The benefit of colonoscopy for colorectal cancer prevention depends on adenoma detection rate (ADR), which varies widely (7-53%) between colonoscopists. For each 1% increase in ADR, the risk of an interval colorectal cancer is reduced by 3-6%, with an 82% reduction among colonoscopists that improved their ADR to the top quintile. Novel methods are clearly needed to improve ADR during colonoscopy, particularly among the low performers. Towards this aim, we applied a deep convolutional neural network to using 8641 hand labeled images from screening colonoscopies, and have achieved an excellent AUC of 0.991 and an accuracy of 96.4% in the task of polyp detection and 94% accuracy in the task of predicting adenomatous pathology in images. The model runs in real-time on a standard desktop machine with a contemporary GPU as verified by running the model on prerecorded colonoscopy videos. **We hypothesize that AI-assisted polyp detection and classification can be effectively utilized in real time during colonoscopy.** Proving this is essential to the conduct of future validation studies to evaluate this breakthrough technology for its ability to increase ADR and develop a resect and discard strategy.