

# Chapter 4

## Playing Rock–Paper–Scissors Using AI Through OpenCV

**Narendra Kumar Rao Bangole**

*Mohan Babu University, India*

**S. Ranjana**

*Sai Ram Engineering College, Chennai, India*

### ABSTRACT

*Day-to-day life has become smarter and more intertwined with technology in the modern era. We can chat with AI chatbots, and we can play with AI machines. In many cases, AI machines are defeating human players. All age groups are likely to play these games. The computer gaming industry has found Artificial intelligence as a necessary element to make more entertaining and challenging games. This work involves the integration of rock-paper-scissors (RPS) game with artificial intelligence (AI) using OpenCV and MediaPipe. Through collaboration with designers and animators, the framework is designed to be computationally light while also entertaining and visually appealing. To evaluate kinematic hand data in Python, the basic gesture recognition pipeline employs a Leap motion device and two distinct machine learning architectures. This proposed system will provide a powerful application for future research into social human-machine interaction.*

### INTRODUCTION

Artificial intelligence (AI) embedded systems that can establish interaction between human-machine via voice, gestures, facial expressions, etc. are gaining popularity now. Using hands as an input is an appealing method for establishing natural Human Computer Interaction among the various interaction techniques. Hand gestures allow users to communicate more information in less time. As a result, in order to improve the interface between users and computers. Human-computer interaction (HCI) technology is widely used. To implement real time computer vision we can use OpenCV (Open Source Computer Vision Library). In the types of interaction between human-machine, it is one of the most researched and popular, because in this type of interaction machine itself train the machine to understand natural human language.

DOI: 10.4018/978-1-6684-9809-5.ch004

Rock- Paper- Scissors (RPS) is a game which is least studied but with a fascinating tactic which is decidedly not for the faint of heart. Its simplicity differentiates it from other well-known games although its influential underlying principles can be applicable in many aspects and have intriguing repercussions. The RPS game is a simple engagement of action and response which has long piqued the interest of researchers among various disciplines. In Sociology, to study the dynamic behavior of collaborative activities and In Biology, to study the evolution of ecosystems RPS patterns are used. And this RPS patterns also helpful in psychology to analyze the various gestures (Filho, 2018) that one can make and will help in revealing their patterns of making gestures in a play or will help in understanding human decision making. As discussed RPS is a game that exchanges information between an AI system and a human player and this provided the foundation for two most important studies in engineering and robotics. In Engineering, it is about the enhancement of basic technology and In Robotics, it is about its use in developing interaction between human and robots.

The following are the key principles to remember when playing Human-Human RPS:

- 1) Non-Randomness (Unpredictability)
- 2) Sansukumi

### **Non-Randomness (Unpredictability)**

As we all think RPS contains random making of gestures from one of three hand gestures, but that's wrong RPS does not contain any random movements. The next move is totally influenced by the opponent's actions. Because of this RPS is performed within a time constraint:

- If there is no time limit for playing RPS or played very slowly then the players will have enough time to make a random gesture or perhaps to analyze the movements of their own and their opponents. Both of these will lead to the same outcome that may be random moves or having equal chance to win.
- If the RPS is performed fast or in a rhythm, players will not get time to make random gestures or to analyze the opponent moves. Hence the triumph depends on one's ability to make quick decisions, understanding the moves that may lead to failure and assess opponent's conduct.

Players play the RPS game in various ways among various regions. But among all those there is a common thing, i.e., players will countdown or chant something or sets timer for some particular time. During 1990s in some parts of Japan, RPS was popularly played to gain money and the game play will be like choosing the best among three and it will be completed in 4 or 5 seconds.

### **Sansukumi**

Sansukumi is a Japanese term that refers to three opposing forces that keep each other in check. This phrase comes from China, although it first occurs in Japanese literature, where it has been related with both games and a range of enlightening philosophical concepts. The citizens obey the emperor's orders, the slaves obey the citizenry's directives, and the emperor fears that slaves may revolt against him, for example.

22 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:  
[www.igi-global.com/chapter/playing-rock-paper-scissors-using-ai-through-opencv/330486](http://www.igi-global.com/chapter/playing-rock-paper-scissors-using-ai-through-opencv/330486)

## Related Content

---

### Development of a Low-Power Consumption Monitoring System for Tension Stringing Construction

Yingdong Lai, Suijiang Mo, Zixin Li, Baoguo Liand Hongbing Wen (2026). *International Journal of Information System Modeling and Design* (pp. 1-16).

[www.irma-international.org/article/development-of-a-low-power-consumption-monitoring-system-for-tension-stringing-construction/401377](http://www.irma-international.org/article/development-of-a-low-power-consumption-monitoring-system-for-tension-stringing-construction/401377)

### Factors Affecting Successful Implementation of Smart Manufacturing Systems

Jaehyeon Junand Insu Cho (2022). *International Journal of Software Innovation* (pp. 1-18).

[www.irma-international.org/article/factors-affecting-successful-implementation-of-smart-manufacturing-systems/301569](http://www.irma-international.org/article/factors-affecting-successful-implementation-of-smart-manufacturing-systems/301569)

### Monitoring Buffer Overflow Attacks: A Perennial Task

Hossain Shahriarand Mohammad Zulkernine (2012). *Security-Aware Systems Applications and Software Development Methods* (pp. 130-151).

[www.irma-international.org/chapter/monitoring-buffer-overflow-attacks/65846](http://www.irma-international.org/chapter/monitoring-buffer-overflow-attacks/65846)

### A Comparative Study of the EUREQA Tool for End-User Development

Paul G. Austrem (2012). *International Journal of Information System Modeling and Design* (pp. 66-87).

[www.irma-international.org/article/comparative-study-eureqa-tool-end/67581](http://www.irma-international.org/article/comparative-study-eureqa-tool-end/67581)

### An Overview of Security Issues in Cognitive Radio Ad Hoc Networks

Noman Islam, Muhammad Furqan Ziaand Darakhshan Syed (2023). *Perspectives and Considerations on the Evolution of Smart Systems* (pp. 213-246).

[www.irma-international.org/chapter/an-overview-of-security-issues-in-cognitive-radio-ad-hoc-networks/327532](http://www.irma-international.org/chapter/an-overview-of-security-issues-in-cognitive-radio-ad-hoc-networks/327532)