Introduction

Why

• Previous tools are hard to use
• Not effective for tactic

What

• A tool easy to use and understand;
• A model for tactics;

How

• A visualization tool;
• 2nd order Markov chain model;

The overview of the Tac-Simur system

Data processing
Model
Visualization

Problem formulation

• Navigation: locate data
• Explanation: support adjustments
• Explanation: provides a straightforward presentation

Model for simulation

$G_i = \{R_i^1, R_i^2, \ldots, R_i^n\}$ Simulate the stroke sequence

$R_i^j = \{S_i^j_1, S_i^j_2, \ldots, S_i^j_n, P_i^j\}$Expand the number of attributes used in stroke characterization to three

System design

Main view

Explanation view

The First-order VS the Second-order Markov Chain Model

- Inadequate Tactic Modeling
- Insufficient Stroke Characterization
- Expanded the number of attributes used in stroke characterization to three

The First-order VS the Second-order Markov Chain Model

Original model

New model

$R_i = \lambda_1 T_1 \lambda_2 - \lambda_2 T_2$

$R_i = \lambda_1 T_1 \lambda_2 - \lambda_2 T_2$

• The different phases in a rally are simulated by different Markov processes.

System evaluation

• Higher recall rates
• Higher precision

Table tennis match structure

Match

Stroke

Game

Tactic

Data

Stroke placement

- Position of the ball on the table
- Various placement of the ball (long, short, backhand, fronthand, jump)
- stroke (long, short, backhand, fronthand)

Stroke technique

- Techniques: various techniques (short, long, slice, drop, etc.)

Stroke position

- Stroke position: various positions in the rally (serve, receive, etc.)

Stroke path

- Stroke path: various paths in the rally (long, short, etc.)

Step 1:

Find pattern in tech view

Step 2:

Generate optimum strategy

Step 3:

Check explanation

Analysis summary

• What: data
• Table of strokes
• How: encode
• Color, spatial, node-link
• Bar, glyphs
• How: change animation

Let's watch a video showing system in action

https://www.youtube.com/watch?v=65cNe3Wd4U
Critique

Strengths:
• Provide a suitable model for the simulative analysis of table tennis;
• Design a user-friendly visualization tool.

Weaknesses:
• Fail to give proof why Markov chain is better than deep learning;
• Three features for strokes are not enough, should have the force of the stroke, rotation speed of the ball;
• The way to encode stroke position is not intuitive.

Thanks!