



IBM Research –Zurich



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The thesis will be performed at the IBM Research-Zurich in Rüschlikon.



# Master Projects

## Developing Efficient Models of Strong AI for Intelligence Quotient (IQ) Test

### Introduction

Strong AI is a term used to describe a certain mindset of artificial intelligence development. Strong AI's goal is to develop artificial intelligence to the point where the machine's intellectual capability is functionally equal to a human's. Raven's Progressive Matrices (RPM) have been widely used for Intelligence Quotient (IQ) test of humans. It is widely believed that RPM problems are highly correlated with general intelligence. In the field of AI, one of the most important goals is to make machines with reasoning ability similar to that of humans, and hence RPM has received increasing attention in recent years. As a result, many computational models have been developed to study the reasoning ability of machines by solving RPM problems.

### Goal

We aim at developing AI models that can solve RPM with minimal training examples and highest execution efficiency on emerging hardware fabrics

### Tasks and Type

There are several challenges that need to be overcome at algorithmic (60%), and hardware (40%) levels to realize such efficient RPM solvers including developing novel methods for analogical reasoning, neuro-symbolic representation and manipulations. We are inviting applications from students to conduct their Master's thesis work on this exciting new topic. The work performed could span high-level algorithmic developments all the way to efficient realization on massively parallel hardware platforms. It also involves interactions with several researchers across IBM research focusing on various aspects of the project. The ideal candidate should have a multi-disciplinary background, strong mathematical aptitude and programming skills. Prior knowledge on machine learning and AI is a bonus but not necessary.

