Mohamed Khodeir

m.khodeir@mail.utoronto.ca • +1 (647)-224-9690 • https://github.com/Khodeir

Education

MSc in Computer Science, University of Toronto Sep 2021 - Mar 2023
Research focused on the interplay of planning and machine learning in Robotics. Supervised by Prof Florian Shkurti at the Robot Vision and Learning Lab.

BSc in Computer Science, University of Toronto Sep 2011 - Apr 2015
Relevant Coursework Machine Learning, Natural Language Computing, Parallel Programming

Work Experience

Machine Learning Engineer at **Xero** Jun 2019 - Sep 2021
Generalized Financial Document Extraction API

- Developed an auto-scaleable state of the art document understanding service used by multiple Xero products, backed by SQS, running in kubernetes and maintaining stringent SLA's while processing a peak load of ~100K documents per hour.
- Led development of a highly fault-tolerant service to extract text, layout metadata and images from popular file formats (e.g. pdf, html, jpeg, doc).
- Trained, evaluated and deployed transformer-based named entity recognition models. Experimented with approaches for improving robustness to sensible re-ordering of input text.
- Designed and implemented a library for defining parallel multi-step data pipelines. Used this to 3x GPU utilization during multi-GPU training jobs.

Data Scientist at **Hubdoc** Oct 2017 - May 2019
Human In The Loop Document Extraction

- Implemented, trained and deployed machine learning models for named entity recognition and document classification. Helped design a methodology for tuning confidence thresholds on noisy labeled-data.
- Worked with the team to drive recall of predictions from 30% to 80% over the course of a year, while holding accuracy at 90%. This meant users got their data in seconds instead of hours while the company lowered human labelling costs by 50%.
- Implemented a queue-based model server to enable predictions at scale. Instrumented this with performance and quality metrics that incorporated delayed user feedback.
- Co-led a cross-team development/deployment which refactored a synchronous API monolith into an async API with a modular queue-worker pipeline architecture. This was necessary for improving scaling properties of the service and allowing integration of arbitrary background processing including OCR.

Co-Founder at **Tutorama** Jan 2016 - Oct 2017
Curated Tutoring Marketplace

- Developed web app with React for facilitating a marketplace interaction between users, facilitating thousands of hours of tutoring per month at peak.
- Implemented API-level integrations for credit card payments, email/sms notifications
- Managed cloud infrastructure on AWS using a combination of terraform and serverless.
- Bootstrapped on cash prizes of ~50,000USD from placing 1st in regional startup competitions including MIT-EF and Seedstars.

Publications

Policy-Guided Lazy Search with Feedback for Task and Motion Planning Sep 2021 - Dec 2022

- Led research in developing a planning algorithm for task and motion planning which can be guided by a learned policy. Publication to appear in the IEEE International Conference on Robotics and Automation (ICRA) 2023. Preprint.

Learning To Search in Task and Motion Planning with Streams Jan 2021 - Dec 2021

- Led research in learning Graph Neural Networks as heursitic functions for task and motion planning problems in robotic manipulation. Published in IEEE Robotics and Automation Letters.

Evaluating robot task planning over large 3D scene graphs Summer 2021

- Co-authored a large-scale benchmark of planning approaches applied to 3d Scene Graphs. Publication appeared in the Conference on Robot Learning (CoRL) 2021. Project Page.

Projects

AI for Contract Review | Legalink.tech May 2020 - Jan 2022

- Developed NLP-based recommendations for an MS Word Add-In for editing legal contracts.