Guest Editors' Introduction: Special Section on IEEE PacificVis 2021

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THIS special section of the IEEE Transactions on Visualization and Computer Graphics (IEEE TVCG) presents the five most highly rated papers from the 2021 IEEE Pacific Visualization Symposium (IEEE PacificVis). This year, IEEE PacificVis was scheduled to be hosted by Tianjin University and held in Tianjin, China, from April 19 to 22, 2021. IEEE PacificVis, sponsored by the IEEE Visualization and Graphics Technical Committee (VGTC), aims to foster greater exchange between visualization researchers and practitioners, especially in the Asia-Pacific region. This forum has grown to be a truly international event, attracting submissions and attendees from many countries in the Asia-Pacific and Europe, America, and beyond. Thus, IEEE PacificVis is serving the additional purposes of sharing the latest advances in visualization with researchers and practitioners in the region and introducing research developments in the region to the broader international visualization research community.

The papers co-chairs employed a two-stage peer-review process to ensure the quality of accepted papers. Each paper was assigned to a primary reviewer and a secondary reviewer from our team of 56 International Program Committee (IPC) members. The primary and secondary reviewers each recruited an additional external reviewer, ensuring a total of at least four reviewers per paper. It was single-blind for IPC members and double-blind for external reviewers. This year's submissions were outstanding, and the symposium accepted 20 full papers out of 80 completed submissions. In cooperation with IEEE TVCG, the guest editors, who are papers co-chairs for the symposium, selected and recommended five outstanding papers to IEEE TVCG based on the first round of reviews. These five papers, representing the most highly rated of the IEEE PacificVis 2021 full paper program, were accepted directly by IEEE TVCG after the authors revised the original manuscripts as required by the minor revision criteria. We give a brief overview of these five papers as follows.

Tactic mining is essential for table tennis match analysis. By collaborating with the Chinese national table tennis team, the authors of "Tac-Miner: Visual Tactic Mining for Multiple Table Tennis Matches" identified the workflow and requirements of tactical analysis. They introduced a visual analytics system called Tac-Miner to extract and analyze tactical patterns of table tennis data. In Tac-Miner, they used advanced embedding and projection methods and designed an interactive glyph to facilitate visual analysis, exploration, and comparison of multiple matches' tactics. They further conducted a user study to evaluate the usability of the tailored glyph and use a case study to demonstrate the usefulness of the system. Moreover, their study discovers some interesting and valuable insights into the tactics employed by several top table tennis players.

Visualizing and comparing streaming surfaces is usually difficult due to the complexity of generating and representing streaming surfaces without occlusion and visual clutter. In "SurfRiver: Flattening Stream Surfaces for Comparative Visualization," the authors address the challenge by untangling and showing the convoluted streaming surfaces in the form of stacked flatten flows and providing rich interactions to facilitate an easy exploration and comparison of multiple streaming surfaces. SurfRiver can be used to examine a single stream surface, investigate seeding sensitivity or variability of a family of surfaces from a group of related seeding curves, or explore a collection of representative surfaces.

How to design infographics to reveal emotional information? "Smile or Scowl? Looking at Infographic Design Through the Affective Lens" gives an answer. The paper investigates people's affective responses to infographics and presents practical design guidelines for designing effective infographics. The authors first conducted two crowdsourcing studies to identify 12 infographic-associated affects and map the 12 affects to infographics. Then, they analyzed the user feedback collected from the study to derive a taxonomy of design heuristics that summarizes the affect-related design factors in infographics. An evaluation with real designers showed that design heuristics could help with the ideation and creation of affective infographics.

In "Asynchronous and Load-Balanced Union-Find for Distributed and Parallel Scientific Data Visualization and Analysis," the authors focus on the scalability of a fundamental algorithm, union-find, for data-parallel scientific data visualization. For example, union-find can be used to unite features/regions of interest identified by individual processes in distributed and parallel visualization pipelines. The authors showed that computations and communications in union-find can be overlapped, presented a k-d tree

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based load balancing for union-find, and demonstrated the method's scalability with up to 1,024 processors.

Set visualizations are designed to represent set elements, set themselves, and the relationships between sets. They are frequently used to illustrate static information in print media or infographics. In "On the Readability of Abstract Set Visualizations," the authors conducted a controlled human-subjects experiment to compare users' performances in terms of time and accuracy when reading static set information via three different set visualization designs, i.e., LineSets, EulerView, and MetroSets. The study results include statistically significant differences, suggesting that MetroSets performs and scales better.

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