

Name of Project: “DeCree” Commercial Use Smart Contracts by HealthTrends.ai, LLC

Proposal Category: app-dev

Proposer: HealthTrends.ai, LLC

Contact: Susan.Joseph@HealthTrends.ai

Website: <https://healthtrends.ai/>

Amount of Grant Request: \$258,060

Do you agree to open source all work you do on behalf of this RFP and dual-license under MIT and APACHE2 licenses?: **YES**

Project Description:

Project DeCree (“DeCree”) will bring US Census data on-chain, facilitate perpetual storage and provide an easy way to use the information.

DeCree will create data bounties plus data storage applications for public data to promote digital infrastructure. This project is exciting because it integrates two leading protocols to further expand the open web. The outcome from this project will deliver on the promise of Web3.0 to the extent that the decentralized applications (“dApp”) will be resilient and scalable. It also provides a practical application which adds value to society by making government data transparent and accessible.

It is the intent of HealthTrends.ai (“HealthTrends”) and its team of experts to build a commercially valuable solution that will highlight, venerate and accelerate blockchain technology (i.e., Chainlink and Filecoin). Furthermore, by incorporating a data bounty system HealthTrends intends to illustrate via this proof-of-concept (“POC”) how blockchain technology can be used to drive both commercial and economic value using government data, which are outside the traditional, or en vogue, realms of FinTech, Gaming and/or NFTs. For example, HealthTrends sees value in providing open access to US Census data (demographics, population, etc.) which is a grounding / foundational statistic for forecasting and economic models. Many of the most compelling future use cases for these models require that these statistics are accessible on-chain.

The project outcome will be to increase the positive focus on ChainLink and Filecoin, hereafter referred to as “Chainlink-Filecoin”, in the effort to build the global community of users by making practical dApps available via the Chainlink-Filecoin open source software (“OSS”) projects.

HealthTrends proposes the creation of a Chainlink-Filecoin smart contract application that combines decentralized Chainlink oracles and Filecoin decentralised storage within a single

application, thus bringing legacy public and other external data into the smart contract universe. HealthTrends sees a growing movement in this area with several recent announcements¹ in the realms of financial data but not government or health data. HealthTrends has a core belief and value that open data should be easily accessible in an open system. Specifically, the source data for this project will be acquired by scraping or downloading via API published, freely available government data. In this case, the team will use US Census data² for DeCree.

Additionally, HealthTrends intends to use DeCree to address poor or non-existent UX/UI design within dApps. HealthTrends will use commercially accepted “best practices” and Human Centered Design to create a UX/UI experience which will make it simple for non-technical users to quickly and easily access, parse and present data via a web accessible dashboard. This will allow legacy, on-and-off chain and hybrid smart contract environments to easily use public and other data.

In summary, HealthTrends will use DeCree to elevate the commercial viability of the Chainlink-Filecoin ecosystem by creating a project that clearly demonstrates blockchain can be used to validate and store legacy data while providing simple, intuitive and flexible UX/UI for the user. These factors will help to promote the value of the Chainlink-Filecoin ecosystem as well as its economic and commercial viability.

Previous Work:

In March of 2020 an all volunteer effort of data scientists, blockchain technologists and healthcare professionals created CoronavirusAPI.com to organize and provide transparency for COVID-19 data. The project received an early grant award from Amazon Web Services (“AWS”). The grant was used to fund the group’s participation in the ConsenSys Health hackathon where it gained new members and new advisors, as well as developed a rudimentary smart contract that hashes pointers to the data on the Ethereum blockchain. By mid 2020, HealthTrends was created as a business to commercialize market opportunity, develop additional technology, apply for National Science Foundation (“NSF”) grant funding and expand into other public health data sets.

In early 2021 HealthTrends began work bringing transparency and trust to COVID19 public health data. HealthTrends was the only non-university recipient of a prestigious Phase I COVID19 research grant by the NSF³. HealthTrends is currently proceeding to Phase II of the NSF process and is developing a blockchain-integrated system to facilitate rapid, auditable, reliable and consistent collection, aggregation, and distribution of public health data.

