有方-科研培养方案

专为计算机研讨班-贾昊龙设计

课题名称： 基于视频的行为识别算法

VIDEO ACTIVITY DETECTION

An activity is defined to be “one or more people performing a specified movement or interacting with an object or group of objects”.

Video activity recognition aims at detecting and tracking objects involved in the activities. It has been the subject of important research efforts due to the importance of its everyday applications. Surveillance by video cameras could benefit greatly by advances in this field. The task of tracking and understanding what is happening in a video can be very challenging.

The project arises from the TRECVID-2021 open challenge: For the Activity Detection task, given a target activity, the system is required to automatically detects and temporally localizes all instances of the activity from a set of videos. For a system-identified activity instance to be evaluated as correct, the type of activity must be correct and the temporal overlap must fall within a minimal requirement.

Students are encouraging to submit their work to TRECVID-2021. The schedule of the task could be found in the link.

PRECORE: Python；Literature Reading Skill；Video Processing Techniques；Basic Understanding of Deep Learning Techniques；English Academic Writing Skill；Latex

课题创新点：

The combination of state-of-the-art deep learning models and signal processing techniques to the create a new algorithm of video activity detection.

SCHEDULE 科研计划

*TBA 为待确定具体时间

科研项目 – 教授/导师课程阶段

论文发表

科研项目 – 教授/导师课程阶段
(每次课 2 小时，导师课晚周六晚 19:00-21:00，教授课暂定周日上午 10:00-12:00)

2021-06-05	Mentor Class 1	**Introduction of the task.** **Assignment:** · Collect relevant literature within the scope of the task.
2021-06-27	Professor Class 1	**The Introduction to Artificial Intelligence** · The Basis of Machine Learning · The Basis of Deep Learning
2021-07-04	Professor Class 2	**The Introduction to Computer Vision** · The importance of CV · The application of CV in environment
2021-07-10	Mentor Class 2	**Discussing possible research direction of the given task** **Assignment:** · Draft the basic structure of the system. · Write a literature review based on the collected papers.
TBA	**阶段性考察汇报**	
2021-07-17	Mentor Class 3	**Machine learning fundamentals:** · Basic machine learning pipeline · Overfitting and model selection **Assignment:** · Read blogs about basic concepts of machine learning · Follow Python tutorials to build machine learning models

2021-07-25	Professor Class 3	· **Academic Writing** · **Review Students' Presentation**
2021-07-31	Mentor Class 4	**Deep learning fundamentals:** · Neuron model and multi-layer dense neural network · Stochastic gradient decent **Assignment:** · Summarize the core concepts of deep learning
2021-08-07	Mentor Class 5	· **Dataset preprocessing** · **Video preprocessing techniques** **Assignment:** · Download and read all the instruction of the dataset. · Learning the relevant techniques in video processing
TBA	**阶段性考察汇报**	
2021-08-14	Mentor Class 6	**Feature engineering:** · Extract useful features from the data **Assignment:** · Finish creating of the features. · Write the feature extraction part of the paper.
2021-08-21	Mentor Class 7	**Baseline model development:** · Design and train a baseline model · Evaluate the model performance **Assignment:** · Finish baseline model development · Write the baseline model part of the paper

2021-08-28	Mentor Class 8	**Deep learning model development** · Build first version of the deep neural network · Evaluate the model performance **Assignment:** · Finish the deep learning model · Complete the paper. · Submit the results.
TBA	Professor Class 4	**Review Students' Presentation**
TBA	**阶段性考察汇报：有方审核，论文定稿**	
TBA	论文发表启动（确定投稿目标期刊/会议）	
TBA	论文发表收录	