TECHFEST 2023-2024
DroneLog

INTRODUCTION

Godrej & Boyce Mfg. Co. Ltd. (G&B), the flagship Company of the Godrej Group, has played a key role in India's economic history by driving excellence in design and manufacturing, and delivering sustainable value for its stakeholders and communities. G&B's diverse presence across 10 industries — from complex engineering solutions to consumer goods like appliances, furniture and security solutions - positively impacts the lives of one-third of India's population every day. From healthcare to infrastructure, G&B has been committed to nation building from its very inception, back in 1897. Through international subsidiaries and joint ventures, the Company's products have also established a strong global footprint across 5 continents.

BACKGROUND

Godrej Aerospace (GA), a strategic business unit of G&B engages in hi-tech aerospace manufacturing activities. Our foray into aerospace activities started in 1985 with development of critical, high precision spacecraft components, made from exotic alloys. Currently, we are executing major projects which serve the Defence, Space and Aircraft segments.

Inventory management is an important and critical aspect of manufacturing & delivering components to clients of Godrej Aerospace. Storage of the various components is a laborious task i.e. inbound, keeping the stock count and similar. Currently, the stock keeping is a manual activity thus subjected to human error, tedious tracking, misplacement and human error. Furthermore, height of the storage rack is minimum 15 feet, keeping track of readings manually is very tedious and often error prone, accuracy in stock keeping is a hygiene and contractually binding when working with global customers.

PROBLEM STATEMENT

Participants are expected to design a workable solution for inventory management using modern technology that is scalable. You may explore drone applications to reduce human error & induce real time accuracy.

Design an autonomous movement of drone in a programmed path i.e. XYZ coordinates may be considered with help of IPS (Indoor Positioning System).

The offered solution is expected to read code on the bins with any suitable technology/scanning mechanism mounted on the drone. The data (scan/RFID) collected in the scanner to be transmitted to a Wi-Fi enabled network that automatically populates a dashboard (used by an inventory in-charge) in real time.

The frequency of flying the drone in the warehouse for checking on the availability of bins could be thrice daily (in shifts). The drone should capture the details on the bin tag i.e. name of rack, shelf, date & time of dashboard update.

Competition Stages:

1. Abstract Submission
2. Code Submission
3. Finale

At both the Abstract Submission and Code Submission stage, there will be a shortlisting. The teams selected for the Finale will then present their work at TechFest and winners will be selected.

- **Abstract Submission:**
  Participants are required to provide a comprehensive summary of their comprehension of the Problem Statement. This summary should encompass a thorough understanding of the challenges and objectives laid out in the PS document. Participants are expected to outline the methodology they intend to employ in order to attain the desired level of accuracy in addressing the Problem Statement.

Abstract Format:

i. Title

ii. Abstract

1. Objectives
2. Beneficiaries (For whom)
3. Value of results (Usage)

iii. Background

iv. Statement of Problem

1. Succinct definition of the problem addressed (follows from material in the background section)

v. Research

1. Present methods of tackling the problem (if any)
2. Proposed Solution
3. Alternate solutions/approaches
4. Novelty of Approach: How is/will your solution be better than the existing products that address the same problem?

vi. Technical Report

1. Description of concepts, theories and/or approach involved in the proposed Solution 2. Financial details of the proposed solution
3. Detailed technical specifications and pictorial representations (block diagrams/ flow chart)
4. Description of the flow of operations demonstrating key features and functionality
5. Performance estimate of the solution

vii. Financial Report

Estimated cost of the prototype, and the finished product; expected selling price and model.

viii. Market Report

Is there a market for your solution/product? Who will be your customers and why will they pay? Quantification here will help.

ix. Any other details: (Patent/Business plan etc.)

- **Code Submission**
  Given the provided weight and dimensions of the drone, the selected teams will be required to comprehensively outline and document their work in the following aspects:

1. Installation of RFID technology onto the designated drone.
2. Selection of an appropriate payload compatible with the drone's specifications.
3. Development of an efficient movement or navigation path for the drone.
4. Determination of task completion time, such as counting bins on a rack.
5. Implementation of real-time dashboard updates for monitoring purposes.

Students are encouraged to utilise freely available software for simulation or any other resources they may have at their disposal. All submitted entries will undergo evaluation by the TechFest team. Subsequently, the most promising submissions will be forwarded to G&B and IIT professors for further assessment. Teams that successfully pass this stage will advance to the competition finale.