Because of HealthTrends’ work, success and notoriety in the blockchain space, the company is an ideal candidate for this grant. As founders of HealthTrends, Susan Joseph and George Pullen are recognized experts and advocates in the blockchain space. They have years of

¹<https://www.activfinancial.com/press/press-releases/chainlink-using-activ-financial-to-bring-traditional-market-data-to-defi.html>

²Initial legal review of terms of use for Census Data shows that with attribution we are free to use the data for the intended purpose of Project DeCree. Use of the following sentence is required, "This product uses the US Census Bureau Data API but is not endorsed or certified by the Census Bureau." (<https://www.census.gov/data/developers/about/terms-of-service.html>)

³NSF2021 \$256,000 Award#2042690 May 1, 2021 - Healthtrends.AI is only the 7th non-University awardee for blockchain based research sponsored by NSF, link: https://www.nsf.gov/awardsearch/showAward?AWD_ID=2042690&HistoricalAwards=false

hands-on experience and are strong advocates of this technology. Susan currently holds the position of Executive Director of Cornell University's FinTech Initiative and is the Co-Founder of Diversity in Blockchain. George holds a teaching appointment with the University of New Hampshire Law School where he teaches on Economics, Blockchain and the Social Impact of Decentralized Technologies. Together Susan and George have assembled a team over the past year to bring together blockchain, public data and analytical experts.

Collectively, HealthTrends and its team will bring community, commercial and academic awareness to the Chainlink-Filecoin ecosystem. Additionally, the POC offers a practical solution, the first of many, that can be used by others to accelerate adoption.

Describe the need for custom tailor made blockchain:

There are few blockchains that are being used to validate, immute and store external, legacy data. This is especially true as it relates to external, legacy government data. By building this POC and making it available as OSS in the Chainlink-Filecoin ecosystem, HealthTrends can encourage and facilitate the use of blockchain and decentralized storage as it relates to publicly available government data. Certain types of government data are available to all but may or may not be accessible to all. The value of this type of dApp is that it facilitates both access to and transparency of government data.

Extending this notion, it is reasonable to envision that the outcome of the POC with its application of US Census data could be expanded to include other forms of publicly accessible government data that would encourage the further adoption of Chainlink and Filecoin. An example of this would be working with Bureau of Labor Statistics ("BLS") public data (unemployment, consumer price index / inflation, etc.) which is already compiled by a government agency and made available via API.

Primitives:

- **Files:** Decentralized content storages
- **NFT:** Non Fungible Token (Tokenized Metadata)
- **OffchainDataSources:** An ODBC (Open Database Connectivity) inspired oracle based connection
- **UID:** Unique identifier

NOTE: Given that HealthTrends intends to use US Census data on-chain, there are several points that should be stated:

- (i) DeCree will NOT involve any personal data or personal identifiable information ("PII");
- (ii) It is assumed that all data released by the US Federal Government has been reviewed and vetted by authorized Federal employees before it is made available on the US Census website; and
- (iii) Per our initial legal review of terms of use for US Census data the data is freely available to use with the following attribution: "This product uses the Census Bureau Data API but is not endorsed or certified by the Census Bureau."

(<https://www.census.gov/data/developers/about/terms-of-service.html>)

Smart Data Contracts

Public data is an asset in a raw state, and requires transformation before it can be applied to real-world use cases. HealthTrends will catalogue data that is available in the public domain, define subset data based on use cases, and apply extract, transform, and load ("ETL") techniques to prepare the data for publication. ETL capabilities are not natively part of the smart contract framework. However, the ability to automate this aspect of the process and include it in our smart contract design could be achieved via the use of robotic process automation ("RPA") technology. At this time, Healthtrends has not determined whether or not RPA technology will be used in the context of this POC. The decision to use or not use RPA technology will be finalized as part of the research and development process associated with the technical architecture. This decision will be made during Sprint 1.

The application will also include a data bounty system to reward the collection and continued storage of valuable data. The specific implementation approach to data bounties will also be defined during Sprint 1.

Once data is ready for publication, HealthTrends will publish this pristine dataset into FileCoin storage using in-built functionalities of ChainLink and FileCoin.

Security and Roles Permissions:

Combining attribute-based access control ("ABAC") models with blockchain technology is more robust and easily manageable in dApp systems.

Function(s) that interact with the smart contract will have one additional parameter (**Read, Write, All, NoAccess**) with 'NoAccess' as default access. All users are mapped to one of the 3 access controls (Read, Write, All) that enables code behind the smart contract to provide appropriate access control.

