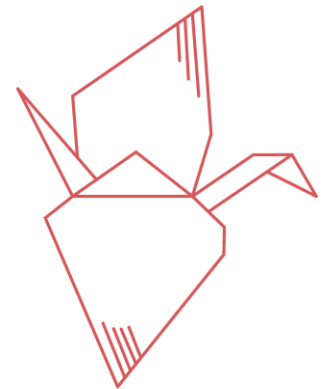# neunet

The Whitepaper v1.1

Abstract: Idea by Design (ideaXdesign) is developing Neunio, a blockchain that is designed to be secured using post-quantum cryptography (PQC). In lieu of the development of this blockchain we are building Neunet, an intelligent matching platform which will help accelerate the recruitment process for startups, hiring managers, and talent globally utilizing artificial intelligence technology. This application will be able to better match talent to opportunities and match opportunities to users, than what currently exists. This will be done by using recurrent neural networks methods (AI) in combination with the traditional statistical analysis to better perform these actions. The goal, to cut down on the time and resources required to find the right talent and the right employment opportunities. This platform will be part of what is considered "Phase One" of this project. We will use cryptofinancing (Initial Coin Offering) to fund our project.

PLEASE NOTE: CRYPTOGRAPHIC TOKENS REFERRED TO IN THIS WHITE PAPER REFER TO THE CRYPTOGRAPHIC TOKENS SOLD IN THE TOKEN GENERATED EVENT BEING DISTRIBUTED ON THE BLOCKCHAIN IN CONNECTION WITH THE NEUNIO TOKEN DISTRIBUTION.

Table of contents

Vision

Our vision with Neunet is to create a world that can enjoy the highest levels of productivity from when the right talent meets the right opportunities. We want to accelerate the level of these connections made around the world and see Neunet as a medium in which human beings connect to change the way we live forever. We have two goals: 1) to create a world in which human capital will rise to its highest level, and 2) to reduce the lack of diversity in the workplace within the entrepreneurial and tech communities and end the digital divide.

Why statement

We exist to move forward human progress and break down the barriers that exist among us furthering the collective power of the human potential through technology.

Background

The employment crisis going on in the world and more specifically in the U.S. is twofold: lack of productivity and its effect on the GDP, and the lack of diversity in the workplace.

The lack of productivity is a causation between the employers and employees being a poor match. According to a recent 2016 article by the National Federation of Independent Business, around 47% of small businesses cannot find qualified applicants for open positions. This statistic is backed up by a recent study conducted by the Pew Research group which found that 50% of SMBs aren't getting the talent they need for their job openings. According to a recent Harvard Business Review, 80% of employee turnover is the result of poor hiring decisions, around 36% of new hires fail within the first 18 months, and the cost of replacing this hire can cost a firm anywhere between a third of their first-year salary to around $250,000. This also compliments a study conducted by Jobvite which found that 74% of the workforce are open to making a job move led by Millennials being more likely to move. One of the leading factors contributing to this expensive problem is found in the conclusive data from a recent Robert Half survey, (Robert Half is staffing and employment agency), which found that 36% of 1,400 executives attribute the problem to a poor skills match. However, a recent study by Deloitte has shown there are also the hidden costs of having an unfilled open position. Between searching for and interviewing the candidate, the lost productivity of having the open position, the ramp up time needed by the new hire, and listing the job. According to a study by the London based Centre for Economic Research, this costs the U.S. around $160 billion annually. More affecting the general productivity of struggling to find the right hire, is the company loses revenues and profits from not reaching its full potential output, and secondly those who remain unemployed or underemployed don't spend as much in the economy therefore stunting overall economic growth.

This leads to a larger problem that has been stated in the Harvard Business Review by Human Resource professionals as the improper gathering and analysis of information and data. Humans are not perfect and this problem until now has long remained as the norm. According to psychometrics.com, humans are hard - wired to have errors when evaluating people and use heuristics in their judgement. This is one of the major causes leading to employee unproductivity which is a $600 billion cost to the U.S. according to a survey conducted by Proudfood Consulting. When you compound the cost of underemployment which, according to a study by the Center for Labor Market, becomes a $160 billion problem in addition to the cost on society with employee unproductivity this sums to over $760 billion annually. But, there's another issue that employers are facing and has been making headlines during the past few years and it's the lack of diversity in the workplace.

