

PREFACE

Welcome to this report on "Mapping and 3D Visualization using Open-source WebGIS." This report aims to develop a WebGIS platform with 3D scene and digital twin features using open-source methods. The process includes integrating several JavaScript libraries and using open-source digital twin datasets.

The digital twin and 3D GIS industry is mainly dominated by big players such as ESRI, Cesium, and Bentley. These companies have developed various approaches to create the most accurate and precise digital twin models of objects. However, the major drawback of using their features is the high cost due to the complex mechanisms required to render a digital twin. To overcome this and develop our own WebGIS platform to support digital twin models using only open-source methods, we have integrated three open-source JavaScript libraries and rendered the digital twin on a 3D scene web map.

Anpara, a town in the Sonbhadra District of Uttar Pradesh, has three thermal power stations. One of the plant's chimneys can serve as a good object for a digital twin model for processing and rendering. In this report, we use three.js, 3dTilesRenderer.js, and MapLibre.js JavaScript libraries, integrating them to support and render the 3D WebGIS scene and the digital twin model overlaid on the base map. The primary data was collected using a UAV, and the images were processed using a 3D Gaussian splat algorithm to generate a 3D mesh in an open-source format, which was later integrated with the developed WebGIS platform.

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