Implement HTM Persistance

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*Abstract*—.

The Aim of this project is to create a system which trains the system and uses the data from the previously applied experiments. For the next time, the system will use the previous data. The persistence is designed as implementation of a custom serializer/deserilizer. The serializer saves the instance of some HTM module to the stream and deserializer is responsible to create the instance from the stream.

(*Abstract*)

Keywords—component, formatting, style, styling, insert (key words)

# Intro (*Heading 1*)

**Hierarchical temporal memory (HTM) is a biologically constrained machine intelligence technology developed by Numenta. Originally described in the 2004 book On Intelligence by Jeff Hawkins with Sandra Blakeslee, HTM is primarily used today for anomaly detection in streaming data. The technology is based on neuroscience and the physiology and interaction of pyramidal neurons in the neocortex of the mammalian (in particular, human) brain.**

The persistence is designed as implementation of a custom serializer/deserilizer. The serializer saves the instance of some HTM module to the stream and deserializer is responsible to create the instance from the stream.

**Serialization class used for serialization and deserialization of primitive types.**

# Methods

**1. Serializes the begin marker of the type.**

**2. Serialize the end marker of the type.**

**3. Serialize the property of type Int.**

**Read the property of type Int and return that integer.**

**4. Deserializes from text file to DistalDendrite and return DistalDendrite.**

**5. Serialize the property of type Double.**

**Read the property of type Double and return Double**

**6. Serialize the property of type String.**

**Read the property of type String and return string**

**7. Serialize the property of type Long.**

**Read the property of type Long and return long**

**8. Serialize the Bool.**

**Read the property of type Bool and return Bool.**

**9. Serialize the array of type Double**

**Read the array of type Double and return double**

**10. Serialize the array of type Int.**

**Read the array of type Int returns Int[].**

**11. Serialize and Deserialize the array of cells.**

**12. Deserializes from text file to Cell and return cells**

**13. Serialize the dictionary with key:string and value:int.**

**Read the dictionary with key:string and value:int and return Dictionary<String, int>**

**14. Serialize the dictionary with key:string and value:int[].**

**Read the dictionary with key:String and value:int[] and return Dictionary<String, int[]>.**

**15. Serialize the List of DistalDendrite.**

**Read the List of DistalDendrite and returns distal dendrite.**

**16. Serialize the List of Synapse.**

**Read the List of Synapse and returns List<Synapse>.**

**17. Serialize the List of Integers.**

**Read the List of Integers.**

**18. Serialize the Dictionary<Segment, List<Synapse>>.**

**19. Serialize the dictionary with key:int and value:Synapse.**

**Read the dictionary with key:int and value:Synapse return Dictionary<int, Synapse>.**

**20. Serialize the Concurrentdictionary with key:int and value:DistalDendrite.**

# Results

This Part of the text describes results of your works. There can only be mentioned references, MUST point back to Methods and Intro chapter. No more external references.

Code examples must be provided to demonstrate how to use the algorithm/module. Provide a reference to more unit tests, which show the same in more detail. Also provide all diagrams with comments and reference to unit tests, which generate diagrams.

# Discussion

Conclusion of your work should be precise and concise. How was the project, what is done, what is the result... There can be discussion on further work and direction.

# Ease of Use

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## Units

* Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as “3.5-inch disk drive”.
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may use the solidus ( / ), the exp function, or appropriate exponents. Italicize Roman symbols for quantities and variables, but not Greek symbols. Use a long dash rather than a hyphen for a minus sign. Punctuate equations with commas or periods when they are part of a sentence, as in:

*a**b* 

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## Some Common Mistakes

* The word “data” is plural, not singular.
* The subscript for the permeability of vacuum **0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter “o”.
* In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
* A graph within a graph is an “inset”, not an “insert”. The word alternatively is preferred to the word “alternately” (unless you really mean something that alternates).
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* Be aware of the different meanings of the homophones “affect” and “effect”, “complement” and “compliment”, “discreet” and “discrete”, “principal” and “principle”.
* Do not confuse “imply” and “infer”.
* The prefix “non” is not a word; it should be joined to the word it modifies, usually without a hyphen.
* There is no period after the “et” in the Latin abbreviation “et al.”.
* The abbreviation “i.e.” means “that is”, and the abbreviation “e.g.” means “for example”.

An excellent style manual for science writers is [7].

# Using the Template

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## Authors and Affiliations

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## Figures and Tables

For adding object other than text (tables, equations, graphs, figures, code…), **there must be at least one cross reference** to it. Figure 1 is an example

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1. Table Type Styles

| Table Head | Table Column Head | | |
| --- | --- | --- | --- |
| Table column subhead | Subhead | Subhead |
| copy | More table copya |  |  |

1. Sample of a Table footnote. (*Table footnote*)



Figure Example Figure Caption

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader. As an example, write the quantity “Magnetization”, or “Magnetization, M”, not just “M”. If including units in the label, present them within parentheses. Do not label axes only with units. In the example, write “Magnetization (A/m)” or “Magnetization {A[m(1)]}”, not just “A/m”. Do not label axes with a ratio of quantities and units. For example, write “Temperature (K)”, not “Temperature/K”.

## Code References:

Referencing Code in your text should be avoided unless necessary. In such cases it can be inserted as a listing as shown in **Error! Reference source not found.**

Listing Code Reference Example

Console.WriteLine(“Referencing code”, var);

// using tab can be replaced with 4 spaces

Do not pass code as image. When referring to variable in **Error! Reference source not found.**, italics should be used for example *var.* Code flows and logic should be presented better as Graph or Diagram instead of words.

Code Block which is too big to put in the textbox can be reference as Listing 2.

Listing Unit Test [EncodeDateTimeTest](https://github.com/ddobric/neocortexapi/blob/0348ffb99739ddf8c8c3a875f8162a18073938ca/source/UnitTestsProject/EncoderTests/DateTimeEncoderExperimentalTests.cs#L34-L49)

public void EncodeDateTimeTest(int w, double r, …)

{

…

DateTimeEncoderExperimental encoder = new…

var result = encoder.Encode(input);

…

Assert.IsTrue(result.SequenceEqual(expected…

}

##### Acknowledgment *(Heading 5)*

The preferred spelling of the word “acknowledgment” in America is without an “e” after the “g”. Avoid the stilted expression “one of us (R. B. G.) thanks ...”. Instead, try “R. B. G. thanks...”. Put sponsor acknowledgments in the unnumbered footnote on the first page.

##### References

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1. G. Eason, B. Noble, and I. N. Sneddon, “On certain integrals of Lipschitz-Hankel type involving products of Bessel functions,” Phil. Trans. Roy. Soc. London, vol. A247, pp. 529–551, April 1955. *(references)*
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7. M. Young, The Technical Writer’s Handbook. Mill Valley, CA: University Science, 1989.

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