For years, firms - whether in the tech industry or in corporate America - have all vowed to make diversity a top issue of their agenda, yet diversity in the workplace remains an issue in the U.S. The U.S. Equal Employment Opportunity Commission has found that as of 2014, blacks and Hispanics only represent 1.9% and 4.4. % respectively of the professional-level workforce. According to the same study there are 13% of black and 16% black women with tech degrees working in unrelated fields in comparison to 7% for white males citing the exclusive environment as a cause as well current recruiting processes. According to a 2017 article by the Huffington Post, despite more talented women and minorities in the talent pool for companies to choose from, "there are now twice as many men as women with the same qualifications working in STEM fields, and top universities are producing black and Hispanic computer science and engineering graduates at twice the rate that leading tech companies are actually hiring them." This problem has become a norm for way too long and costs firm. The Center for Talent and Innovation has found that "companies with diverse employees and leaders are 45% more likely to grow market share over the previous year and 70% more likely to capture a new market." Unfortunately, as PwC found through

a recent survey from Millennials, only 55% of Millennials agree with the statement that 'organizations talk about diversity, but don't feel opportunities are really equal for all".

Many firms and innovations have come along the way to try and improve this labor situation. As you will read, they have only addressed the problem of helping companies find talent. Below, we will address them and their inadequacies and how we believe we have the best solution to this problem because according to the Bureau of Labor Statistics, as of April 2016 the economy had set a new all - time high of 5.85 million unfilled job openings clearly showing the current solutions aren't working as well as there is a still a wide diversity problem in the U.S. workforce.

Current Status Quo

A study conducted by the Pew Research Center discovered that there are more online job seekers than ever before in America as around 54% of Americans use the internet to find jobs with 45% applying online in comparison to 2005 where there were only 26% Americans were searching for jobs online. Because of this upward trend companies have been trying to optimize the employment process and its inefficiencies in the U.S. using various methods.

The flaw comes from the result of the unintended biases the above algorithms were built on. If the company has a higher male to female ratio or has more white employees than black employees the current algorithms that exist will filter out those candidates that don't match with the workforce so in the first scenario women would get discarded from being able to match with the company and in the second black candidates would get discarded. As of 2016, this $868 billion problem continues to persist.

In both scenarios, there is another opportunity we have observed, which is the transfer and processing of employee personable identifiable information (bank account information, social security, ID's, etc). Newly onboarded employees must deliver this information to their employer with full trust without properly assessing the security of their storage capacity. Most firms either store this information with third party vendors or on their own servers. However, this leaves the information vulnerable to internal and external breaches which can cost on average, according to IBM, anywhere between $80 - $355 per lost record. This results in data breaches costing millions of dollars for employees so such protection comes a reasonably high price given the security of such sensitive information. Although, these are the current conditions which the world lives under, we believe we have found a solution to both status quos.

With the advent of quantum computing, we must prepare our technologies to ensure security and privacy against any attacks. These computers will be able to attack any computer or network including decentralized and distributed ledgers such as Blockchain. Currently these systems rely on elliptic curve cryptography, however this method is not quantum secure.

Neunio Ecosystem

The Neunio blockchain is designed to be secured using post-quantum cryptography (PQC). Transaction signatures are made using a PQC key scheme that involves lattice-based cryptography (LBC), where keys are based on ring polynomials for which finding a matching key is considered mathematically hard both classically and with respect to quantum computing. The particular signature scheme used is GLYPH, a modified version of the GLP scheme. GLYPH is submitted for consideration as the standard post-quantum signing algorithm as a conclusion of NIST's First PQC Standardization Conference. GLYPH theoretically guarantees at least 128 bits of security, independent of possible future advancements in the field of PQC. The signing scheme currently employed in most blockchain applications, which relies on elliptic curve cryptography (ECC), will not be secure with the advent of quantum supreme computers. Both Alphabet and IBM have announced or predicted their own quantum supreme computers by the end of 2017.

A side effect of this signing scheme is an increase in block size as public keys will grow significantly in size. As compression algorithms arise in PQC, and advancements in network speed increase with the growth of fiber optic cables, however, the impact of this size increase should become minimal. We are constantly working to improve the Neunio application and subsequent improvement plans will address these concerns.

