

CV3DST - Exercise 2

Orçun Çetintaş
cv3dst-ss22@dvl.in.tum.de

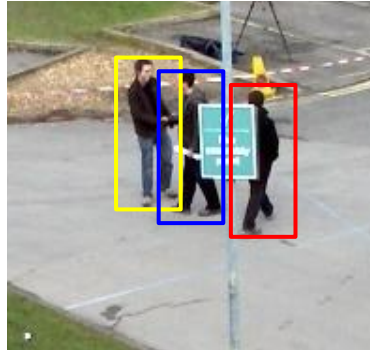
Tasks

1. Improving the ReID-based tracker from the previous exercise
2. Implementing a GNN-based tracker from scratch

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Recap: Hungarian Tracker

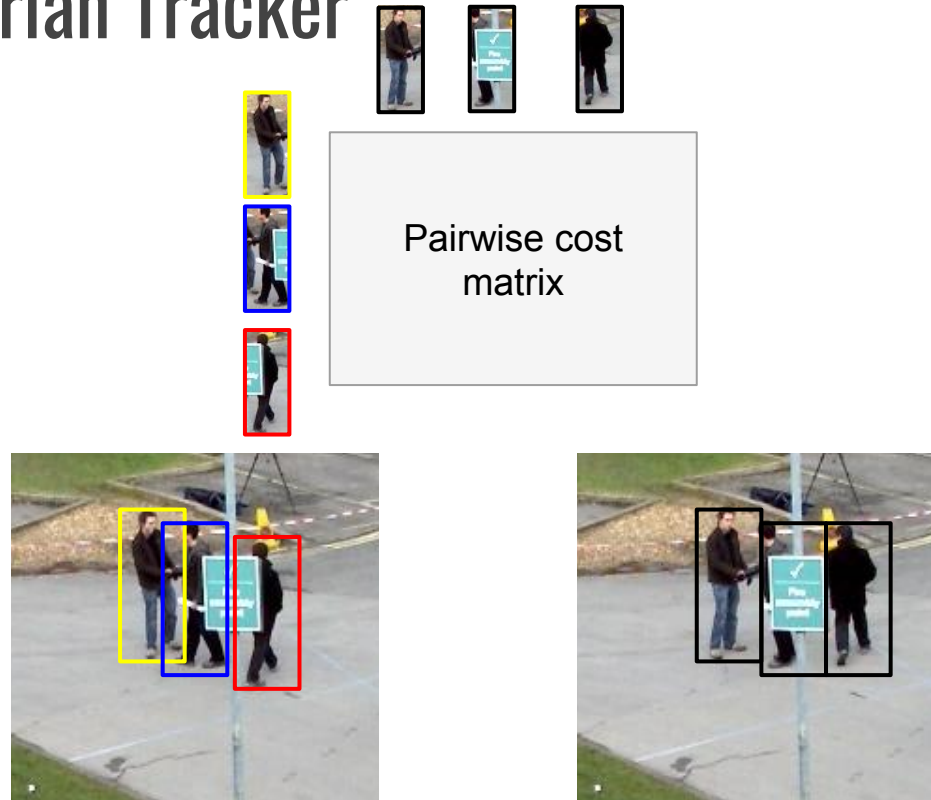


Tracks in past frame

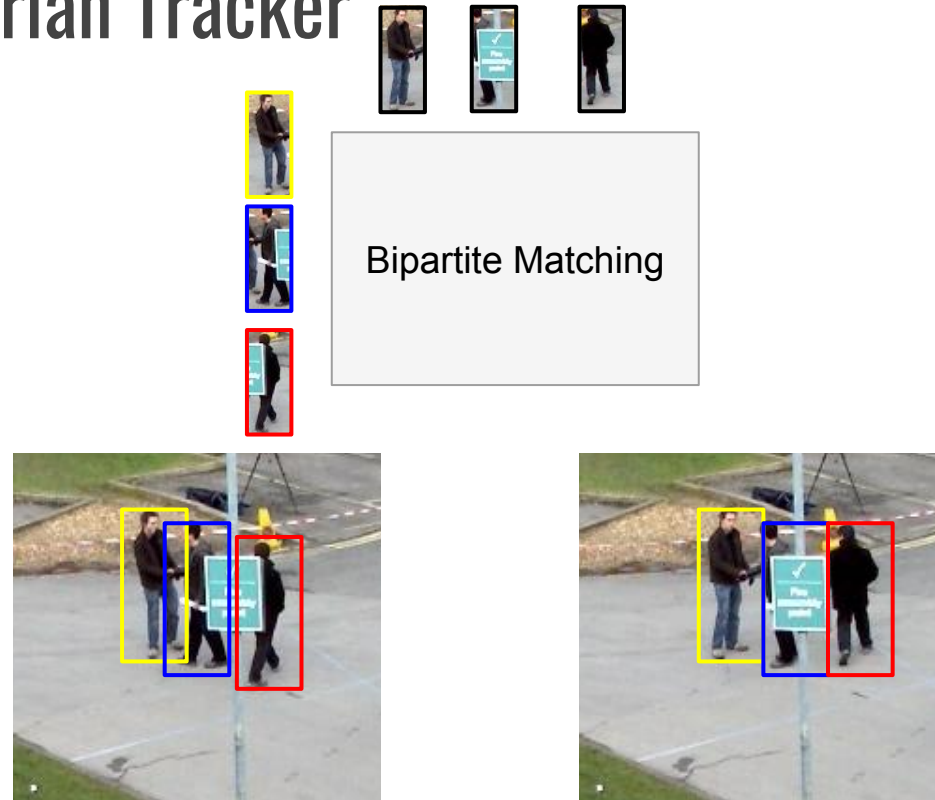


Current Frame
detections

Recap: Hungarian Tracker



Recap: Hungarian Tracker



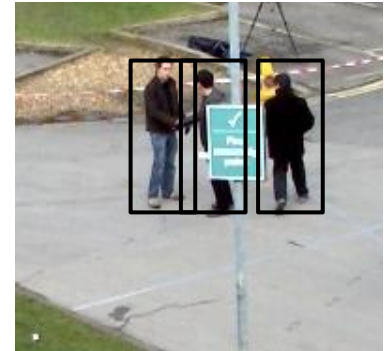
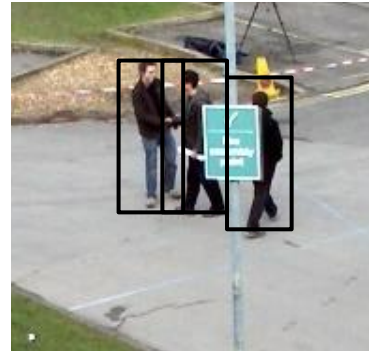
Tracks in past frame

