Job Description

HITACHI
Inspire the Next

Job Title	AI Researcher
Responsible to:	R&D Group AI Innovation research Center Intelligent Information Research Department Manager
Responsible for:	R&D Group AI Innovation research Center Intelligent Information Research Department
Appointed Deputy	—
Job Function:	The role of a researcher is developing AI technologies and prototype system and publish research achievements.

Main Responsibilities

AI is Hitachi's focusing and differentiate technologies and it could lead digital transformation to all over the world. Strong and useful AI technologies is needed at all of Hitachi's business to expand the market. Hitachi can offer a candidate an exciting career with many opportunities for personal development within a global and diverse team.

The role on offer will contain the following responsibilities;

- Advanced AI technologies research for social infrastructure, smart city, industry, logistics, IoT; in collaboration with business division to gain domain-specific knowledge and define problems to solve.
- Develop new AI algorithms and applications to improve the customer's business value and to solve social issues by leveraging the Hitachi's capability.
- Develop a prototype application or system to evaluate AI algorithms through programming.
- Publish research report, patent, and academic paper.
- Make a demonstration that is presented at internal and external exhivision events.

As part of the role, the candidate will need to be able to;

- Effective cooperation to satisfy internal stakeholders (Sales, Engineer, and worldwide research team) to achieve team goals
- Proactive and academic approach is required to keep up with the latest market and technology trend globally
- Support the respective Department Manager to establish a strategic research plan to ensure future proof value to support growth of company
- Assist team members to develop a strong technology fit for the market needs
- Inspire and motivate AI researchers to challenge and solve issues for future company growth based on Hitachi Values
- Attend research events, conferences, meetings making presentation if necessary

Job Skills, Experience and Qualifications

Essential

Skills / Experience

- Demonstration of being able to complete a technical project whilst working effectively with other team members
- Demonstration of working "out of the comfort zone" and overcoming challenges
- Demonstration of obtaining a new skill and being effective with that skill
- Having excellent communication skills
- Having professional programming skills (Python and/or Java with well-known libraries to focus on implementing algorithms, to accelerate development speed, and to improve software quality)
- Having basic knowledge of mathematics and information system
- Showing commitment to an organization
- Flexible and forward thinking
- Foreign language skills - English

Licences / Competences

None

Qualifications

Master's degree, preferably Doctor's degree of engineering/information

Behavioural

- Hard working within a team and acting in accordance with the company's Mission, Vision and Value
- Respect teamwork
- Passion and drive to deliver "can do" attitude
- Global collaboration mind is required

Desirable

- Foreign language skills – Japanese, etc.
- Some AI research work experience
- Awards or high rank acknowledgement in Analysis Competition.
- Development experience of business model

Appendix:

Activity examples

Building Relationships:

"AI for Powering Good" – A joint workshop by Hitachi & Mila

https://www.hitachi.com/rd/sc/aiblog/011/index.html

Abstract: In October 2019, the "AI for Powering Good" workshop was organized as part of a research collaboration project which has been going on between Mila (Montreal Institute for Learning Algorithms) and Hitachi since spring 2019. The workshop was an idea to bring the researchers from both Hitachi and Mila to meet each other and to share and exchange knowledge as networking is a key element for successful collaboration.

Publishing Academic Papers:

Kato, T.; Kamoshida, R. Multi-Agent Simulation Environment for Logistics Warehouse Design Based on Self-Contained Agents. Appl. Sci. 2020

https://doi.org/10.3390/app10217552

Abstract: It is generally difficult to analyze the performance of a multi-agent system,thus it is important to model a warehouse and conduct simulations to design and evaluate the possible system configurations. However, the cost of modelling warehouses and modifying the models is high because there are various components and interactions compared to conventional multi-agent simulations. We proposed a self-contained agent architecture and message architecture of a multi-agent simulation environment for logistics warehouses to reduce the simulation-model development and modification costs.

Kujirai, T.; Yokota, T. Greedy Action Selection and Pessimistic Q-Value Updating in Multi-Agent Reinforcement Learning with Sparse Interaction, SICE Journal of Control, Measurement, and System Integration, 12:3, 76-84, 2019

https://doi.org/10.9746/jcmsi.12.76

Abstract: We previously proposed three methods (greedily selecting actions, switching between Q-value update equations on the basis of the state of each agent in the next step, and their combination) for improving the performance of coordinating Q-learning (CQ-learning), a typical method for multi-agent reinforcement learning with sparse interaction. We have now modified the learning algorithm used in a combination of these two methods to enable it to cope with interference among more than two agents.

Osakabe, Y; Asahara, A; Morita, H. Hitachi Materials Informatics Analytics Platform Assisting Rapid Development. In: AAAI Spring Symposium: Combining Machine Learning with Knowledge Engineering (1). 2020.

https://www.researchgate.net/publication/349490951_MatVAE_Independently_Trained_Nested_Variational_Autoencoder_for_Generating_Chemical_Structural_Formula

Abstract: We propose MatVAE–two nested VAEs inde- pendently trained on different datasets. The first VAE, which is trained on a huge open dataset, is a universal generator of chemical structural formulae, and the second VAE, which is trained on a small experimental dataset, learns the structure– property relation. This training framework can be understood as a semi-supervised learning, which is expected to enhance model transferability.

Research Presentation through "Hitachi Review":

Moriya, T.; Kimura, N.; Ara, K.; Watanabe, T. Development of Autonomous and Collaborative Robotics Technologies for Advanced Automation. 2019 vol. 68 No.4
https://www.hitachi.com/rev/archive/2019/r2019_04/04b05/index.html

Abstract: Across a multitude of industries, against the backdrop of the diversification of end-user needs and a labor shortage, there is a requirement for automation that can handle advanced work demands and changes in that work. Hitachi is advocating the concept of an "autonomous and collaborative robot system," which achieves automation that combines flexibility and efficiency by allowing multiple intelligent robots to move autonomously and collaborate together smartly. This article describes the fundamentals of that concept, and introduces a case example, for a distribution warehouse, and an example operation using an actual robot system.