Phase 1: Exposure
Most people still don't know what blockchain is or what cryptocurrency is so we plan on creating a hybrid application that uses elements from the traditional way of creating applications and elements of the blockchain industry.

The first application we will be building is an AI platform, Neunet, that will intelligently match employment opportunities with talent. This platform will be created using unbiased algorithms

allowing for women and other minority groups to have a fair and equal opportunity in the hiring process. This platform will help these groups and companies alike. There is nothing about this platform that uses blockchain. Now what is going to be a difference maker outside of the unbiased algorithms is the use of our natively built cryptocurrency token, Neunio. Users will use Neunios to for their membership onto the platform and to use features like applying to a job or contacting a top candidate.

The first application to utilize the Neunio blockchain will be blockchain based system to transport sensitive data between employers and employees. As talent use Neunet to find employment opportunities, the next step that is required of them is to accept the offer and, upon doing so, providing the employer their Personable Identifiable Information (PII) such as their social security, driver's license, bank account information, etc. quantum secured method of sending personable identifiable information to employers which will help companies and people become accustomed to the benefits of blockchain as they use it in this manner. This will help keep employees and employer databases more secure and private and will give ownership of data to the individual at the same time. Employers don't have to handle their own servers, staff, or pay vendors to host this information. Our blockchain will be dedicated to protecting this sensitive information.

Phase 2: Build the community

The next phase for our project will be creating an environment where anyone who understands how to create an app or a website will be able to create an application utilizing our blockchain. Fittingly so we will create an "App Store" for our community to launch their applications and to engage with users. Similarly, like the app store once a user is logged into the blockchain they simply just have to download the application and they can use it without having to create an account as they are already signed onto the network. Neunios will be used to do work on the blockchain.

5.1 Artificial Intelligence

5.1.1 Background

Artificial intelligence (AI) is a powerful tool for analyzing data and recreating specific intelligences. AI benefits many areas, including natural language processing (NLP), computer vision (CV), data classification, and, broadly, "general intelligence." The grand goal of AI is to recreate the capabilities of a human brain and more to optimize tasks that are tedious for humans and to approach problems in new, more complex ways that are impossible with another existing tech.

For the purposes of this platform, we will be applying an area of AI called neural networks (NNs) – in particular, recurrent neural networks (RNNs). This is a technological system of classifying textual information as a form of NLP. By assigning words weighted values in certain areas, associating those words together, and then feeding the associations and meanings through a network, we can ascertain details about textual information in much the same way a human does.

5.2   Identity Management System

As part of the ecosystem, we will develop a new way for employers and employees to transfer highly sensitive data (personal identifiable information) to one another. Below is how the blockchain application will work:

Users will create a profile in which they store their personal identifiable information (PII) into a wallet. This wallet will have a public key and a private key. We will build decentralized private databases for each company which will have an address associated with it and will store their employees' PII. The databases will be stored using a decentralized file storage systems. When an

employee joins a company, they will send their information to a company's address. The requested transaction will be broadcasted to the blockchain network of nodes who will validate the transaction. Once verified the transaction will be combined with other transactions to create a new block of data for the ledger and the company then receives the information. Within the company, only a select group of admins will have control of the information within the company. The employee will always have control of their data. When the employee leaves the company their information simply gets removed from the database where the former company no longer has access to the employee's information. Once the employee joins a new company they simply will repeat the process.

This will completely change the relationship of trust between the employee and the employer regarding their PII. Employees and employers can both ensure through blockchain the security and encryption of their data. Companies currently either use third party providers or store the information using their own servers and are looking for more privacy and secure methods in a world where cybersecurity has never been more of a concern. According to a 2017 Forrester Study, 90% of data security professionals still challenge with data security issues. In the same article, around 41% of firms do not know where their data is stored, 66% of companies fail to classify unstructured data, and more than 60% of data security professionals attest their organization does not limit access with a least privilege model. We believe this exchange will be best suitable for blockchain to solve allowing for security and privacy between parties and maintain trust.

Blockchain would also be used for concealing PII that could manipulate hiring practices; through application process, embed PII along with merits in blockchain so that employers accept candidates based on qualifications before receiving contact information; once accepted, employers are allowed info to contact employee. It would also be used to validate the skills and experience of potential employees.