Tracks in current frame

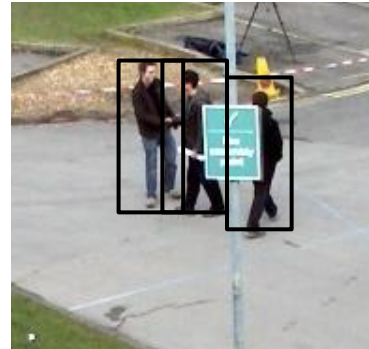
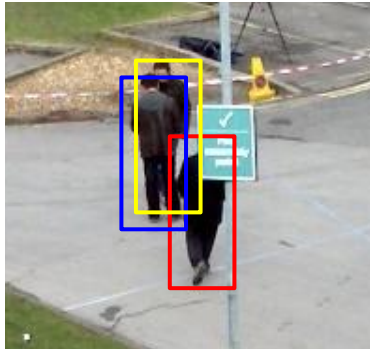
Long-Term ReID Tracker



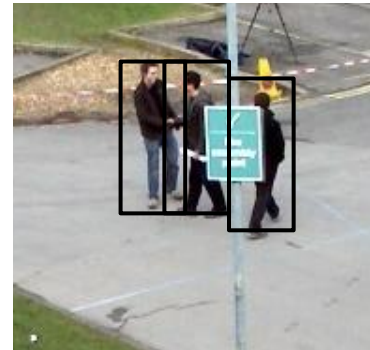
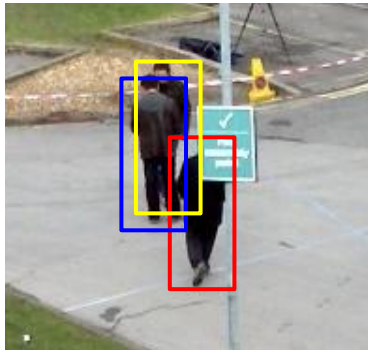
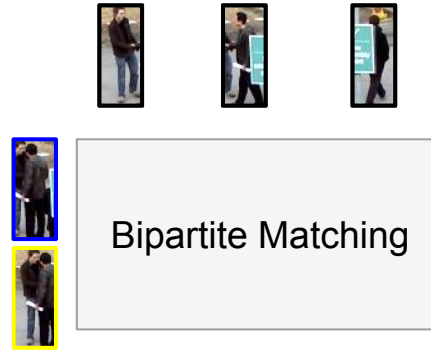
**Missed
Detection**



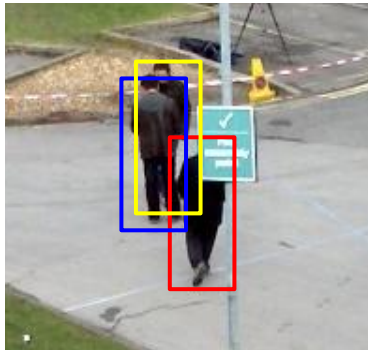
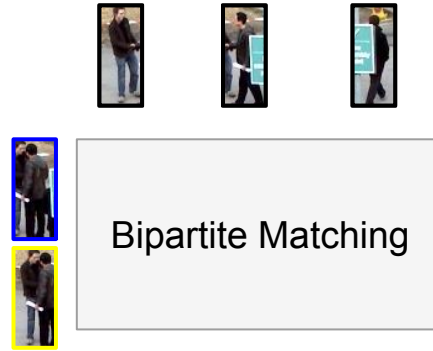
Long-Term ReID Tracker



