# Nuowen Kan

*Ph.D. student, SJTU*

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## Education

**Ph.D. Student**  **Shanghai Jiao Tong University, Shanghai, China**, *Sep, 2020 - Jun, 2024 (expected)*.
**Research Focus:** Multimedia Communication & Reinforcement Learning & Stochastic Optimal Control.
**Advisor:** Prof. Junni Zou, Assoc. Prof. Chenglin Li and Prof. Hongkai Xiong

**MEng**  **Shanghai Jiao Tong University, Shanghai, China**, *Sep, 2017 - Mar, 2020*.
**Research Focus:** Rate Adaptation for 360-degree Video Streaming.
**Advisor:** Prof. Hongkai Xiong

**BEng**  **College of Engineering of Information and Electronic, Nanjing University of Aeronautic and Astronautic, Nanjing, China**, *Sep, 2013 - Jun, 2017*.

## Research interest

The application of deep reinforcement learning in video compression and transmission
Reinforcement learning and stochastic optimal contorl
Network oriented image/video processing and communication

## Publication

### Conference papers:

**NOSSDAV 2021**  **Nuowen Kan**, Chenglin Li, Caiyi Yang, Wenrui Dai, Junni Zou, Hongkai Xiong: Uncertainty-Aware Robust Adaptive Video Streaming with Bayesian Neural Network and Model Predictive Control, in *Proc. of ACM Workshop on Network and Operating System Support for Digital Audio and Video*, September 2021(accepted).

**ICASSP 2019**  **Nuowen Kan**, Junni Zou, Kexin Tang, Chenglin Li, Ning Liu, Hongkai Xiong: Deep Reinforcement Learning-based Rate Adaptation for Adaptive 360-degree Video Streaming, in *Proc. of IEEE International Conference on Acoustics, Speech, and Signal Processing*, May 2019.

**ICIP 2019**  **Nuowen Kan**, Chengming Liu, Junni Zou, Chenglin Li, Hongkai Xiong: A Server-side Optimized Hybrid Multicast-Unicast Strategy for Multi-User Adaptive 360-Degree Video Streaming, in *IEEE International Conference on Image Processing*, September 2019.

### Journal papers:

**TCSVT 2020**  Kexin Tang, **Nuowen Kan**, Junni Zou, Chenglin Li, Xiao Fu, Mingyi Hong, Hongkai Xiong: Multi-user Adaptive Video Delivery over Wireless Networks: A Physical Layer Resource-Aware Deep Reinforcement Learning Approach, *IEEE Transactions on Circuits and Systems for Video Technology*, 2020.

**TCSVT 2020**  **Nuowen Kan**, Junni Zou, Chenglin Li, Wenrui Dai, Hongkai Xiong: RAPT360: Reinforcement Learning-based Rate Adaptation for $360°$ Video Streaming with Adaptive Prediction and Tiling, *IEEE Transactions on Circuits and Systems for Video Technology*, first round of revision.

## Research Experience

**Jul. 2017 - Present**
**Research Assistant**, *Institute of Media, Information, and Network (M.I.N)*, Department of Electronic Engineering, Shanghai Jiao Tong University.

- Participated in the State Key Program of National Natural Science Foundation of China (Grant No. 61972256): Spherical convolutional network-based adaptive transmission for immersive video streaming.
- Improving the users quality of experience (QoE) for adaptive 360-degree video streaming under the limited and time-varying network conditions: Formulated the QoE optimization problem, learned an optimal policy for bitrate selection by DRL, and evaluated the proposed algorithm with extensive simulation experiments with Python code and Pytorch framework.
- The study of generalization and sample efficiency issues in reinforcement learning with the PAC-Bayesian theory and model predictive control.
- RL-based rate control for deep video compression: Studied the theory and practically implemented the code of DNN-based video compression model.
- The survey and study of the differentiable optimal control: Studied the theory of koopman operator and differentiable model predictive control.

**Nov. 2014 - Jun. 2017**
**Research Assistant**, *Advisor: Prof. Weiqiang Liu*, College of Electronic and Information Engineering, Nanjing University of Aeronautic and Astronautic.

- The implementation of LZ4, a lossless compression algorithm, on FPGA for accelerating the speed of encoding. The simulation was implemented on Xilinx Kintex-7 FPGA with Verilog code.
- Research of the encryption and decryption circuit using physical unclonable function (PUF). The system was designed and implemented on FPGA using the SRAM-based PUF.

## Honors and Awards

**The SMICS MengNing Scholarship**, *2019*.

**Second Class, Graduate Student Fellowship of SJTU**, *Fall 2017 - Spring 2020*.

**First Prize, Electronic Circuit Design Competition of NUAA**, *2016*.

**First Prize, University Student FPGA Application System Design Invitational Competition of Jiangsu Province**, *2015*.

**National Encouragement Scholarship**, *2015*.

## Skill

Outstanding mathematical analyzing and modeling ability

Strong modeling and programming skills in Python, Pytorch and MATLAB

Effective technical writing in English and fluent oral English for academic communication