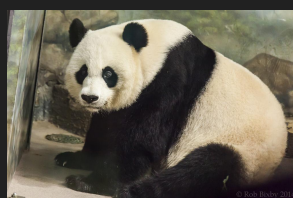
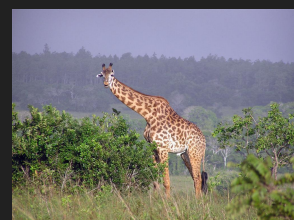
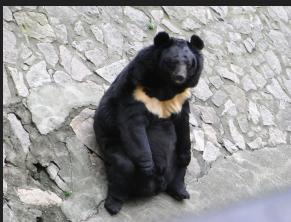


A sizable zoo is home to numerous animals and birds. There are many tourists who come to this zoo. Due to its vastness, many visitors had trouble remembering where certain animals were located, and frequently, people got lost. You are the CEO of an autonomous vehicle-based firm. You have been approached by the zoo's owner for assistance. He desires a completely autonomous car that can transport visitors to various animals while navigating the zoo. And since everyone needs refreshments, snack points have been set up around for the visitors.

You have to identify the animals and snack points in the images from the overhead camera with their kind and exact location, then navigate to them in a predefined order. Brief description of the animals and snack points have been provided you along with the images.

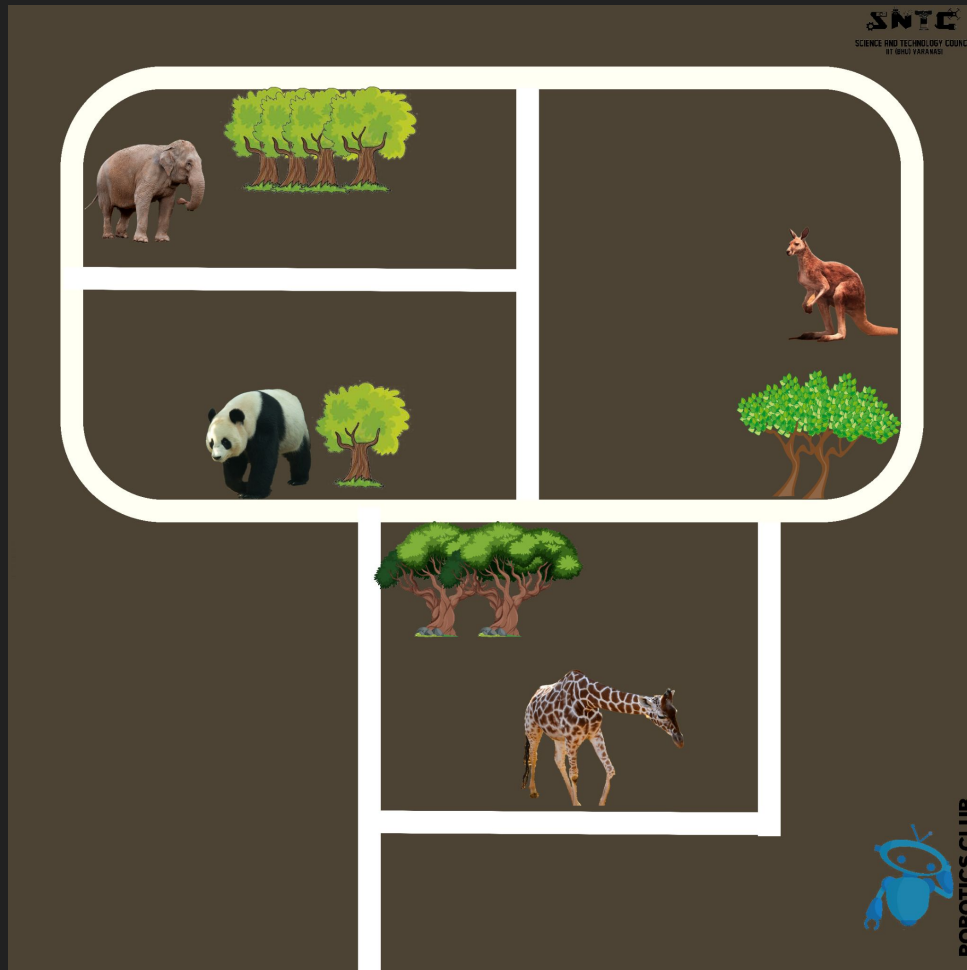
Dataset description : [dataset](#)

The above given dataset contains different classes of animal and two snack points. Every Team should use only the images provided to train their Models. Use of pre-trained models is strictly prohibited.