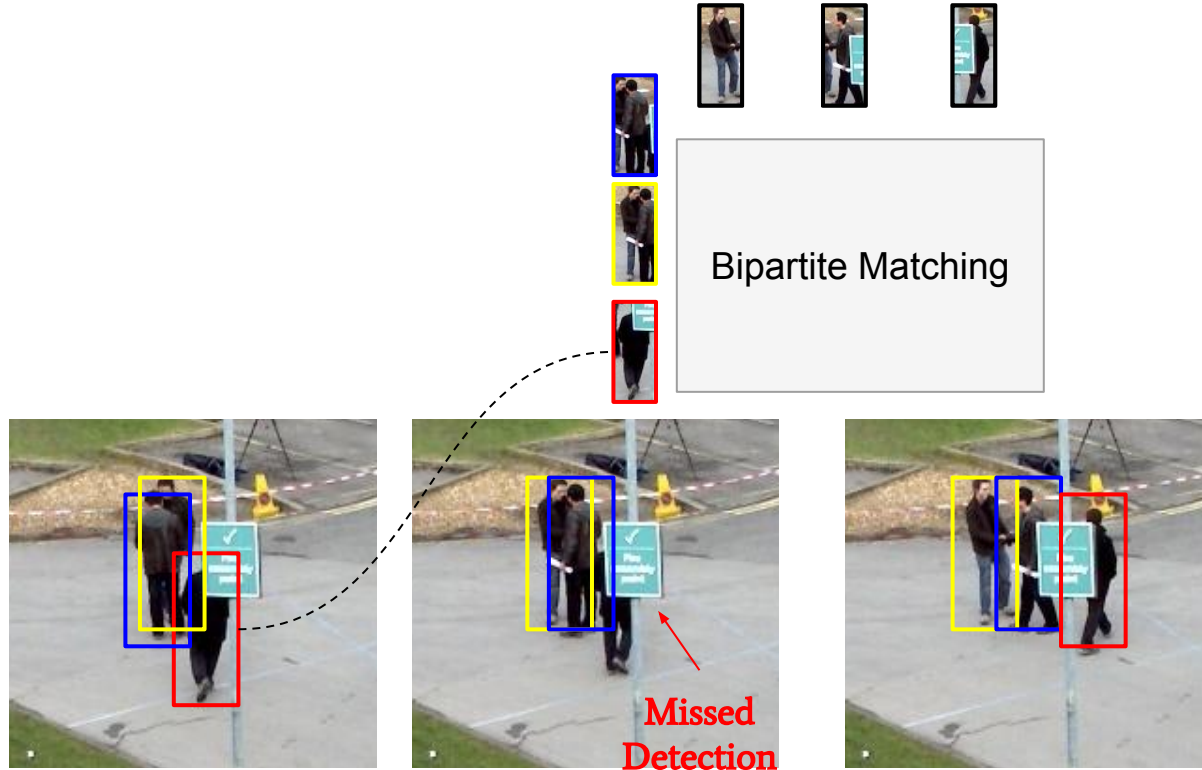
Long-Term ReID Tracker



Long-Term ReID Tracker



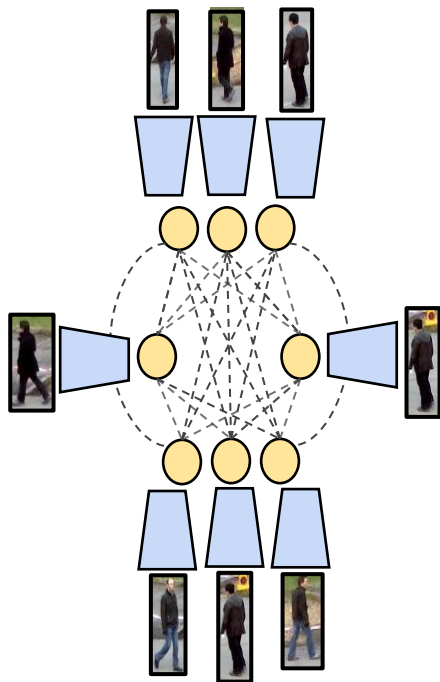
Long-Term ReID Tracker



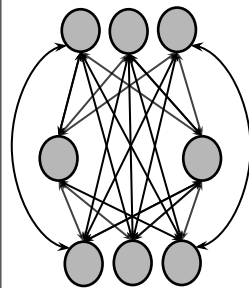
Goals

1. Improving the ReID-based tracker from the previous exercise
2. **Implementing a GNN-based tracker from scratch**

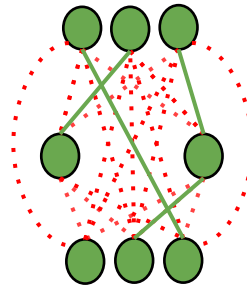
Learning a Neural Solver for Multiple Object Tracking



Feature Extraction



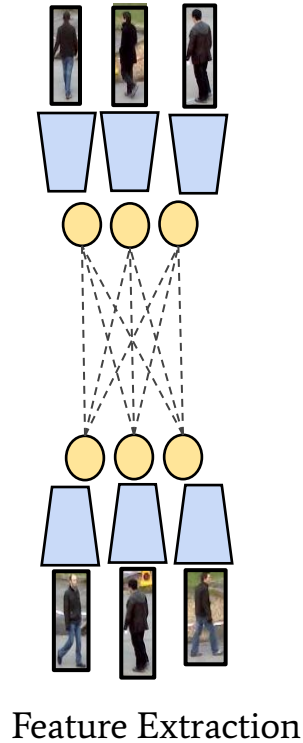
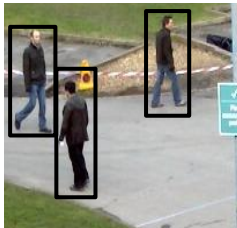
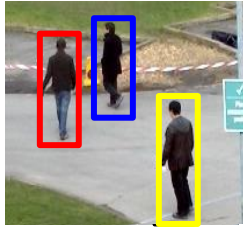
Neural Message
Passing



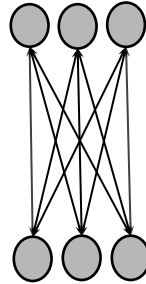
Edge
Classification



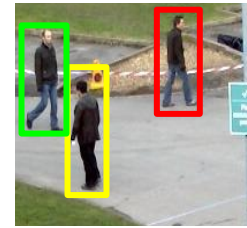
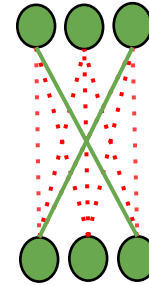
Overall pipeline



