Titan Capital Assignment

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Index

Startup Recommendations

1. **EMO Energy**
   EMO Energy presents a compelling seed stage investment opportunity as a deep tech startup specializing in safe and rapid-charging battery packs. With their patented Active Thermal Management, AI Battery Management System (BMS), and Life Extension Algorithms, they achieve charging speeds of 20 minutes and extend battery life to over 5 years. For Titan Capital, investing in EMO Energy represents an opportunity to tap into the booming EV market

2. **GPU.Net**
   Investing in GPU.Net offers a unique opportunity to capitalize on the increasing demand for GPU computation in the AI-driven market. With a decentralized model challenging industry giants, GPU.net provides equitable access to GPU resources, addressing shortages and high costs prevalent in the market. Their innovative approach, coupled with potential revenue projections exceeding $1 billion, highlights the company's growth potential. By supporting GPU.net, Titan Capital can enter the rapidly expanding GPUaaS market.

3. **Inspeq AI**
   Investing in Inspeq AI presents a compelling opportunity in the thriving AI sector. Their software helps improve and monitor AI applications, tackling important issues like LLM performance, data privacy and accuracy. With little competition in its niche and a focus on research and partnerships, Inspeq AI is well-positioned for success. Their experienced team and commitment to innovation make them a promising investment opportunity in the AI sector.

Investment Memo - EMO Energy

Overview

EMO Energy presents an interesting seed stage investment opportunity. It is a deep tech startup that is building safe and powerful battery packs to be charged in minutes rather than hours.

Fast charging Li-ion batteries face two main problems today - safety and reduced battery life. When battery packs charge rapidly, lithium-ions can gradually crowd around the anode, resulting in significant battery deterioration. Similarly, fast charging utilizes 16x the current usually required for slow charging, consequently generating 256 times the heat compared to slow charging over 4 hours.

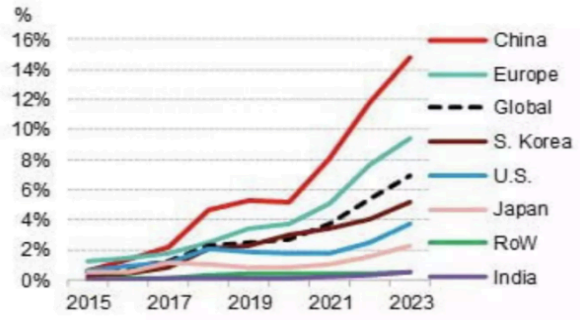
Emo's Tech stack solves this through their patented Active Thermal Management, AI BMS(battery management system) and Life Extension Algorithms, resulting in 20 min charge speeds and >5 years of battery life.

Market Opportunity

The Automotive Industry stands at a huge Turning Point. Fuel prices are at an all time high and urban air quality at an undeniable low. The only way forward is to convert all our energy production to zero emission renewable sources and our Internal Combustion Engine (ICE) vehicles to Electric Vehicles (EVs).

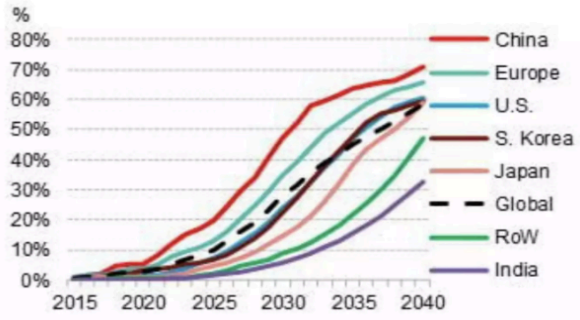
India today has a 6.3% EV Market share, which is much higher compared to 1.75% in 2021 but is seeing a massive increase in the interest and demand for EVs. Over 1.53 million vehicles were sold in 2023-24, a cagr of 89.7% as compared to 0.45 million in 2021-22 . India's EV market size is expected to reach USD 152.21 billion by 2030, expanding at a CAGR of 94.4% from 2021 to 2030.

Figure 1: Global short-term EV share of new passenger vehicle sales by region



Source: BNEF. Note: Europe includes EU, U.K. and EFTA.

