

High Accuracy and Effectiveness with Deep Neural Networks and Artificial Intelligence in Pathological Diagnosis of Prostate Cancer: Initial Results



Chengwei Zhang*¹, Qing Zhang*¹, Xiubin Gao², Peng Liu² and Hongqian Guo¹

¹Department of Urology, Nanjing Drum Tower Hospital, Nanjing, China ²Nanjing Innovative Data Technologies Inc., Nanjing, China

MP70-04

Background & Objectives

Artificial Intelligence (AI) : the theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

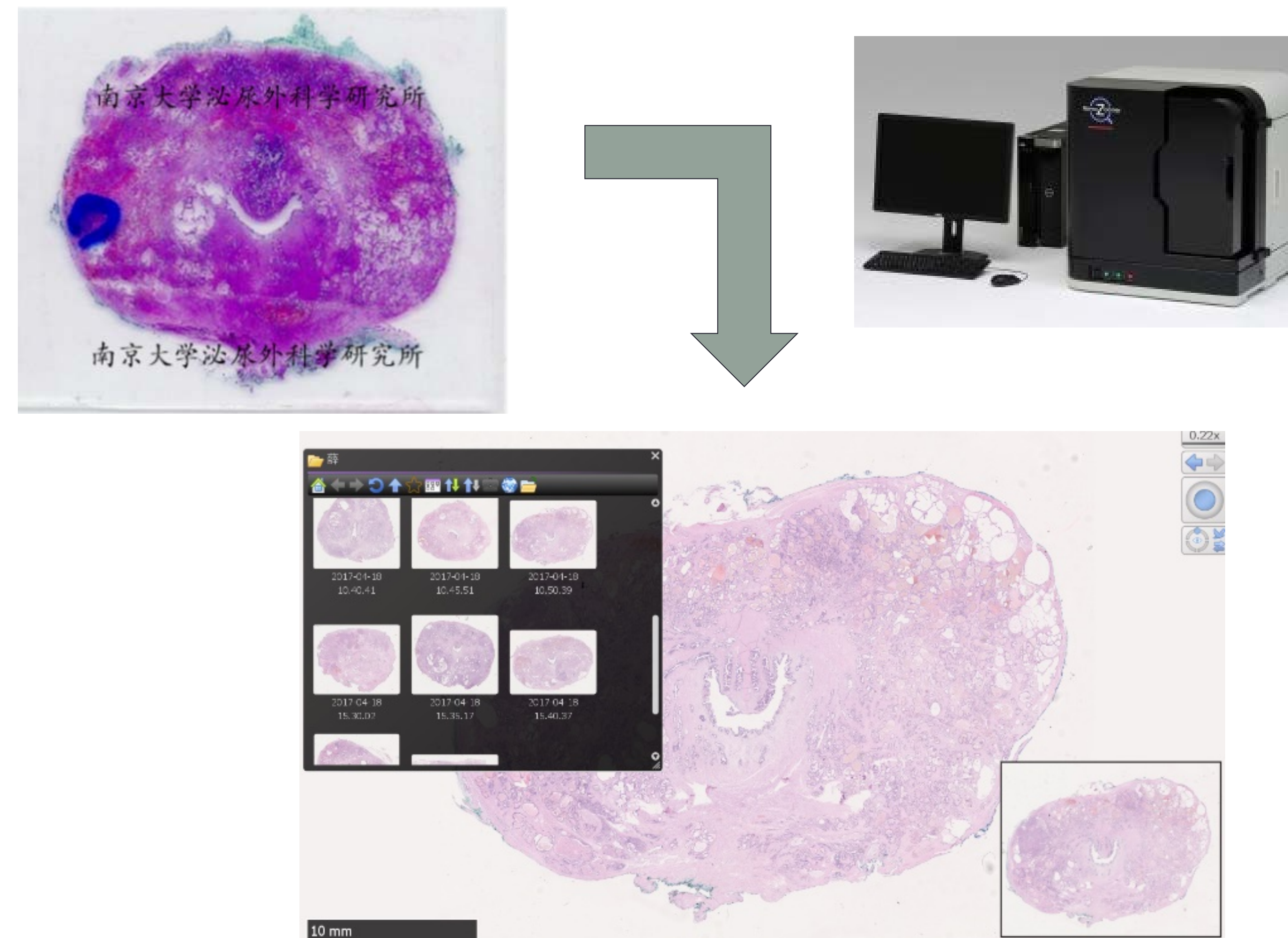
AI is going to become a hot topic recently, which is affecting our daily life in many areas containing voice assistant, face recognition, autopilot technology, home helper robot, etc. AI technology has broad application prospects in medical field. In this study, we explored the application of AI in prostate pathology diagnosis, leading to a rapid, exact and high-efficiency technique.

