DEEP FEATURE EXTRACTION FOR SAMPLE-EFFICIENT REINFORCEMENT LEARNING

DANIELE GRATTAROLA Author
Prof. MARCELLO RESTELLI Supervisor
Dott. CARLO D'ERAMO Co-supervisor
Dott. MATTEO PIROTTA Co-supervisor

October 3, 2017

INTRODUCTION

Famous examples and motivation

TABLE OF CONTENTS

DEEP LEARNING

Hierarchical abstractions

REINFORCEMENT LEARNING

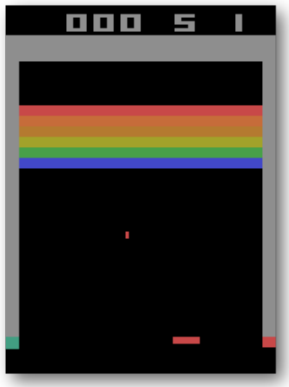
Maximizing reward in an environment

OUR ALGORITHM

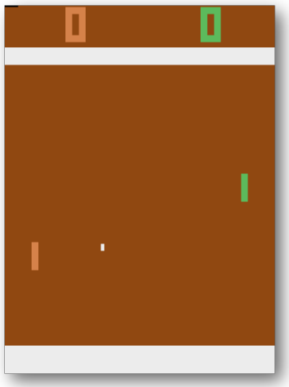
Deep features and batch reinforcement learning

