

SARATHI

Synopsis report of Major Project

BACHELOR OF TECHNOLOGY in INFORMATION TECHNOLOGY

Submitted by

Roll Number	Name	Year	Branch	Section	Outcome (Patent/Research Paper/ Application Project deployable)
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ABSTRACT

Sarathi an innovative road safety system aims to combat fog-related accidents on highways particularly prevalent in India during winter months. By using IoT and ML technologies Sarathi effectively addresses the increased likelihood of subsequent crashes at the site of an initial collision due to reduced visibility caused by fog on highways. The core component of Sarathi is a vehicle mounted module that provides real-time warnings to drivers approaching a nearby vehicle significantly reducing the risk of accidents. In the event of an unavoidable collision the vehicle's Sarathi module transmits a signal to receiver modules installed on highway light poles each positioned at a distance of at least 300 meters, These receiver modules activate a light and sound alarm system alerting oncoming vehicles of the accident and preventing further collisions.

INTRODUCTION

Fog presents a significant safety challenge on highways particularly in India during the winter months leading to frequent and severe accidents due to low visibility. The need for effective solutions to address fog-related hazards is critical considering the substantial human and economic toll. In response Sarathi offers an innovative road safety system using IoT which includes Ultrasonic sensor and Sensor fusion of different sensors such as Impact sensor, accelerometers and gyroscopes to enhance accuracy. And using Machine Learning techniques like Linear Regression and Decision Tree for processing and making real time decisions. [1]

Sarathi's approach centers on proactive hazard identification through real-time data and advanced algorithms. The key component is the vehicle-mounted module acting as the system's eyes and ears these modules continuously monitor the surroundings providing timely alerts to drivers and facilitating informed decision-making.

In case of an inevitable collision Sarathi goes beyond warnings. The vehicle-mounted modules send distress signals to strategically placed receiver modules along highway light poles. Spaced at 300-meter intervals these receivers act as guard triggering high-intensity light and sound alarms to alert oncoming vehicles transforming the highway into a cautionary zone and preventing further collisions.

MOTIVATION

The vast expanse of Indian highways concealed by dense fog a pressing concern unfolds – the constant threat to lives and the looming specter of economic setbacks. Each collision serves as a poignant reminder of the critical need for transformation. Enter Sarathi not just a project but a compelling initiative driven by an unwavering determination to redefine the landscape of road safety. The impetus behind Sarathi lies in the

urgent call for change, spurred by the alarming frequency of accidents in foggy conditions. With a clear vision Sarathi aims to harness the powerful synergy of Internet of Things (IoT) and Machine Learning (ML). This amalgamation propels the project beyond a mere technical venture it signifies a resolute commitment to preserving lives, shielding families and fundamentally reshaping the safety paradigm on highways. Motivated by this imperative Sarathi seeks to address the inherent risks and challenges associated with fog-induced accidents. By leveraging cutting-edge technologies the project endeavors to create a transformative impact envisioning a future where accidents in fog become obsolete. In essence, the Motivation section of Sarathi underscores the urgency, purpose and dedication that drive this project to be a beacon of change in the realm of road safety.

