

# Renjie WU

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## EDUCATION

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**Shanghai Jiao Tong University(SJTU)**

Sep. 2016 - Jun. 2020 (expected)

**School of Electronic Information and Electrical Engineering (SEIEE)**

**B.S. in Computer Science and Technology**

**Overall GPA: 3.6/4.0 (85.8/100), Junior GPA: 4.0/4.0 (92.3/100)**

**Courses:** Algorithm and Complexity (98/100), Computer Graphics (92.5/100), Introduction to Cryptology and Information Security (92), Virtual Reality and Augmented Display (93/100), Data Visualization and Visual Analytics (93/100)

## RESEARCH EXPERIENCES

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**Clothes Recognition and Retrieval Based on Semantic Representation**

Jul. 2019 - Aug. 2019

*Group Leader, Advisor: Prof. Liqing Zhang, Brain-like Computing and Machine Intelligence Laboratory, SJTU*

- Designed and implemented a Classification and Retrieval Network which combined the basic network frame of Faster R-CNN with multi categories and attributes utilized in FashionNet, and set the output values as binary codes for both accurate classification and fast retrieval
- Processed a new clothes dataset of 20 multi-label attribute classes (including 202 attributes totally, more than 660,000 images and associated labels) for training by crawling data from JingDong, extracting useful tags from goods descriptions, and merging semantic similar tags
- Trained and optimized the network with the accuracy of 96.49%; Encoded the output of each image as a list containing 20 vectors; Calculated the sum of Euclidean distances of corresponding vectors in two lists as their final distance; Retrieved similar clothes through a hierarchical search strategy using their final distances as a similarity measure

**VR-Based 3D Tooth Operation Model System for Dental Surgery**

Apr. 2019 - Jun. 2019

*Group Leader, Advisor: Prof. Bin Sheng, Visual Media and Data Management Laboratory, SJTU*

- Calculated 3 axes, established single tooth coordinate systems, and calculated oriented bounding boxes (OBB) for each tooth using principal component analysis (PCA) to improve the accuracy of locating operating axes and points
- Developed 10 interaction modes (rotation around X/Y/Z axis and left/right/top/bottom side of the tooth, translation along X/Y/Z axis) for each tooth in both PC system and VR system
- Established scenes for surgery simulation and data displaying (number, transformation matrix of the chosen tooth, etc.); Integrated all functions above in a VR application which could be used to simulate surgery vividly and calculate transformation matrix of each tooth during operation

**Reconstructing Teeth from a CT Scan**

Sep. 2018 - Dec. 2018

*Group Leader, Advisor: Prof. Bin Sheng, Visual Media and Data Management Laboratory, SJTU*

- Designed and implemented a neural network based on SegNet to segment teeth parts from converted CT images; Constructed teeth dataset by annotating teeth using Photoshop after converting CT scans to PNG images; Optimized the performance of the network to high accuracy (99.5% in testing) using SELU
- Extracted edges of segmented teeth images using Canny Operator which is not susceptible to noise; Generated point clouds on extracted edges and reconstructed the 3D teeth mesh model using spatial characteristics of CT scans
- Proposed an optimized method which segmented teeth from CT scans using the network above but changed produced images into CT formats to utilize existing mature medical imaging technology for reconstruction

## SELECTED PROJECTS

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**VR-Based Alpine Skiing Project for 2022 Olympic Winter Games**

Apr. 2019 - Jun. 2019

*Core member, Advisor: Prof. Bin Sheng, Visual Media and Data Management Laboratory, SJTU*

- Designed a real-time detection system based on relative angle and collision mechanism of predefined tags to detect the orientation and swing range of player's arms

- Established realistic scenes associated with snow mountains and skiing using Unity; Designed an interactive VR action game with 2 different modes (Prop Mode and Gate Mode)

### **ChinaVis 2019 Data Visualization and Analysis Challenge**

May. 2019 - Jun. 2019

*Core member, Advisor: Prof. Xiaoju Dong, Institute of Theoretical Computer Science, SJTU*

- Predicted the conference agenda, possible potential types, and relationships of participants as well as emergency represented by outliers after analyzing data of sensors through clustering
- Designed and implemented an interactive visual analysis website to demonstrate findings about the relationship and outliers with 9 different kinds of charts(Personal Track Map, Radial Bar Chart, etc) and different interactive methods

### **Gene Data Classification Using Classical Approaches and Deep Learning**

Sep. 2018 - Dec. 2018

*Group leader, Advisor: Prof. Bo Yuan, SJTU*

- Implemented pretreatment and dimensionality reduction using normalization and PCA to change ill-posed questions into well-expressed mathematics questions
- Used deep learning techniques and classical methods (SVM, Logistic Regression and Decision Tree) for binary and multiple classification; Assessed and compared performances of different methods according to their accuracies and training time in both binary and multiple classification

## **HONORS AND AWARDS**

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Elite Liu Yongling Scholarship ( <b>top 1%</b> )	Oct. 2019
Academic Excellence Scholarship of Shanghai Jiao Tong University ( <b>top 10%</b> )	Nov. 2019
Academic Progress Scholarship of Shanghai Jiao Tong University	Nov. 2019
Outstanding Students of Military Training ( <b>top 10%</b> )	Sep. 2017
Excellent League Member of Shanghai Jiao Tong University ( <b>top 10%</b> )	May. 2017

## **LEADERSHIP AND SOCIAL ACTIVITIES**

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### **Monitor - Class F1603305**

Sep. 2016 - Jun. 2020 (Expected)

- Led classmates to participate in Class Style Contest and won the first prize (only four classes earned this prize among 40 classes); Organized classmates to take part in the Competition of Best Classes of SJTU and earned the Third Prize of The Best Class Award in the sophomore year (other winning classes are at least in their junior year)
- Organized more than 20 activities in the class of 31 students such as class meetings, class trips, and contests.

### **Core Member - Student Service Center (SSC, university-wide)**

Sep. 2017 - Sep. 2019

- Organized at least 5 photography trainings for more than 30 new members; Designed and organized the filming of the video for Anniversary Memorial of SSC
- Undertook the photojournalism work of many large conferences at SJTU such as "FaxXing Plan" and "Top Ten Influential People on Campus"

### **Volunteer - Shanghai International Marathon**

Nov. 2017, Oct. 2018

## **SKILLS**

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**Programming:** Python (TensorFlow, NumPy), C/C++ (OpenGL), C#, HTML, JavaScript, SQL, Java, Swift

**Professional Tools:** Unity, MATLAB,  $\LaTeX$ , Adobe Photoshop

**Other:** Photography