

# FIT Shooting Machine Analysis

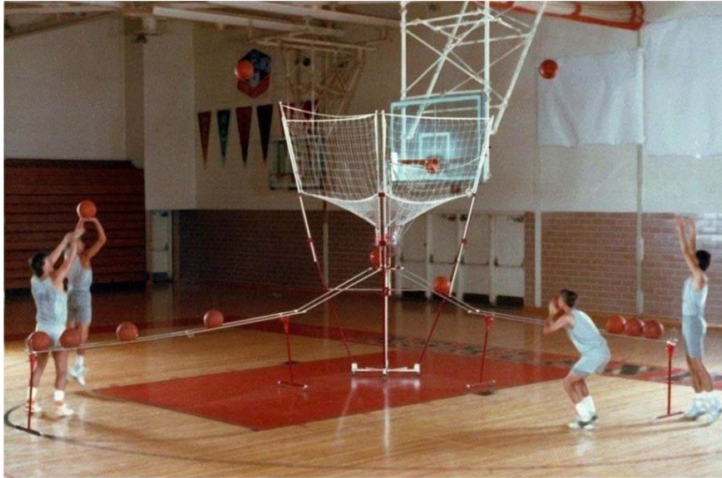
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# Background and Introduction

- History of shooting machine and motivations
- <https://www.youtube.com/watch?v=SpDcDpvmWLw>
- Computer Hardware progression over time
- Motivations for my choosing



The Original Shoot-A-Way in 1982

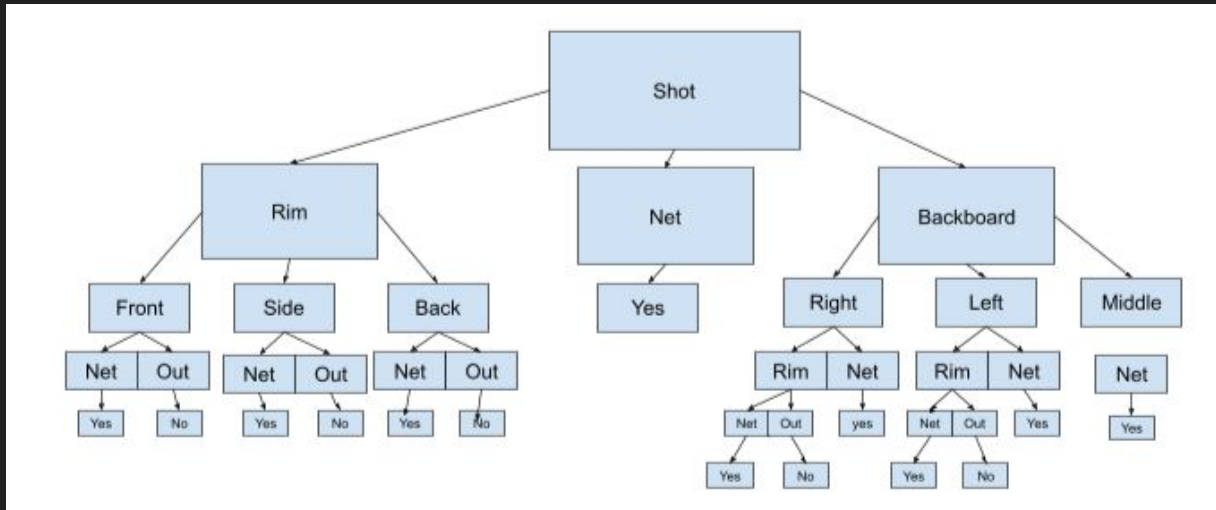


Coach John Calipari shown with the Original Shoot-A-Way at a Five-Star Basketball Camp in PA in 1985 (left), with The Gun 6000 at the University of Memphis in 2007 (middle) and most recently with The Gun 10K at the University of Kentucky in 2020 (right).

Shooting Machine Development and progression over time

# Technique

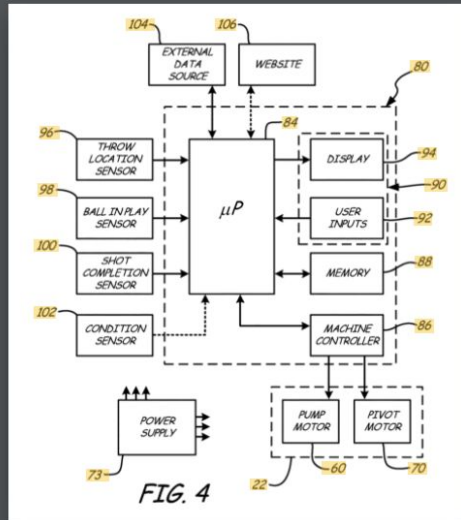
- Shoot - A - Way and Pattern Recognition
  - Classification methods
  - Image processing
  - Live versus Static Shooting



