

# EE689 COMPUTATIONAL INTELLIGENCE AND NEURAL LEARNING

## PROJECT REPORT

### Leveraging Fuzzy Cognitive Maps to Decode Complex Interrelationships in Tiger Conservation in India

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#### Introduction

India, hosting over 70% of the world's tigers, faces challenges in sustaining these majestic animals due to habitat destruction, poaching, and human-wildlife conflict. Our project employs **Fuzzy Cognitive Maps (FCMs)** to model and analyze the complex interrelationships affecting tiger conservation.

#### Objective

The goal is to use FCMs to identify and quantify critical factors influencing tiger conservation, simulate scenarios, and provide actionable insights for policymakers.

#### Methodology

1. **Data Collection:** We used data from NTCA reports, conservation studies, and expert consultations to ensure reliability.
2. **FCM Construction:**
  - Identified key variables and assigned causal relationships based on expert guidance and literature.
3. **Simulation and Analysis:** Applied iterative computations to track system dynamics and predict the impact of interventions.

#### Key Findings

1. Enhanced anti-poaching measures and voluntary resettlement programs emerged as critical factors for improving conservation outcomes.
2. Restore degraded habitats to improve ecosystem resilience.
3. Monitor climate impacts on tiger landscapes and adapt conservation strategies accordingly.

#### Weakness:

1. The accuracy and reliability of FCMs heavily depend on the quality and comprehensiveness of the input data.
2. Assigning weights to causal relationships in an FCM involves a degree of subjectivity.
3. This FCM model may not be universally applicable. Different regions have unique ecological, social, and political dynamics that require tailored approaches.

We would further polish and refine this model by integrating insights from other tiger expert maps and incorporating the suggested feedback