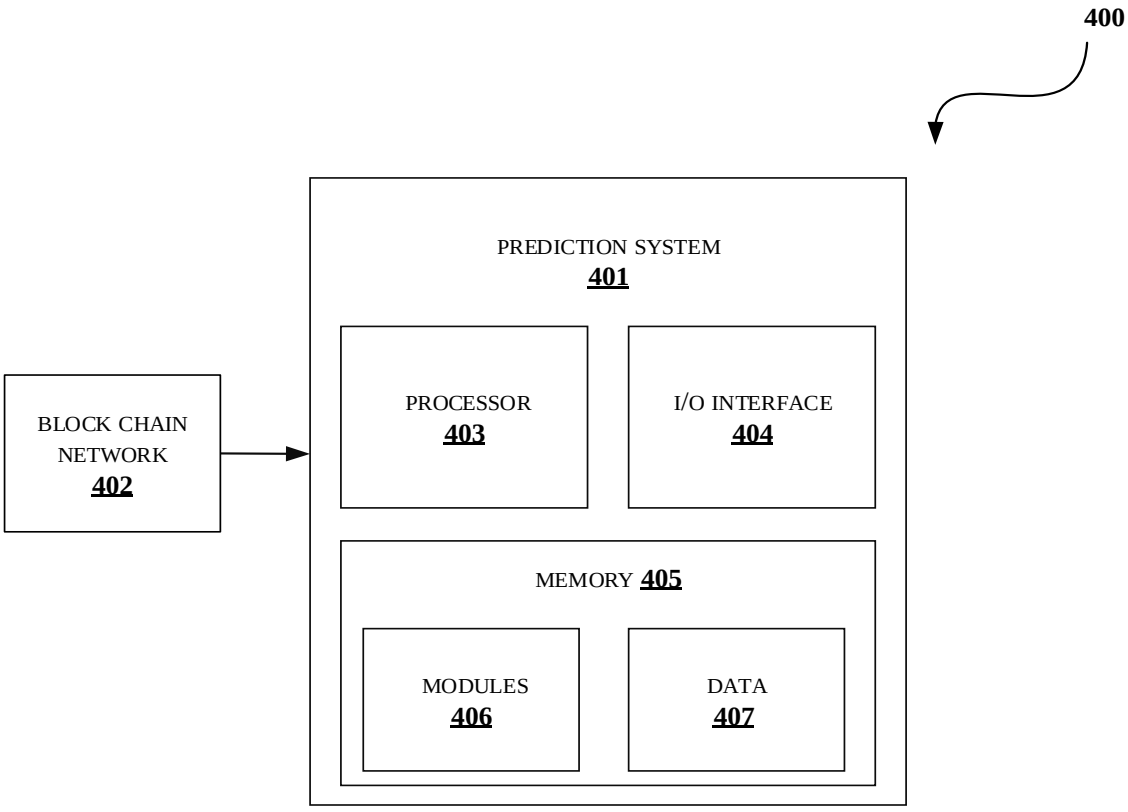
400
PREDICTION SYSTEM
401
PROCESSOR
403
I/O INTERFACE
404
BLOCK CHAIN
NETWORK
402
MEMORY 405
MODULES
406
DATA
407

Figure 4

7/7

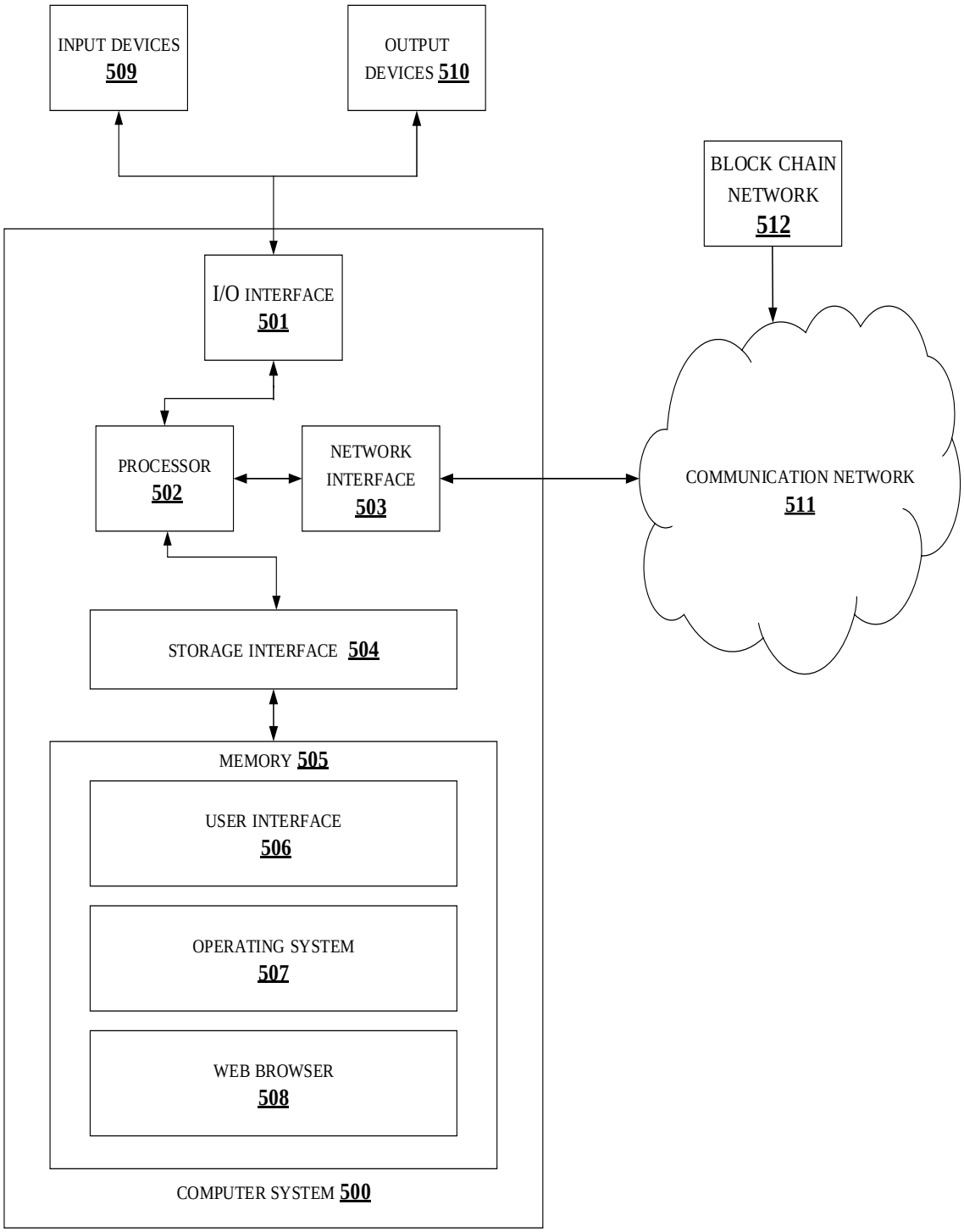
INPUT DEVICES
509
OUTPUT
DEVICES 510
BLOCK CHAIN
NETWORK
512
I/O INTERFACE
501
PROCESSOR
502
NETWORK
INTERFACE
503
COMMUNICATION NETWORK
511
STORAGE INTERFACE 504
MEMORY 505
USER INTERFACE
506
OPERATING SYSTEM
507
WEB BROWSER
508
COMPUTER SYSTEM 500

Figure 5