EXPERIMENTS

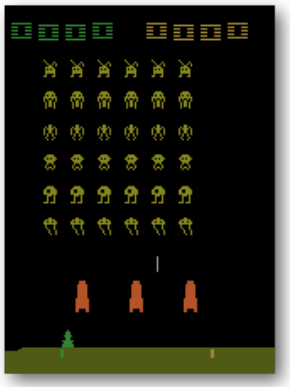
Testing our algorithm on Atari games



Breakout



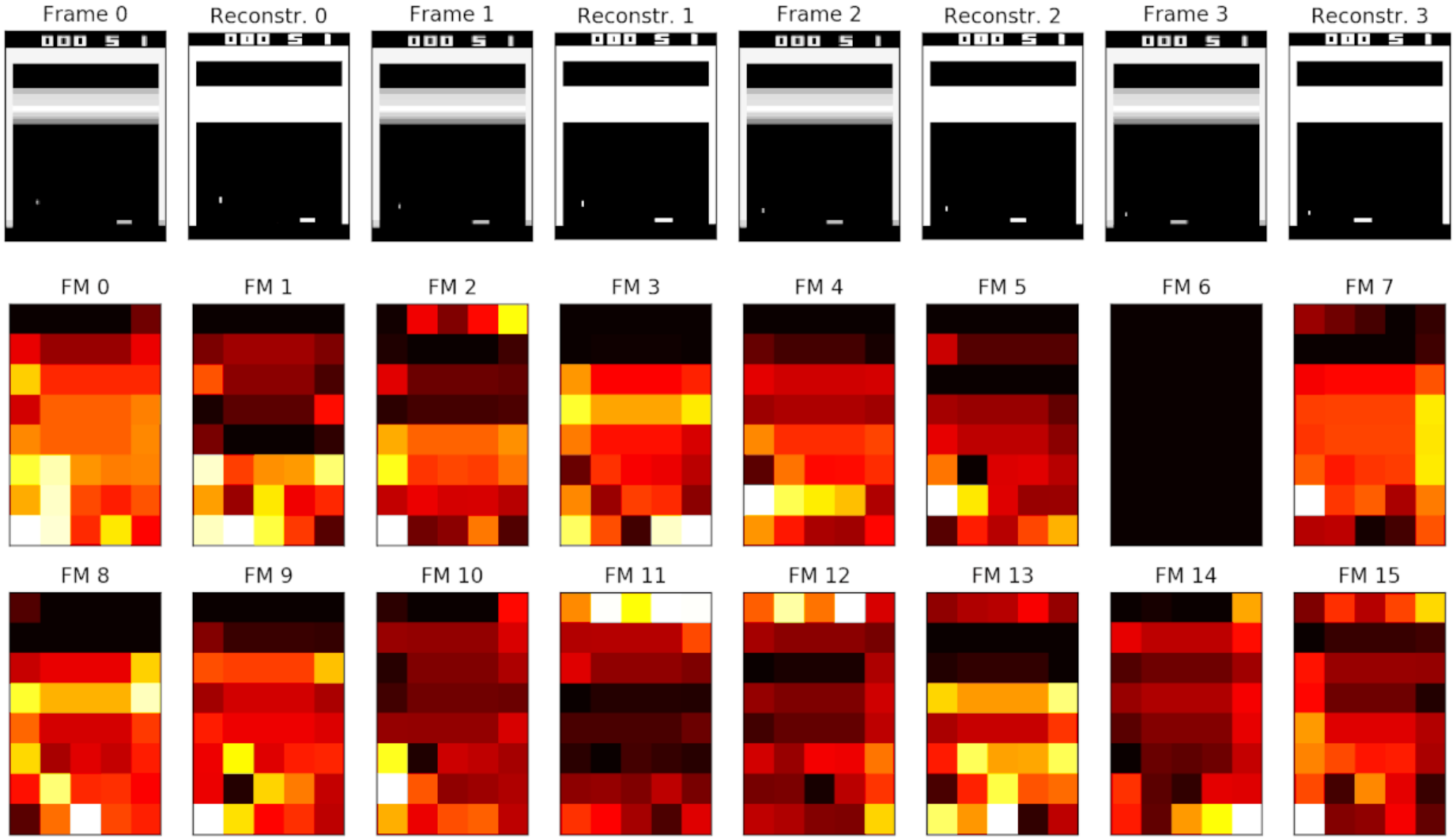
Pong



Space Invaders

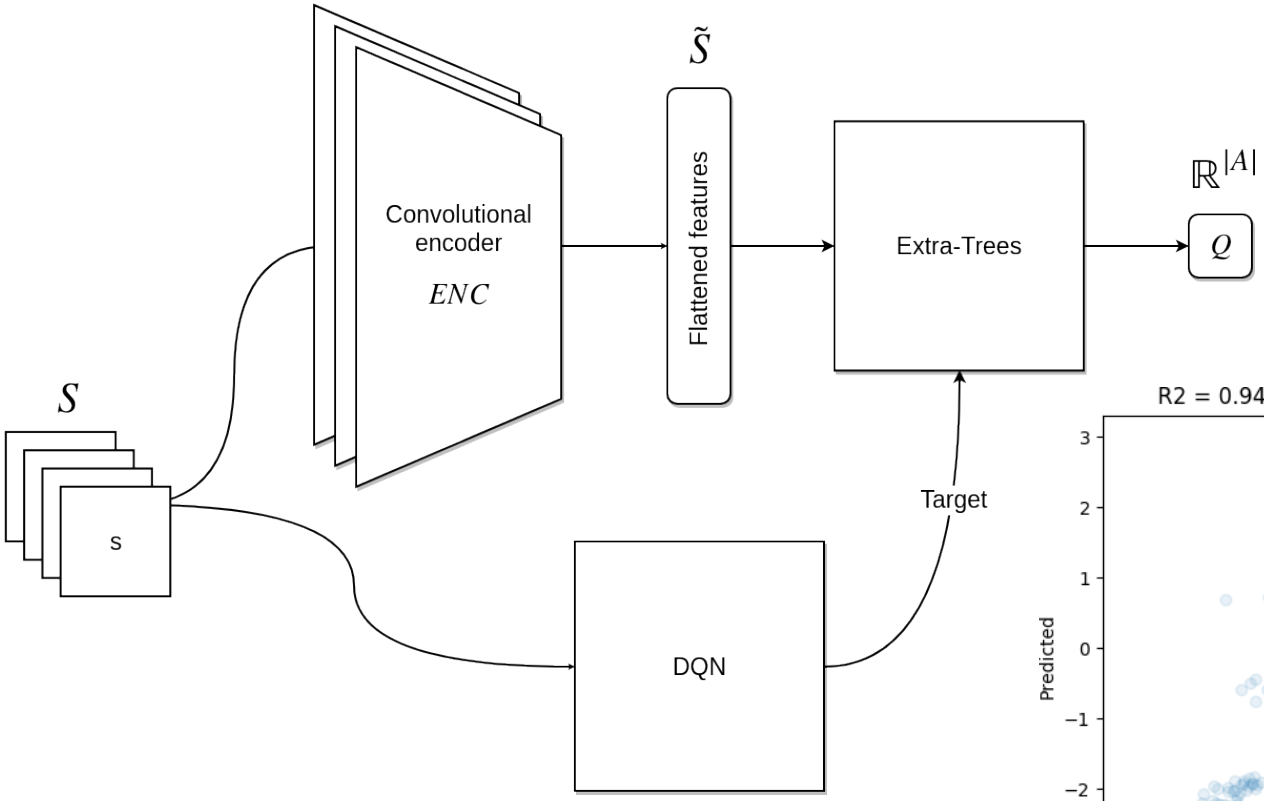
EXPERIMENTS

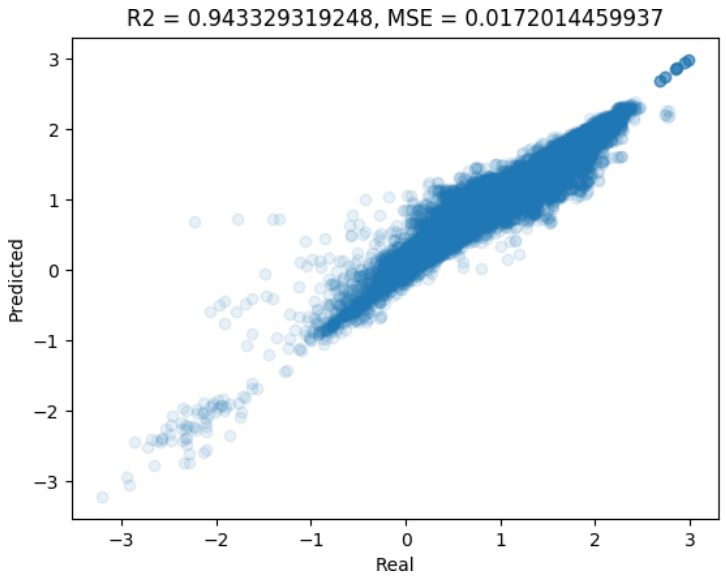