5.3 Neunio token

ideaXdesign intends to introduce its utility token called Neunio(s) which will be an integral part in the Neunio Blockchain and ecosystem. Before we explain the details of the token uses on our platform, we want to establish a basic definition of what a token is to our non - technical readers:

A cryptocurrency is a medium of exchange, created and stored electronically in the blockchain, using encryption techniques to control the creation of the monetary units and to verify the transfer of funds. It is comparable to traditional currencies such as the USD or YEN. In similar fashion, you own them and can transfer to someone else.

The Neunio will be used in all aspects of the Neunio ecosystem from Neunet and to do work on the blockchain.

Token Mechanics and Sale Details

6.1. Initial Coin Offering

As stated above, Neunios have a very functional role in our platform enriching the user experience. The token will be used for users to join the network, connect with one another, among other features of the platform.

We will be having four crowdsales starting with our Pre-ICO on November 22nd. The model for our crowdsales follow this process:

1. sell some X percent of coins at a static price with parcel limits
2. provide gradually increasing block rewards to prevent instamine for first Y blocks before difficulty retargeting catches up
3. distribute remaining 1 minus X percent of coins through block rewards until next round of funding, basing block rewards based on number of transactions in block
4. repeat (1) and (3) for each further round of funding

The reason for the transaction count based block rewards is due to empty blocks. Pools or those with high performance computing capability could simply verify empty blocks, which propagate faster through the network because it is less information to send than a whole block. Basing it on number of transactions means empty blocks would have no value. Transaction fees are also avoided since the reward is determined by the number of transactions and paid for from the available pool of undistributed coins. No cost to spender for transactions and no incentive for empty blocks.

Our Initial Coin Offering (ICO/crowdsale) will have four stages. The Pre - ICO will begin November 22, 2017 12:00 AM EST and will conclude December 8, 2017 11:59:59 PM EST. The tokens will be distributed can be purchased on neunio.io and will be directly distributed using a cryptowallet to the investor's wallet address.

The Pre - ICO will be primarily for Phase One.

For our ICO rounds, of the total number of tokens, there will be a total issuance of 500,000,000 tokens, ideaXdesign will provide 425,000,000 tokens for sale through the ICO at various price levels. For the Pre - ICO we will be offering 10,025,640 tokens. Our goal for the Pre - ICO is to raise $600,000. Below there is a description of price levels:

• *Pre - ICO 10,025,640 tokens available*

Investors will be able to purchase Neunios in ETH, BTC, and USD.

425,000,000 Neunios will be available through the ICO rounds.

75,000,000 Neunios will be reserved by the company for subsequent promotions, bounty campaigns, product development, and payments to the company employees.

The fundraising campaign will last for 17 days: it will start on November 22, 2017 at 12:00 AM EST and end on December 8, 2017 at 11:59:59 PM EST.

The tokens sold will be automatically available to all clients immediately after investing in the project and do not warrant any voting rights or shares in the company. The founding team will retain 25% of the tokens sold and 75% will be sold to investors.

Below is how we will allocate funds from our Pre - ICO:
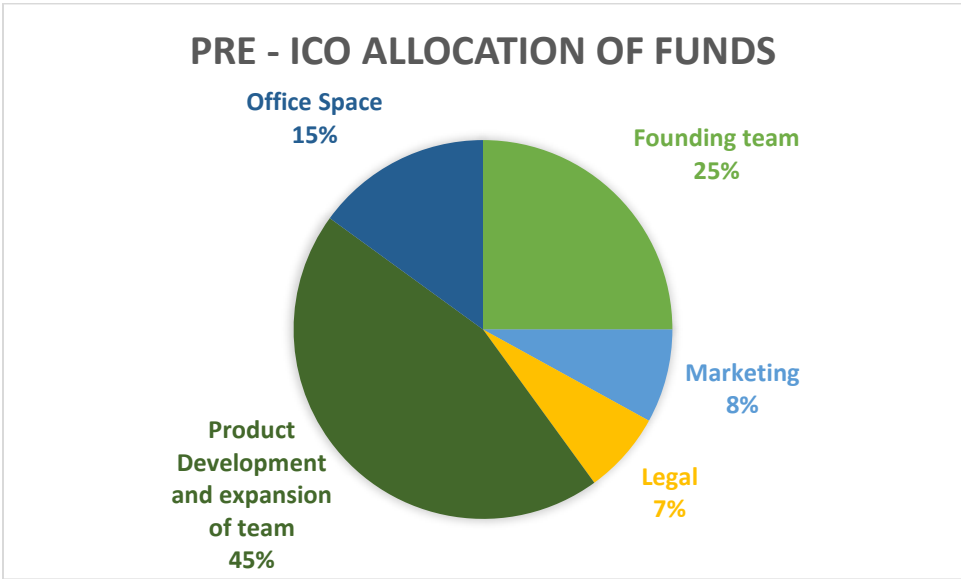
6.2 Vesting schedule

