Labeling User Interface

In this section, we show the user interface that was used by the labelers to author the semantic parses for each question. The UI is rendered in a Web browser, making it easy to share and recruit others to the labeling task.

Question without Constraints

In this section, we show the labeling interface for the question "what kind of currency does Greece have?". Below is the screen the user sees:
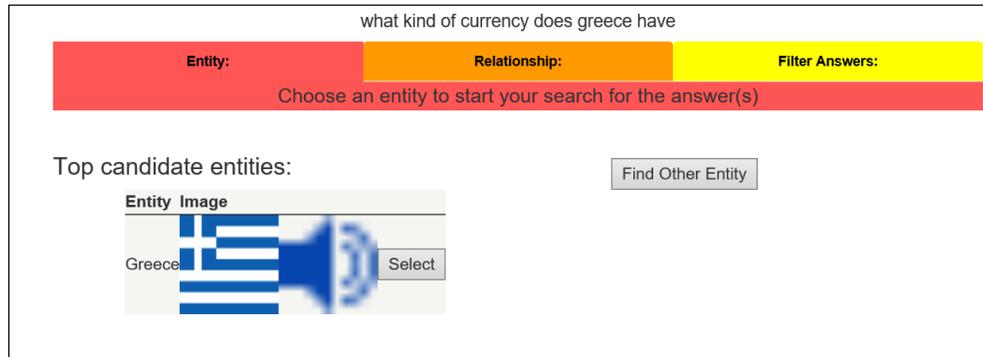
The labeling process is divided into three steps: (1) select the primary entity for this question, from which we can follow relations to get to the answer, (2) select the chain of relations to lead from the primary entity to the answer set, and (3) restrict the answer set by adding constraints or ordering. These three steps correspond to the three tabs on the top of the interface, which the user can use to move back through the steps if they need to be revisited. That is, if the user selects an entity and then decides a different entity needs to be selected, the user can click on the first tab to get back to this screen.

On the first tab, the tool shows highly-confident entities based on an entity linking system. If the desired entity is not one of these, the user can click "Find Other Entity" and select the piece of text in the question to search for additional relevant entities. In this case, the selected entity is the right one, so the user clicks "Select" next to Greece, and is presented with the next tab:

On this tab, we show all of the Freebase relations that follow from the selected entity (Greece), along with the associated values (or entity names, when the relation connects to another entity). We found from initial

experiments that presenting the values provided significant value to helping the user choose the right relation, vs. only showing the relation names. Each relation here corresponds to a specific freebase relation; for example, "Currency Used" is actually *location.country.currency_used*, but we hide all but the final name of the relation from the user. The relations are ordered by a system that tries to guess the most relevant relation for the question. Many questions are answered by traversing through a Freebase CVT node (anonymous nodes used to reify multi-argument relations), which we present in tabular format. In the above example, "Minimum Wage" is a relationship to CVT nodes containing currency, amount, frequency, etc. Clicking on any relation selects it as the primary relation for this question. Here, the user has clicked "Currency Used" and is then presented with the third tab:

On the top of the panel are two tables: on the left is the answer set that the current parse would return, on the right are additional filters or constraints selected by the user. Below these two are properties that may be used to filter the answer set. Clicking on any value adds a constraint that an answer must have that value with the associated relation. The list of constraints is ordered by a system that looks for word overlap between the relations, values, and terms in the question. If the primary relation was to a CVT node, then the other relations of that node are also listed as possible constraints (i.e., if the user had selected "minimum wage, amount" on tab 2, then on this tab they would see currency, frequency, date, etc. as possible relations to filter on).

On each tab the user may indicate a labeling issue, such as when no appropriate entity could be found, no useful relation is found, or the user was unable to find a useful constraint to answer the question. Additionally, the user can leave a comment regarding the labeling.

Question with Constraints

As an example of when constraints are needed, consider the question "what is the name of Justin Bieber brother". The first two tabs are similar to the above, with the user selecting the entity "Justin Bieber", and the relation "siblings". On the third tab, the user must indicate that the correct answer set contains siblings who have gender of "male":

Clicking on "Male" adds this constraint to the set of answer filters, and then filters other answer values appropriately, in case the user needs to add more constraints (which are considered to be conjunctive):

Note also that for dates or numerical values, we allow the user to select the minimum or maximum. For example, if the user could have clicked "(max)" for "Date Of Birth" to answer the question "what is the name of Justin Bieber's youngest sibling", or both to answer "what is the name of Justin Bieber's youngest brother".