**Dynamic tree shortcut**

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**Abstract:**

Given a rooted tree of size $n$, the tree shortcut problem is to find a set of shortcut edges to ensure that the shortest path from each node to its ancestors is of length $O(\log n)$. Moreover, the degree increment of each node is required to be constant. We consider the dynamic version of the problem which supports node insertion and deletion. For insertion, a node can be inserted as a leaf node, or a node can be inserted as an internal node by splitting one edge. For deletion, a leaf node can be deleted, or an internal node can be merged with its single child. We propose an algorithm that maintains the shortcut structure with $O(\log n)$ update time.

**About the Speaker:**

Zhang Chenzi is a full-time MPhil student at the Department of Computer Science, the University of Hong Kong. His supervisor is Dr. T.H. Hubert Chan and he is working on topics in algorithm and data structure.