To ensure the founding team stays committed to the project we will be using a vesting schedule to distribute the tokens. The funds will allocated to the founding team by 1/6th vesting schedule for the Pre - ICO. For each ICO round thereafter, there will be a vesting schedule in place.

6.3 Investors Protection

Security is the utmost priority for the duration of our ICO rounds. We will be implementing the following methods to ensure security and compliance for the protection of our investors and believers of our project:

1. We will create an escrow wallet to ensure that transactions are full secure and insured for investors via a third-party company.

2. We will use be using Cloudflare to handle website traffic

3. We will be sure to kick out phishing messages and false announcements

Current state of progress

Phase 1: Exposure

Currently our team has created a website (https://ideaxdesign.com/) that we have used to alpha test and gather feedback on the initial Neunet idea. Note the website does not currently use machine learning or blockchain technology. However, we have been testing different models to create the intelligent matching platform. Currently, users can search based on skill and location and then can narrow the search results by more preferences. The platform as it is now is limited to the amount of talent that have signed up to the platform.

7.1 Timeline of Milestones (product development)
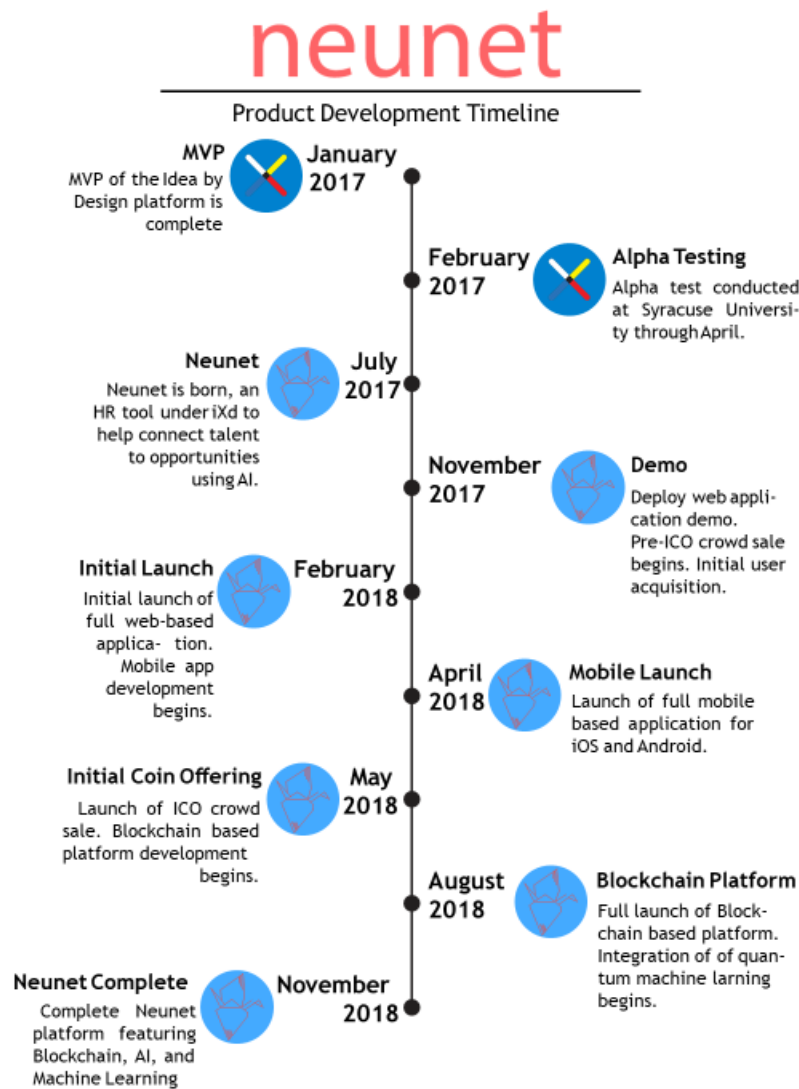
DISCLAIMER: While the product is being developed it will be available for early adopters and users to use. This will help us grow the market and be able to better perfect the product based on user behavior and conversion.