'Read' is provided to all registered users, 'Write' is for the users who want to create smart contracts, 'All' is for "super users" such as administrators. There is a lot of room to fine tune this model -- this said it is relatively easy to implement while maintaining secure integration of smart contracts within Solidity code.

Value

Please describe in more detail why this proposal is valuable for the Filecoin ecosystem. Answer the following questions:

- What are the benefits to getting this right?

The benefit of DeCree to the Filecoin ecosystem is that off-chain, external, legacy data will be brought on-chain, placed in perpetual storage, and verified. The resulting stored data will be immutable and can be audited for any changes post publication. This ability to survey the record of storage and that the data stored has not been altered will increase public trust in public data. This development will also create tangible, accessible value for organizations that

are currently constrained by legacy data-flows, thus increasing the overall value of the Filecoin ecosystem.

As previously stated, an additional value proposition for the POC relates to UX/UI design. As a prevalent attribute of most dApps, it appears that little time or effort is extended on usability or more specifically on ease of use for those other than experienced software engineers. Increasing the usability of dApps that use the Filecoin ecosystem will expand the end users to members of the larger data, research and analytics community who are not blockchain native. The power of audit, immutability and certified trust are all risk reducing functions that end users not traditionally part of the blockchain community also need and are actively seeking. Since HealthTrends plans to build its tool for non-technical users we have engaged a UX/UI design expert. This expert will, within the constructs of the time and budgets available under this project, help us to create an “Apple-like” experience for the users of DeCree. We envision that the solution will allow for quick and easy access for past and present data via a dashboard. HealthTrends believes that this type of UX/UI experience will result in the increased adoption of this application thus benefiting the Chainlink-Filecoin ecosystem.

- What are the risks if you don't get it right?

The risks of not getting it right are that the market must continue to wait for US Census data to be brought on-chain. US Census data is one of the fundamental building blocks of the vast majority of forecasting and econometric models. The lack of this data on-chain means that current blockchain protocols are not able to use the information, and value it contains, in the same way that legacy firms can and do. Why would HealthTrends want to leave legacy firms with any advantages, particularly when it comes to data?

- What are the risks that will make executing on this project difficult?

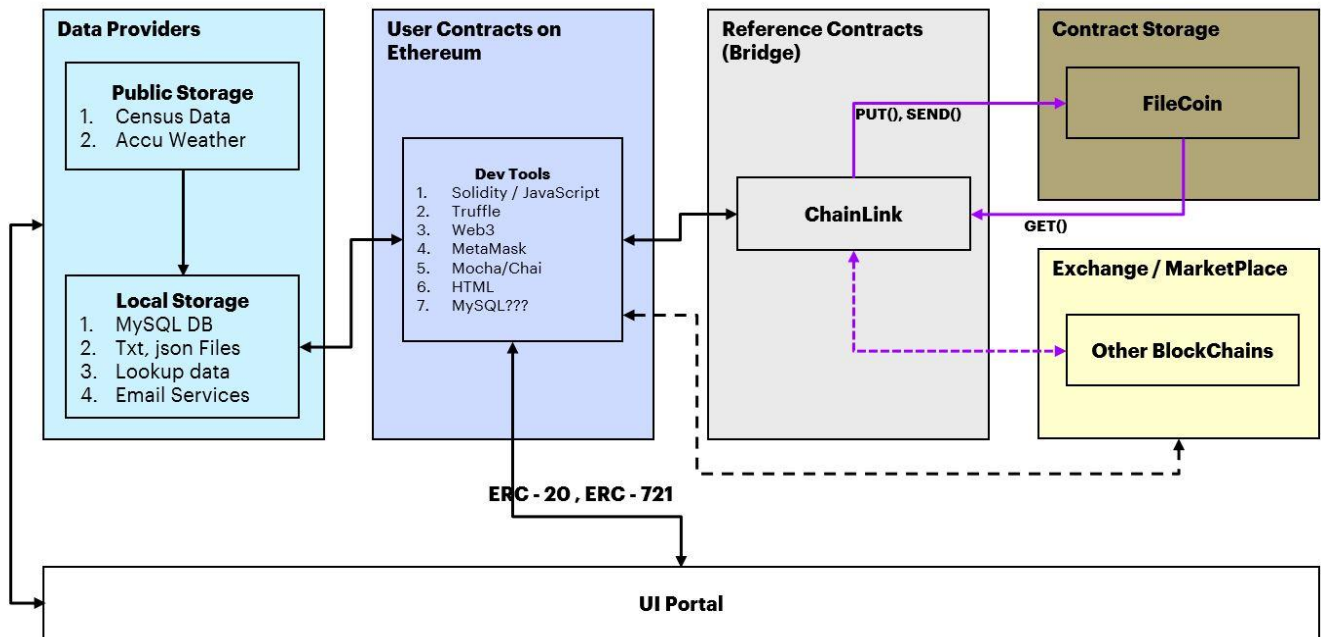
1. Theoretically FileCoin and ChainLink are meant to be integrated, however, there lies a risk since the provided API's (of both ChainLink and FileCoin) have not been fully tested.
2. FileCoin storage costs may be high for the amount of US Census data we look to store.