Methods

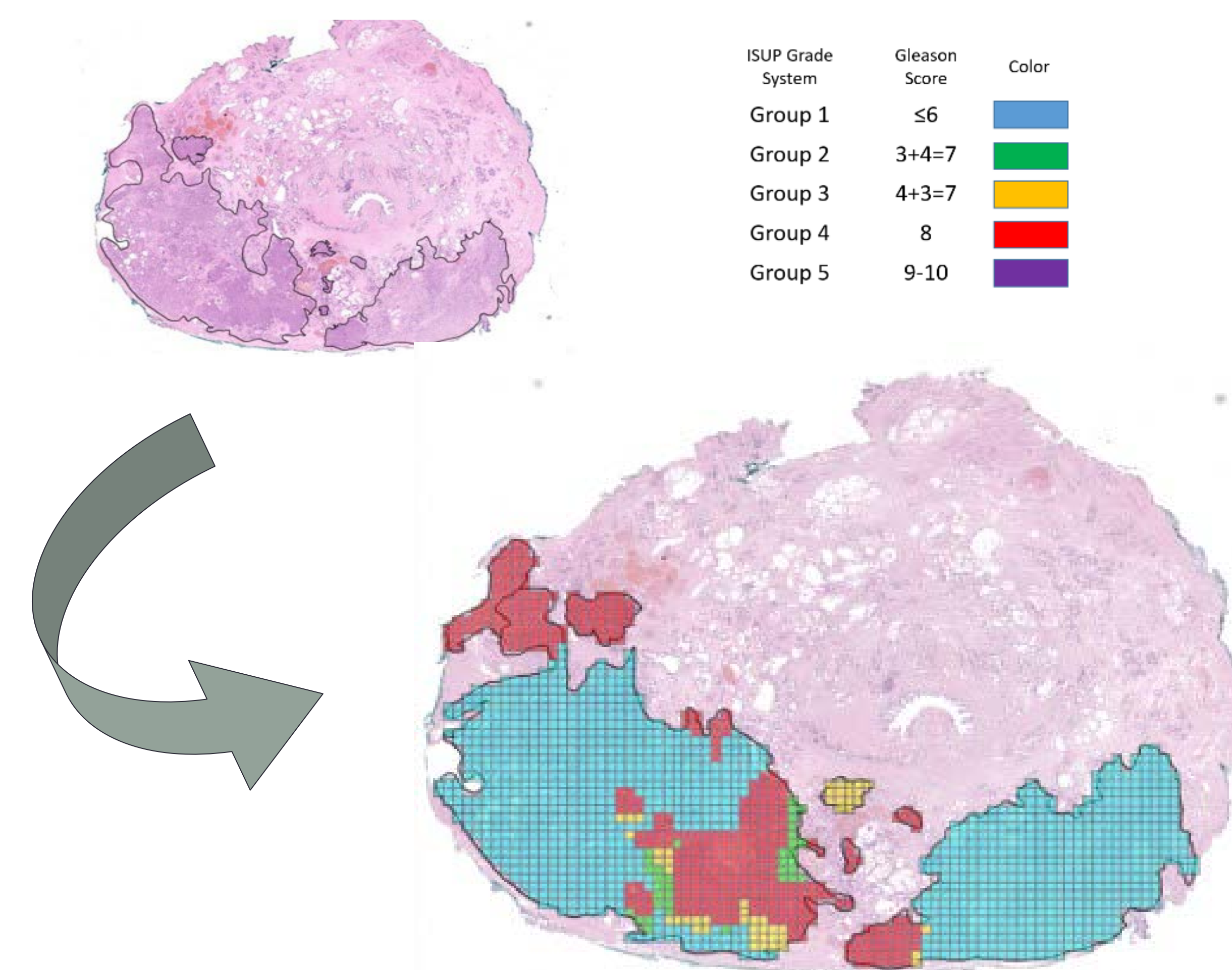
Histopathological whole mount (WM) sections of prostate after robot-assisted laparoscopic radical prostatectomy were used for machine learning. The pathology of prostate was evaluated according to 2014 International Society of Urological Pathology (ISUP) grading systems of prostate cancer.

