First-of-its-kind software quickly automates sports analytics

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Credit: Rice University

New software designed by Rice University students working in the Oshman Engineering Design Kitchen and Liu Idea Lab for Innovation and Entrepreneurship (Lilie) can provide automated sports analytics in

an hour.

The [software](), Cherrypick, was designed by James Grinage, Connor Heggie, Rebecca Lee, Victor Gonzalez, Sachin Jain and Betty Huang as part of their senior [engineering design]() course. The software is the first kind capable of automatically analyzing volleyball matches and providing analytics. It allows coaches to record a game, upload video and receive statistics from the game within an hour. Cherrypick is powered by machine learning and computer vision algorithms developed by the team and is the first software capable of delivering game statistics in an hour.

"Cherrypick will automatically go through the game and extract the important statistical information and tie it directly to the video," said Grinage, a Duncan College senior majoring in electrical engineering. "Coaches can then easily go through the video and know when different plays took place and who was responsible for specific plays."

Grinage said the software will allow coaches to make data-driven decisions based on player activity and tailor their coaching to specific situations, including deciding what plays to practice, which rotation to begin a match in, etc.

Heggie, a Will Rice College senior majoring in [electrical engineering](), said Cherrypick's ability to provide analytics in an hour sets the software apart from what is currently on the market. Current programs have a data turnaround time of 12-24 hours due to the manual analysis required.

"A major competitive advantage of this software is its speed," he said. "It's especially desirable for sports – such as volleyball – where teams play games within 24-48 hours of other games and coaches need data quickly to make coaching decisions."

The students said one reason they chose to focus the software on volleyball was because of the start-stop nature of the sport.

"It is easier to implement the technology with a sport that has a definite start and a definite stop," Grinage said. "With volleyball, you start with a serve and end with a point awarded."

To test the accuracy of the software, the team members tagged the ball position in dozens of hours of Rice and club volleyball matches. In total, the students have tagged approximately 20 matches, ranging in length from 1.5 to 2 hours and filmed at 30 frames per second.

"To the best of our knowledge, it's the largest data set of volleyball tracking play segmentation in existence," Heggie said. "We've spent a good deal of time over the past year hand-tagging every single frame of video to show where the ball is at all times."

Grinage and Heggie began working on the project in summer 2017 after conducting research in the lab of Ashutosh Sabharwal, a professor of electrical and computer engineering. The students told Sabharwal that they wanted to focus on an idea they could turn into a startup company following graduation.

Initially, the students' plan focused on the extraction of highlights from youth sporting events. They planned to design a product for parents interested in cataloguing memories of their children.

"Our initial idea was focused more on capturing those great memories of kids having a good time, and keeping these moments for the future," Heggie said.

It was during their research to further develop this idea that the students learned about the popularity of club volleyball, a highly competitive and

profitable sport with a large market. They decided to slightly alter their idea and target it to individuals seeking analytics for coaching.

"The original idea involved knowing when certain events – such as when a ball was hit – took place during a game," Grinage said. "And that is very valuable information for people who coach competitive sports."

The team refined their business strategy skills this semester in a capstone project-based experiential learning course, the Lilie New Venture Challenge, taught by Hesam Panahi, a lecturer in entrepreneurship at Rice's Jones Graduate School of Business.

"For them (Cherrypick), it was really trying to get a sense of some of the components that they would have to put in a plan for actually launching the business," said Panahi, who is also a faculty member at the Rice Entrepreneurship Initiative and the Liu Idea Lab for Innovation and Entrepreneurship. "Part of that is getting a sense of some of the financials and understanding a little bit more about where to start in terms of the market."

The team won "Fan Favorite" in the H. Albert Napier Rice Launch Challenge and "Best Interdisciplinary Engineering Design Award" at Rice's George R. Brown Engineering Design Showcase.

In the future, Grinage and Heggie plan to expand the software to include other sports, including tennis and possibly baseball. They plan to work on Cherrypick full time following their graduation from Rice May 12. Gonzalez will also do some work for the startup.

"For right now, this makes the most sense because we're so young and haven't gone into industry," Heggie said. "It's easier to make a transition into this kind of lifestyle."

Grinage said he always imagined starting his own "something" but noted that a startup definitely involves hard work and a seemingly endless supply of dedication.

"I wasn't sure what the idea was or anything, but I knew I wanted to start a company of my own," he said. "However, it's definitely one thing to say you're going to start a company, and it's another thing to have the tenacity to be continually focused on one idea and pursue it."

More information: For more information, see oedk.rice.edu/Sys/PublicProfile/41440853/1063096

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