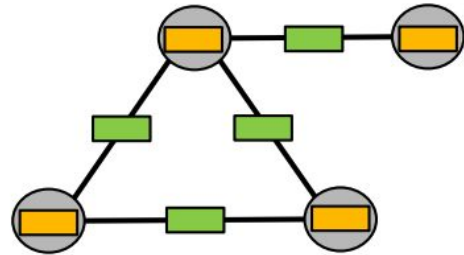
Neural Message Passing



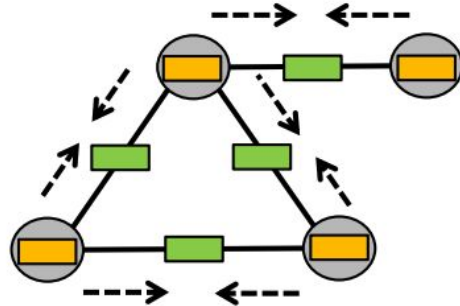
Edge Classification



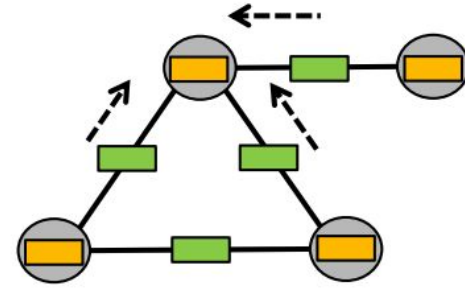
Recap: Neural Message Passing



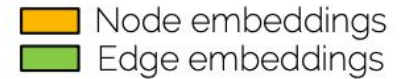
Initial Graph



'Node to edge' Update

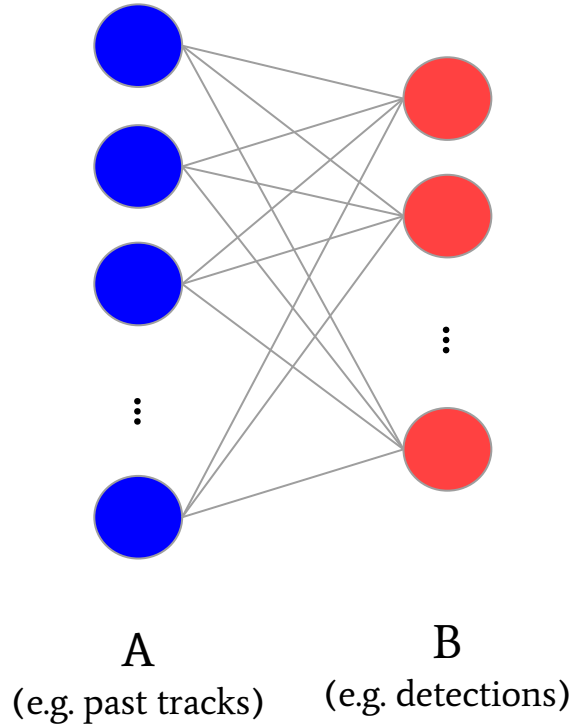


'Edge to Node' Update

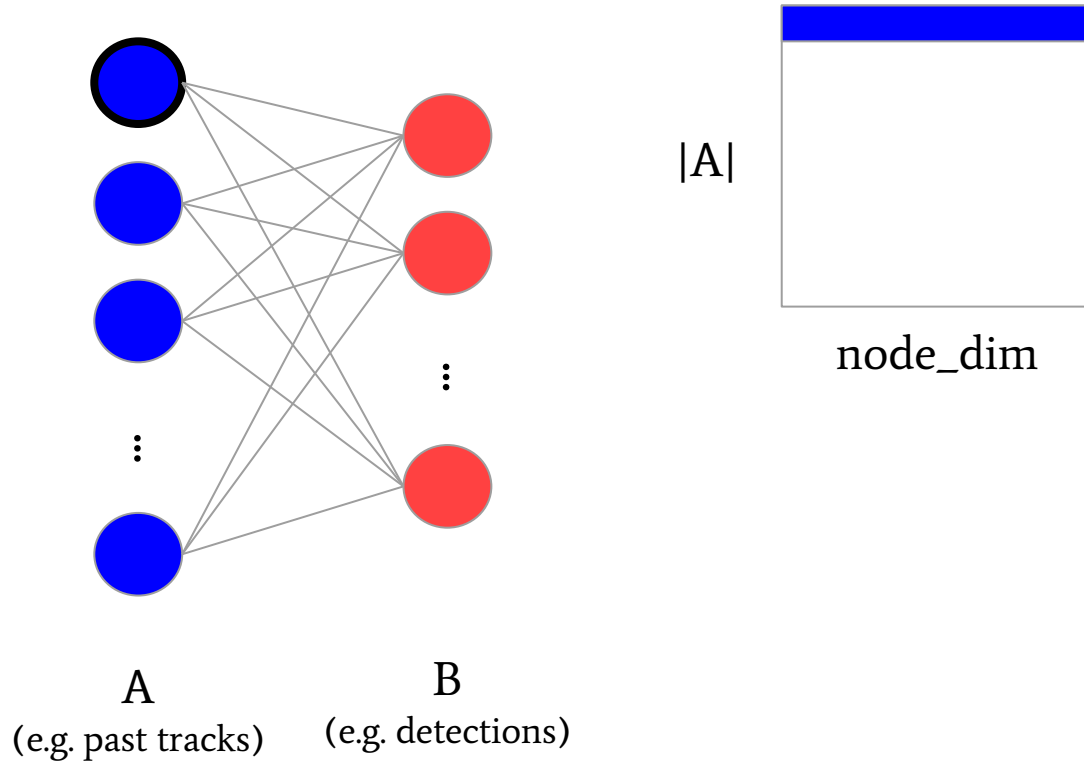


Make sure to go through Lecture 5!

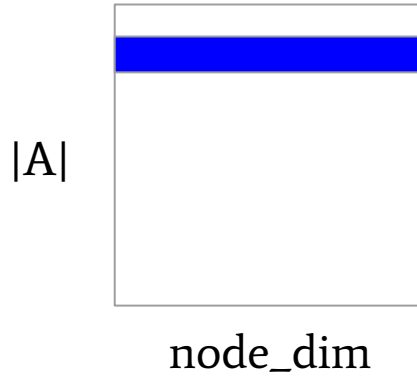
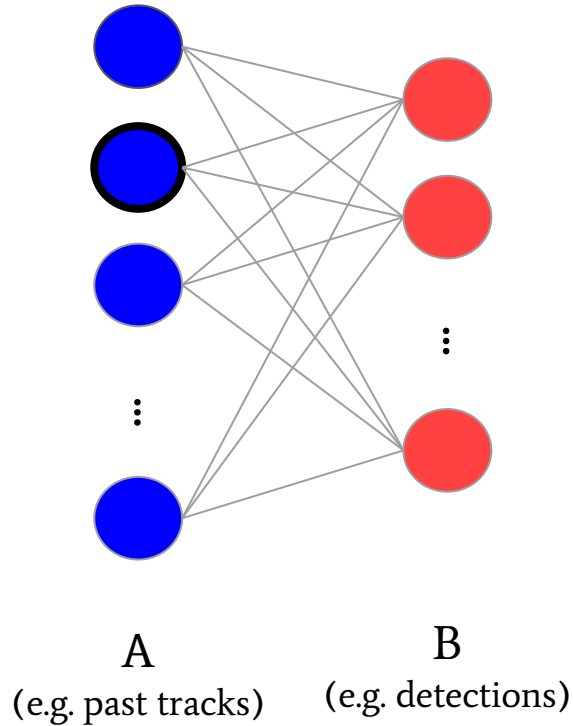
Neural Message Passing on Bipartite Graphs



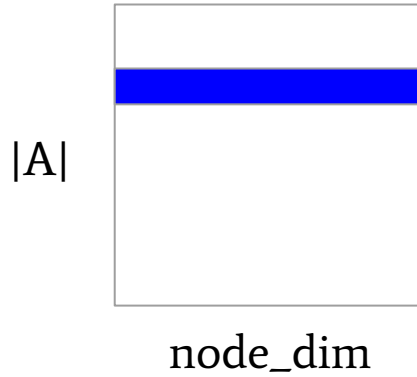
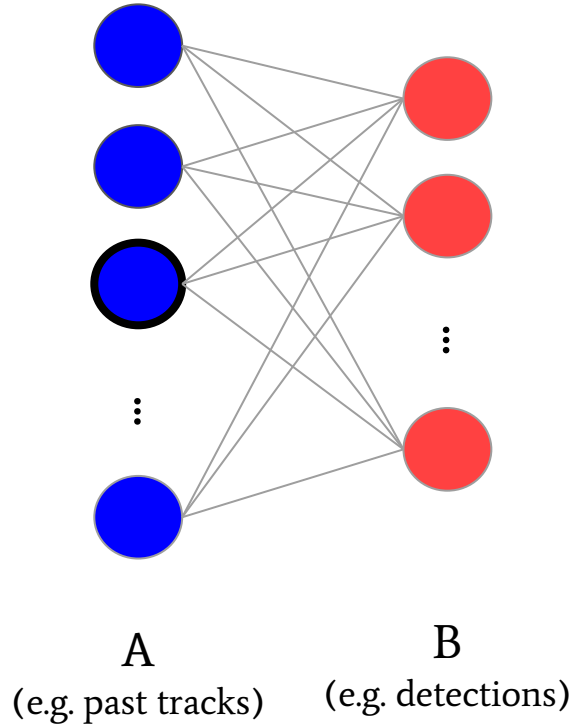
Neural Message Passing on Bipartite Graphs