Figure 2: Global long-term EV share of new passenger vehicle sales by region



Competition

EMO energy faces some direct and indirect competition from many companies operating in the fast charging low range battery space. Among its indirect competitors are notable players such as Ather, Ola, and Revolt, alongside established industry giants like Bajaj, Hero, and TVS. Some of its direct competitors in the battery manufacturing space are exponent energy and cygni energy.A brief description of its direct competitors is given below:-

1)Exponent energy offers cell-agnostic, 15 minute rapid charging capabilities by using a flexible, and highly programmable energy stack that employs a proprietary battery pack, charging station, and connector. They are working on both the battery and fast charging fronts, to make the chargers and batteries more compatible with each other. It takes 15-minutes to fully charge when using their proprietary chargers and nearly 1 hour otherwise.

2) Cygni Energy offers a wide range of battery solutions, with a focus on both long and short range batteries. Their recent launch of sodium ion 2-W battery pack offers 40 to 50 km range per charge, 30 mins fast charging and 3000+ cycles.

Comparison of EMO energy on the basis of charge rates and battery details is shown below:

#	Battery/Vehicle Name	Battery Size (kWh)	Cell Chem.	Charger Input	Charge Time in mins	Charge rate (Kms / min)
1	EMO Energy	2.5	NMC	AC	20	2.5
2	Tesla Model 3	50	NCA/LFP	CCS2	20	20
3	Rivian R1T	180	NMC	CCS2	30	19
4	Tata Nexon	30	LFP	CCS2	60	6.5
5	Euler HiLoad	12	NMC	DC01	45	2.8
6	Mahindra Treo	7	LFP	AC	600	0.1
7	TVS iQube	2.5	NMC	AC	220	0.4
8	Ather 450	2.5	NMC	AC	90	1.5

The current production threshold for Fast Charge for 4 Wheelers is at ~20 kms/min (Tesla, Rivian) and 1 km/ min (Ather, Ola) for 2 and 3 Wheelers.

Financial Performance and Projections

In the first year of its operation, the startup has generated a revenue of INR 1 Cr. While many of its offerings are still under the pilot phase, the startup is generating revenues by selling 2-kilowatt hour (kWh), 2.5 kWh, and 3 kWh battery packs for two- and three-wheelers.

The financials of EMO energy are not available publicly. However a good estimate of it can be made from its competitors. Ather's 3.7 kWh battery costs INR 58000, which means it has a cost per kWh of ~ INR 16000. The industry standard is also ~INR 15000 per kWh. The prices of EMO energy are also very close to these benchmarks, as confirmed by their founder in an interview.

The company intends to **increase their CapEx** by improving their Mysore factory's capacity to produce 1000 battery packs in a month, which would be a 33.33% increase from its ~750 battery packs production capacity. The company also wants to get into strategic partnerships with li-cell manufacturers, which can help them decrease their cost of production. Apart from this, the company is actively looking for some long term partnerships with EV manufacturers and battery swapping stations, which can help them secure constant cash flow streams in the future.

If the company is able to ramp up their monthly production to 1000 battery packs, then their 2kWh ZEN Pac batteries alone can provide **3,00,00,000 INR (2*15,0000*1000)** of monthly revenue. Also the company is currently working on its latest 30kWh, 30 minute charging battery packs for heavy duty vehicles which can also add to this revenue in the future.

Currently most of the company's revenue comes from fulfilling orders for multiple fleet operators from their factory in Mysore, which currently produces about 25 to 30 packs daily. Apart from this they also get some orders from EV manufacturers and battery swapping stations.

The cost of battery manufacturing can range anywhere from 130 to 150 dollars depending on market conditions. Assuming their battery pricing is INR 16000, we can get a gross margin for different scenarios.

#	Price(INR)	Cost of manufacturing (INR)	Gross margin(INR)	Gross margin(%)
Scenario 1	16000	10790	5210	32.5
Scenario 2	16000	11620	4380	27.3
Scenario 3	16000	12450	3550	22.1

Hence the company must be able to maintain a gross margin of ~20 % in worst of the conditions, assuming they don't increase their own prices.

Potential risks and Mitigation Strategies

	Risks	Mitigation Strategies
Product	- Their charge rate at 2.5 km/min is impressive, but the range for light-weight 2-wheelers is only 50 km - The failure rate of EMO Energy's batteries (at the pilot stage) is still a little high	● Develop new battery packs with higher range without compromising on charge rates ● With their new BMS technology the company expects to reduce it to less than 1%
Supply side	- Reliance on external suppliers for Li-ion cells. Supply chain disruptions or price increases could affect margins	● Diversify towards Na-ion cells ● Build strategic partnerships with Li-ion cell manufacturers
Hiring	- Need for top talent to aid R&D in improving existing battery technology.	● Leverage founders' extensive 10+ years of experience and connections in the domain for recruitment.

