

# Vehicle Routing

## Team Charter

### Purpose and goal

- To create a state-of-the-art reinforcement learning (RL) algorithm to solve the vehicle routing problem in collaboration *Research.ai*.
- If time permits, submit a technical paper to one of the major computer science conferences presenting our algorithm and its performance.

### Time commitment

Approximately 15 hours per week per person that includes weekly meetings, and all group and independent work.

### Team culture

- Always be learning.
- Respect all team members.
- Peer support: Help each other when anyone is struggling in his or her part of work.
- Aim for 'good' not perfect. Further iterations will improve the product.
- Communication: Timely communication to update the team about individual progress and setbacks if any.
- Conflict resolution: In case of conflict, think of what is best for the team and the project, and act accordingly. If the conflict still is not resolved, seek external help from the project manager and/or MIDS capstone administrators.
- Honesty and integrity: Be honest with team members regarding work and maintain research integrity.

### Deliverables

- **KPI:** The performance of RL algorithms using standard RL evaluation methods on vehicle routing data.
- **Timeline:** Discuss project progress with the team and the stakeholder every week to make sure the project is on track as per the timeline mentioned below in the table.
- **Remediation plan:** In case of deliverables losing track as per the timeline, come up with a remediation plan to get things back on track. If there is a major setback, our plan is to work for extra hours during the 8-week winter break to compensate for the setback. In the case where an algorithm does not perform as per expectation, discuss with the *Research.ai* team to decide what is best moving forward.

### Estimated Project Timeline

S. No.	Month	Deliverable
1	August 2020 - September 2020	Learn the theory of reinforcement learning.
2	October 2020 - November 2020	Replicate existing RL techniques on vehicle routing data.
3	November 2020 - February 2021	Modify existing RL algorithms to improve the performance of the current techniques.
4	March - April 2021	Writing the academic paper and submitting to conferences.

## Desired end result

To submit our work of tackling the vehicle routing problem using reinforcement learning in a popular conference such as ICLR as an academic paper. The submission will be accompanied by a Git repository.

## Team members and roles

- **Amandeep Rathee**: learn reinforcement learning theory and build the algorithm for the project.
- **Tzu-Chun Hsieh**: learn reinforcement learning theory and build the algorithm for the project.
- **Ronald Tinashe Nhondova**: learn reinforcement learning theory and build the algorithm for the project.

## Supporting resources

- **MIDS capstone in-charges**: For providing support whenever we encounter any issue during the project.
- **Project manager/ stakeholder**: For providing technical guidance related to reinforcement learning during the project. And to co-author the academic paper.
- **Google Colab/Duke VM**: We will use these platforms throughout the project to run reinforcement learning experiments.

## Reporting plan and meeting expectations

- Internal team meetings will occur weekly (on Fridays at 3:30 pm during Fall 2020; TBD for Winter 2020 and Spring 2021)
  - Team members to be prepared to brief the rest of the team on the status of their allocated tasks.

- Everyone to share their progress, discoveries and resources related to the project since the last meeting.
  - Be respectful and accommodative of all team member contributions.
  - The meeting environment should be safe to allow members to contribute without fear or reservations of being judged.
- Meetings with the external stakeholder, i.e. *Research.ai*, will occur weekly (on Mondays from 10:15 to 11:15 am during Fall 2020; TBD for Winter 2020 and Spring 2021). Team members are expected to share updates on last week's project progress. Presentations will be required only for major updates.