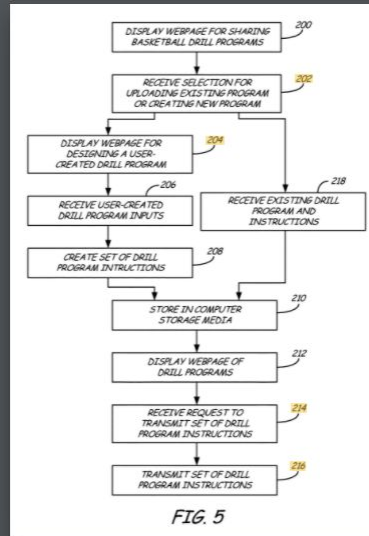
Shooting Machine Decision Tree Ideal

# Problem and Hypothesis

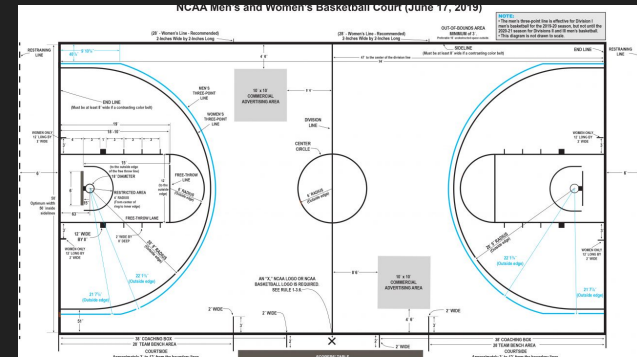
- Accuracy of Shoot-A-Way counter and processor
- Hypothesis I plan to conduct



Breakdown of shoot-a-way processor

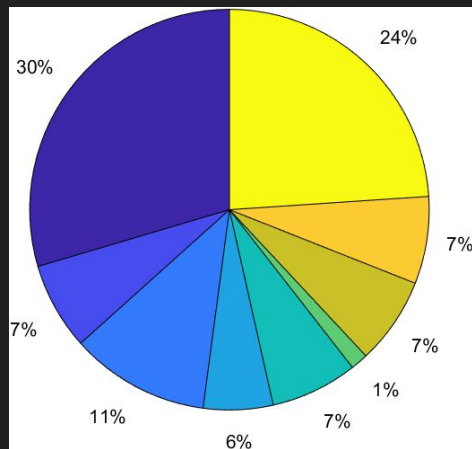


Breakdown of shoot-a-way display screens

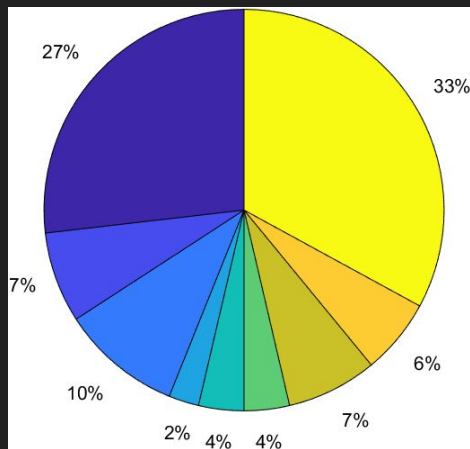


# Experimentation and Findings

- Experiment Conducted
- Findings
  - Internal Factors
  - External Factors
  - Surprising Findings



3 pt miscounted Shots



2 pt miscounted Shots

```
>> x = ShootingMachineError2pt
x =
10x10 table
      Shot_Location RC  RW  RE  RS  T  LS  LE  LW  LC
"Shot_Location" NaN NaN NaN NaN NaN NaN NaN NaN NaN
"" NaN NaN NaN NaN NaN NaN NaN NaN NaN
"Player 1" 4 0 1 0 0 0 1 1 3
"Player 2" 3 1 0 0 2 0 0 0 4
"Player 3" 1 1 1 0 0 1 0 1 5
"Player 4" 3 2 0 0 1 0 0 0 4
"Player 5" 2 1 0 1 0 0 0 1 2
"Player 6" 3 1 2 0 1 0 2 2 2
"Player 7" 1 0 2 1 0 1 1 0 4
"Player 8" 5 0 2 0 0 1 2 0 3

>> x = 3:10;
>> labels = {'RC','RW','RE','RS','T','LS','LE','LW','LC'};
>> pie(x,labels)
```

2 pt Individual player miscounted shots

```
>> X = ShootingMachineError3pt
X =
10x10 table
      Shot_Location RC  RW  RE  RS  T  LS  LE  LW  LC
"Shot_Location" NaN NaN NaN NaN NaN NaN NaN NaN NaN
"" NaN NaN NaN NaN NaN NaN NaN NaN NaN
"Player 1" 3 2 0 0 1 0 0 0 3
"Player 2" 1 1 1 0 0 1 0 1 1
"Player 3" 4 0 2 1 0 0 2 1 3
"Player 4" 3 1 0 0 2 0 0 0 2
"Player 5" 3 0 1 0 0 0 0 1 2
"Player 6" 2 1 0 1 0 0 0 1 2
"Player 7" 1 0 2 1 2 0 1 0 1
"Player 8" 4 0 2 1 0 0 2 1 3

>> labels = {'RC','RW','RE','RS','T','LS','LE','LW','LC'};
>> pie(X,labels)
```

3 pt individual player miscounted shots

# Replication and Acknowledgements

- Replication of Procedure
- Acknowledgements
- Conclusion
  - Overall Results
  - Questions

# References

- <https://www.shootaway.com/our-company/>
- <https://www.insidescience.org/news/artificial-intelligence-nba-basketball>
- <https://asp-eurasipjournals.springeropen.com/articles/10.1186/s13634-021-00731-9>
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- <https://medium.com/fuzz/machine-learning-classification-models-3040f71e2529>