Reconstruction and feature analysis



EXPERIMENTS

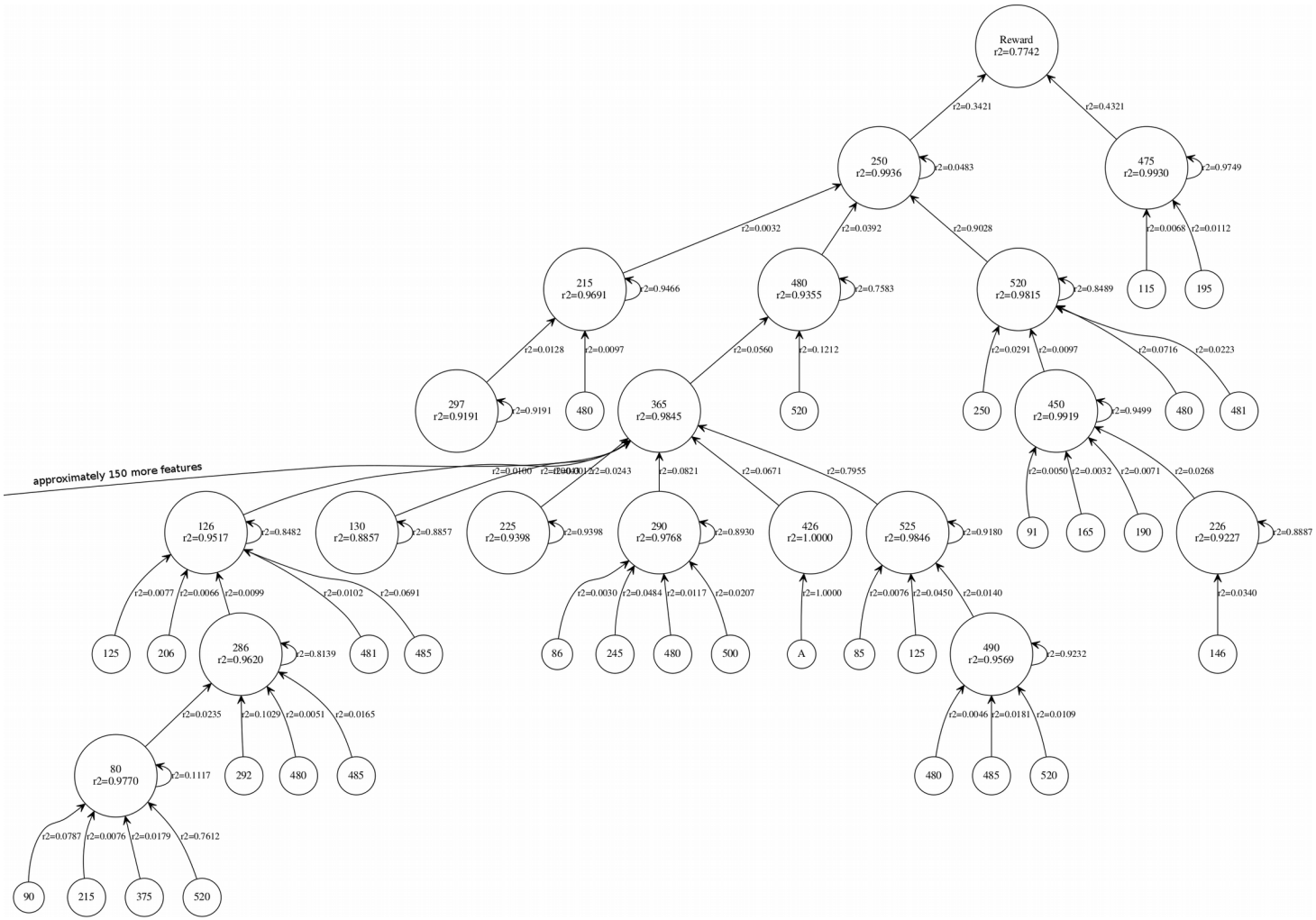
Suitability for control





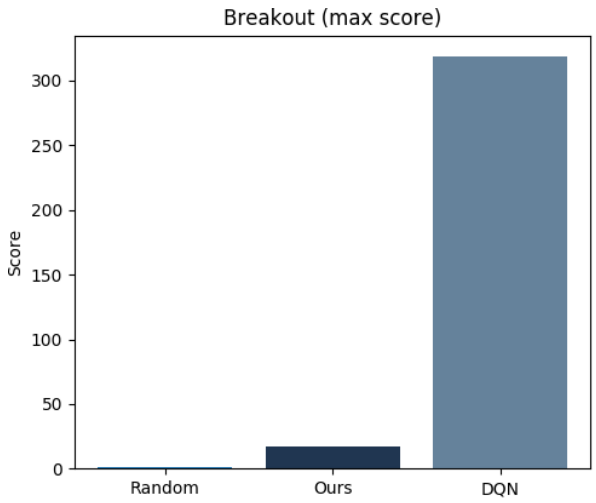
EXPERIMENTS

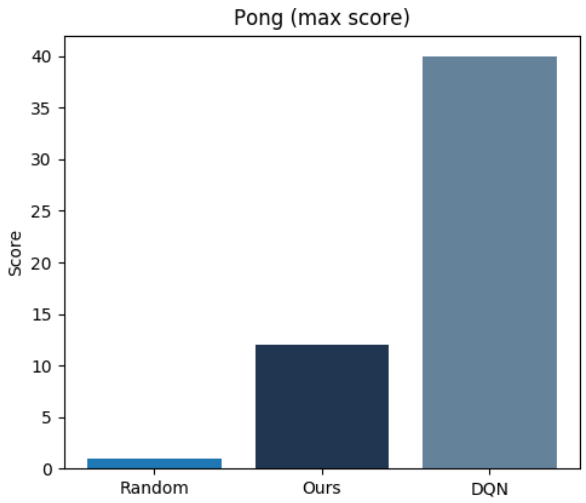
Recursive Feature Selection