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Reference Architecture:

The following chart is a summary of the proposed architecture:

HIGH-LEVEL BLOCKCHAIN REFERENCE ARCHITECTURE



Development Roadmap:

HealthTrends will deliver project DeCree using an *Agile* methodology. The development roadmap is a twelve (12) week project which is comprised of six (6) Sprints. Each Sprint is two (2) weeks in length. Each Sprint has specific deliverables as defined below in the section labeled “Deliverables.” The illustration below is a summary of the development roadmap. The detailed roadmap is contained in Exhibit A of this document.

	Sprint 1		Sprint 2		Sprint 3		Sprint 4		Sprint 5		Sprint 6	
	Wk 01	Wk 02	Wk 03	Wk 04	Wk 05	Wk 06	Wk 07	Wk 08	Wk 09	Wk 10	Wk 11	Wk 12
	08-Oct	15-Oct	22-Oct	29-Oct	05-Nov	12-Nov	19-Nov	26-Nov	03-Dec	10-Dec	17-Dec	24-Dec
PMO	[Yellow bar with arrow]											
Requirements, Use Cases and Assessment	[Pink bar with star]											
Technical Architecture and Design Document			[Pink bar with star]									
Team build up	[Pink bar]											
Setup Environment	[Blue bar]											
Database	[Green bar]											
Setup User Ids	[Blue bar]											
Development	[Light Green bar with arrow]											
Integrate with Contracts					[Green bar with star]							
Integrate with ChainLink							[Yellow bar with star]					
Process Test End to End									[Yellow bar with star]			
Go - No Go											[Blue bar with star]	
Go Live											[Blue bar with star]	
Testing											[Light Blue bar with arrow]	
Documentation	[Yellow bar with arrow]											
★ Delivery Milestone												

It should be noted that HealthTrends intends to make a status presentation and demo to the Chainlink-Filecoin Foundation at the completion of Sprint 3. This presentation/demo will be scheduled at the mutual convenience of the parties and will be done via Zoom or another agreed upon video conferencing platform.

Deliverables

During Sprint 1, the project team will finalize project objectives, timelines, resource requirements and the technical architecture. As a result, the deliverables (“Deliverables”) will also be finalized for the project. Therefore the Deliverables listed below are subject to change.

Sprint 1	Requirements, Use Cases and Assessment
Item	
1	UX - User Persona(s) on who we expect to use the final product
2	UX - Define Data Points - Identify data points we want to pull from the census
3	UX - Flow Chart - how those data point relate and interact with each other
4	UX - Functionality Spreadsheet for each data point
5	PM - Manages day-to-day project planning and task prioritization

6	PM - Responsible for standard scope documentation and deliverables, as it pertains to client business needs.
7	PM - Keep track of team's effort in JIRA
8	DEV - Gather all requirements
9	DEV - Conduct all necessary assessments
10	DEV - Collect all Use Cases and translate into Technical language
11	DEV - Finalize all Requirements, Use Cases and Assessment

Sprint 2	Technical Architecture and Design Document
Item	
1	UX - Finalize Functionality spreadsheet for each data point
2	UI/UX - Dashboard wireframe
3	DEV - Complete Technical Architecture
4	DEV - Complete End to End Data Flow
5	DEV - Identify Technical Tools stack
6	DEV - Complete Design Document

Sprint 3	Smart Contracts
Item	
1	UI - Final Dashboard design
2	UX - Identify data points we want to pull from the census
3	UX - Flow chart of how those data point relate and interact with each other
4	DEV - Complete Setting up development Environment
5	DEV - Extract Data from Public domains from Portal
6	DEV - Create and upload Smart Contract on Ethereum BlockChain
7	DEV - Demo on UI Portal