BACKGROUND

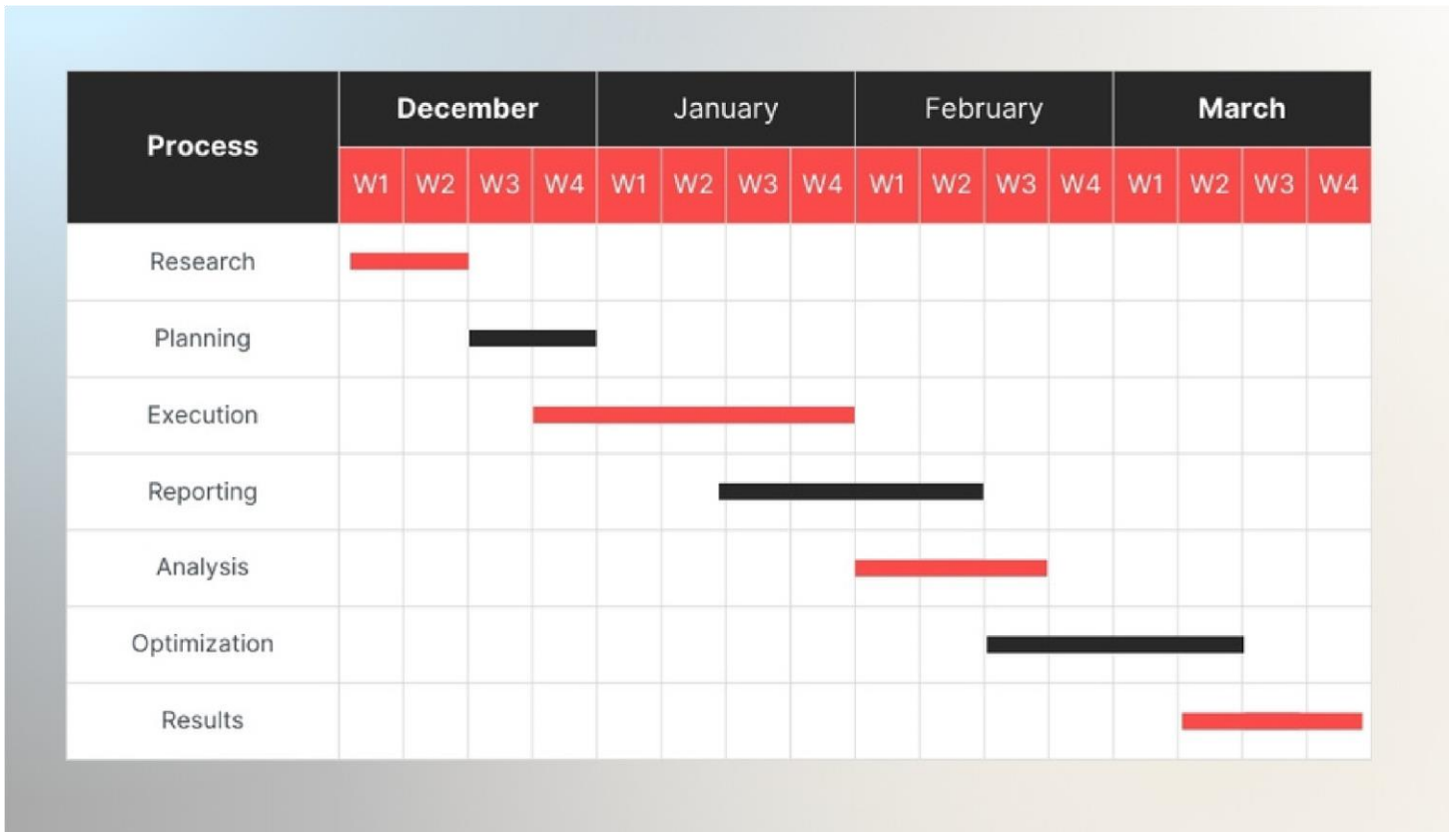
Current road safety measures during fog are often insufficient leading to high number of accidents. Existing solutions though present but reveal gaps in addressing the dynamic challenges of fog-induced low visibility conditions. Existing solutions lack the dynamic response needed for low-visibility challenges requiring an innovative approach to mitigate accidents and enhance highway safety.

C-ITS is a cutting-edge technology fosters safer and smoother roads by enabling real-time information exchange between vehicles, infrastructure and road users. Drivers gain crucial awareness of potential dangers like accidents, road closures, and hazardous weather, allowing them to make informed decisions and avoid collisions. This collaborative approach optimizes traffic flow, reduces travel times, and ultimately saves lives. As C-ITS continues to evolve, it holds immense promise for revolutionizing transportation and ensuring safer journeys for all. [2]

ANPR(NHAI) cameras play a pivotal role in enhancing road safety through real-time license plate identification. Beyond aiding in speeding detection for immediate enforcement these cameras contribute to comprehensive traffic monitoring. By analyzing traffic patterns and pinpointing congestion hotspots they optimize traffic flow reducing the risk of accidents and promoting safer driving habits.[3]

In response to this concern our project Sarathi emerges as a road safety solution by using IoT and ML technologies. Sarathi aims to transform vehicles into entities capable of preemptive communication, Vehicles Equipped with dedicated modules will proactively warn drivers about nearby vehicles significantly reducing the chances of collisions in low-visibility conditions. In the unfortunate event of a crash Sarathi's coordinated response involving light and sound alarms on highway light poles will alert approaching vehicles preventing further accidents.

GANTT CHART



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