Part-time Software Developer position, Harvard EconCS group (Parkes lab, Paulson School of Engineering and Applied Sciences)
May 27, 2020

We have an opportunity for a part-time, experienced software developer to help with the ongoing development of an AI platform and to advise on engineering decisions and best practices. We envision that this work will be an even split between programming tasks and planning and consulting tasks. Essential skills include Python and Tensorflow.

The anticipated time commitment is 20 hours/week for June- July, 2020, and then continuing with 4 hours/week for August 2020 through December 2021. Competitive salary (not benefits eligible).

**Background:** This relates to an ongoing, DARPA funded research project on multi-agent reinforcement learning and the AI-driven design of dynamic economic mechanisms. We have developed a custom version of OpenAI Gym, OpenAI Baselines and ALE (Arcade Learning Environment) that supports two-player Atari games and linking multiple Atari games for three or more player environments. Our ambition is to create a framework that will become the de facto standard for future multi-agent reinforcement learning research in the same way that Gym and Baselines have for current single-agent RL.

**Example Tasks:** As an immediate step, we would like to migrate our project to the latest versions of Gym and Baselines. This will entail working with team members to decide which parts will be needed going forward, suggesting ways to simplify existing code and interfaces, and implementing these changes. Once migrated, we would track changes in the vanilla Gym and Baselines repositories.

In the future, we anticipate high-level planning around software architecture, especially defining interfaces between different parts of the project; advice on best practices to follow; and implementation (e.g., specific Atari environments and learning algorithms within Gym and Baselines, and design of APIs to expose economic resources and mechanisms in a flexible way, with an eye to creating a multi-agent RL version of Gym and Baselines). Work and advice on other tasks are also possible, depending on background and interests (e.g., on Atari 2600 assembly, on scaling out to cloud compute resources such as Amazon AWS, browser-based tools for human data collection in JS, and backend OpenAI gym environments in Python).

Typical duties include:
- High-level planning and advice on software architecture
- API construction
- Implementation of key software infrastructure
- Advice and training on coding best practices
- Writing documentation and unit tests
- Participation in weekly group meetings (currently Friday 11am Eastern time, via Zoom)
Basic Qualifications:
- Minimum of two years’ post-secondary education and relevant work experience
- Experience with Python
- Experience with Tensorflow

Additional Qualifications:
- Bachelor’s degree preferred
- Prior experience with OpenAI Gym and/or Baselines would be a very strong asset
- Experience with high-level planning of software architecture and API definitions
- Ability and interest in communicating architectural considerations and engineering best practices to junior team members
- Experience with profiling performance of Python/Tensorflow applications
- Software development experience, including responsibility for one or more projects from inception to delivery
- Familiarity with a research-oriented working environment
- Experience with GitHub for version control and collaboration
- The following are not expected, but could be integrated if of interest to the applicant:
  - Some understanding of or interest in Reinforcement Learning algorithms
  - Experience with AWS
  - Basic C++ understanding
  - Basic experience with, or interest in, assembly

Application:
Send a resume and cover-letter to Ann Marie King (aking@seas.harvard.edu). Applications considered on a rolling basis. Informal inquiries to David Parkes (parkes@eecs.harvard.edu) and Matthias Gerstgrasser (matthias@seas.harvard.edu)

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