

Possibilities of Sharing Multi Species in a Cage Based on Their Food Preference Using Graph Coloring Technique

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Abstract: Clustering has become a special tool in the case of identifying homogeneous groups among large population of dynamic species. Graph coloring technique plays the main role in clustering procedure in many real world problems', since dynamic objects can represent by a graph using a set of vertices, V and a set of edges, E and the graph formed can be clustered in to several number of homogeneous subgraphs according to any considered variable using the graph coloring technique. Basically during this research a vertex coloring

algorithm has been used for finding subgraphs (clusters) from the initial graph according to certain order. Our main contribution in this research is investigating the possibilities of multi species sharing the same cage (multi species exhibits) based on their food preference using graph coloring technique at the National Zoological Gardens, Dehiwala, Sri Lanka and proposing an algorithm that can be used to achieve that target for any zoological garden using graph coloring technique for clustering.

I. INTRODUCTION

During the evaluation of zoos, most of zoological gardens were presented a certain collection of species using single species exhibits. As the number of different species getting increased then they have been faced physical problems due to the space limitation when arranging single species exhibits. As a result the idea of mixing different species by considering some factors has become popular increasingly. Presently most of zoos have considerable experience of presenting mixed species exhibits for several fish, reptiles and some for several species of aves class animals. In Sri Lanka also they have considered that option for fish, some aves and some reptiles and presently it has been a successful effort to overcome the space limitation problem up to a certain level. But most of zoos have identified that single species exhibits of mammals were affected for the occurrence of space limitation problem mainly. Then they have focused on mixed species exhibits of two or more mammal species. It is relatively young concept and also it was a new concept to Sri Lanka.

In this case mainly it should be focused on predator - prey relations, feeds, feeding type and the dominant characters. If it is possible to overcome these factors somehow, it can be seen as a special enrichment, which leads a complex, attractive, educable and fantastic experience for visitors. In the case of finding mixed species exhibits of animals can be seen as clustering of dynamic objects in statistically since clustering has become a special tool in the case of identifying homogeneous groups among large population of dynamic species. In many real world problems', graph coloring technique plays the main role of clustering procedure since dynamic objects can represent by a graph using a set of vertices, V and a set of edges, E and graph formed can be clustered in to several number of homogeneous subgraphs according to any considered variable using the graph coloring technique. Basically during this research a vertex coloring algorithm was used for finding subgraphs (clusters) from the initial graph according to a certain order. As a result, it can be obtained mixed exhibits which are homogeneous within

exhibits and heterogeneous between exhibits according to the above considered factors. The graph coloring technique can be easily used for clustering for a dynamic population of species as explained above. Similarly during this research the aim was investigating the possibilities of multi species sharing the same cage (multi species exhibits) at the National Zoological Gardens, Dehiwala, Sri Lanka using graph coloring technique and proposing an algorithm that can be used to achieve that target for any zoological garden. The main objectives of this research can be presented as follow.

- The main goal is to educate its visitors about the natural behavior of each animal when different species sharing the same cage.
- Overcome the space limitation problem as much as possible.
- To achieve the second goal it should be determined the minimum number of mixed species exhibits with maximum number of species (using graph coloring technique).
- To present an algorithm which can be determined the cage or cages relevant to a newcomer according to same technique that used before.

II. METHODOLOGY

Graph formed by a set of vertices and edges where each edge having a physical meaning. The set of edges are the connections between vertices. During the clustering of a graph into several subgraphs, the task is grouping a set of heterogeneous vertices into clusters (subgraphs) by consideration of the structure of the edges. In that case there should be many edges within each cluster and relatively few between the clusters. During this research it has been over viewed the definitions and techniques for graph clustering, that is finding highly related vertices using vertex coloring technique. Finally it has been presented a local algorithm for producing clusters for the selected population of vertices of species of the input graph.