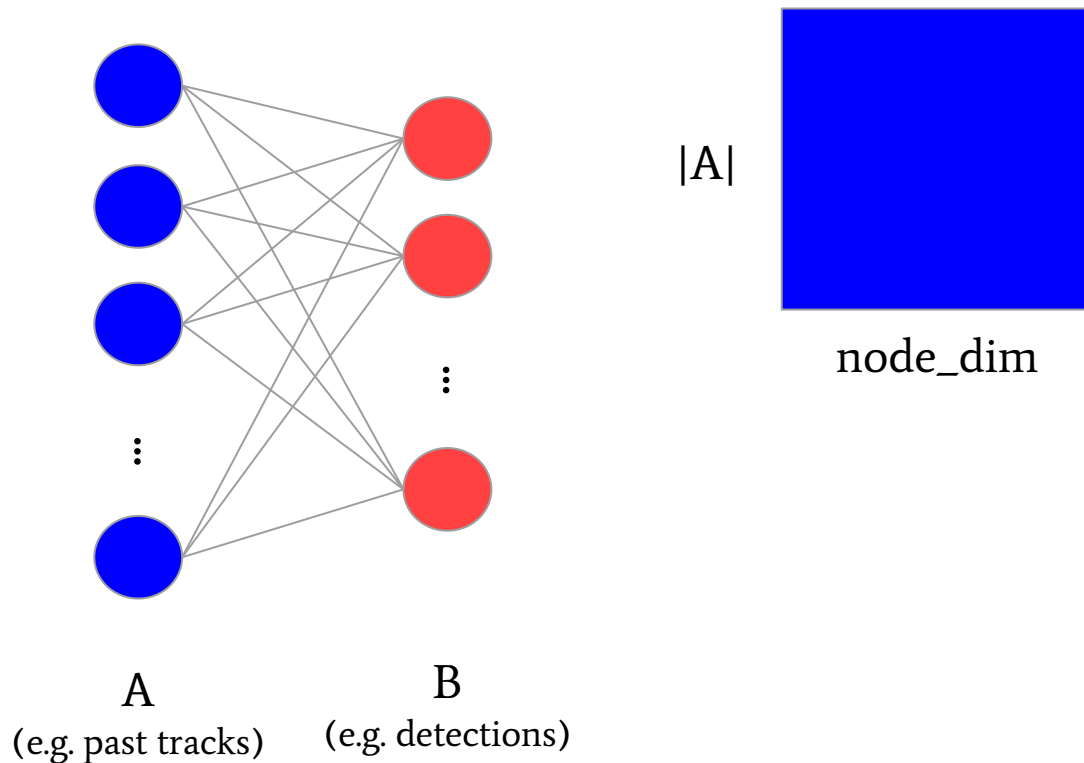
Neural Message Passing on Bipartite Graphs



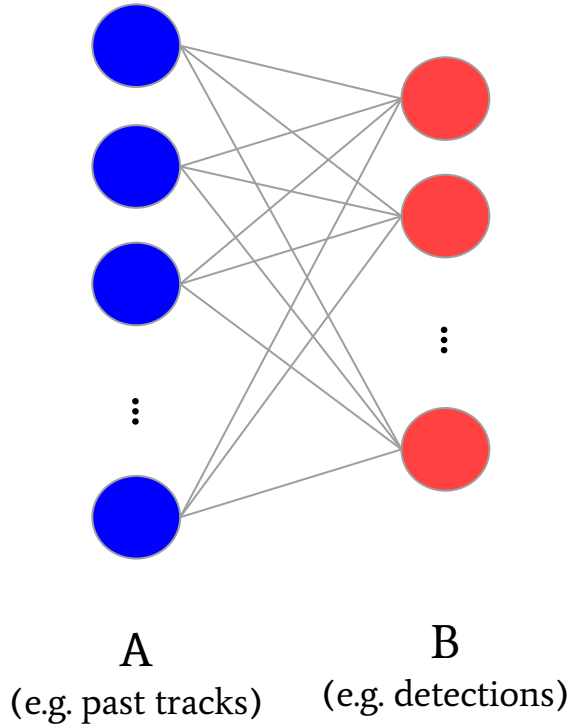
Neural Message Passing on Bipartite Graphs



Neural Message Passing on Bipartite Graphs



Neural Message Passing on Bipartite Graphs

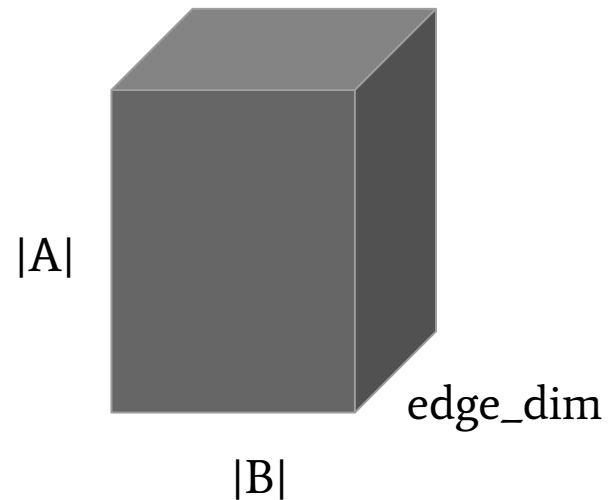
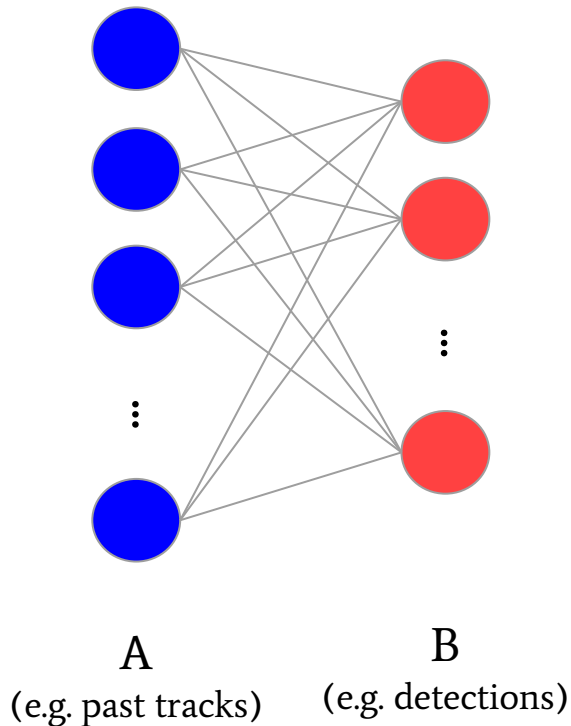
 $|A|$ 