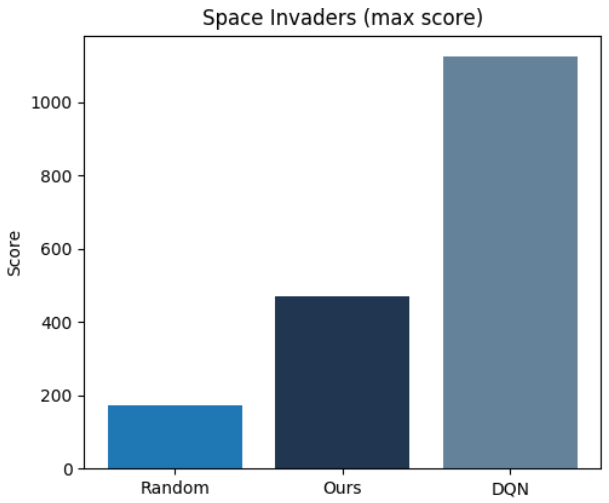


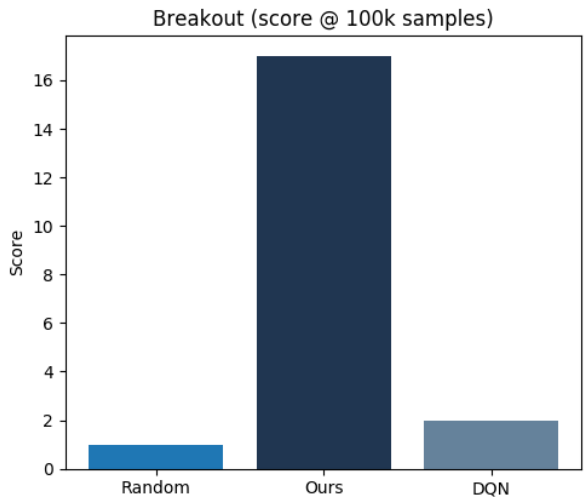
EXPERIMENTS

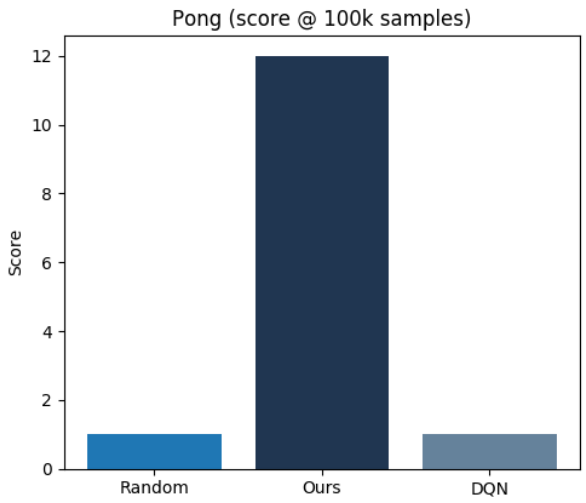
Main results: score

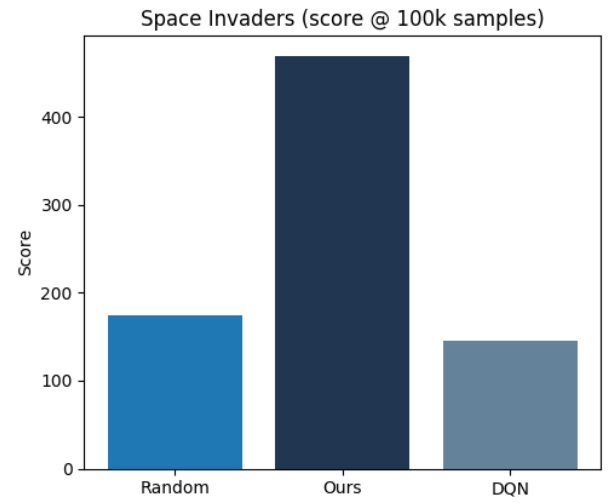






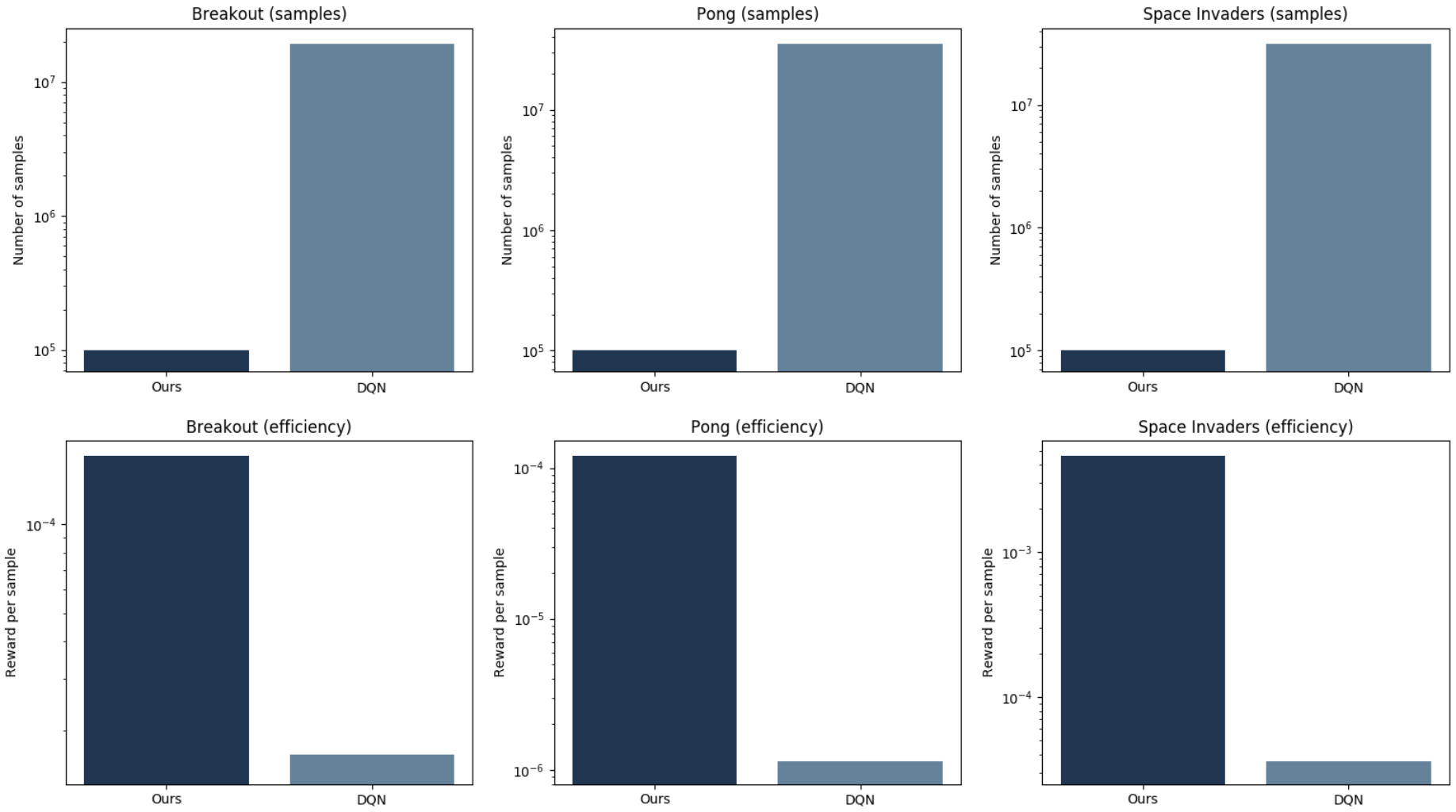






EXPERIMENTS

Main results: efficiency



CONCLUSIONS

Recap and future work

100x more **efficient**

25% performance

0.3% training samples

Better on **small datasets**

Improve **exploration**

Improve feature **extraction**

Optimize RFS

Test other **models**

POLITECNICO
MILANO 1863

THANK YOU

DANIELE GRATTAROLA Author
Prof. MARCELLO RESTELLI Supervisor
Dott. CARLO D'ERAMO Co-supervisor
Dott. MATTEO PIROTTA Co-supervisor

October 3, 2017

TITOLO

Sottotitolo con più spiegazioni