Towards a Brighter Future for Cross-Disciplinary ASR

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In light of the wide diversity of backgrounds and high levels of specialized expertise which participants are bringing to this Bielefeld Workshop on Developmental Speech Recognition, it is germane for me, as more of a generalist, to contribute a "big picture" talk to the workshop – addressing some of the broad issues which impact us as we look at a paradigm shift from the automatic speech recognition (ASR) methodology which has emerged as standard over the last 25 years to a new methodology more fully informed by our knowledge of human developmental patterns (especially in the linguistic domain).

More specifically, this talk will begin with a brief examination of the historical disconnect between, on the one hand, the sciences of human language and language development (linguistics / psychology) and, on the other, the fields that have primarily been responsible for language technology development (electrical engineering / computer science). Then, informed by that often less than felicitous historical cross-disciplinary collaboration, I will begin a survey some of the potential upsides to improved knowledge sharing and begin to lay out the global characteristics of and constraints on "developmental speech recognition", where that is understood to mean the acquisition of human-like ability to speak with humans via a learning paradigm which reflects our knowledge of child language acquisition. And, finally, I will sketch a strawman emergent learning framework to illustrate one way in which we might undertake the developmental speech recognition research program.

I am under no illusion that this talk will comprehensively survey the broad set of issues, nor, of course, provide all of the necessary insights and answers. The talk, rather, has three goals: (1) to back-fill the context a bit for those who are coming to the workshop from disciplines other than human language learning; (2) to make some observations and pose some of the relevant larger questions in order to help shift focus away from the pressing immediate issues of specialized sub-disciplines towards the over-arching issues of initiating a different ASR paradigm; and, most importantly, (3) to seed and stimulate discussion and elaboration (and refutation) by workshop participants with respect to the limitations of the current, standard ASR paradigm and the ways in which a new developmental ASR paradigm will be different.