VIT-AP UNIVERSITY

Capstone Project Proposal Report
(Individual Report)

Guide Approval (initials/date):	Dr. Somya Ranjan Sahoo	04/08/2022

CAP4001– Capstone Project Proposal Report

Student Name	**GUDI VARAPRASAD**
Student Register Number	**19BCE7048**
Programme	B.Tech Computer Science and Engineering (Core)
Semester / Year	Fast Track Fall Semester (2022-23)
Project Guide	Dr. Somya Ranjan Sahoo
Project Title	A Novel Approach using Fuzzy Logic to Detect Traffic Control Systems

Team Composition: Provide the information below for each member of the **project team**. Include **all** project team members, not just those in your discipline or those enrolled for Capstone project. Please also include yourself!

Reg. No	Name	Major	Specialization
19BCE7048	GUDI VARAPRASAD	CSE	CORE

Project and Task Description : Provide a brief (one or two page) technical description of the design project and your specific tasks, as outlined below : (use a separate sheet)

(a) Provide a summary of the project, including a description of the project and its requirements, the purpose, specifications, and a summary of the approach. If this is a continuing project, you may use and/or edit the same project description.

(b) Describe the specific role and tasks that **you individually** will be completing as part of the design of the project. What **specific deliverables** will you produce ?

(c) Discuss in detail the specific approach that will be used to complete **your** portion of the design.

(d) Describe the phases of the design process that will be incorporated and what work will be accomplished during those phases. (you may attach a Gantt Chart)

Outcome Matrix

S.No.	Outcomes	Plan for demonstrating outcome
1.	An ability to apply knowledge of mathematics, science, and engineering.	Basic understanding of Artificial Intelligence, Fuzzy Logic, Human reasoning, and Cognition is required to implement this project. In order to comprehend the core ideas behind it, it may also be helpful to have a basic understanding of mathematics aspects like Sets, Boolean algebra, etc. To accomplish this, one would also require programming skills (preferably Python here).
2.	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	Traffic congestion in many places is caused by an increase in traffic and a lack of available roadways, which has an impact on productivity, efficiency, and energy loss. The traffic signal controller operation approach at road junctions is a significant contributor to this congestion. Using fuzzy logic theory as a foundation, I suggested a fuzzy traffic control system in this project.
3.	An ability to function on multidisciplinary teams.	This project will be solely developed by me under the supervision of Dr. Somya Ranjan Sahoo sir. I assure to give my best in every aspect when necessary.
4.	An ability to identify, formulate, and solve engineering problems.	Unlike Boolean algebra, fuzzy logic is a type of computer logic, a type of reasoning that has its roots in fuzzy set theory. Mathematical methods for describing ambiguity and imprecise information include fuzzy models or sets.
5.	An ability to communicate effectively.	The execution of this project and its presentation at forthcoming research conferences require effective communication abilities since it is in the research area. In order to gain them, reading additional research papers and articles will aid in successful finish of this project.
6.	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	Python programming experience is required for the project to be successfully compiled. Some of the Python requirements include Numpy, Pygame, Scipy libraries, etc.

Realistic Constraints

1. The Python Community is not accessible for debugging source code.
2. Fuzzification rules and limitations are prior established.
3. Because each vehicle's speed is preset, the problem can only be partially addressed and partially optimized, which is not how real-world situations work.
4. Handling erroneous data and the intuitive inference made by human cognition.
5. It requires tremendous effort to develop a system that can mimic human intellect.
6. Stick to the project timeline and keep checking the deadline.

Engineering Standards

Traffic congestion is one of the crucial aspects of the urban planning. However, with the rapid increase of traffic (both public and personal transport) these days there are a lot of traffic congestion problems.

Using fuzzy logic theory as a foundation, I suggest a fuzzy traffic control system in this project. The approach of fuzzy logic imitates the way decision making in humans that involves all intermediate possibilities between digital values YES and NO. The project that I design can effectively handle the traffic congestion and long queue waiting at the red light. It can control the traffic lights based on the number of vehicles waiting in line at a red light and set the timing to release or retain the vehicles accordingly.

It can calculate the green light time duration by using the information about the number of waiting for vehicles at the red-light phase and the number of vehicle’s frequency during the green phase. The system will use Min-Max inference procedure and Centroid Defuzzification strategy to get the crisp value for the green light time duration as the output.

For successful implementation of the project, I will be using Python for Backend, Pygame to design Front end Interface (GUI). Some of the other Python requirements include Numpy, scikit_fuzzy, Scipy libraries, etc. Fuzzy logic provides a way to solve complex and non-linear problems easily and effectively. Fuzzy logic has a wide range of applications in the areas such as decision making, control theory, pattern recognition, image processing, health care and so on.