210508D Selaka Deemantha

My contribution to the project primarily focuses on designing the PCB and mechanical structure for our innovative 3D LiDAR scanner. In designing the PCB, I meticulously selected compatible components and adhered to strict PCB design rules to ensure optimal performance and reliability. This involved integrating components that support the functionalities required for precise data capture and processing, while also considering factors such as power consumption and signal integrity.

Additionally, I took into account the enclosure constraints to ensure that the PCB design fits seamlessly within the physical dimensions of the scanner. This careful integration of electronics within the mechanical framework ensures efficient use of space and enhances the overall durability and aesthetics of the final product.

For the mechanical structure of the 3D LiDAR scanner, I developed a unique design inspired by a cam cylinder structure. This design allows the laser module to rotate smoothly for horizontal scanning and also facilitates vertical movement for capturing data from different angles. By incorporating this cam cylinder structure, we achieve precise control over the laser module's positioning, crucial for generating accurate 3D maps in various environments. And I also developed the mathematical module for this project. Because in this project laser module travel in a horizontal rotation while moving up and down, specialized mathematical structure is needed to map between 3d coordinates and motor angles And i programmed AVR collaboratively with my team member Dineth.

One of the standout features of our scanner is its use of a single laser module, a strategic choice I made to optimize cost-effectiveness without compromising on performance. This design decision not only reduces manufacturing complexity but also enhances the scanner's reliability and longevity.