Future Potential of the Company

EMO Energy's future is promising as the E2W and E3W markets continue to remain fragmented, providing them with a significant market share opportunity. By 2025, they could potentially capture 50%-75% of the 2W market and 70%-85% of the 3W market, amounting to an estimated $3 Billion market value. With its in-house Battery Management System (BMS) and expertise in battery technology, EMO Energy is poised to become a leading battery manufacturing company in India.

Apart from their 2kWh battery, the company has also built a 10 kWh Lithium Iron Phosphate (LFP) battery pack for three-wheelers and light commercial vehicles. These battery packs weigh 110 kg and can operate between -10 degrees and 50 degrees Celsius. Besides, EMO Energy is building an NMC battery pack of 30 kWh for heavy-duty vehicles, which would have a charging time of 30 minutes and a life of 3,000 charging cycles. This battery pack is still under testing, and its production is expected to start in November this year. These inclusions are expected to bring 20X growth in the top line in FY24.

Why should titan capital invest?

There are certain factors that are crucial to the success of a Battery Pack Technology startup. These include the design and technology of the battery pack, manufacturing capabilities, and strong research and development potential. EMO Energy excels in all these areas, integrating mechanical, electronic, and software elements flawlessly.

Some of the key points that distinguish them are:-

1) Founders:-
   The startup was founded in the year 2021 by Sheetanshu Tyagi and Rahul Patel, who met while working at Ola Electric. Rahul Patel is an IIT Bombay graduate, who has over 10 years of experience in the battery industry, and has worked with General Motors, Sun Mobility and Ola Electric. Sheetanshu Tyagi has worked for some of the World's Largest OEMs on critical engineering decisions for systems ranging from Batteries (Ather, Ola) to Body and Chassis (Rivian, Alta).

2) EMO Energy's solution:-
   Their proprietary software-controlled system efficiently cools battery cells using specialized dielectric fluid, ensuring optimal temperature distribution, consistent operation, and rapid charging even in hot climates. Their in-house developed BMS enables reliable high-current flow, precise measurements, real-time health and safety analysis, and seamless communication with server-based data processing, enhancing battery life,and performance.

3) Fragmented market:-
   The fragmented Indian market for electric two-wheelers (E2W) and three-wheelers (E3W) presents an untapped opportunity. Many smaller players lack in-house R&D and manufacturing capabilities. EMO Energy's innovative battery pack solutions address this gap, offering reliable and high-performance products to major industry leaders as well as emerging OEMs.

Investment Memo-GPU.Net

Overview

GPU.Net is a decentralized graphics processing unit on-demand infrastructure designed to empower the next generation of generative AI.

Currently, approximately 80% of the GPU supply is concentrated in the hands of industry giants such as Microsoft and Meta, allowing them to impose significantly higher rates for GPU usage. Despite Nvidia shipping close to 1.2 million GPUs annually, a considerable shortage persists.

To address this issue, GPU.Net introduces a public blockchain where all providers, regardless of size, can compete on an equitable basis. By decentralizing GPU availability, GPU.Net creates an ecosystem akin to the Airbnb of GPUs: Providers can host GPUs, while Consumers can rent them.

Market Opportunity

The global GPU as a service (GPUaaS) market size was estimated at USD 3.005 billion in 2022 and is projected to grow at a compound annual growth rate (CAGR) of 20.3% from 2023 to 2030. The increasing volume of data and the demand for advanced data analytics have been major drivers behind the growing demand for graphics processing unit (GPU) acceleration, especially in GPU as a Service (GPUaaS).
The market opportunity in the GPU space is broadly facilitated by these factors:

- GPU computational resources in the hands of few:
  Globally, the 4 largest cloud providers - AWS, Google, Microsoft Azure and Oracle - own 80% of the global parallel computation resources leaving funded startups and researchers to either buy it from them at a heavy premium or get their own GPUs which needs skilled datacenter management plus long wait times for the chips to come from Nvidia.

- Surge in Demand for training LLM models:
  As of 2023, There has been a rapid surge in the training of AI models increasing the consumption of GPUs all over the world. This drastic surge resulted in shortage of GPU's availability and cost skyrocketing 10 times.