7.2 Path to growth (our adoption curve): Neunet
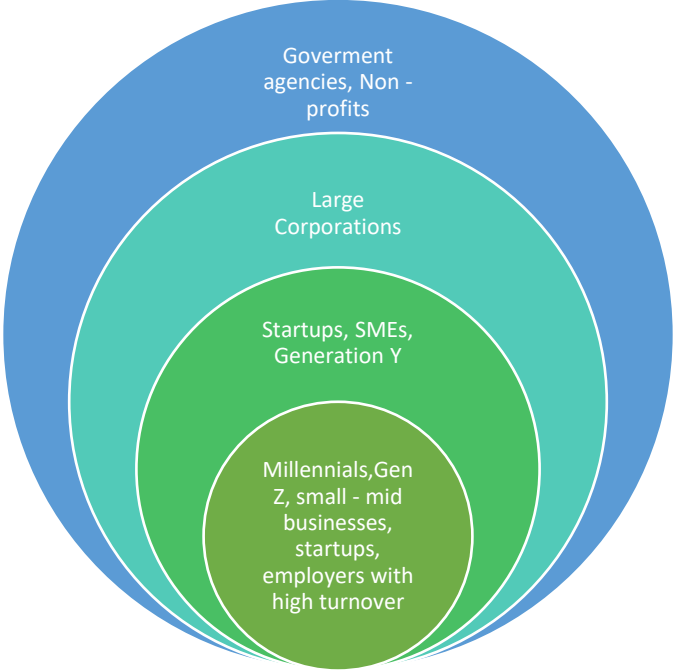
We plan on targeting Millennials and more specifically women given the data from a 2016 Jobvite survey which not only found Millennials are more optimistic about finding the right employment opportunity for them but also showed that 55% Millennial women are more likely to leave their current job. We are also targeting colleges and universities first primarily because employers are trying to find their talent early so we believe we can be the bridge for this connection.

Meet the Neu team

Cayes Delpeche is the CEO and Founder of ideaXdesign. He created ideaXdesign while pursuing his Masters in Entrepreneurship in New Venture Creation and Corporate Innovation program at Syracuse University in 2016. He is a first-time entrepreneur and has learning many things since running the startup since then but his passion and inspiration for why he is pursuing this venture is endless. He has a dream of creating a world in which everyone has the equal opportunity to live their dream. Outside of running the startup he loves to read novels about spirituality, loves traveling, and loves learning about history. An avid reader of new technology and loves learning about its usage in the world.

https://www.linkedin.com/in/cayesdelpeche/

Carson Wilber is the Chief Technology Officer at ideaXdesign. Born into a U.S. Air Force family, Carson has traveled across the country, but currently lives in Pensacola, Florida and is pursuing degrees in Computer Science at the University of West Florida. He puts his extracurricular effort into expanding STEM education in the area, investing his time in school, work, and community. Carson advocates for artificial intelligence, cybersecurity, and robotics education to advance the national workforce, and has taught these subjects as both an instructor and student organization leader throughout his career. In his free time, his hobbies include software, web, and app development.

https://www.linkedin.com/in/carsondwilber

Alonso Moreno is the Co-Founder and Head of Marketing for ideaXdesign. Alonso Joined Cayes toward the end of his first year of his MBA at the University of Rochester, Simon Business School. He has a deep interest in the intersection between business and technology and enjoys learning about new technologies, not just from a business perspective but also diving into the technical details. He joined ideaXdesign to empower the entrepreneurs to pursue their ideas, but also to try and provide access to information and technology to those who wouldn't have it otherwise and end the digital divide.

https://www.linkedin.com/in/alonsomoreno/