

Report of Tutorial : Anomaly Detection In Images

Speaker: Giacomo Boracchi, Diego Carrera

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The tutorial introduced their research of approaches about anomaly-detection in the image, including some theories in the machine-learning perspective of semi-supervised and unsupervised learning/monitoring. Emphasized the anomaly-detection methods based on learned models. At last, they introduced some deep learning approaches and the prospects of the technology of anomaly detection in images.

I understand more clearly what is the 'anomalies', it may appear as spurious and most informative things. And I learned how a complete image inspection system works. Moreover, there are three parts to the tutorial. Part 1, problem formulation and statistical solutions, introduced some methods of question modeling, some statistical parameters to value the detection. Part 2, anomaly detection in images, introduced the mathematical logic detail behind the algorithms of detection, from modeling problems to set detection methods and feature extraction. Part 3, anomaly detection by deep learning modes, introduced how to use CNN(convolutional neural networks) to define the anomaly score and decision rules.

I think the most relevant thing from the tutorial to me is I got some basic ideas of the most advanced image processing technology/system and what technology is applied nowadays, and what's next? For example, I got that the anomaly detection system starts from real-time data collection by the terminal module and the transaction blocking rules. And before detection anomaly

things, the model should set what is normal things firstly. Then, transfer the data to access the scoring rules module and the data-driven model, two modules are designed by suitable algorithms, such as CNN. At last, the professional investigators collect the information from these two modules and feedback to them to let the system learn how to perform better.

Report of PLENARY - Katie Bouman: Capturing The First Picture Of A Black Hole & Beyond

Speaker: Katie Bouman

California Institute of Technology

In the present, Katie Bouman introduced the methods and procedures used to produce the first image of a black hole from the Event Horizon Telescope, as well as future developments.

I learned that to get this picture of the black hole, they solved a lot of problems, like to simulate a large enough telescope, they organized many observation groups around the world to summary the result and other technical issues, such as atmospheric disturbance, earth rotation, and so on. They used mainly maximum likelihood estimation to find the blurred black hole picture from the noisy signal from space. I think their work is brilliant, but I still have some questions, although these questions sound stupid. Firstly, how they know they know the image is a black hole as there is no picture of a black hole in the world? I mean how to get the pattern of a black hole's picture? By mathematical model from unproven theories? Or some

unsupervised signal groups? I don't get this. Another question is about the extent of their work, could they find some 'light sources' of the 'light ring' of the black hole? I think these light sources can help to get more detail about how the black hole impact the light.

I think the most relative thing in the presentation with me is how to flexibly use existing image processing technology to complete seemingly impossible tasks. They showed their solution, I think that is exciting. People always can do something beyond their imagination.

Overall, although I could only understand a part of the events I attended, at least I broadened my horizons. I hope I can gain more from such events after I learn COMP.SGN.110. And thanks for the chance to attend the conference, it is a meaningful experience!