node_dim

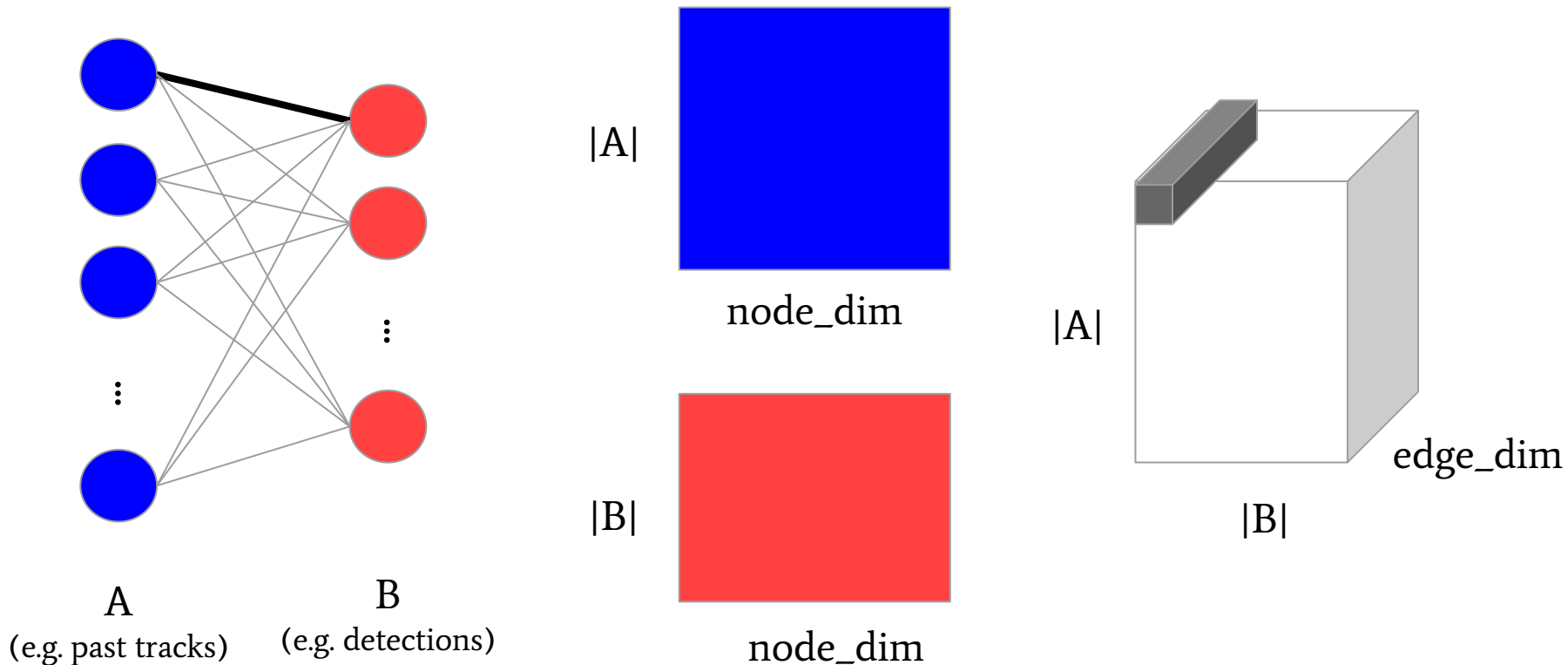
 $|B|$ 

node_dim

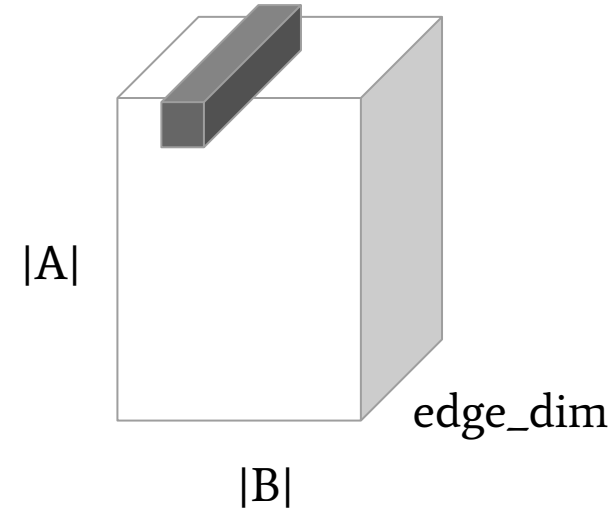
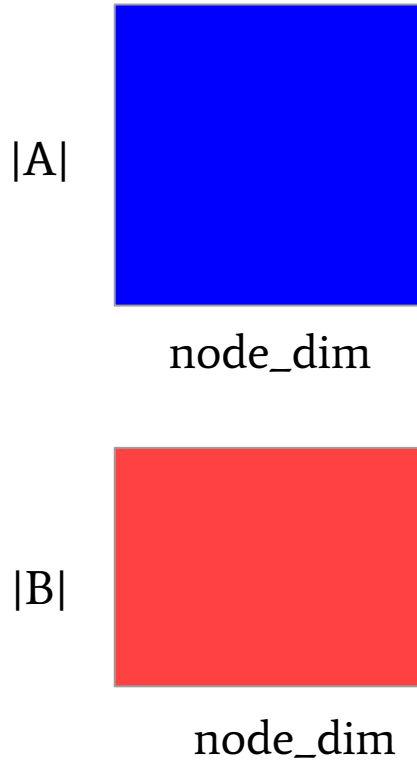
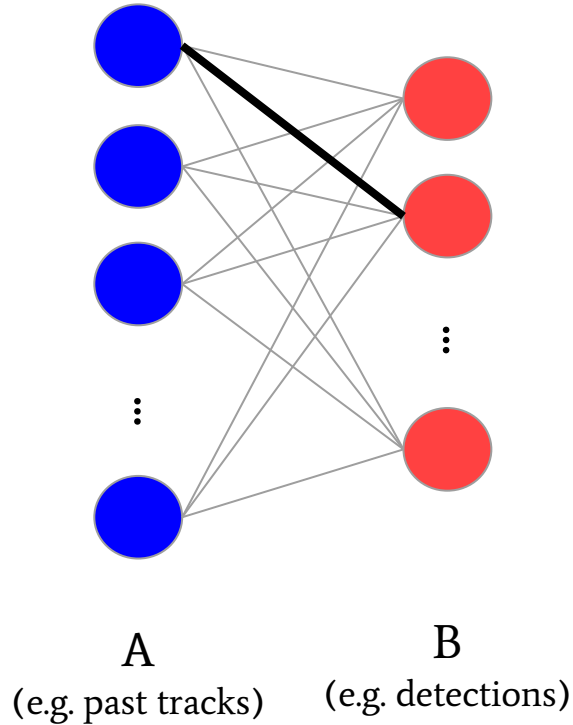
Neural Message Passing on Bipartite Graphs



