Internships in Machine Learning
Software Engineering Research Laboratory
Location: St. Petersburg, Russia

JetBrains is a software development company whose tools are targeted towards software developers and project managers. It has more than 700 employees in its six offices in Prague, St. Petersburg, Moscow, Munich, Boston and Novosibirsk.

Data-driven methods, including machine learning techniques, are growing in popularity in many fields of research and industry, including software engineering. Within this research group, JetBrains aims to merge current state-of-the-art practices in both areas by improving modern software engineering tools and discovering new ways to develop and maintain code. Currently, the company has open internship positions in the following projects.

**SOURCE CODE EMBEDDINGS**
To employ machine learning techniques on source code, one should first build a vector representation of code. One of the recent trends in this area is using neural models to learn continuous distributed vectors (code embeddings) automatically from a large codebase instead of hand-crafting features. This project aims to experiment with neural code embeddings: explore their structural and semantic features, different models to learn them, and their various applications in the software engineering domain from code search to refactoring recommendation.

**Requirements:** Python, PyTorch, strong machine learning background

**AUTOMATED REFACTORING RECOMMENDATION**
For the last couple of decades, numerous papers have been published on refactoring recommendation introducing both heuristic and machine learning based techniques. However, adoption of refactoring recommendation tools among software engineers is still very low. The goal of this project is bridging this gap. It involves a wide variety of tasks, ranging from evaluating existing approaches and implementing the best of them as plugins for our IDEs to suggesting new techniques that operate in real-time and scale well under strict performance limitations.

**Requirements:** Java/Kotlin, software engineering background

**REVIEWER RECOMMENDATION**
Code review (the practice of reviewing and discussing code changes made by peers) is an established routine in software development, supported by dedicated tools. Some code review tools can recommend the most qualified reviewers for a batch of incoming changes, through analysis of prior code reviews and code changes. Existing reviewer recommendation systems are based on a bird’s eye view of history and do not utilize any information on contents of changes or their impact on existing codebase. The goal of this project is to improve existing reviewer recommendation models by enabling them to utilize information about code dependencies within a project.

**Requirements:** Java/Kotlin, software engineering background. Academic writing is a plus

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**How to apply?**
Go to APPLY.MIT.EDU and select “Russia.”

**Deadline:** March 1

**Funding**
Program expenses, including airfare, visa, accommodation and a stipend, are covered.

**Have questions?**
Send email to MIT-Russia Managing Director Katya Zabrovski at zabroves@mit.edu
JetBrains Research unites several scientific laboratories conducting research in the fields of Bioinformatics, Applied Math, Robotics, and other exciting cutting-edge science. Check out our other research groups at research.jetbrains.org to see if there is anything that peaks your interest. Please, feel free then to contact the Lab Head directly, they would be happy to hear from you.

The Mobile Robot Algorithms Laboratory Internship:
The ultimate goal of the Laboratory is to realize humanity’s long-standing dream of having a fully autonomous mobile assistant which can perform complex tasks and make its own decisions. Currently, we have open positions for students in the ROS SLAM Constructor project.

We will be happy to have you as our intern if you have experience with:

- Linux
- C++
- Probability theory
- We’ll be super excited if you have an understanding of ROS concepts and experience in computer vision.

We offer:

- Fascinating work in a friendly, young team.
- Developing products for software developers much like ourselves.
- Hot meals prepared on site, free drinks, fruits, and snacks.
- Office gym (with washrooms), massage room, and a recreational zone.
- Russian language tutoring, if requested.

Work packages/current roadmap:

- Support components for graph-based SLAM methods.
- ROS SLAM Testing Farm (virtualized, container-based environment, for semi-autonomous SLAM algorithms testing).
- SLAM datasets service.
- Visual odometry framework which will allow the use of a broad range of methods, including Machine Learning and others.
- Multi-robot SLAM implementation (including testing ROS over DDS [aka ROS2] concept)

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