Individual Reflection

Module: Knowledge Representation and Reasoning

4/17/2023

1.0 Introduction

The module, Knowledge representation and reasoning (KRR), is one of the core modules in the course Artificial Intelligence (AI). This reflection summarises my learning journey throughout this module.

2.0 Knowledge gained throughout this module

Definition of the terms and concepts: I have never before thought that deep about how humans learn new things. The different concepts in this module such as data, information, knowledge, and reasoning gave me a good insight of how our brain learns things and functions. And this concept simulated in machine to understand world was indeed interesting to learn.

Set language rules help to represent logic relationship and truth table help to resolve logic problems. Initially I thought set language and logic relations are applied to solve only mathematical and scientific problems. Through this module I witnessed that it could be applied to all reasoning problems, to build relationships between objects. I learned about first order logic and created logic statements with Prolog using quantifiers.

In addition to logical knowledge representation, I gained knowledge in semantic network representation. I further explored and learned about frame representation and production rules as well. I gained deep understanding of semantic network knowledge representation with ontologies using OWL language and had practical experience in knowledge modelling using protégé. I also learned about inferencing and reasoning using protégé software

3.0 Activities carried out

I carried out the following activities independently to acquire the knowledge detailed in section 2.0.

Reading: I read the relevant chapters in the core book listed in the module and reading list in each unit, which provided the basis of my learning.

Lecture casts: I actively listened to the lecture casts which were very useful in general understanding of principal points.

Seminars: I listened to Tutor-led seminars offline which were very beneficial in all aspects, especially, in the preparation of module assessments such as the case study review, modelling assignment and also this reflective writing.

Formative activities/ Seminar preparation activities: I independently performed these activities which provided me confidence in applying my knowledge to problems in a very practical way. I created logic statements using Prolog, ontologies using Protégé. Screenshots of activities performed attached in Appendix section. I also carried out Module assessment activities such as the case study review and the modelling assignment.

Tutorials: I watched several YouTube videos and read online study materials on knowledge representation topics such as logical reasoning, first order logic, semantic web ontology creation, natural language semantics, etc. (Knowledge Representation in AI, 2023) (Khemani, 2016)

Discussion with others: I had several discussions with work colleagues about application of knowledge representation in the field of radiation oncology and gave brief lectures about modelling ontologies.

4.0 My learning process and progress

Beginning of this module, I felt very nervous skimming through all the units and the modelling assignment. Being a beginner in computing field, I well prepared myself to put in hard work and good amount of time. I worked out a schedule to allocate time for learning and devised a learning plan for me with set targets and deadlines to meet and regularly reviewed it to overcome the challenges that I faced.

Time management was my biggest issue: at work, being in a healthcare job and at home, being mother of two young boys, I had to schedule my learning time mostly late nights and early mornings. With efficient time management and self-motivation, I carried on with my learning plan.

The initial units were relatively easier compared with later units on modelling. I was already exposed to the set theory and logical expressions since high school. I found the application of logic statements for reasoning real world problems with first order logic very interesting to learn.

Later, learning knowledge modelling with the tool Protégé was challenging, but made good progress within a week by working on several activities using the practical guide by Horridge (2011). Also the discussions and queries of my fellow students during seminars added to my learning progress.

Throughout this course, I grew my knowledge and skills through self-led learning process as described by Hooshyar et al. (2020). I made written notes during all learning activities and managed my thoughts during quite times to build a expressive picture of all units that I learned, evaluated myself on my capability to use them fluently and assessed my learning routinely (Deakin Crick, 2007).

Another area to improve was my critical writing skills and I devised a plan to improve my thinking skills such as analysing and evaluating as described in Bloom's taxonomy developed by Benjamin Bloom (Colorado College, n.d.).

Overall, I my learning experience was very positive. As I progressed through each unit and carried out the learning activities, my confidence increased which in turn increased my interest on the subsequent activities.

And here I go, already found a scope for developing ontology for radiotherapy physics and an existing ontology, to start on.

5.0 Conclusion

In my learning journey, initially had only 'information' about knowledge representation and reasoning and towards end of this module, but now can confidently say, had acquired 'knowledge' about it.

6.0 References

Colorado College (n.d.) Bloom's Revised Taxonomy. Available at: https://www.coloradocollege.edu/other/assessment/how-to-assess-learning/learning-outcomes/blooms-revised-taxonomy.html [Accessed: 17 April, 2022].

Deakin Crick, R. (2007) Learning how to learn: the dynamic assessment of learning power. The Curriculum Journal 18(2): 135-153. DOI: https://doi.org/10.1080/09585170701445947

Hooshyar, D., Pedaste, M, Saks, K., Leijen, A., Bardone, E., Wang, M. (2020) Open learner models in supporting self-regulated learning in higher education: A

systematic literature review. Computers & Education 154(9): DOI: https://doi.org/10.1016/j.compedu.2020.103878.

Horridge, M. (2011) A Practical Guide To Building OWL Ontologies, Using Protégé 4 and CO-ODE Tools. Manchester: University of Manchester.

Khemani, D. (2016, January 12). *Artificial Intelligence: Knowledge Representation and Reasoning* [Video]. YouTube. https://youtu.be/cckckL3uOW8

Knowledge Representation in AI (2023) Available from: https://www.javatpoint.com/knowledge-representation-in-ai [Accessed 17 April 2023]

7.0 Appendix: Evidence of activities done

Kindly refer attached PDF document