**Application Of Neural Networks To Robot Animals**

**Final Project CS547**

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# Abstract

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# 1. Introduction

This paper rigorously establishes that neural network design models can be used to manipulate learning on simulated biological system. All the research was done using professor Thomas Caudell’s animal robot environmental model. ADDIN EN.CITE <EndNote><Cite><Author>Thomas Caudell</Author><DisplayText> (Caudell)</DisplayText><record><ref-type name="Generic">13</ref-type><contributors><authors><author>Thomas Caudell</author></authors></contributors><titles/><title>Flatworld</title><periodical/><dates><year></year><pub-dates/></dates></record></Cite></EndNote> (Caudell) The starting point of the research involved 3 architectures, used to establish the parameters of life with respect to the simulated organism and its environment. These provide a basis for analyzing the implemented neural network algorithms, the goal of which is to create a “neuron” based brain for the organism to live as long as possible in its environment, and determine what neuronal design structures degrade or enhance this attribute.

# 2. Approach

# 3. Results

### 3.1 Architecture 0: No movement, measure lifetime

Table 1: Over 200 runs, every run of a stationary robot had a lifespan of 5001 cycles

|  |  |  |
| --- | --- | --- |
| Number of Runs | Lifespan of Robot | Standard Deviation |
| 200 | 5001 cycles | 0 |

### 3.2 Architecture 1: Movement, measure lifetime as a function of speed



Figure 1: Shows the max speed of the robot to be 0.1

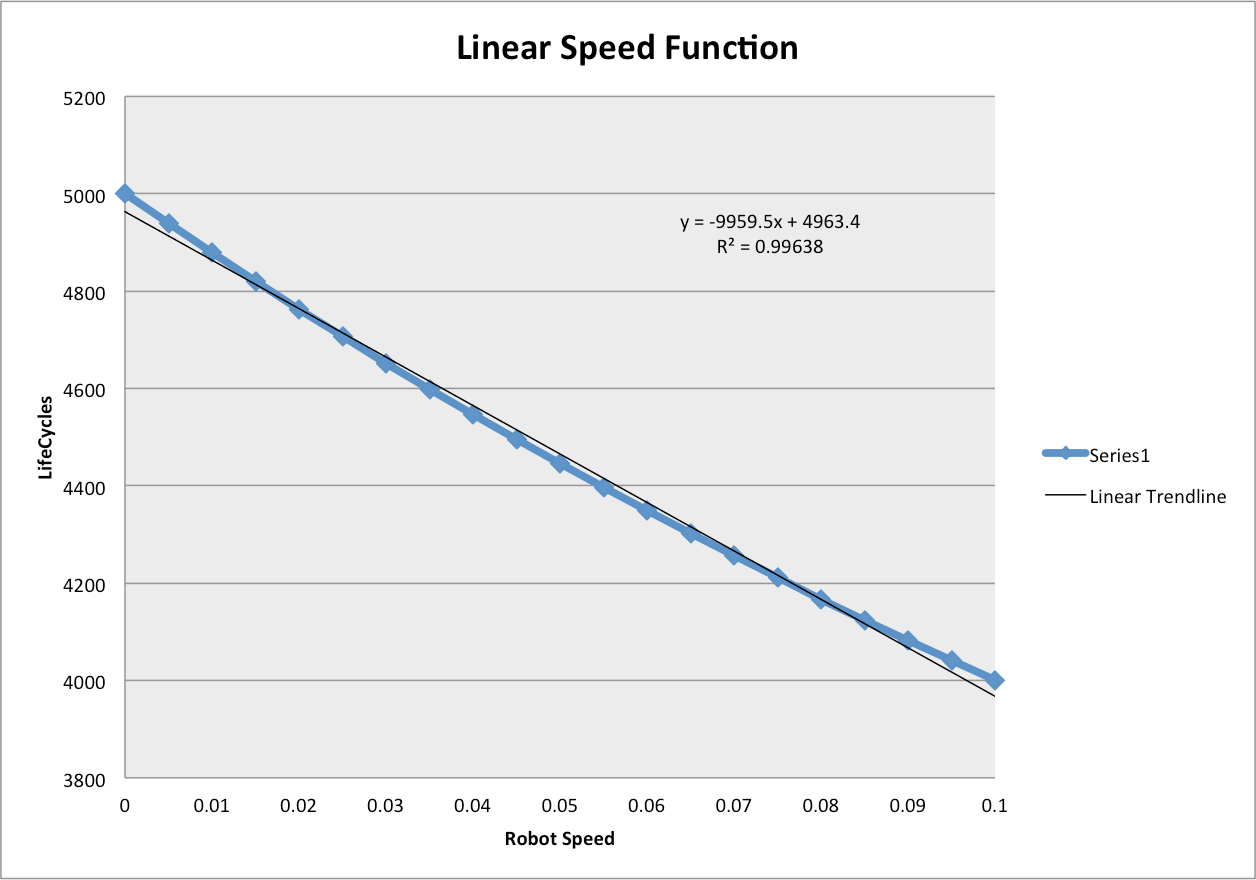


Figure 2: Linear function of the lifecycles with respect to the Robots speed. The standard deviation was 0.

# 4. Discussion

# 5. Summary and Conclusion

# 6. Acknowledgements

# 7. References

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Caudell, Thomas. "Flatworld."

# 8. Appendix A