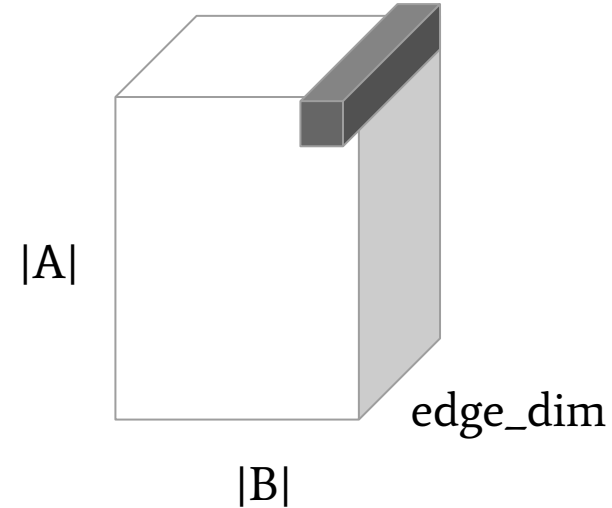
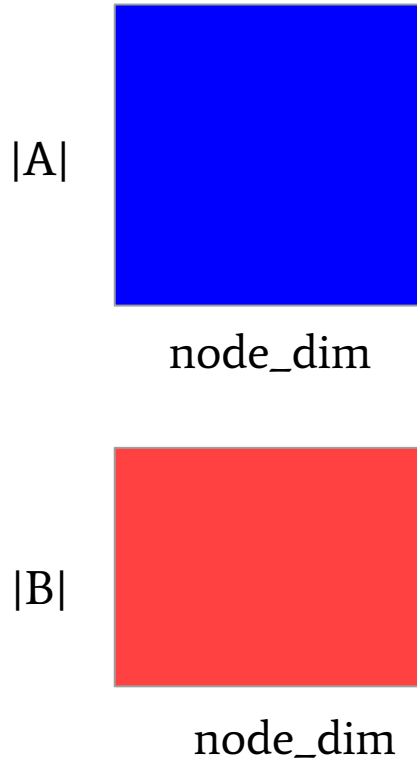
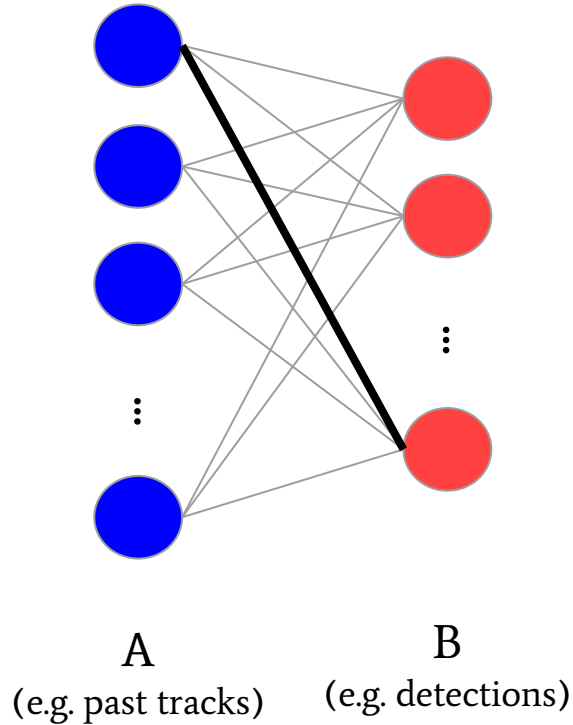
Neural Message Passing on Bipartite Graphs



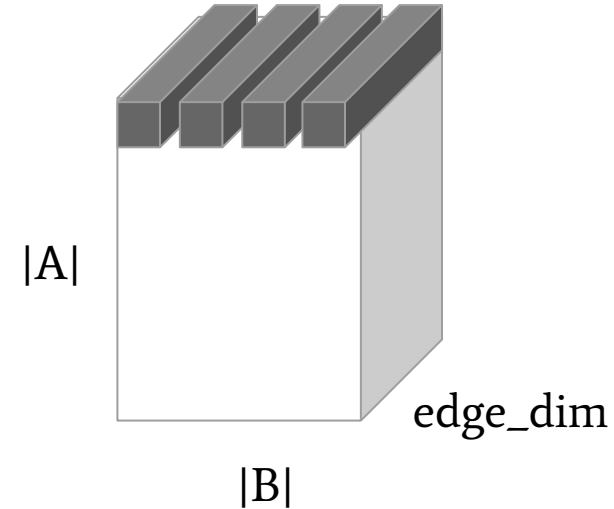
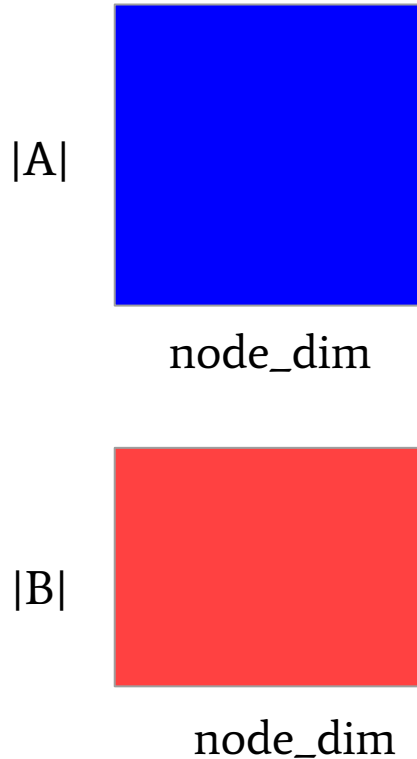
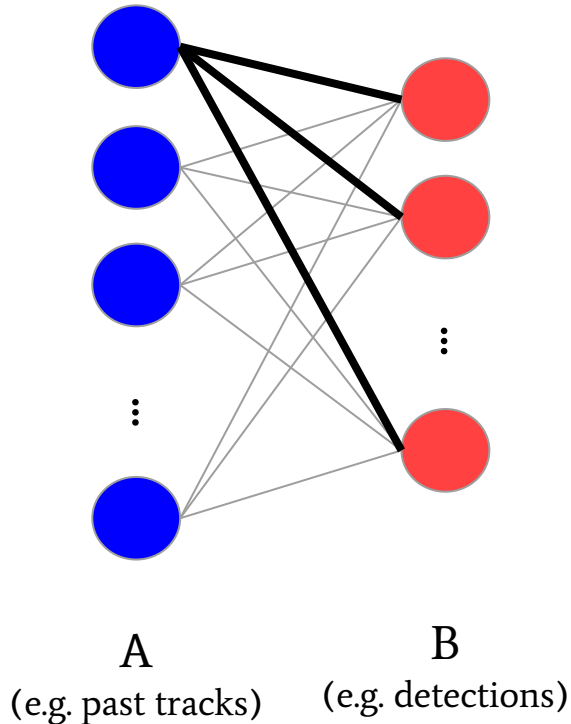
Neural Message Passing on Bipartite Graphs