Sprint 4	Integrate with ChainLink
Item	
1	UX - Finalize Functionality spreadsheet for each data point
2	UI/UX - Dashboard wireframe
3	DEV - Integrate Ethereum Smart Contracts on ChainLink
4	DEV - Integrate Non BlockChain data to ChainLink

Sprint 5	Process Test End to End
Item	
1	DEV - Integrate ChainLink with FileCoin
2	DEV - Upload Smart Contracts on FileCoin
3	DEV - Retrieve Files/Documents from FileCoin
4	DEV - Demo End to End process flow (Smart Contract to FileCoin via Chain Link)
5	DEV - Demo End to End process flow (FileCoin to Ethereum via Chain Link)
6	DEV - Collect all pending Tasks

Sprint 6	
Item	
1	UI/UX - User Test Cases
2	DEV - Address all pending Tasks that are identified in Sprint 5 deliverables
3	DEV - Complete all required Technical Test Scripts
4	DEV - Complete all required Functional Test Scripts
5	DEV - Complete all Documents (Functional and Technical)
6	DEV - Project Wind up

Total Budget Requested:

The total budget requested for this twelve (12) week POC project is \$258,060 USD. This includes:

- Planning
- Development
- Testing
- Documentation
- Project / Product Management
- Management Oversight
- Advisory
- General Administration

The following matrix is being provided illustrating a summary of hours by Sprint. A detailed matrix has been included in Exhibit B of this document.

Summary Hours by Role		Sprint 1	Sprint 2	Sprint 3	Sprint 4	Sprint 5	Sprint 6	
Development Team Total Hours by Sprint		328	336	152	152	168	192	1328
Advisor & Mngt Total Hours by Sprint		28	28	28	28	28	28	168
General Administration	5%							75
Contingency Factor	10%							150
							Total Hours	1720
							Blended Hourly Rate	\$150
							Proposed POC Budget	\$258,060

Maintenance and Upgrade Plans

Specify your team's long-term plans to maintain this software and upgrade it over time.

HealthTrends has core values of the availability and freedom of public data being maintained for the good of society and to serve enterprise. HealthTrends sees the use of Chainlink oracles and Filecoin storage as fundamental in this mission. DeCree will solve critical problems for HealthTrends' long term goal of making trusted public health and other public data accessible with the help of decentralized systems. HealthTrends' plans to further expand its team in order to effectively maintain and continuously improve this software and related projects.

HealthTrends has been around and growing now for over a year and has more work that needs to be done with no plans of going away. HealthTrends is also currently in its Phase II application for another NSF grant with the potential of an additional support from them for our larger research goals.

Team:

Delivery Team Members

- Susan Joseph- CEO
- George Pullen- CFO/COO
- Raju Tharimaan- Blockchain Architect
- Faisal Zeeshan- Data Architect
- Carlos Gutierrez- Product Manager / Project Manager
- Melissa Caven- UX/UI Design Expert
- Caleb Brown- Web Engineer
- Jim Zordani- Delivery Lead

Advisors

- Dr. Tiffany Gray, DrPH, MPH - Data Scientist and Statistician
- Joseph DeLong, Blockchain Engineer Research Advisor

HealthTrends Team LinkedIn Profiles

- Susan Joseph- <https://www.linkedin.com/in/susangjoseph/>
- George Pullen- <https://www.linkedin.com/in/georgepullen/>
- Raju Tharimaan- <https://www.linkedin.com/in/raju-s-tharimana-72ab448/>
- Faisal Zeeshan- <https://www.linkedin.com/in/faisal-z-132b864/>
- Carlos Gutierrez- <https://www.linkedin.com/in/yourlastcarlos/>
- Melissa Caven - <https://www.linkedin.com/in/melissa-caven-b40604111/>

- Caleb Brown- <https://www.linkedin.com/in/caleb-brown-54459440/>
- Jim Zordani- <https://www.linkedin.com/in/jimzordani/>
- Dr. Tiffany Gray - <https://www.linkedin.com/in/tiffanyrgray/>
- Joseph DeLong- <https://www.linkedin.com/in/delongjoseph/>

Team Website:

<https://healthtrends.ai/>

Relevant Experience:

As a company, HealthTrends has experience implementing leading edge technologies to solve real world issues. These technical capabilities were applied to the COVID-19 pandemic and are continually being improved.

