Assignment #1 [L1 Batch A] – Amogh S Amblihalli PES1UG21ME011

1. (Official / Govt of India) definition of a Tech Startup

   Ans: An entity working towards innovation, development, and commercialization of new products, processes, or services driven by technology or intellectual property.

2. What is a DeepTech Startup and how is different from a 'regular' Tech Startup?

   Ans: DeepTech start-ups are active tech start-ups that create, deploy or utilize advanced technology in their products or services. Advanced technologies largely include Artificial Intelligence(AI)/ Machine Learning (ML), Internet of Things (IOT), Blockchain, Big Data & Analytics, Augmented Reality (AR)/Virtual Reality (VR), Robotics, 3D Printing and Drones, etc. They are different from regular tech startups as they deal with complex technical solutions that have the potential to redefine or create new markets and utilise more than one technology to solve problems.

3. What are the characteristics of "Inventive DeepTech" Startup?

   Ans: Inventive DeepTech startups are generally backed by fundamental research. The technology innovations under this largely develop new intellectual property that advances science. They create new ways of computing, communicating, manufacturing or result in an engineering innovation.

4. Read the section on "DeepTech Ecosystem Landscape" and answer the following:
   (a) Number of DeepTech startups and growth rate.

      Ans: 3000+ startups and a growth rate of 53% (for those founded between 2011-12)

   (b) Top 2 sectors for top adopters of DeepTech startups.

      Ans: Artificial Intelligence and Big Data & Analytics

   (c) A set of 'inventive DeepTech startups are creating solutions and value based on Intellectual Property (IP)'. List any 5 IP focus areas.

      Ans: Aviation, Martine & Defence; Security and Surveillance; Life Sciences; HealthTech; Agritech

5. Read the section on "Tech Stack Trends"; apart from Artificial Intelligence what are the 3 other tech focus areas?

   Ans: Big Data Analytics, Internet of things, Blockchain

6. What are the key characteristics of the Indian DeepTech startups? Pick 2 characteristics and answer the following for each:
   Ans: Higher seed and early stage funding; fewer unicorns; strong focus on technical talent; intellectual property-focused; enterprise customer focus; fewer active institutional investors

   (a) What is the significance of this being a key characteristics/enabler of the Indian DeepTech startup?
   Ans: Intellectual property-focused refers to the filing of patents, which ensures that any key technologies that a startup makes can be in their hands and will not have to worry about infringements. Enterprise customer focus ensures that products developed will not only have a large customer base, but also a stable and reliable customer to cater too.

   (b) Your opinion – why opinion – why do you think there are fewer unicorns in the DeepTech startup space?

   Ans: The DeepTech startup space is a competitive field, however it is often plagued by buzzwords and more talk than actual product. Not to mention, the relative ease of accessing computing power makes it really easy to start, but harder to compete with so many others. Funding would be fractured among them as there are only so many funding bodies that exist. Talent is regularly poached and there often does not exist a sense of loyalty or dedication apart from the founding team.

7. Pick any two of the 8 areas listed (Pg 12 in the PDF “There are 3000+ startups working across mature DeepTech Technologies).
   Pick one startup in each area and research about these 2 startups and answer the following questions for each of the startup:
   Ans: GreyOrange in Robotics and Fracktal Works in 3D printing.

   (a) What is the key problem the startup is trying to solve?
   Ans: GreyOrange – Inventory management
   Fracktal Works - 3D printing services including manufacturing and consulting.

   (b) What is the differentiation, the startup is trying to provide through its solution?

Ans: GreyOrange – They use AI cloud software and robotic automation in tandem to manage inventories.

Fracktal Works – They not only provide 3D printing services to customers, but also the option to buy a various types of 3D printers varying from personal to industrial levels.

(c) If the startup is successful, what impact (financial, societal, etc) will it have in the marketplace &/or economy?

GreyOrange – By using robots and AI in tandem, managing and transferring goods of inventories has a steep reduction in price, while giving a 24/7 service with minimal disruptions. This can ensure faster deliveries to consumers and less errors due to human factors.

Fracktal Works – By targetting a wide audience with essentially the same product, but scaled differently, they manage to not only make themselves valuable for prototyping, but also manufacturing. 3D printing offers a potentially less expensive way for rapid prototyping and manufacturing of complex parts, opening up an entire venue of new designs for machines or items that would have been uneconomical in the past.

(d) If you were an angel investor or VC, would you invest in these 2 startups? Why?

Ans: I would, as they provide a valuable service to many industries simultaneously without compromising by over-reaching or over-exerting in many cases. They also have near infinite potential for growth, especially once newer areas such as the space and ocean industries open up. These sectors will benefit heavily from the lack of humans needed that these companies can provide due to environmental factors. This includes, but is not limited to, space manufacturing, underwater mining, etc. Once a strong base, along with a steady flow of profit is reached, research into specialising into these sectors will be crucial. This is possible with time and long-term planning.

8. Based on the 8 areas* (Pg #12) pick any 2 Techs and answer the below for each of the tech areas - *AI, Blockchain, IoT, Big Data & Analytics, AR/VR, Robotics, Drones, 3D Printing

(a) Share **your** understanding (what/why/application/etc) of this deep-tech in ~100 words

Ans: Robotics: Robotics is the use of physical machines to either replicate or automate physical tasks that have been traditionally done by humans. It is merely an extension of the one of the most ancient traits of humankind, laziness. The tendency for us to do less work has made us invent machines to do our work. This has benefited in general as

it as allowed us to get to the point where we are. Its versatility in fields ranging from a docile environment such as homes to extreme environments such as the ocean and space makes it far more appropriate to use them as beasts of burden. However, it is more likely to compliment humans than replace them.

3D Printing: In a similar approach as robotics, 3D printing is also an automated process to reduce human input. Currently however, due to material and technological limitations, it is better suited to rapid prototyping or small numbers of manufacturing. However, everyday there is an innovation done or a record is broken. Its applications today include everything from small hobby projects to even manufacturing of rocket engines and homes. With future applications especially off-world on other planets, it is the nearest sci-fi like technology for rapid making of anything.

(b) Can you think of creative ways of deploying this technology locally (India) and/or globally to create impact (financial, societal, etc)? Capture this in 100 – 200 word*s.*

Ans: The use of robotics in India has many applications. Whether it be in aiding the poor manufacturing state of India, or in helping in agricultural such that the whole country can go from a population mainly focused on it to a much higher level complexity, it holds many promises. Millions of acres of land can also be surveyed and monitored, whether it be for defence or research, robotics would ease the process. A healthcare drone system in transporting blood and organs quickly from point-to-point locations to avoid the horrendous traffic and road conditions of India also holds promise. Another, is for taking care of the elderly. This would free up the productive parts of the demographics and thus increasing the productivity of the nation.

Ans: 3D printing India has a poor manufacturing and research record. 3D printing cannot solve this, however it can be one of the stones to improve upon that. By allowing rapid prototyping at a cheaper cost, a new culture of work involving research and development can evolve. In terms of manufacturing, it can be a cornerstone in manufacturing specialised parts of certain applications, including aerospace. However, I believe its use in making small homes, is possibly the best use especially for low-income households while maintaining sustainability. Other than that, its lack of technical knowledge required for operating 3D printers can be beneficial to a large unskilled labour market, thereby increasing the other aspects in which it can be used.