Sample images

Arena Description



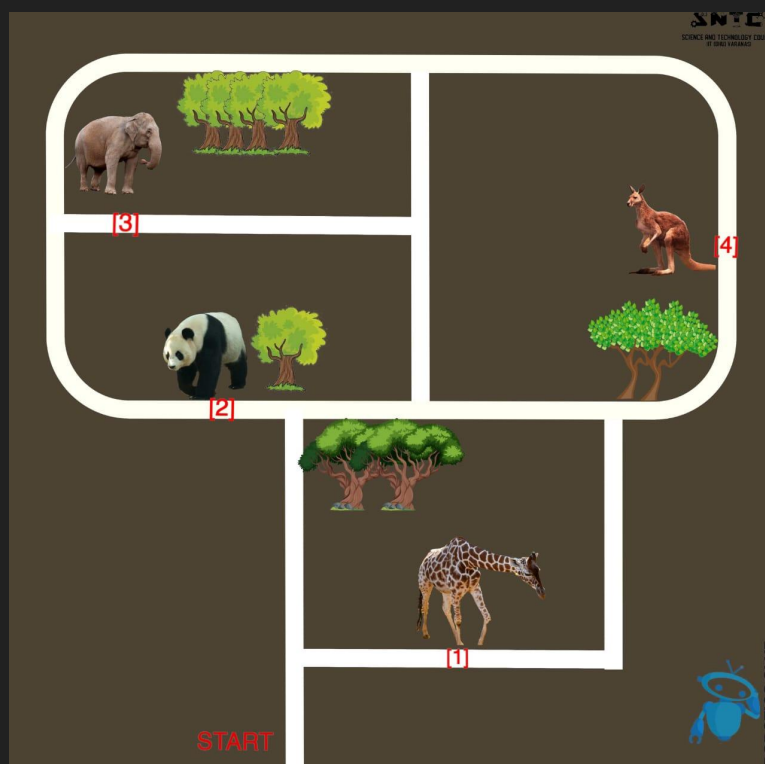
- This is the top view of the zoo (150 cm * 150 cm). Arena contains
 - 5-8 Animals / Snack of different classes of size 15 cm * 15 cm to 20cm*20cm which you need to detect and classify the type of animal
 - 10cm width white road is provided for navigation of bot
- A Video feed from the overhead camera will be provided to the team. The team's computer should autonomously instruct their bot throughout the arena.
- An ArUco marker will be attached on the bot to get the current location of the bot.

GAMEPLAY

- Now, from the starting position, you need to visit all the animals and snacks points in the sequence provided to ensure the joyful ride of visitors.
- The bot first needs to detect and classify the animals / snacks in the zoo using the overhead camera provided.
- The team should generate the proper bounding box along with class name and display it to organiser.
- The bot is provided to you with an aruco marker on top of it. You have to use this to localise the robot.
- You should ensure that your robot stays on the road (white path) and does not go outside of the road. Reaching a point around 10cm of an animal / Snack on the road is considered visiting the animal.
- You should find the shortest path to complete the journey and do it in the minimum possible time. Use the knowledge you gained through our workshops and try your best to implement it on the hardware and complete the task.

Example

- The bot is currently placed on the white line near the starting point.
- The sequence order of visiting animals will be provided by the organiser and the team would have 5 min to calibrate the code.
Sample sequence txt file - Click [here](#)
- The bot is currently placed at the initial position (bottom of arena) from where it needs to visit the first animal in sequence order i.e. here Giraffe.
- Reaching a point around 10cm of an animal on the road is considered visiting the animal.
- Next from Giraffe to Panda, there are two possible pathways from which the bot needs to choose the most optimal one.
- The gameplay ends as soon as bot reaches the last animal in the sequence.



Bot description

You have to create a bot from given components which have maximum dimensions of 22cm x 18 cm and will have an aruco marker attached on its top for positioning. The bot is to be controlled through the provided ESP8266, commanded via the algorithms you develop on ROS in your PC, without any human interference except at the beginning. The power to the bot is to be provided through on-board Li-ion battery.

Any cabled connection to the bot or use of components other than the ones provided is highly discouraged and may lead to heavy penalties or even disqualification.

Scoring Policy

- Final score will be calculated by the given formula

$$\text{Final Score} = 1000 - x$$

- Where:-
 - x is the time taken to complete the problem statement in seconds
- A penalty of 20 points will be levied for every wrong detection of animal
- A penalty of 30 points will be levied for every wrong classification of animal and a new image of the same class will be replaced.
- Only 3 restarts will be allowed with 100 points penalty.
- Run will be aborted if
 - Your robot deviated from the road and started traveling off the road
 - Your robot is out of control
 - Your robot has stopped in middle abruptly

Event Rules

- Each team can have a maximum of 4 participants
- The robot should work autonomously, purely on image processing-based principles.
- The robot should be started by a single click or single command issued by the participant.
- You will be given 5 min for calibration and to set your code according to the sequence of animals.
- The final codes must be submitted to the event coordinator.
- Team members are not allowed to touch the robot and laptop after starting the bot.
- The organizers reserve the right to change the rules as they deem fit.
- Change in rules, if any, will be notified to the registered participants.
- The decision of the organizers shall be final and binding.
- Note :
 - The arrangement of the animals and roads might be different from the one depicted in the sample image during the final event.