- Rising cost of GPU Infrastructure:
  The cost of the CPU is less than one cent/hour, which technically eliminates the need to migrate to an alternative in the presence of Big Tech infrastructure

(AWS/GCP/Azure). GPU instances, on the other hand, begin at $3/hour and provide a compelling urge to seek for alternative providers.

Competition

GPU.Net faces both direct and indirect competition from various companies. Among its indirect competitors are established industry giants like Amazon, Meta and Microsoft. Some of its direct competitors in the decentralized GPU providing space are Akash Network, Render Network and Gensyn Network. A brief description of its direct competitors is given below:-

1) Akash Network is an open cloud network built on blockchain that pairs lessors with lessees of GPUs. The main difference between Akash and GPU.Net is in the validation process. While GPU.Net works on the Proof of Compute concept, Akash works on the Proof of Stake concept. Additionally, Akash utilizes a delegator-validator model where the delegator can put some tokens on a validator, and the validator who receives the most tokens gets the validation assignment.

2) Render network focuses only on providing decentralized GPU computing power for 3D Content Creation. It uses a proof of reputation concept. Render relies on a multi-tier pricing (MTP) protocol that uses users' reputation scores to determine job allocation. This tiered configuration provides the foundation for the Render Network's Proof-of-Render (PoR) governance system, which relies on a combination of automated and manual inputs to determine user reputation scores.

3) Gensyn network is the Machine Learning Compute Protocol that unites all of the world's compute into a global supercluster, accessible by anyone at any time. Unlike the other two competitors, it doesn't focus on blockchain methods for validation. Instead, Gensyn is designing a mechanism that includes both cryptographic and game-theoretic components to ensure proper verification.

Comparison of GPU.Net from its competitors:-

#	Company	Use Cases	Validation process	Category	Average Hourly rates($)
1	GPU.Net	General Purpose	Proof of compute	Decentralized	1.5
2	Akash	General Purpose	Proof of	Decentralized	3

			stake		
3	Render network	Rendering	Proof of repute	Decentralized	1.5
4	Gensyn	Machine Learning	N/A	Decentralized	-
5	Microsoft	General Purpose	Done by Microsoft	Centralized	3.7

Financial Performance and Projections

The financials of GPU.Net are not public. However a good estimate of their revenue can be made from its competitors. For example, Akash network charges a 20% take rate from tenants who lease cloud computing services. So if a tenant wants to lease 1 GPU whose price is $4.5 per hour, the fee will be $4.5*20% = $0.9. The cloud industry generated a revenue of $526 bn in 2023 and is expected to generate $628 bn this year. Even if GPU.Net is able to tap 1% of this market share, and assuming a percentage cut same as Akash network, it can generate a revenue of **$1.052 bn(0.01*526*0.2)**.

Potential Risks and Mitigation Strategies

	Risks	Mitigation Strategy
Competition	Competitors such as IO.net, Gensyn, and traditional cloud computing companies might offer lower price packages to obtain market share.	- More focus on acquiring providers with high-end Nvidia chips like H100 and A100 - Monitor competitors' pricing strategies and adjust pricing accordingly
Supply risk	- Currently, NVIDIA serves as the primary supplier of GPUs to major tech giants. - If tech giants create their own GPUs, NVIDIA's excess stock could flood the market, lowering prices and potentially helping small and medium-sized businesses find cheaper GPU options	Diversifying into other domains where market supply is minimum

Future potential of the company

The company's future is bright, especially with the traditional cloud computing market expected to reach $1.26 trillion by 2030, driven by AI advancements.

ChatGPT, a powerful AI, runs on 10,000 top-end GPUs. Meanwhile, other AI models need even more GPUs, like 100,000 for 2D. It is estimated that 3D Generative AI models will require at least 1 million GPUs for their operations.

GPU.Net aims to grab 20% of the global GPU market by 2030, which is estimated at 5 million units. This industry is set to grow tenfold in the next decade, making the company's prospects even more promising.

Why should Titan capital invest?

Titan Capital should consider investing in GPU.Net due to the following reasons:

1) Market Opportunity:-
   GPU.Net adopts a distinctive decentralized approach, challenging established players with large market shares. This approach enables the company to meet the growing demand for GPU computation driven by advances in AI technology at a more economical rate compared to competitors.

2) The Product:-
   Their holistic ecosystem, which unites validators, providers, and consumers on a shared platform and ensures equitable treatment for all participants.

Investing in GPU.Net offers Titan Capital an opportunity to enter the rapidly growing sector of GPU computation which is expected to grow tenfold because of its crucial importance in the success of AI technology.

