**RESEARCH PROJECT TEMPLATE FOR ALL INSTITUTE RESEARCH PROJECTS**

*This is what researchers/content owners will fill in to feed content for the new website. Aligns to the design wireframe in invision seen here;* <https://digitalpulp.invisionapp.com/share/KZYJGG78U7Y>

*Top image seen in the design will be sourced by the Communications team to ensure we use royalty free images. If you have a suggestion as to type of image please let us know here.*

**Image suggestion:** [Optional]

**Name of Project**

Assessing the Spread of Invasive Alien Plants in a Biodiversity Hotspot

**Project Contacts**

Madhav Marathe

Abhijin Adiga

**Funding Agency**

United States Agency for International Development

**[SUMMARY (TOP) SECTION: MAXIMUM 200-225 WORDS]**

*[Example below. State the far-reaching challenge – why is it important to solve? How do we foresee solving the problem, research we will do?]*

Biological invasions cause unprecedented disruptions to native ecosystems, and negatively impact health and economy. In the United States alone, the annual economic cost due to environmental damages and losses caused by such invasions is over $120B. The invasive species problem is a common impediment to the achievement of multiple sustainable development goals drafted by the United Nations. We are studying the spread of invasive plants in the Chitwan Annapurna Landscape (CHAL) of Nepal, which is part of a biodiversity hotspot. CHAL has a rich diversity of flora and fauna, which is threatened by the combined effects of climate change and increased human activities. In recent years, there have been a number of studies in this regard.

In this work, we develop a novel framework to explore the feasibility of applying modern machine learning techniques, such as convolutional neural networks (CNNs) on satellite imagery for the invasive species distribution problem. With advances in machine learning and availability of high-resolution imagery (satellites, drones, etc.), monitoring species, forests and croplands using remote sensed data has become a viable option. CNNs have recently been explored for learning from multispectral and hyperspectral imagery. This method also opens up the possibility of retrodiction by using a time series of satellite imagery. Finally, coupled with epidemiological models, this method can help provide forecasts and analyze the different pathways by which these plants can spread and establish in this landscape.

[TAB] **FINDINGS**

[TAB] **TEAM**

Madhav Marathe

Abhijin Adiga

Aniruddha Adiga

Srinivasan Venkatramanan

[TAB] **TOOLS (might also say References, Resources, Publications or Proceedings but needs to be consistent across all projects)**

A Deep Learning Framework for Invasive Species Mapping using High-Resolution

Satellite Imagery, ASPRS 2020 Annual Conference (virtual), June 2020.

S Maharjan, B B Shrestha, M D Joshi, A Devkota, R Muniappan, A Adiga, and P K Jha. Predicting suitable habitat of an invasive weed Parthenium hysterophorus under future climate scenarios in Chitwan Annapurna Landscape, Nepal. Journal of Mountain Science, 2019

[TAB] **IN THE NEWS**

Please provide links to any news articles you want included on this page related to your project. Scroll through the Biocomplexity Institute website and any other online sources you are aware of that might contain articles relevant to your project.