

## **Deep Reinforcement Learning for Dynamic Resource Allocation**

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The problem of matching resources to tasks in an effective manner, generally referred to as Task Assignment Problem (TAP), was extensively studied in operations research. However the dynamic TAP (DTAP), where resources and tasks are made available dynamically, has received little attention. This work demonstrates the possibilities offered by Deep Reinforcement Learning (DRL) applied to different variants of the DTAP. In particular, we introduce:

1. An extension to the Petri Net formalism, namely Action-Evolution Petri Nets (A-E PN) that allows to formulate DTAP instances to be solved through DRL
2. A translation mechanism from A-E PN to a special type of graph, namely assignment graph, that allows to express DTAPs with infinite state spaces
3. A DRL solution based on assignment graphs for DTAPs simulated through real-world data