Investment Memo - Inspeq AI

Overview

Inspeq AI is a software development platform to evaluate, optimize and monitor LLM apps like AI Conversational Bots and Content Generation agents, ensuring data privacy and security.

There have been numerous instances of AI malfunctioning, which has raised concerns about the widespread use of generative AI and large language models. Generative AI technology presents a significant inflection point for humanity. However in order to see wide scale adoption of this technology, it becomes necessary that there are good guardrailing solutions to make sure that the outputs of the applications are accurate, consistent and they are not hallucinating.

To solve this problem, the research team at Inflection AI has designed over 50 metrics and guardrails using a combination of advanced NLP and AI/ ML models that allows organizations to evaluate and optimize model's capabilities and utility across various applications.

Market Opportunity

According to data from research firm Mordor Intelligence, the enterprise AI market is expected to grow at a compound annual growth rate of 52.17 per cent from $25.10 billion in 2024 to $204.79 billion by 2029 as businesses realise the significance of AI in their processes to boost efficiency and reduce costs by automating process flows.

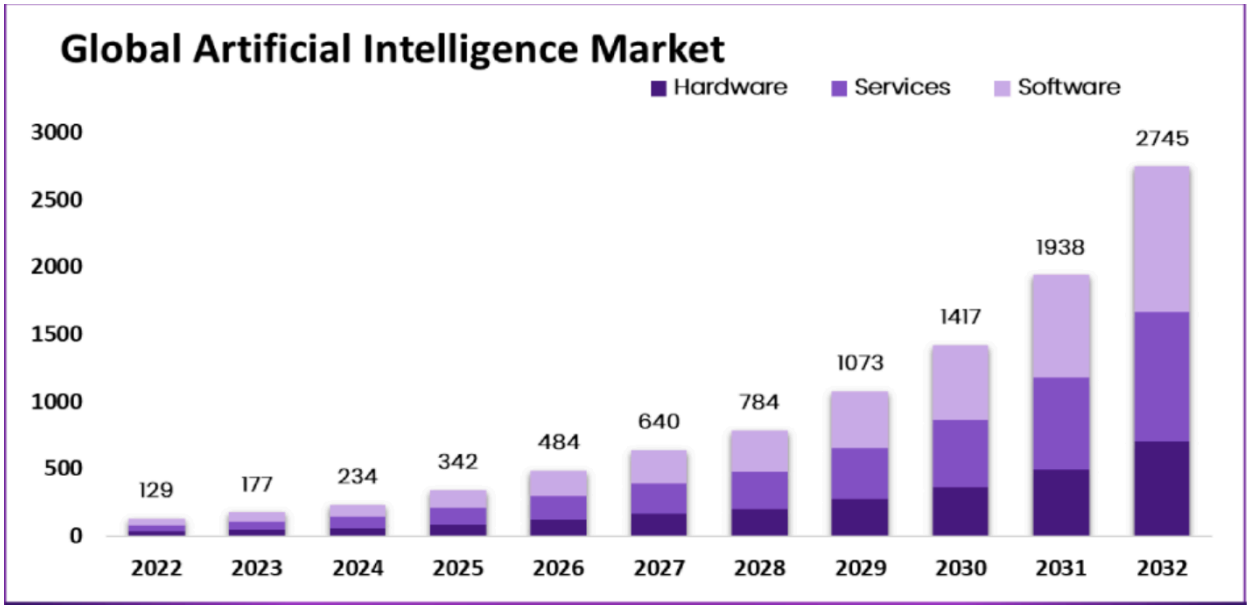
Some of the major market-based factors that have facilitated this growth are:-

- Advancements in New Technologies-
  Increased computing power, storage capabilities and new algorithms are enabling programmers to grow AI applications exponentially.

- Ongoing Growth of Cloud Computing-
  The AI wave wouldn’t have happened without the continued growth of the cloud, which supplies massive computing power for processing and data storage.

- Big Data and Data Availability-
  Until recently, data storage was limited to what could be put on a local magnetic disk or cartridge. Now cloud-based storage gives companies easy access to huge amounts of structured and unstructured data. This access provides

significant opportunities for AI-powered data analysis to detect patterns, identify trends and make predictions.



Competition

Inspeq AI is operating in a relatively nascent domain and hence there are no established players yet. However, it still faces direct competition from some of the smaller startups operating in the AI security space which are mentioned below.