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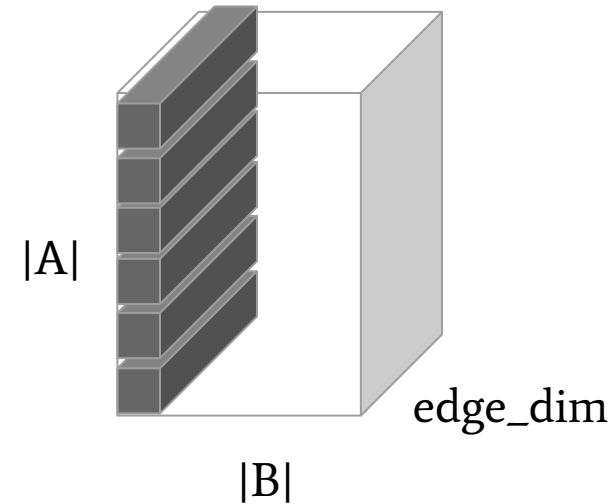
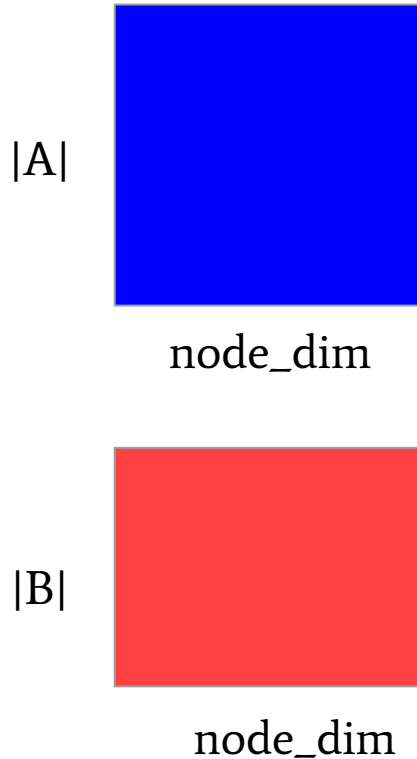
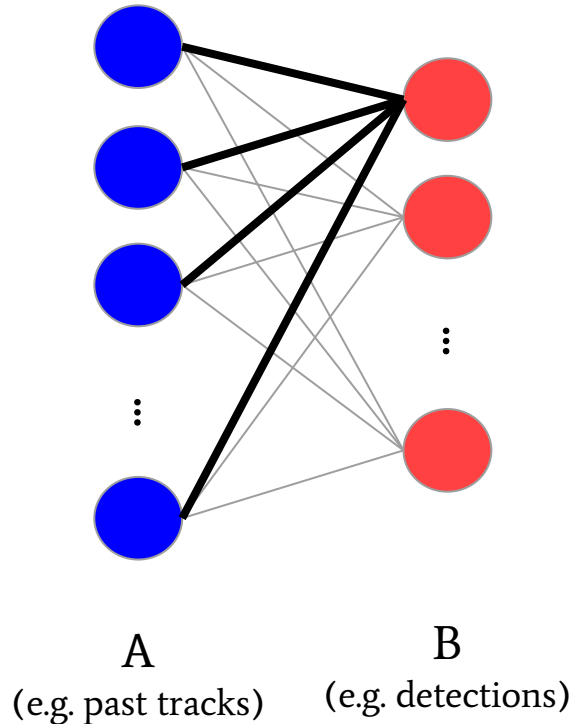


Neural Message Passing on Bipartite Graphs



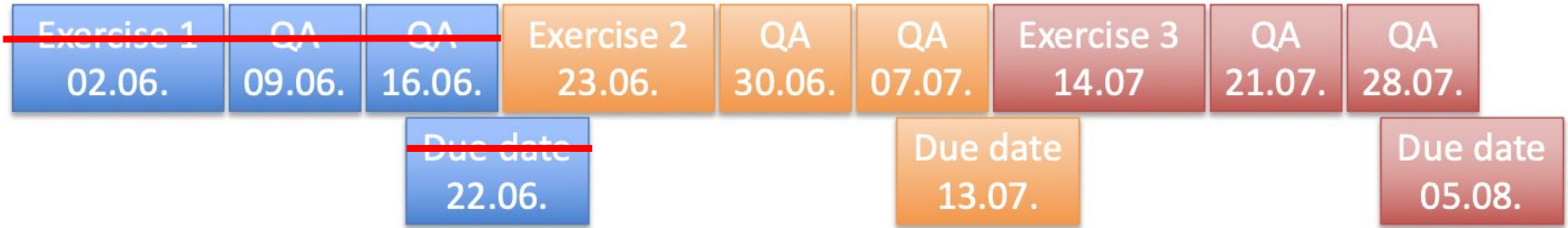
Aggregating over neighbors can be done by summing over rows/ columns

Neural Message Passing on Bipartite Graphs



Aggregating over neighbors can be done by summing over rows/ columns

Timeline



→ Deadline always 23:59 CET on due date

Links

Exercise 2: <https://colab.research.google.com/drive/1eIT4nfc3DGdosPZU2A5SsOSFZrY8JxhL>

Submission: <https://adm9.in.tum.de/embed.php/prakt/cv3dst/>