TU/e
iNNOVATION SPACE

Challenge name	Autonomous scoring system
Challenge owner	Silat Academy & Pro Silat
	X Company □ Research □ Student team
	Robert Brandt
Email challenge owner	
Phone challenge owner	
Preferred way to contact	□ email □ Phone call X SMS / what's app □ Other; …
Brief summary	Pencak Silat is traditional martial arts from Southeast Asia and has been listed as cultural heritage within UNESCO since 2019. Pencak Silat is a jury sport, the jury observes the score and enters it digitally or manually via a jury form. In the past, we saw that this is a very subjective and interpretable way of observing with results at championships often being questionable. The Silat Academy started the Pro Silat project in cooperation with Persekutuan Silat Melayu Netherlands to make the score measurable autonomically. The challenge is to come up with a way to do this.

About the challenge owner

I want to professionalize Silat as a sport through innovation. Silat is a jury sport and therefore interpretable, through the new method we want to make Silat as a sport measurable and therefore transparent. The challenge lies in the fact that a difference between a kick (2 points) and a punch (1 point) must be achieved on the scoreboard. The current situation is that jury members keep score digitally with a device they have to operate or manually with pen and paper. At the World Cup in Malaysia last July, matches were still judged with a jury. Through this new system, we want to make the competitions more reliable worldwide.

Challenge description

Counting points in a match of Silat is complex. Punches and kicks receive a different amount of points. Measuring impact in for example the body protector could work, but different types of kicks from people with different weights and ages would generate very different impact values.

Another approach could be by using smart cameras that detect movement and impact, and automatically translate that to the scoreboard. In other sports smart camera's are used (think about challenges in tennis or volleyball, or a video referee checking for offside in soccer). These systems however do not work in real-time, and given that Silat is a very fast sport, such a lack of real-time usage is unacceptable.

Yet another approach could be to create devices that the athletes connect to their hands and feet, allowing them to register impacts. This could potentially be connected with sensors in the body protector, to make sure we know that the impact is between the hand (or foot) and the body of the opponent.

Students are challenged to think outside the box and come up with a way to automatically register and count points during a Silat match. A couple of examples are presented above, but we can imagine that students have very different ideas that could work just as well.

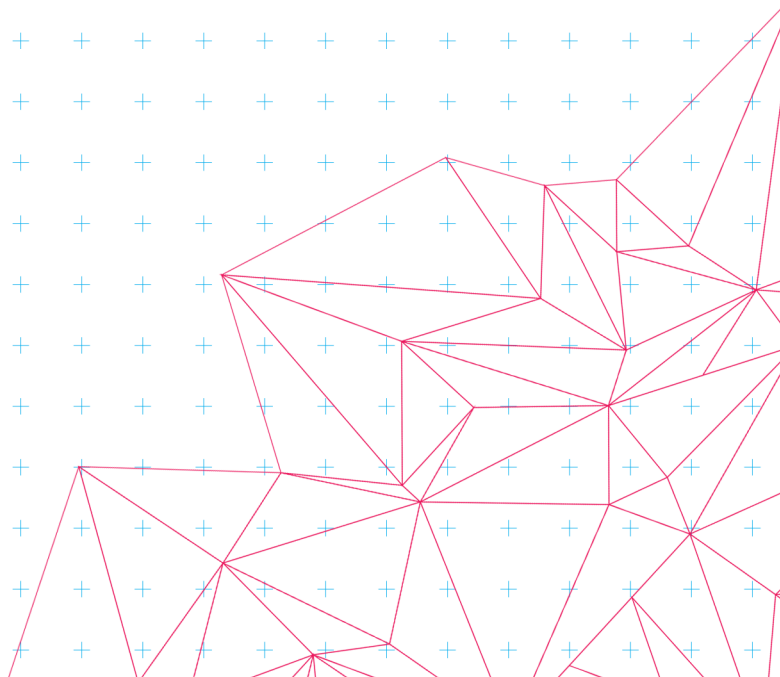
Input and involvement of challenge owner

As a gym owner and referee, I can provide the team with information regarding rules and regulations. Can show different armor and we can simulate matches on location. In our training room, we can organize national competitions so that the team itself can participate and gain experience within Silat as a competitive sport.

It means the sport will become reliable and transparent worldwide, a revolution within Silat as a sport

Resources

- Expertise; in the field of Silat as a competition sport
- We can provide a body protector for research;
- We have a workshop where we have tools and materials.;
- We have big network in Silat and ICT security



Roles of different disciplines (only for ISBEP)

Automotive Technology	
Biomedical Engineering	
Architecture, Urbanism and Building Sciences	
Computer Science and Engineering	When creating a network of sensing techniques, an IT environment needs to be created in which these data are shared between devices and analysed appropriately, before a score is changed on the scoring board.
Data Science	When using data from smart camera's, hundreds of variables can be tracked continuously. A data science student can work towards creating an understanding of what is happening in the match from these data, and translate that into relevant points counting.
Electrical Engineering	When developing sensing techniques that monitor the scoring during the game, control systems should be created that allow for the correct indication of points.
Industrial Design	Designing a well-fitting and working prototype of a sensor that can be incorporated in the athlete's outfit.
Medical Sciences and Technology	
Psychology and Technology	
Chemical Engineering and Chemistry	
Sustainable Innovation	
Industrial Engineering	
Applied Physics	Applying knowledge from minimal jerk patterns to the automated counting of points, be it through sensors at a distance or sensors that are placed on the body.
Applied Mathematics	When smart sensing systems are the direction the group takes, an AM student could create a way to translate information from sensors into information that is relevant for counting points. This includes calculations on which limb is where at which time, and using predictions that guide the automated scoring.
Mechanical Engineering	When working on a system with sensors that detect activity relevant for scoring, an ME student could be designing the sensors, mapping the output they generate, and translate that into usable information.