1. Introduction

The COVID 19 has profound economic, social, health and other impacts on the whole population.The spreading and control of these types of infectious disease depend on many interconnected factors which includes healthcare infrastructure, policies made by the government , population behaviour and vaccination. Traditionally models provide overview of spreading of disease, but they lack the complete view of all dynamics involved in various influencing factors. System Dynamics provides a great tool to analyze and perform simulation over complex factors over time.

2. Background

The COVID-19 pandemic illustrated the requirement of a detailed approach to understand and manage various infectious disease outbreaks. Previous pandemics, such as Flu of 1918 and the other outbreak of 2009, reveals the gap of preparedness, capacity of healthcare and effectiveness of policies. System Dynamics models are used in various domains , including epidemiology, and study the transmission of diseases and the impact of public interventions. By applying feedback loops, effects of delays and various scenario analysis, SD models offer valuable insights into the control and mitigation of pandemics.

4. Problem Statement

The objective of this project is to develop a System Dynamics model to study the dynamics of pandemics. The model will aim to capture how the government policies , vaccination , hospital capacities affects the pandemics. By simulating various scenarios , we can assess the effectiveness of various intervention strategies which improves decision making in future pandemics situations

3. Literature Survey

Various studies have been done in the area of pandemics dynamics includes:

Sterman (2006) applied System Dynamics to infectious disease modeling, highlighting the role of feedback loops in understanding disease spread.
Homer & Hirsch (2006) examined healthcare policies using System Dynamics, demonstrating the effectiveness of interventions in resource management.
Rahmandad et al. (2020 developed an SD model to simulate COVID-19 spread and policy interventions, emphasizing vaccination, social distancing, and economic impact.
Wang et al. (2021 analyzed the role of public compliance and misinformation in pandemic dynamics, showcasing the importance of behavioral factors in disease control.