2025-10-24 Work on formal specification of graph execution semantics

Participants

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Agenda

- Review of the first (;-)) draft of the informal specification of an ONNX graph

Minutes

- Add a note to explain that
  - We know that our input model will be strongly massaged by the ML implementation frameworks: some nodes may be added (for instance to improve the "symmetry" of processing and prevent "side attacks"), some nodes may be suppressed (for optimization")
    - (Add bibliographical references)
  - We are not considering this aspect: it will be up to the model developer to demonstrate traceability to the SONNX model (which is the spec).
- Add directly the constrainst on the absence of cycles (ACG), even though it may already be implied by the SSA constrainst.
- Add references to the ONNX documentation.
- Suppress the reference to tensor id (off-meeting)
- Check if the "1 to 1" correspondance rule between computation nodes and operators is necessary (I guess it is!!!)
- Complete the description of function nodes. Check if it is necessary to specify them in the graph specification...
- **The constraint stating that all computation node outputs must be used is too strong**. For instance, the indexes output of **maxpool** (max, indexes...) is usually not used. Replace with a relaxed version stating that at least one output must be used (to prevent useless computation nodes).
- Long discussion about RNGs
  - The semantics of ONNX must be checked and clarified.
  - (If required) Add a note to indicate that the fucntional semantics may bnot be satisfied by RNGs
- Concerning control flow operators
  - Proposition of an "unrolling" semantics whihc presents the advantage of being "static" (it doesn't really care about what actually happens at runtime). Another possibility would be to "define" the graph at the time it is executed (at runtime) .
  - If we stick to the "unrolling semantics", we have to
    - correct the rule stating that all nodes must be executed (because it might be the case that some nodes are never executed if the loop ends before the max number of iterations). This is also the case for the **if** operator.
    - define how to select the output tensors (basically, if the loop iterates *n* times instead of the *N* max iteration, then we have to select the *n*th instance of the tensor of the unrolled version)
  - Check if the **lstm** of other types of reccurrent operator use control flow nodes.

> ⓘ **Note that neither RNGs nor control flow operators are part of the current SONNX set!**
>
> We propose to clarify our understanding and complete the informal specification if the effort is reasonable. Otherwise, we may simply stick to the semantics applicable to our operator subset.

- [ ] Correct and complete the graph spec and inform the participants for review `project` SONXX 2025-11-18