Methods

(1) Histopathological WM sections of prostate were digitized:



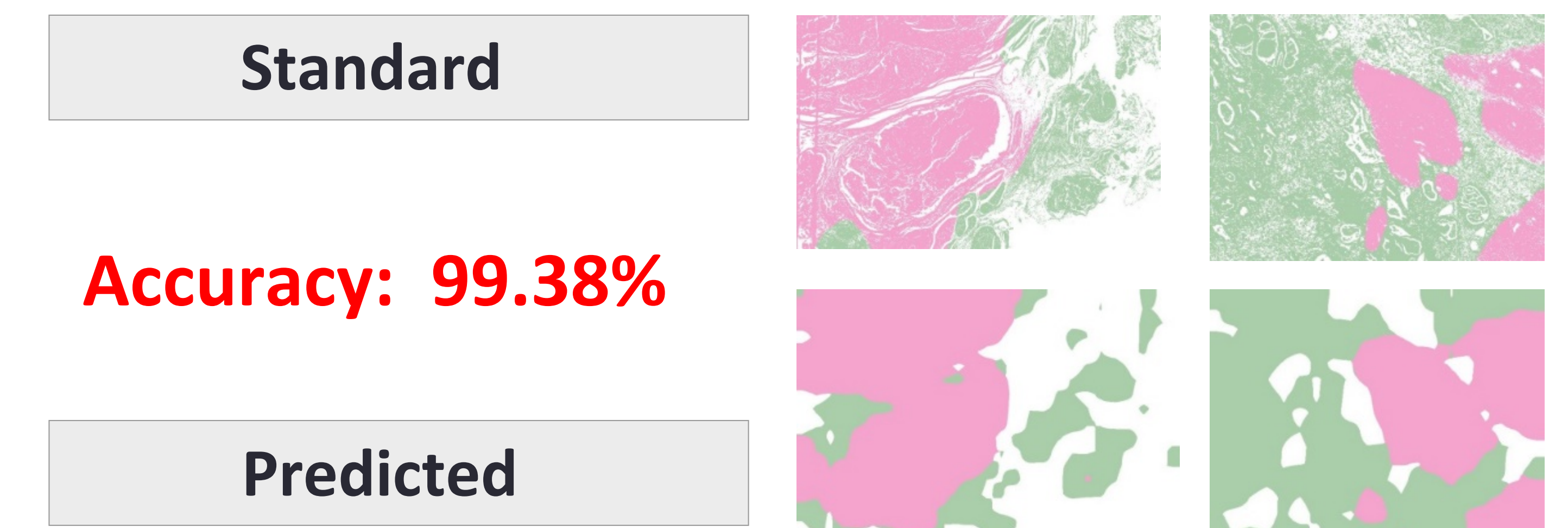
(2) All WM sections were marked with different Gleason Grade by pathologists:



Results

(1) Cancer / Non-cancer:

918 WM sections from 283 patients were included. Pathology images were subdivided into 40,000 smaller samples: 30,000 of these samples were used to “train” the software, the remaining 10,000 were used to test accuracy.



(2) Different ISUP Grade:

918 WM sections were used to “train” the software and 10 WM sections were used for testing.