1) Braintrust Data:-
   Braintrust targets the problem of AI evaluation by giving teams a dedicated tool to see how their AI model performs and improve it well before it reaches the production stage. Braintrust provides libraries in Typescript and Python to run evaluations, score outputs using prebuilt scoring functions, and a web UI to visualize and inspect eval results.
2) Talc.ai:-
   Talc provides tools for setting up custom datasets tailored to the specific performance needs of AI systems. With accurate domain-specific data, Talc can evaluate more than just generic benchmarks, identifying mistakes unique to each use case. Talc also generates synthetic data to train large language models (LLMs) on a wide range of tasks, from complex multi-step processes to various natural language processing (NLP) tasks such as Named Entity Recognition.
3) Confident AI
   Confident AI is an open source LLM evaluation model that helps companies

evaluate their LLM models by providing custom metrics, showing difference between models and giving confidence scores.

Comparison of Inspeq AI from its competitors:-

#	Company	Improvement in performance (%)	Metrics Evaluated	Improvemenin AI development time
1	Inspeq AI	80	50	4 times
2	Braintrust Data	79	-	-
3	Talc AI	-	15	-
4	Confident AI	-	12	2.4 times

Financial Performance and Projections

The company's financials are not publicly disclosed, and it is currently in a pre-revenue stage. However, we can estimate its potential based on current AI market conditions.

Currently, there are approximately 65,000 AI companies, all focused on improving model accuracy. Inspeq AI's platform addresses performance issues throughout the entire LLM development lifecycle, from testing and evaluation to monitoring, performance enhancement, and guard-railing of B2B and enterprise AI applications. If Inspeq AI can capture a quarter of this market with a $50 monthly subscription fee, it could generate a monthly revenue of **$812,500 (0.25 * 50 * 65,000)**.

Inspeq AI also enjoys a first-mover advantage, as it faces no significant competition in its niche. Additionally, it can assist enterprises in integrating robust AI solutions into their systems and operations, thereby enhancing productivity and creating another potential revenue stream for the company.

Potential Risks and Mitigation Strategies

	Risks	Mitigation Strategies
Hiring	Need for a strong R&D team to maintain a competitive edge against new and existing competitors.	The founders have great connections in this domain, which can help them hire the right talent.

Data Security	Risk of private data leakage during model testing.	Implement strong data protection measures and establish secure systems for storing and accessing test results.
Competition	Potential future entry of established AI players into the niche market.	Invest in extensive R&D to create a strong competitive moat.

Future potential of the company

The future potential of Inspeq AI looks promising. As the AI industry expands, so do the prospects for the company. Inspeq AI has already achieved significant milestones, including a 70% reduction in development costs, an 80% reduction in hallucinations, and a 90% improvement in LLM performance.

Additionally, the company is working with businesses to enhance their AI capabilities. They are collaborating with platforms like Pocket FM, which is transforming audio entertainment with audio series, to reduce manual verification tasks and ensure accurate content delivery at scale. With the global growth of AI regulations, Inspeq AI is well-positioned to lead in AI compliance for DevOps practices.

Over the past five years, the number of AI companies has doubled, with many established firms pivoting towards AI. Consequently, it is reasonable to expect that the number of companies in the AI space could quadruple in the next 10 years. As more companies integrate AI into their operations, Inspeq AI is positioned strategically to capitalize on this trend.

Why should Titan capital invest?

Titan Capital should consider investing in Inspeq AI for several reasons. Firstly, any AI startup heavily relies on R&D, making it crucial to assess the expertise of the co-founders and their team. Fortunately, both founders possess significant expertise in the AI-ML sector. Ramanujan has contributed to Applied Research in AI/ML at meta, while Apoorva brings over 10 years of experience in Product Management and Software Engineering.

Furthermore, within the AI industry, Inspeq AI operates in a sector with minimal competition, giving it a first-mover advantage. By heavily investing in R&D, the company can establish a strong competitive edge and deter new competitors from entering the market. All of these reasons make Inspeq AI the perfect bet for Titan Capital to have in the AI race.

Appendix

The data about companies is mainly sourced from these websites

1. Tracxn :- https://tracxn.com
2. Crunchbase:- https://crunchbase.com
3. EMO Energy:- https://www.emoenergy.in/
4. Cygni Energy:- https://www.cygni.com/
5. Exponent energy:-https://www.exponent.energy
6. GPU.Net:- https://www.gpu.net/
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