At the start of the pandemic, HealthTrends used blockchain technology to collect and validate COVID-19 data. HealthTrends efforts to bring transparency and trust to public health data was recognized by the NSF who awarded HealthTrends an NSF research grant. HealthTrends is only one of eight non-academic institutions to have ever received such a grant from the NSF for blockchain technology development.

The importance of this fact and its relevance to the proposal is that HealthTrends was recognized for being a leading edge company, using blockchain-integrated systems to facilitate rapid, auditable, and consistent collection, aggregation, and distribution of data to solve real-world challenges. HealthTrends brings this same vision, focus and intention to Project DeCree.

HealthTrends is woman lead and minority owned with experience in promoting and recognizing talent from all members of the community. At an individual level, the HealthTrends team is composed of hand picked individuals chosen from the commercial sector and academia. Each was chosen based on: (i) shared value for open source protocols, (ii) their skills and how those skills aligned to this project; (iii) their specific area of expertise; (iv) relevant experience as it relates to this project and the value each will contribute; and (v) passion. Each person that has been chosen for the project has a unique passion that will help to drive remarkable outcomes for the project. Here is a summary of the team’s background and examples of each person’s work:

Name	Skills	Summary Experience
Susan Joseph	Innovation/technology Attorney, Blockchain consultant/global expert, Strategic leader	C Level Executive and former General Counsel for enterprise, fintech, and blockchain startups (i.e. MMBI – supply chain, ID2020-identity)

George Pullen	Blockchain initiatives expert, Senior Economist, Adjunct Professor for Economics and Blockchain, Barista and Geek.	Has run large teams of data scientists, programmers, and statisticians focused on data sourcing and big data analytics using ML and other advanced technical expertise.
Raju Tharimaan	A Blockchain, Big Data, Data Science, Cloud SME.	He has over Twenty years of Development and Global Consulting experience with Enterprise wide Solutions.
Faisal Zeeshan	Advanced Analytics, Open source Technologies, Real-Time and Streaming Analytics, Real-time Visualization, Massive Parallel Processing Databases, Distributed Processing.	AWS certified Solutions Architect, HortonWorks Certified Developer
Carlos Gutierrez	Entrepreneur and Enterprise Product and Project Management, Blockchain Enthusiast.	Coordinator of cross-functional teams. Experienced startup project manager. Frequent collaborator and systems process engineering optimization consultant.
Melissa Caven	UX/UI Design Expert, Specializing in eCommerce and Enterprise Website Design.	Design lead for OneGoal Chicago, a project that required extensive mapping and information architecture to organize content from schools across the country. T2 Labs eCommerce lead for delivery of at-home COVID-19 testing for the patients of it's hospital partners.
Caleb Brown	Full-stack web and data process developer.	Has developed web applications, co-founded and architected digital non-repudiation systems, and built innovative algorithmic tools and associated data pipelines.
Jim Zordani	Global Deliver Executive Specializing in Blockchain,	Founder of Elastech Services, an industry leading

	Ar/VR, Process Automation and eCommerce.	custom software development consultancy.
Dr. Tiffany Gray (Advisor)	Public Health and health analytics SME, Data Scientists and Statistician. Board member of Black Women in Blockchain.	Doctorate of Public Health, from George Washington University; current health advisor for DC Dept of Health.
Joseph DeLong (Advisor)	Research engineer in the blockchain area and fluent in many types of languages to develop and program it.	Core developer working with Ethereum based projects. CTO SushiSwap (Decentralized Exchange)

Overall, when using these five criteria (i.e., values, skills, expertise, experience and passion) are used to compile and calibrate a team, the data shows that the team delivers exceptional results. For these reasons, HealthTrends believe that we can help ChainLink and FileCoin to achieve their desired outcomes of growing the community and expanding adoption. This will start with an investment in this project, in HealthTrends and the capabilities of this team.

Team Code Repository:

To date no one has created code to allow US Census data to exist within Web3.0, hence the reason for our project proposal. HealthTrends will create the code repository for this project during Sprint 1 and will make it available to the Chainlink-Filecoin committee at that time.

Additional Information:

Healthtrends.ai LLC is a New York limited liability company. Its principal place of business is: 7 Lawridge Drive, Rye Brook, NY 10573.

Exhibit A Detailed Development Roadmap

Detailed development roadmap:

