# New Age Tourism Guidance with Travelling Salesman Algorithm Using GPS-Enabled UAVS

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*Abstract: In the era, where smarter technologies are constantly on a rise,human-machine interaction always tends to have an integral part to play. With the advancement of various speech technologies, influences on the Humans, Bots and now in Unmanned Aerial Vehicles (UAVs), has scaled to a greater extent, making all of them, much smarter than ever. The Tourism Industry across the nation, has always been the quickest to adapt to newer technologies.However, the need for handling automatic tourism guidance, through predefined voice-outputs, calls for a low-cost, real time adaptable system. The proposed manoeuvre, CALL-DROGO, will serve handy for these requirements. It capitalizes on the Travelling Salesman algorithm and covers the complete arena, thusproviding the various tourists, with the voice-based knowledge regarding their existing surroundings. It's ability to self-stabilize,to be able to hold a GPS-based position,that's the level of autonomy, that makes it an intelligent machine.The experience gathered during its development and implementation could be useful in other defined environments.*
*Keywords:Automatic Tourism Guidance,Travelling Salesman Algorithm,GPS based.*

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## I. Introduction

The Tourism Industry across the country has always been keen in attracting both the national and international neophyte tourists.The growth in technological advancements seems a boon for both the aspiring travellers and the industry involved. The adaptations that the industry has undergone despite the various governmental pressures seems interesting. Despite the control being in various hands,every state's interest and contributions for their tourism seems on to be on par with each other. Amidst the viewership it creates and the business it generates,there is something with the nature, that attracts and appeals to everyone, right from a tiny toddler or a naughty kid,to ayoung adult and to the varied set of peoples in any families.The technological improvements have constantly focused on the surroundings, the pleasant ambience that attracts the general public, and on the palatable food for the incoming guests. Despite all these,there is an area that needs attention from the higher officials of these organizations, i.e. a proper chaperone.The beauty of anything lies on how it's observed and absorbed.

Various states have come up with different and interesting ways to sort this existing issue.They have come up with digital boards,instead of the traditional sign map,which is years old.However,these sign boards can be placed in minimal and maintainable areas,so naturally questions are raised on the need for a proper guide in dense trekking regions,the hilly unmanned zones,to name a few.Thus,to satisfy these requirements, a manoeuvre is proposed under the primary reference DROGO, which basically means DRONE on the GO. So, the CALL DROGO is a pre-programmed drone that highly capitalizes on the travelling salesman algorithm for its movements.Once,a drone is assigned an arena,its programmed with various exhibit spots involved inside it,i.e. the GPS locations are feed into the manoeuvre that it needs to cover on its journey across.Post location feed,each GPS pin is audio mapped with pre-recorded voice output.These voice outputs are the way in which the chaperone delivers the desired information to the incoming travellers.It also possesses an IP camera, that can contribute for the surveillance of animal count in an exhibit, watching the staff's behaviour, and waste management can be made efficient by proper garbage monitoring.
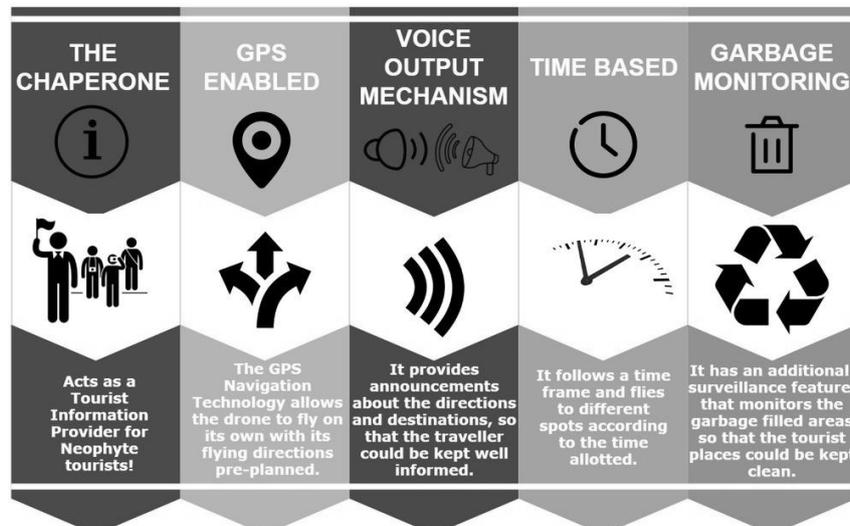
**CALL DROGO - THE PEOPLE'S GUIDE**

| THE CHAPERONE | GPS ENABLED | VOICE OUTPUT MECHANISM | TIME BASED | GARBAGE MONITORING |
|---|---|---|---|---|
| Acts as a Tourist Information Provider for Neophyte tourists! | The GPS Navigation Technology allows the drone to fly on its own with its flying directions pre-planned. | It provides announcements about the directions and destinations, so that the traveller could be kept well informed. | It follows a time frame and flies to different spots according to the time allotted. | It has an additional surveillance feature, that monitors the garbage filled areas so that the tourist places could be kept clean. |

**Fig 1:** Special Features of CALL-DROGO.

## II. Existing System and Its Shortcomings

For longer decades together,painted sign boards have served as a guide to neophyte tourists.Initially, they were very few in number, and as years passed, there was a gradual increase of them within the defined environments.Then, with the technological advancements, digital sign boards replaced the traditional ones. However, these are still serving the same purpose yet again, but in a digital form.These boards have failed to help out the illiterate and senior populace, who still have enough interests across the diverse beauty that the nation upholds.There seems to be a demanding need, seeking attention,to serve as a better alternative to the existing methods.The commonly addressable shortcomings are the complaints that every commoner would arise.A proper throughout guidance by any dependable chaperone would serve the wish which has gained the limelight.Amidst these,automations have flourished in various industries, and one such implementation in the host's business can serve the existing dilemmas and needs.
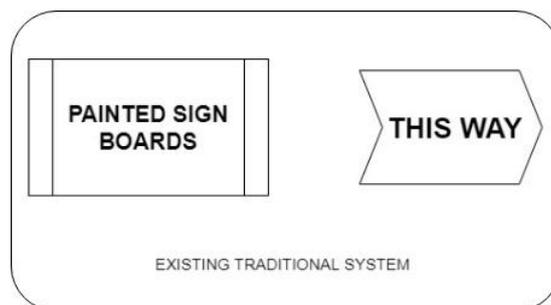
**PAINTED SIGN BOARDS**   **THIS WAY**

EXISTING TRADITIONAL SYSTEM

**Fig 2:** The Traditionally Existing System.

## III. Related Works

Fodness and Murray said that the detailed knowledge of the actual tourist behaviour is inadequate (Fodness and Murry, et.al.,1997) and Aramberri claims that most of the tourist researchers does not help to explain the creation of modern mass tourism (Aramberri, et.al.2001) [1]. The work that has seeked attention in detail at tourist practice is termed as the "tourist information seeking" literature (Snepenger et al., 1990; Moore et al., 1995). This literature concludes that it avoids detailed qualitative description, giving attention more on broad categories of tourist practice and questionnaire–based studies (Riley and Love, et.al.,1999) [2].

Wireless access through mobile devices adds to the Internet connection the element of ''portability'', i.e., connection with no time or geographical limitations, by devices with high penetration to the public [3]; tourists are between this technology-oriented public. Hence, a growing body of commercial and research

initiatives that incorporate electronic tourist guide functionality into mobile devices have been reported [4]. However, these technologies in general have had a limited success; this is due to the lack of an in-depth study of the special characteristics of tourism, which can draw implications for the design of mobile tourist applications [5].

Naveen Kumar, Karambir, Rajiv Kumar have done the survey on the travelling salesman problem using various genetic algorithm operators. The proposed work solves the travelling salesman problem using various genetic algorithm operators. The various methods for the genetic algorithm operators like selection methods, crossover methods and mutation methods are also mentioned in the paper [6]

The Traveling Salesman problem (TSP) The Traveling Salesman Problem (TSP) is an NP-hard problem in combinatorial optimization studied in operations research and theoretical computer science. Consider a list of cities and their pairwise distances, the task is to find a shortest possible tour that visits each city exactly once [7]. With metric distances in the metric TSP, also known as delta-TSP, the intercity distances satisfy the triangle inequality. This can be stated with "no shortcuts", in the sense that the direct connection from A to B is never longer than the detour via C.

$$Cij<=Cik+Ckj$$

In recent years, research and development in aerial robotics (i.e., unmanned aerial vehicles, UAVs) has been growing at an unprecedented speed, and there is a need to summarize the background, latest developments, and trends of UAV research. Along with a general overview on the definition, types, categories, and topics of UAV, this work marks out a systematic way to identify 1,318 high-quality UAV papers from more than thirty thousand that have been appeared in the top journals and conferences. On top of that, we provide a bird's-eye view of UAV research (et.al., 2001) by recapitulating various statistical information, such as the year, type, and topic distribution of the UAV papers. [8]

## IV. Proposed Solution

Thus, to overcome these shortcomings, a manoeuvre is proposed, which has a predefined voice output mechanism.The Drone capitalizes on the Travelling Salesman algorithm and covers up the entire defined set of spacing. It passes through the programmed set of pre-pointed locations across the organization within an allocated amount of time-split.It is set on a forever loop throughout any working day and satisfies 'N' no of tourists.The numerous PIN Locations within the workspace is all matched with their exact voice outputs and when the UAV reaches a particular destination,it delivers that corresponding voice output, which will resolve the dizzy confusions of any tiring tourists, who has already had a long day.

### (i) ELEMENTARY SKILLS:

The basic foundation of the DROGO is the mini-computer Raspberry Pi, on whose hands the entire control lies. It handles each and every component involved in the system on behalf of a human.The Pi is programmed to perfection on various factors, right from plotting the exact locations to be covered by the UAV, then audio mapping the pre-recorded voice instructions that needs to be sent out on various defined GPS points inside the arena.The speakers rightly convey the voice outputs.
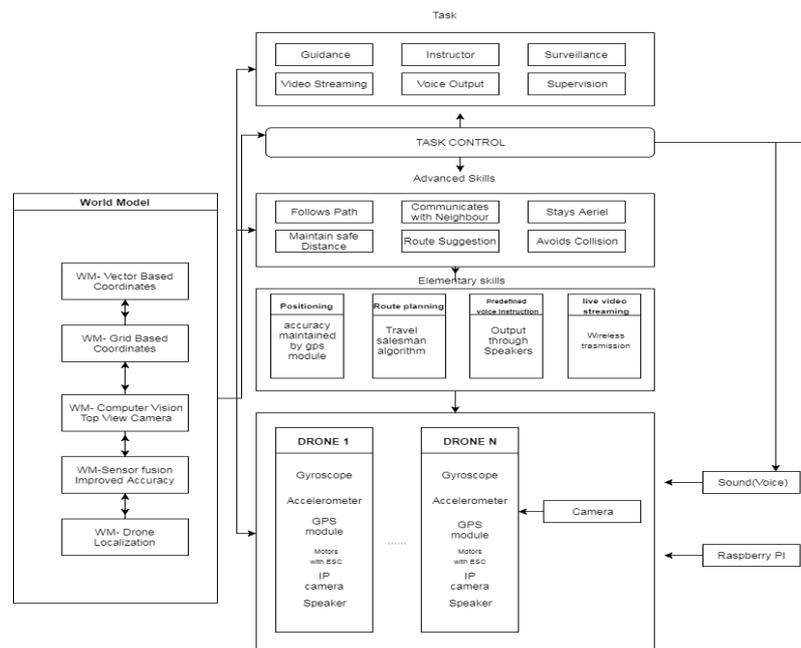
**Fig 3:** Proposed Architecture Diagram.

**(ii) ADVANCED SKILLS:**

The UAV properly follows the algorithm, completes its cycle within defined time limits. It performs its routine on a constant loop, until it gets interrupted by any manual approach or natural disturbance. It maintains a safe distance from the ground, manages itself to stay aerial until its power base supports.Collision with any of its peer drones is not a possibility as each of them in an environment is carefully programmed in such a way that no two of them cover a single exhibit at the same specific time.

The IP camera,that stays along with the chaperone,provides further additional benefits. It, along with covering various pinned locations,monitors the predefined count of the various species in the exhibits, helps the person in the admin sector to keep an eye on the staff's working attitude and behaviour, and finally on garbage monitoring which makes the waste management in the organization more efficient and effective.

## V. Application of Travelling Salesman

1. Consider the various nodes A to F symbolizing different spots in a tourist zone.
2. Find the shortest possible way starting from an initial exhibit A.
3. On a particular iteration,the UAV will cover each and every exhibit only once, abiding to the specified algorithm.
4. It conveys the matched audio outputs and performs the mentioned additional welfares as promised.
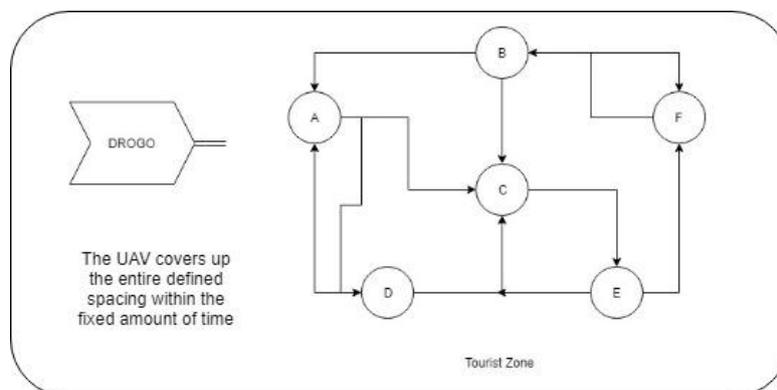


**Fig 4:** Diagrammatic Representation of Work Proposed.

## VI. Conclusions

The paper discusses about the possible new age guidance in the field of tourism. The traditional existing system is discussed and its shortcomings are realized, which clearly indicates a need for a new and efficient chaperone.Thus, a new manoeuvre is proposed named CALL-DROGO, which enhances the system of helping the neophyte tourists.The Architecture diagram is well discussed leading to a proper clarity of the do's and don'ts of the UAVS. The Tourism Industry can very well quickly adopt and implement this technique, so as to bring in many exciting prosperities to both themselves and the explorers.Thus, the proposed system, once implemented will serve as an essential game changer to both the travellers and the industry involved.

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