- **Finale**
  This stage will involve a physical demonstration, during which the chosen teams will present the functionality of their software. G&B will provide a single drone that all participants will utilise for their demonstrations. The TechFest team will need to verify whether they can provide the IPS (Indoor Positioning System) coordinates to the selected teams ahead of the final event. This coordination would streamline the drone setup process, saving valuable time. Students will be expected to successfully integrate their software and tag readers with the provided drone and demonstrate the desired outputs.

JUDGING CRITERIA (FINALE):

Teams will be scored on technology, implementation.

a. Scoring = (180 - time taken) + points earned (ease of operating in decided path) – penalty (drone crashing, inaccuracy, inconsistent dashboard data populating)

b. On site demo will be evaluated
➔ for accuracy of capturing / scanning box data,
➔ longevity of battery life depends on movement of drone flight path.
➔ efficiency in terms of time taken to complete data capturing in given time.

GENERAL RULES

- Participants may decide the size of the tag on the boxes for accurate scan.
- Maximum time of 3mins from take-off to landing will be given to complete scanning of 20 boxes.
- Start & finish point will be the same.

- Timer will start & stop from take-off to when the drone lands.

Eligibility:

1. Individuals or teams from the following categories are allowed:
    a. Students/research scholars of authorised institutions (students have to show their Valid College ID)
    b. Early stage startups or up to 3 years old college pass-outs.
2. A team is allowed to have a maximum of 4 members.
3. If the participating team feels that their idea requires more participants in their team, they can forward their request, with suitable reasons, to the subject "Ideate: Team number increase request."

DATA PROVIDED

Tentative rack height 15ft, 30 boxes to be scanned in one rack, 1.4meter distance between the racks. Participants can decide the size of the drone considering all parameters. Weight carrying capacity of G&B's drone that would be provided for the finale is 400 g.

Registration and Submission:

The Participants have to register on the official Techfest Website and fill all the necessary details. www.techfest.org ->Competitions-> DroneLog -> Explore More -> Register -> Fill all your details - > Now you must create/Join a team.

Abstract Submission:

Teams are required to submit one report to dronelog@techfest.org . This report should contain the idea they are looking forward to working on.

Code Submission:

The Code should be mailed to with the subject 'Drone Log'. The report must be submitted in PDF format only mailed to dronelog@techfest.org .

Certificate Policy:

Only those teams that are shortlisted for the finals and also give a final presentation about their work during Techfest 2023-24 would be awarded an e-Certificate of Participation. The top 5 entries from this event would be provided with a Certificate of Excellence.

General Rules:

1. Every team has to register online on our website for the competition. A Team ID will be allocated to the team on registration which shall be used for future references.
2. A team can register at any point of time before 30th October and submit the abstract and Code (as mentioned in the structure).

3. The decision of the organizers or judges shall be treated as final and binding on all. Techfest has all the rights to verify the identity and accuracy of the details provided by the participants.
4. No responsibility will be held by Techfest, IIT Bombay for any late, lost or misdirected entries.
5. The idea presented by the teams should be original (not protected by means of patent/copyright/technical publication by anyone else).
6. Note that at any point of time, the latest information will be that which is on the website. However, registered participants will be informed through mail about any changes on the website.
7. All modes of official communication will be through the Techfest e-mail.

Prizes:

The prize money will be awarded to top 3 winners via NEFT and will be processed within 30 working days after receiving the prize money from sponsors. Winners have to mail the following information (immediately after the announcement of results) to akshat@techfest.org

Format Of Mail :
Subject: Drone Log, Team_ID - Position
Body of mail:

1. Account Holder's Name
2. Account Number
3. Bank name and Branch name.
4. IFSC Code

Timeline:

Last date of registration	30th October 2023	Participants need to register before this date
Abstract Submission	30th October 2023	Abstract report has to be submitted before this date
Declaration of Result for Code Submission Round	4th November 2023	Declaration of shortlisted teams to work for Code submission Round
Code Submission	10th December 2023	Code has to be submitted before this date
Declaration of Result for Finale Round	15th December 2023	Declaration of shortlisted teams to work for Finale Round
Finale Round	27th - 29th December 2023	Final Round of Competition