**Creating a Portable LiDAR 3D Data Collection System for Computational Virtual Reality Environment Building**

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**Abstract**

To build virtual reality models in a computational environment, it is essential to collect accurate three-dimensional (3D) data from real-world structures. This project focuses on assembling a portable LiDAR (Light Detection and Ranging) system to capture and visualize 3D point cloud data for mapping buildings and structures. The primary goal is to design and integrate key components, including a LiDAR scan head, GPS unit, laptop computer, and portable power supply, into a cohesive system capable of collecting high-resolution 3D spatial data. After assembling and testing the system, we conducted field surveys at the Technology Building and Science and Mathematics Complex (SAMC) to acquire detailed 3D datasets, including color images of building walls and roofs. The collected data was processed and visualized to support the creation of virtual reality models with measurable scale in a computational environment. This system will enable the collection of geographically accurate 3D datasets for various campus buildings.

**Poster**A screenshot of a web page

AI-generated content may be incorrect.

**Project Description**

**1. Introduction**

Virtual reality (VR) environments require precise 3D representations of real-world structures. This project addresses this need by developing a portable LiDAR-based system to capture and process 3D data from campus buildings (e.g., Technology Building, SAMC) for computational VR modeling.

**2. System Design**

Components:

* LiDAR Scan Head: Captures high-resolution point clouds.
* GPS Unit: Provides geospatial accuracy.
* Laptop: Runs data acquisition software.
* Portable Power Supply: Ensures field operation.

Integration Challenges:

* Balancing portability with accuracy.

**3. Data Collection**

* Field Surveys: Conducted at Technology Building and SAMC.
* Data Types:
  + 3D point clouds (XYZ coordinates).

**4. Results & Applications**

* Output: Scalable 3D models of campus buildings.
* Applications:
  + Campus planning and maintenance.
  + Immersive VR tours for prospective students.