# Model Commonsense Reasoning Bahasa Indonesia dengan Pendekatan Intermediate Task, Cross-lingual Transfer Learning, dan Task Recasting = Indonesian Commonsense Reasoning Model Using Intermediate Task, Cross-lingual Transfer Learning, and Task Recasting Approach

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Abstrak

Model natural language processing (NLP) ditantang tidak hanya memiliki kemampuan “mengingat” secara statistik, tapi juga dapat melakukan semantic reasoning mendekati kemampuan manusia dalam memahami bahasa. Tugas ini disebut juga sebagai tugas yang menguji penalaran (commonsense reasoning) untuk suatu model. Tugas commonsense reasoning pada bahasa Indonesia sudah ada, tetapi performa mesin pada tugas tersebut masih terbilang rendah. Penelitian ini mencoba meningkatkan performa mesin dalam tugas commonsense reasoning bahasa Indonesia. Digunakan tiga buah metode, yaitu intermediate-task transfer learning, cross-lingual transfer learning, dan task recasting. Ditemukan kalau intermediate-task transfer learning efektif dilakukan untuk data commonsense reasoning bahasa Indonesia, dengan peningkatan performa di berbagai tugas. Metode cross-lingual transfer learning juga ditemukan sangat efektif dilakukan. Didapatkan performa yang melebihi baseline pada tugas IndoGrad hanya dengan melatih model dalam data bahasa Inggris dan melakukan klasifikasi secara zero-shot pada data bahasa Indonesia. Lalu didapatkan juga performa state-of-the-art (SOTA) baru dalam IndoGrad yaitu 0.803, naik 0.116 dari performa tertinggi penelitian sebelumnya. Performa tersebut dicapai menggunakan model yang dilakukan fine-tuning pada data bahasa Indonesia setelah dilatih dengan data bahasa Inggris. Pada metode task recasting, performa model masih rendah dan didapatkan performa chance pada data uji. Dilakukan juga penjelasan terhadap model dalam menjawab tugas commonsense reasoning bahasa Indonesia. Penjelasan dilakukan dengan visualisasi attention dan probing task. Ditemukan model mendapatkan kenaikan performa dalam probing task ketika performa pada tugas commonsense reasoning juga naik. Ditemukan juga model dapat menjawab dengan benar dengan memberikan attention yang lebih besar ke pada jawaban yang benar dan mengurangi attention pada jawaban yang salah.

.....A natural language processing (NLP) model is challenged to not only ’remember’ statistically, but can also perform semantic reasoning close to human ability on language understanding. This task is also known as a commonsense reasoning task. Commonsense reasoning tasks in Indonesian already exist, but the machine performance is still relatively low. This research aims to improve the machine performance on commonsense reasoning tasks in Indonesian. Three methods are used: intermediate-task transfer learning, cross-lingual transfer learning, and task recasting. It was found that intermediate-task transfer learning was effective for commonsense reasoning tasks in Indonesian, with improved performance on various tasks. Cross-lingual transfer learning was also found to be very effective. A model that only trained on English data and performs zero-shot classification was found to have performance that exceeds baseline on the IndoGrad task. A new state-of-the-art (SOTA) performance was also achieved on the IndoGrad task, which is 0.803, up 0.116 from the highest performance in the previous study. This result is achieved using a model that was fine-tuned on Indonesian data after being trained on English data. On the task recasting method, the model performance is still low and chance performance is achieved on the test set. Model explanation on

answering a commonsense reasoning task in Indonesian is also conducted. Probing task and attention visualization are used for model explanation. It was found that the model that got increased performance on probing task also got increased performance on commonsense reasoning task. It was also found that the model can answer correctly by giving more attention to the correct answer and reducing attention to the incorrect answer.